

UNIVERSITY OF CAPE COAST

INCOME CONVERGENCE IN THE ECOWAS REGION

BY

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Name: Emmanuel Amoateng

Signature Date.....

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

The incidence of cross-country per capita income convergence has been debated for long by economists; all in the attempt to either validate or reject the per capita income convergence hypothesis as predicted by the Human capital - augmented Solow model (HC-ASM). However, researchers seem to have given little attention to the Economic Community of West African State (ECOWAS) region in this ongoing discourse despite the wide per capita income disparity gap in the region.

Using panel dataset from 1975 to 2012 on 15 ECOWAS member states, the study examined the convergence hypothesis by employing panel Generalized Method of Moments (GMM). The study established per capita income divergence among the countries in the ECOWAS region, however the study established per capita income convergence among the West African Economic and Monetary Union (WAEMU) sub-group. These findings are in complete disagreement with the prediction of the HC-ASM and further suggest that regardless of the presence of Savings, physical capital stock and government expenditure, per capita income disparity gap among countries in the ECOWAS region tends to widen.

The study recommend that, poorer countries in ECOWAS should urgently pursue pragmatic policies to increase domestic savings and Gross physical capital formation accumulation and subsequently make efficient utilization of these resources to reduce the per capita income gap since both were found to positively impact on per capita income growth in the ECOWAS region.

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DEDICATION

To my lovely wife Sharon Akosua Amoateng

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LIST OF ACRONYMS

ADB	Africa Development Bank
ADF	Augmented Dickey-Fuller
AERC	African Economic Research Consortium
CPI	Consumer Price Index
ECA	Economic Commission of Africa
ECOWAS	Economic Community of West African State
EMU	European Monetary Union
EU	European Union
FCCD	Fund for Cooperation, Compensation and Development
FDI	Foreign Direct Investment
FTA	Free Trade Areas
GDP	Gross Domestic Product
IGO	Inter Governmental Organizations
IMF	International Monetary Fund
ISI	Import Substitution Industrialisation
MERCOSUR	Mercado Comum del Sur
MRU	Manu River Union
OPEC	Organization of the Petroleum Exporting Countries
OPEN	Trade Openness
PPP	Purchasing Power Parity
RGDP	Real Gross Domestic Product
RIA	Regional Integrated Area
SAP	Structural Adjustment Programme

SSA	Sub Saharan Africa
TFP	Total Factor Productivity
TLS	Trade Liberalisation Scheme
WACH	West African Clearing House
WAEMU	West African Economic and Monetary Union
WAMA	West African Monetary Agency
WDI	World Development Indicator

CHAPTER ONE

INTRODUCTION

Background of the Study

The purposes of regional integration in Africa are to promote political and economic cooperation. The Economic Commission of Africa (ECA) in its seminal works assessing regional integration in Africa identified the various objectives driving African countries to join regional economic communities (RECs) within the continent (ECA, 2006). While these objectives are varied from country to country, and the weight ascribed to each also being variable across countries, the growth goal was key to each REC member. Thus, the desire to generate income growth dynamics through integration is not only common across the countries, but also the weight prescribed to it tends to be significant (Barro and Sala-i-Martin, 1995).

It is therefore not surprising that theoretical and empirical discourses present regional integration as a possible catalyst for income convergence. The idea of catch-up, which has been widely studied, presumes that cooperation that takes place between states in a regional integration framework would enable poor countries to reach the level of incomes already attained by the richer countries that they are cooperating with. Europe is a good example and a realistic case study of how this cooperation in a regional integration framework has enabled once poor European states to become developed economies. The recent enlargement to reach 28 EU member countries and the

clamor by new potential members was informed by the rapid growth experienced by countries such as Spain.

The traditional neoclassical model of growth which was developed by Solow (1956) and was subsequently refined by Mankiw, Romer and Weil (1992), has guided a number of empirical studies on income convergence. One of the central implications of the basic neoclassical growth model is the notion of economic convergence according to which, poor countries tend to grow faster than rich countries. Adopting a Cobb-Douglas production function in which output depends essentially on stock of physical capital and the amount of effective labour, Solow (1956) predicted that in a country's transition to its long run steady state level, initial per capita income is inversely related to subsequent growth in per capita income. In simpler terms, (rich) countries with higher initial per capita income would grow quite slowly compared to (poor) countries with smaller initial per capita income, so that in the long run both groups of countries will converge to identical per capita income level. Thus, there would be per capita income convergence between richer and poorer countries. This prediction was made by Solow under the assumptions of constant returns to output, diminishing returns to inputs, and a closed economy without government activities, among others.

Paola (2010) argued that, although economic convergence is not a recent topic, it is crucial in economics because it is important for economists, to assess whether countries with lower income levels are catching up with countries with higher income levels and also to evaluate whether the differences in incomes across countries tend to decrease or increase with the passage of time. Cavazos (2001) also asserted that, that the issue of economic

convergence or divergence is very important from economic policy point of view. The recognition of income disparities between economies, the forces that trigger the disparities and potential disappearance or otherwise of these income disparities can help countries to formulate policies aimed at speeding up the process of economic development.

The existence of poverty and wide per capita income gaps among countries in SSA remains a subject of concern and owing to the notion that cross-country convergence implies the elimination of cross-country per capita income disparities; the study of cross-country convergence has become a highly popular research area in contemporary development agenda. Also, Baier and Bergstrand (2001) argued that, per capita income convergence is another essential catalyst for intra-regional trade. This implies that, to eliminate income inequality and to subsequently promote trade among SSA countries, there is the need to investigate thoroughly into the per capita income convergence hypothesis.

Even though, in their seminal papers, both Romer (1986) and Lucas (1988) cited the lack of observed cross-country income convergence as evidence against the neoclassical growth model and in favour of their theories of endogenous growth models, some cross – country studies such as Mankiw, et al, (1992), Barro and Sala-i-Martin (1995), Sala-i-Martin (2002) and Islam (2003) have found a negative relationship between initial per capita income and subsequent growth in per capita income after some variables that affect per capita income growth have been controlled for. In other words, these studies found conditional convergence which is the prediction of the

neoclassical growth model of Solow (1956) and the human-capital augmented Solow model of Mankiw et al (1992).

The ECOWAS region has been increasingly urged to expand its openness to international trade by reducing tariff and non-tariff barriers, and instituting an array of other liberalization programs (Morris, 2008). Yet, after several years of policy changes and attempts to integrate the region into the world markets through increased trade openness, many countries of the region are still showing meager progress in terms of achieving high income growth (World Bank, 2011).

Sub-Saharan Africa is characterized by low economic growth (Cinyabuguma & Putterman, 2010; Sachs & Warner, 1997). The economic performance of most Sub-Saharan Africa (SSA) countries has been low compared to other developing countries, especially the East and South-East Asian countries. East Asian economies have produced high growth rates, allegedly as a result of their greater openness to international trade (Morris, 2008). The average GDP growth rate for SSA countries was only 2.9% for the period 1990-2012, compared to 7.8% for East and South-East Asian countries (World Bank, 2012).

Several explanations have been provided for this poor economic performance. Among them are the fact that Africa is badly affected by low density, long distances and deep divisions (World Bank, 2008). Kamau (2010) also attributed this dismal performance to a number of factors, such as the inability of most African countries to secure access to larger markets, inherent high trade costs among neighbours, and lack of an effective framework for regional cooperation and resource pooling. Collier (2006) asserts that

agglomeration economies in sub-Saharan Africa are less important than those prevailing in Asia and in OECD countries. Because countries in the region are too small and not integrated enough, many African cities tend to be too small compared to the optimum. As shown by Au and Henderson (2006) for the case of Asia, this may have serious impacts in terms of foregone growth. Research on agglomeration economies and international competitiveness further suggests that late-comers to industrialization, such as Africa's natural resource exporters, face a competitive disadvantage linked to the spatial distribution of the global industry (Page, 2008).

Sub-Saharan Africa appears as fragmented and poorly integrated. Intra-regional trade in the region is fairly low comparatively to what is noticed in other areas. Therefore, increasing economic integration in the region appears as one of the best way to foster economic growth. It may help Sub-Saharan Africa achieve greater economies of scale, widen markets, enhance industrial efficiency, and reduce the sub-region's external dependency and vulnerability of its economy (Jones, 2002). The other benefits that may be expected from an increased regional integration are the following: a greater bargaining power vis-à-vis the outside world; the minimization of duplication, thin spreading of resources and wasteful competition; a cheaper and more efficient transportation system; greater division of labor and specialization in production; greater prospects for technological advances and innovation; expansion of trade, incomes and employment due to free movement of goods, services, labor and capital, (Jones, 2002).

The analysis of regional economic convergence in Africa raises questions about the effectiveness and impact of domestic institutions and

policies in long-term growth. Parts of the integration theory assume that the formation of regional integration areas (RIA) promotes the increase of welfare as well as the catching up to regional economic leaders. At the same time it would stimulate the seemingly unrelated solving of trans-national problems, like environmental and energy problems, the reduction of extreme poverty (like the “pact of convergence, stability, growth and solidarity” of WAEMU). It might also support the extension of bargaining power at multilateral level for developing countries, stability and peace (Limao, 2007).

The integration of West Africa is made up of 15 countries and is being led by the Economic Community of West African States (ECOWAS) which was created on 28th May, 1975, with the signing of the Treaty of Lagos, its main mission is to promote economic cooperation and regional integration. Overall, although ECOWAS has adopted protocols and policies for sustained integration, regional integration has progressed slowly (ADB /ADF, 2013).

Statement of the problem

Partly in contrast to the neoclassical growth theory, the new integration and new economic geography theory suggest explanatory models which implicate that, at least in the short and medium term there is income divergence in regional integration areas (Baldwin, Martin & Ottaviano, 2001; Krugman, 1991; Scott, 2006). Krugman (1991) shows that economic integration processes induce agglomeration especially if at the initial state the industrial development (and thus industrial centers) is unequally distributed. The liberalization coming along with the regional integration then leads to a further concentration of economic activities (Krugman & Venables, 1996).

Relevant parameters for the agglomeration tendencies in these economic geography models are increasing returns to scale in the industrial sector, decreasing transport costs over time, and boosting urban centripetal forces (localization economies). According to Goodfriend and McDermott (1998), the key factor of convergence processes is the openness to foreign ideas and technologies. Consequently, a closed regionalism between developing countries must cause divergence due to the lack of new technology and ability of innovation. Giannetti (2002) added that the intensified knowledge spill over in integration areas entails the risk of income divergence as different economic areas do not benefit uniformly from the knowledge exchange, in particular low developed agricultural areas. Finally, Venables (2003) argued with the theory of comparative price advantages, his study exhibited income divergence for integration agreements among low-income countries owing to concentration processes of the manufacturing industry into countries with intermediate comparative advantage.

Several regional integration arrangements have been elaborated in Sub-Saharan Africa. In West Africa alone there are more than 30 regional integration treaties (McCarthy, 2002). Yet, Sub-Saharan Africa is still noted for its lack of success with this instrument of trade policy. Several constraints may undermine the success of those regional integration arrangements. One of the greatest difficulties encountered in integrating countries of Sub-Saharan Africa may be due to the fact that much of regional integration in Africa arose from a political agenda rather than from an economic agenda (McCarthy, 2002).

Another concern with Sub-Saharan Africa regional integration process is that it is mimicking European Union. This raises the question, whether African countries would not gain by following a process that is more in line with the specific nature of their economies, instead of trying to copy the exact model of the Maastricht Treaty (Dramani, 2010). The European model of economic integration seems to focus on price stability rather than economic growth and employment (Maleleka, 2007; Pesaran, 2007). It is based on policy convergence. Therefore, its success required a close homogeneity of the economies involved. Because of the structurally diverse economies, the level of policy convergence at the ECOWAS level does not appear to be as convincing as the European Monetary Union (EMU).

Another constraint is that in Sub-Saharan Africa trade is also affected by lack of diversification. Exports of Sub-Saharan Africa countries are characterized by a high concentration on similar primary commodities and lack of value added, as well as the exclusion of informal sector trade. Only few countries have the benefit of diversified exports, like South Africa which overwhelmingly dominates intra-regional trade. According to McCarthy (2002), these constraints are so powerful that African aspiration towards economic integration appears as an illusion. One way to check whether African economic communities are successful in achieving economic integration is testing empirically if African countries are converging.

Standard international trade theory based on the neo-classical growth models predict that the lifting of barriers to trade and the free movement of factors of production across countries in a regional bloc such as ECOWAS, would not only enhance the general economic welfare of the integrating area

as a whole, but would also cause income per capita to converge among its member countries (Martin, 2001). As stated earlier, this assertion has however been challenged by recent growth theories. These theories postulate that under certain circumstances differences in production technologies, increasing returns to scale, positive agglomeration externalities and transport cost in countries in a particular group may lead to an increasingly uneven spatial distribution of economic welfare (Barro, 1997). However there is widespread agreement that the integration of Europe has led to substantial economic benefits for the European Union as a whole (Martin, 2001). Therefore it is imperative to investigate if integration of West African countries has led to substantial economic benefits (measured by real convergence) for the whole region to suppress lingering worries about the possibility that integration would lead to divergence between countries as propagated by new growth theories.

Despite these enormous researches on income convergence, researchers seem to have given little attention to SSA especially West Africa in this discourse. Relatively few studies have been conducted to examine whether the per capita income disparity among SSA countries has been disappearing (Jones, 2002 and Kumo, 2011).

Objectives of the Study

The study sought to test for the existence of real convergence among ECOWAS member countries. The specific objectives of the study were to:

1. Assess if countries with low initial per capita incomes are growing faster than those with high initial per capita incomes.

2. Establish if the dispersion of real per capita income across Ecowas member states tends to fall over time.
3. Estimate the number of years it would take for the per capita income disparity among ECOWAS countries to disappear if convergence hypothesis holds.

Hypotheses of the study

1. H_0 : countries with low initial per capita incomes do not grow faster than those with high initial per capita incomes.
 H_1 : countries with low initial per capita incomes grow faster than those with high initial per capita incomes.
2. H_0 : The dispersion of real per capita income across member economies does not fall over time
 H_1 : The dispersion of real per capita income across member economies tends to fall over time

Significance of the Study

Nearly two decades have passed since African countries undertook the economic reform program and efforts made so far to study the likely effects of the policy measures on target variables such as, whether less advanced economies tend to grow faster than relatively wealthy ones within the ECOWAS region, and whether the dispersion of real per capita income across member economies tends to fall over time, are rare. However, for the purpose of economic policies, the sub-regional grouping authorities need to know to

what extent poor member countries are catching up to wealthy ones as a consequence of economic reforms within the groupings.

Another aspect that makes this study different from other studies in the literature is that, we expand the sample period from 1975 to 2012. Given that convergence is a dynamic phenomenon, expanding the sample size with more recent information is likely to produce better results. It is on account of all this vacuum that the current paper has specific relevance.

Scope of the Study

Generally, this research seeks to find out if there exist income convergence in the ECOWAS region. It includes theoretical and empirical discussions of real income convergence.

To estimate real convergence, the two main measures of real convergence are employed in this study. The first is sigma (σ) convergence which measures the dispersion of per capita GDPs within a sample of countries over a given period. The sigma (σ) convergence of real per capita GDPs were calculated for the 15 ECOWAS countries. A decline in standard deviation of the real per capita GDPs for prolonged time gives evidence of convergence. On the other hand, an increase in standard deviation indicates divergence in the real per capita GDPs among the ECOWAS countries.

The second well-known measure of real convergence in the economic literature is beta (β) convergence. This measure of convergence is based on the neoclassical growth model of Ramsey (1928), Solow (1956), and Koopmans (1966). The beta-convergence is generally tested by regressing growth in per capita GDP on its initial level for a given cross-section of countries. This beta-

convergence also covers two types of convergence: absolute and conditional convergence. Absolute convergence depends on the main assumption that ‘the only difference across countries lies in their initial levels of capital’. In reality, however, economies may differ in their propensities to save, or their population growth rates, hence they will have different steady states. Therefore, an appropriate test of convergence is the so called ‘conditional beta-convergence’ Sala-i-Martin (1996).

The study employed the following variables: real GDP per capita, government expenditure as a percentage of GDP, gross domestic savings, real effective exchange rate, Gross fixed capital formation and human capital. Human capital is proxied by primary school enrolment. The study was limited to the period 1976 – 2012. This period is chosen because 1975 marks the signing of the ECOWAS treaty and due to availability of data on some of the variables, we limit the study to 2012.

Organisation of the Study

The thesis is organised in six chapters as follows. Beside chapter one, Introduction to the Study, chapter two presents an overview of economic integration in the ECOWAS region. Chapter three, revisits the empirical evidence of income convergence in countries that have some form of regional integration. The section brings together studies and the various points of view on regional integration and income convergence.

Chapter four then presents the theoretical and empirical models used to estimate the income convergence in the ECOWAS region. Chapter five presents the empirical results and finally, chapter six, based on the outcome of

the preceding analysis, offers summary, some conclusions and policy recommendations.

CHAPTER TWO

AN OVERVIEW OF ECONOMIC COMMUNITY OF WEST AFRICAN STATES (ECOWAS)

Introduction

The main aim of this chapter is to present an overview of the ECOWAS region. The first section looks at the history of regional integration in the SSA. This is followed by an overview of the ECOWAS state.

History of regional integration in Sub Saharan Africa

Before going more into detail, let us first give a theoretical definition of regional integration to work with. Regional integration theory is still in its infancy and until now, there is no clear definition of regional integration; all explanation approaches are based on a mixture of models and assumptions from growth, trade, labour market, and political economy theories. Therefore, this study has opted for the following definition of regional integration: “Regional integration is accordingly an empirically observable, intensifying process of increasing cross-border political, economic and social activities, cooperation and coordination (based on formal treaties) within a geographical region” (Ziltener, 2003).

According to Nyirabu (2004), the history of regional economic integration in Sub Saharan Africa dates back to the 1950s, when pioneering leaders such as Nkrumah (Ghana), Toure (Guinea), Nasser (Egypt), Kaunda (Zambia) and Nyerere (Tanzania) already proposed a regional integration

scheme for the African continent. At that time however, the majority of African leaders considered this plan to be much too ambitious and thus embarked on an integration course based on sub-continental regional groupings. Serious efforts in the 1970s culminated in the 1980 Lagos Plan of Action that stimulated African countries to establish sub-regional economic blocs.

Economic Integration in ECOWAS

Long before Western African integration arrangements were formalised in 1975, the Economic Commission for Africa (ECA) had begun to see the need for integration. The ECA-sponsored integration initiatives, prioritised the need for individual countries to adopt an Import-Substitution Industrialisation (ISI) strategy before formally entering into integration arrangements. The strategy attempted to insulate countries from external influences which were believed to be holding back the development process, and which were assumed to be much more severe than internal constraints.

In many countries, import-substitution was undertaken with state ownership, except in cases where this was not feasible. In Ghana, in particular, the state nationalised all major foreign production and distribution enterprises and set up new ones. Even in countries that supported private capital, such as Nigeria and Côte d'Ivoire, the state's participation in production was not marginal. In many instances the state became a partner of the foreign companies that previously owned the enterprises, as did the Nigerian government with banks. According to Aryeetey (2001), the irony of Income Substitution Industrialization (ISI) was of course that many state-owned firms

were highly dependent on imported fixed and variable inputs. As a result the import bill did not shrink, often leading to major balance of payments problems. In the end, the ability of nations to diversify production was compromised.

As in other parts of the developing world, the experience of West Africa with formal regional integration has been largely driven by the desire to overcome the constraint of small economic size, which was hampering their ability to industrialise efficiently, by extending the logic of protected and state-led economic development to a larger number of countries. Indeed, the preamble to the 1975 ECOWAS Treaty noted that the community was being created in view of the “ overriding need to accelerate, foster and encourage the economic and social development of member states in order to improve the living standards of their people” (ECOWAS, 1975). The structural transformation envisaged was later clarified to be within the context of “self-reliant and self-sustaining development of member states” (Organisation of African Unity, 1981).

Both the original Treaty and the subsequently revised version of 1992 (complemented by more than 30 protocols and supplementary protocols) include initiatives to promote co-operation and development in industry, transport, telecommunications and energy, agriculture, natural resources, commerce, monetary and financial matters, as well as social and cultural affairs. The principal areas of operation have been:

- expanding the regional market;
- harmonising agricultural and industrial policies through production integration;

- ensuring the harmonious integration of physical infrastructures;
- promoting monetary and financial integration to facilitate trade;
- maintaining regional peace, stability, and security; and
- ensuring free movement of persons, including rights of residence and establishment.

It is important to note that ECOWAS exists alongside other sub-regional integration arrangements. By 1975, there were over 40 inter-governmental organisations (IGOs) that co-operated with either the countries of ECOWAS, the erstwhile Communauté des États de l’Afrique de l’Ouest (CEAO), or the Mano River Union (MRU). Table 1, shows membership of regional integration arrangements in West Africa.

Table 1: Membership of Regional Integration Arrangements in West Africa

ECOWAS-1975	CEAO-19734	MRU-1973	WAEMU-1994
Benin	Benin	Guinea	Benin
Burkina Faso	Burkina Faso	Liberia	Burkina Faso
Cape Verde	Côte d’Ivoire	Sierra Leone	Côte d’Ivoire
Côte d’Ivoire	Mali		Guinea-Bissau
Gambia	Mauritania		Mali
Ghana	Niger		Niger
Guinea-Bissau	Senegal		Senegal
Liberia			Togo
Mali			
Nigeria			
Senegal			
Sierra Leone			

Note: Mauritania left ECOWAS in December 1999.

Source: Aryeetey , 2001 and OECD Development centre

The three current integration organisations have promoted quite similar projects to advance their objectives, including the establishment of institutions

for human development, agricultural and industrial development, and monetary cooperation. Before WAEMU, the CEAO led the scene with the creation of a joint central bank, the BCEAO. On its part ECOWAS established a West African Clearing House to facilitate intra-regional transactions and reduce reliance on foreign convertible currencies. It is remarkable that despite a certain communality of purposes, liberalising intra-area trade and achieving other forms of co-operation, there has been hardly any effective co-ordination among them. Considering the significant overlap in both goals and activities, it is indeed surprising that member countries found it necessary to maintain a multiplicity of institutions. Explanations include the 'French factor', that is the desire of successive governments in Paris to support organisations grouping of their formal colonies in the region - as well as a lack of confidence by individual countries in the capacity of such institutions to protect their interests (Bundu, 1997).

ECOWAS is operated through a conference of Heads of State, a Council of Ministers, an executive secretariat, a development and co-operation fund, and five specialised commissions, namely:

1. Trade, Customs, Immigration, Monetary and Payments;
2. Industry, Agriculture and Natural Resources;
3. Transport, Communications and Energy;
4. Social and Cultural Affairs;
5. Administration and Finance.

The individual countries remain the ultimate decision-makers of ECOWAS, through what has been described as "inter-governmentalism" (Ntumba, 1997).

Though the objectives of ECOWAS are laudable objectives, their achievements have fallen far short of expectation especially in the area of trade liberalization. The Community has been trying to provide basic infrastructure such as good roads, reliable communication network, efficient transportation system and strong financial institutions, which, hopefully, will facilitate trading among member states. There is no doubt that the Community, with 15 member states cutting across Francophone and Anglophone countries in the West African sub-region, has come a long way in fashioning these objectives. It has established institutions necessary not only for effective management of day-to-day activities of the Community, but also for increasing trade flows among member states.

The West African Monetary Agency (WAMA), an autonomous body that grew out of the West African Clearing House (WACH), was established to facilitate multilateral payments in the sub-region and to provide means of overcoming the multiplicity of currencies in the region. The Fund for Cooperation, Compensation and Development (FCCD) was established as the financial arm of the Community. Its major functions are to mobilize financial resources for the implementation of the Community's projects and to supervise payment of compensation to member states that might have incurred losses in revenue as a result of the implementation of the trade liberalization scheme (TLS).

The Community's projects are mainly in the area of infrastructure. Two major road projects are at various stages of completion: the 4,767 km trans-coastal highway linking seven countries and the 4,633 km trans-Saharan highway. These roads are designed to open up some member states.

Telecommunications is another project of the Community designed to facilitate growth of intra-ECOWAS trade. Notwithstanding these efforts, intra-ECOWAS trade remains insignificant. It has not shown appreciable change over the years, and various reasons have been adduced for the limited response of intra-Community trade flows. Some analysts argue that these countries have limited trade potential; that is, even if trade were to be totally liberalized, some of these countries would have little or nothing to trade with each other based on their levels of development and resource endowment.

The second level of the argument centres on why trade barriers among member states have not been removed or are difficult to remove. In this regard, past import-substitution policies, revenue constraints, and skewed distribution of benefits and compensation scheme in the Community are usually considered in the explanation of the performance of the Community (Collier, 1993). These factors tend to reinforce each other, thereby allowing for the problem to perpetuate itself.

The primary macroeconomic convergence criteria established for the economic community are:

- 1) Budget Deficit/GDP Ratio \leq 4%,
- 2) Inflation Rate \leq 5%,
- 3) Central Bank Financing of Budget Deficit/Previous Year's Tax Revenue \leq 10% and
- 4) Gross External Reserves \geq 6 months of imports cover.

The total population of the region in 2010 was 302.69 million. The region is home to 29.3 percent of the continent's population. Economic growth in the ECOWAS region was relatively strong during the middle of the

last decade. Real GDP growth was above 5 percent in 2004 and 2005, and reached almost 6 percent in 2007 before declining in 2009 as a result of the global economic crisis. Growth began to rise again in 2010 to 6.7 percent and 5.9 percent in 2011. Real GDP growth in 2012 and 2013 were 6.6 percent and 6.4 percent respectively, World bank data (2013). The renewed growth in commodity prices (notably oil and minerals) has benefited natural resource-rich West African countries, and is fostering higher growth in the region as a whole (ADB Annual Report 2010).

The ECOWAS economic performance reflects improvements in macroeconomic management over 2000-2013. Inflation was under control at less than 10% although it fluctuated because of the impact of changing weather patterns on agriculture. Fiscal discipline was mixed; both national savings and investment as a percentage of GDP were rising; and external debt was declining. In 2010, West Africa as a whole has a budgetary surplus, at 2.9 percent of GDP. The average yearly budget deficits however ranged from a high of 6.9 percent, 6.4 percent and 4.4 percent of GDP in Ghana, Guinea-Bissau, and Gambia, respectively, to an average yearly surplus of 1.7 percent, 1.6 percent and 0.5 percent of GDP in Nigeria, Niger and Liberia (ADB Annual Report 2010).

Most of these countries in West Africa are still largely agriculturally oriented. Benin has important external debts; its cultivation is mainly traditional. The main export goods are cotton and cashew nuts. Burkina Faso is one of the poorest countries in the world, also with important external debts. It has no natural resources and produces mainly cotton and peanuts. After a putsch in 1982/83 and severe riots, it started an IMF adjustment program in

1991. In Mali more than 80 percent of the labour force is dedicated to traditional agriculture entailing a high risk of crop failures. It cultivates mainly peanuts, maize, cotton and sorghum. However, after some economic reforms in 1992, the industrial share of the GDP has increased substantially. Note also that Mali has one of the highest fertility rates in Africa.

Cote d'Ivoire is the world's leader in cocoa production and was therefore especially affected by the price decrease for cacao since 1980 followed by economic crises and a civil war in 2002. Besides, Cote d'Ivoire is one of the oil-exporting country in the region and profits from oil-price increases, Goretti and Weisfeld (2008). Togo's economic situation improved notably after some IMF reforms in 1979. Nevertheless, its economy still depends strongly on its traditional products like cocoa, coffee and, since 1990, also cotton. But Togo is also an important re-export port for automobiles. Riots and the price decrease of export goods were followed by a recession in the 90s. Guinea-Bissau had had a steady growth until the beginning of political unrests in 1997.

Until the mid 80s Niger had implemented a policy of development agencies. Unfortunately, several bad harvests and a quite high fertility rate led to subsequent stagnation. Senegal has a significant industry for the subsequent processing of primary goods, especially for food and textiles. Therefore, though its main export goods are based on peanuts and cotton, it is less affected by price changes for primary goods on the world market. Actually, in 2000, primary goods constituted only 2 percent of Senegal's total export.

Since 1983 Ghana has participated in an IMF restructuring program with a devaluation of its currency. Its export is dominated by gold, diamonds,

and some agricultural goods. The economic growth of Nigeria was based on oil export since the 1960s but was thwarted by mismanagement, corruption and a military regime from 1993 to 1998, Khan (1994). Today it has a growing telecommunication sector. Guinea implemented some economic reforms in 1985, liberalized its rules for FDIs in 1998, and has several joint ventures today, especially in the mining sector. In contrast, Gambia has hardly any natural resources, acts as a re-exporter instead. More than 80 percent of Sierra Leone's exports are raw minerals. Since 1991, the exploitation of diamonds has decreased due to a civil war, and a main part of its "export" is simply illegal diamond smuggling. From its independence in 1975 until 1990 Cape Verde had been a communist system. In 1991 it changed to a neoliberal service-oriented market economy living from tourism and trade. It has a rather important money transfer from emigrants amounting to about 20 percent of the GDP.

CHAPTER THREE

REVIEW OF RELATED LITERATURE

Introduction

This chapter intends to provide an overview of the theoretical and empirical literature on the issue of economic growth as it relates to regional economic convergence and regional integration. The chapter is divided into three sections, the first section presents the theoretical underpinnings of economic growth and convergence and the empirical literature review in the second and third section respectively. To conclude the chapter, a brief synthesis of the both the theoretical and empirical literature is given in an attempt to highlight general overview of the study.

Theoretical Review

Broadly speaking, economic convergence in an area is understood to mean the increasing alignment of the economic variables considered, due to more rapid advances in the less favored (lagging) countries than in the average of the whole region. Two broad types of economic convergence are usually considered in the literature, namely; nominal convergence and real convergence. Nominal convergence refers to the tendency towards a greater uniformity of nominal variables (those indicative of macroeconomic stability e.g. CPI and GDI as % of GDP). Real Convergence on the other hand expresses the approximation of the levels of economic welfare, generally proxied by per capita GDP.

There are basically two principal theories or mechanisms for real economic convergence: the Heckscher-Ohlin – Samuelson (HOS) model of international trade and the neo-classical growth model. Both of these models assume that all markets including factor markets are perfectly competitive. However, the new growth theories have a different view from the one proposed by HOS and Neo-classical models. These theories postulate that an integrated region can be a source of divergence.

Heckscher-Ohlin – Samuelson Model

Concerning the theoretical link between regional economic integration and real convergence, the implications of traditional theories of trade are very clear. The Heckscher-Ohlin model demonstrates that countries export goods rich in factors which are abundant in their economies and import goods rich in factors whose endowment is weak. In abstraction to transport costs, liberalization tends to equalize prices of goods traded. Thus countries will export the products that exploit their best factor endowment. The demand for abundant and less expensive factors increases while that of limited and expensive factors falls.

The convergence of prices of goods tends to bring about convergence of factor prices. In peripheries where labor is abundant, real salaries will fall while at the centre where labor is limited, they will increase, everything being equal. Capital or labor mobility is made possible between the two poles in conformity with the predictions of Mundell (1957). Labor will migrate from the periphery to the centre in search of high salaries. The consequence is an increase in wages in the periphery and a fall in wages in the centre. As for

capital, it will move from the centre to the periphery in search of better returns. This movement reduces the wages of the centre and increases those of the periphery. The whole movement favors the alleviation of the difference in factor prices between regions and ends up in the convergence of income levels of member countries.

The convergence school predicts that real income levels in an integrated economic area will come closer together. The theoretical background for this strong assertion is the Heckscher-Ohlin-Samuelson (HOS) model and its extensions. The Heckscher-Ohlin-Samuelson model (also known as the Factor Endowment or the Variable Proportion Model) not only describes the pattern of trade, but it also predicts the impact of trade on the national income and returns to the factors of production. The HOS model provides an explanation for trade based on different factor endowments – in particular, a difference in relative factor endowments, rather than different technology or different tastes, or something else. The HOS model of trade assumes that in addition to competitive factor markets, if the economies have similar relative factor endowments, international trade between countries will then result in goods price equalization, due to arbitrage, without necessitating any movement of capital or labour across national boundaries.

Allowing for international factor mobility speeds up productivity, wages and price convergence in absolute sense (Pentecost, 2002). Thus the effect of closer economic integration should lead eventually to price and wage convergence. Therefore, according to the HOS model, the driving force of this convergence result depends on the model considered. If factors of production

are mobile across countries and regions, factor mobility guarantees convergence.

In European context of limited labour mobility, capital mobility is when companies decide to invest outside their home market. Such FDI contributes to the transfer of knowledge and new technologies from the more advanced to the lagging regions. In situations where factors of production do not move across countries, convergence obtains as a result of international (intra-regional) trade. Countries specialize in products that use intensively the factors of production that are abundant and cheap in that country. As a consequence of those trade relations, the theory predicts that abundant production factors in each country will become more expensive, that countries will adopt the same technology and that income levels will fully converge. The second mechanism for real convergence across countries stems from the traditional Neo-classical theory of Solow (1956) and Swan (1956).

Neo-classical Growth Theory

For most of the period since the end of the Second World War the analysis of economic growth has been dominated by debates which have centered on the neo-classical growth model developed by Solow. Neoclassical growth theory, as described by Solow (1956), is a natural starting point for an overview, since most of the theory underpinning regional growth analysis is an adaptation of, or reaction to, the assumptions of basic neoclassical theory (Vernables, 2000). A fundamental assumption of this theory is diminishing returns to capital and a spatially common technology. As a result in this model the level of output is determined by the labour force and fixed capital

interacting within the framework of a given technology available to all. Since fixed capital is subject to diminishing returns (or declining marginal productivity) each economy will converge on a unique, long run stable growth path-the “steady state” determined by the growth of the labour force and technological progress. The Solow –Swan model assumes that growth stems from capital accumulation.

As the steady state is reached, an economy’s output will grow at a rate equal to that of population growth and thus per capita growth in output reverts to zero. The consequence is that the income levels of poor countries and those of rich ones converge. When countries with lower capital per person grow more rapidly than richer ones with higher capital per person then beta convergence is said to take place.

In its’ simplest form, the neoclassical growth theory implies the elimination of differences between capital-labour ratios and productivity levels as countries converge to a single equilibrium. Thus at equilibrium, productivity in each country’s economy grows at the same rate, which is equal to the exogenously given rate of technical progress. Therefore, standard neoclassical growth models predict that open economies (i.e countries in a region) should converge. Assuming that technologies are identical and exogenous, the dynamics of convergence rests on decreasing returns to capital. Therefore, the theory assumes that countries with the low capital stocks and per capita income should have a higher marginal product and return to capital. Consequently, opening up the country-as happens in the framework of an integration process like the one in ECOWAS should trigger a convergence process, as capital accumulation and faster growth in poorer countries than in

richer ones sets in as a result, per capita income, labour productivity and capital-labour ratios converge across countries.

This line of reasoning has formed the basis of conventional theories of economic integration developed since the pioneering work of Viner (1950). Thus, models that share the neoclassical growth theory generate a tendency for prices, costs and income levels to converge with trade and international factor mobility acting as the convergence mechanism. Because of increased integration of economies, the process of convergence is further stimulated by the reduction of transactions costs, elimination of foreign exchange uncertainty due to trade and factor movements.

Since poorer countries are generally considered to have capital-labour ratios below their long run optimum, and thus backward in adopting the available technology, their rate of return on fixed investment should be higher than in richer countries. Consequently, there should be a systematic tendency for poor countries to grow faster than rich countries until they have “caught up” with levels of income per head of the rich countries. This is the convergence hypothesis.

In the neo-classical framework, persistent inter-country differences in incomes per head reflects either difference in the quality of factors of production available or in the efficiency with which they are combined. Therefore, the policy recommendation of the mainstream neo-classical school is that the best way to ensure both convergence of incomes per head and steady economic growth over the long run is to allow market forces to operate freely. This is the basis for policy recommendation to lagging countries to enable them to “catch-up” with prevailing income levels in rich countries

(Vernables, 2000). The presumption that poorer countries, on average, will grow faster than richer ones (over the long run) has been termed beta convergence. Such differential growth is necessary to reduce the inter-country variation of per capita income levels (Vernables, 2000).

A tendency for the dispersion of per capita incomes (as measured by their standard deviation as a percentage of the mean) across a group of countries to fall overtime has been called sigma convergence. Therefore, sigma convergence is not only a function of the differential rates of growth between poorer and richer countries but also of the size of the initial income gap. These standard conclusions have been challenged. Critics of the neoclassical theory challenge the assumption that all countries have the same access to exogenous technology. Some dispute the claim that market forces are capable of triggering sustained growth and convergence in under-performing countries.

Classical economists, such as Adam Smith (1776), David Ricardo (1817), and Thomas Malthus (1798) and much later, Frank Ramsey (1928), Allyn Young (1928) and Joseph Schumpeter (1934), provided many of the basic ingredients that appear in modern theories of economic growth. These building blocks include approaches such as competitive behavior, the rate of diminishing returns and its physical and human capital accumulation, the interplay between per capita income and the growth of the population and effects of technological progress (Bezuidenhout, 2003).

The New Growth Theories

New models have emerged in the last fifteen years notably under the aegis of the new growth theory or endogenous growth theory which contrary to the neoclassical paradigm do not predict that income convergence between rich and poor countries is the only possible outcome of economic integration (Martin et al, 2001). In these new approaches emphasis is put on endogenous sources of growth and technical progress and more especially on the importance of investment in human capital and on the spillover effects of fixed capital. This model agrees with the post Keynesian view that increased investment may raise the long-run rate of growth because investment may be subject to increasing returns. Therefore, in general, the key to “catch up” lies in closing the technology gap between the poor and richer countries (Vernables, 2000).

According to Romer (1986), one of the first proponents of this theory, returns to capital do not have to be diminishing. If this assumption is relaxed, the impact of economic integration on convergence is not as clear as in the Solow setting (neoclassical reasoning). Lucas (1988) as cited by Martin et al (2001) proposed an approach where increasing returns on human capital are the main driving force of economic growth. There is therefore a distinct possibility that a “brain drain” from poorer to richer country could act as a vehicle for cross country divergence. Some endogenous growth models that emphasize the importance of commercially oriented research and development effort as the main engine of growth may also explain the existence of permanent and even widening technological and income gaps between countries.

The Schumpeterian approach incorporates a different viewpoint in regard to competitive markets and it identifies innovative entrepreneurship as the key to sustained growth (Schumpeter, 1934). The post Keynesian analysis also comes with another viewpoint. They stress higher profits and strengthening of the propensity to invest to lead towards sustained growth path.

New Economic Geography Theory

In a separate argument put forward by Krugman (1991) in what he calls new economic geography literature, he puts forward several reasons to explain why economic integration may lead to a pattern of increased spatial income inequality assuming increasing returns. The assumption of increasing returns introduces the presence of imperfect competition. A characteristic feature of these models is that they assume the existence of knowledge spillover effects at regional level. They do this by considering that imitation is cheaper than innovation, thus implying that convergence through technological diffusion is a likely outcome assuming diminishing returns.

This model also emphasizes the role of trade and foreign direct investment as channels for technology spillovers. This model considers human capital to be an essential condition for convergence (Krugman, 1991). New growth theories allow a greater role for government policy in creating conditions for sustained growth and catch up. The view held here is that economic behavior is embedded in a framework of economic, social and political institutions that go beyond economic activity.

The literature is less than fully conclusive as to whether or not economic integration on its own generates convergence. When the assumptions of the pure neoclassical growth models are relaxed, particularly that of identical and exogenous production possibilities across countries, then opening up to trade and factor mobility may become a source of divergence. According to some versions of endogenous growth models, integration although still leading to aggregate welfare gains may potentially result in income polarization.

To clarify this theoretical debate, Boldrin and Canova (2000) as cited in Martin et al (2001) propose to distinguish the various available theoretical models according to whether they embody:

1. A strong version of the convergence hypothesis which states that due to decreasing return on capital,” in the long run, a common level of economic well-being can be achieved, independently of initial conditions and independently of the detail of national policies, as long as the diffusion and adoption of technological innovation is not seriously restrained.”
2. A weak version that emphasizes the determining role of initial conditions endowments in immobile factors and national policies in the adoption of technologies.
3. A strong non-convergence hypothesis under which, due to high fixed costs, widespread increasing returns and external effects (e.g agglomeration effects,) “any increases in the degree of trade openness is likely to send the most productive factors flowing towards the

advanced regions, where their return is higher, leaving the disadvantaged area further behind.

4. A weak non-convergence hypothesis (akin to the infant industry argument) which argues that “minimum absolute level of the externalities inducing factors must be obtained” for global convergence to set in. If these factors are absent, such models are likely to generate “club convergence,” under which countries with similar endowments in the strategic factors tend to converge into clusters, Boldrin and Canova (2000).

The view that economic growth is a complex function of a wide range of interrelated factors, over and above traditional factor inputs, has led to the development of the idea of conditional convergence (Vernables, 2000). This remains within the neo-classical framework but describes the tendency of countries to converge on their own long-run equilibrium paths as a function of a number of preconditions or conditioning variables. Testing for conditional convergence requires choosing “conditioning variables” as proxies for the determinants of the long-term balanced growth path of individual countries. A number of economic, institutional and political variables have been included in empirical growth studies and many have concluded for significant effect on growth (Vernables, 2000).

Measurement of Real Convergence

To arbitrate among conflicting theoretical basis we are rescued by empirical analysis. Although the analyses are not free of ambiguity, current research generally seems to lean towards associating economic integration

with some version of convergence hypothesis. There has been no consensus as to the proper measurement and definition of convergence, however various authors in the area had to clarify what the word convergence means in practices in the way that can be tested empirically. Therefore, most studies on Convergence have come-up with a wealth of different measures and they are openly being debated on their merits. To cement this argument, Bezuidenhout (2003) refers to the topic of convergence hypothesis as complex, confusing and multifaceted.

Dorwick and Nguyen (1989) argue that there is a distinction between convergence and catch-up. The convergence hypothesis is explained by the neoclassical theory assertion that, groups of countries are becoming homogeneous in terms of levels of productivity, technology and per capita income. The issue of convergence can be interpreted in many different ways. Barro (1997), Martin et al (2001) and Barro and Sala-i-Martin (1995) argue however, that there are two broad categories of Convergence i.e real convergence and nominal convergence over which other categorization falls.

The simplest indicator for assessing real convergence between countries within an area is to test whether the per capita GDP of a country or a set of countries is approaching the mean of the area. The two most popular measures as defined before are Beta-convergence and Sigma-convergence. Beta-convergence implies that the poor countries grow faster than richer ones in both levels and growth rates. It is generally tested by regressing the growth in per capita GDP on its initial level for a given cross-section of countries.

This beta convergence covers two types of convergence: Absolute Beta-convergence and Conditional Beta-convergence. Convergence is

conditional with the inclusion of control variables, while it is absolute (unconditional) without controlling for additional variables in the cross-sectional regression. In the case of conditional convergence, each country is assumed to converge to its own steady state and the speed is faster, the further the country is from its own steady state, whereas with unconditional convergence countries are assumed to converge to a common steady-state. Comparing the two, conditional convergence is closer to reality relative to unconditional convergence, especially when considering more homogenous groups of countries or regions (Cunado & Perez de Gracia, 2006).

On the other hand we have Sigma-convergence, often referred to as homogenization of per capita income, which shows the reduction in the dispersion (standard deviation as percentage of the mean) of per capita GDPs within countries. None of existing measurement procedures mentioned above is generally accepted as inherently superior to the other in any circumstances. According to Martin et al (2001) probably because of its intuitive appeal beta convergence remains commonly used.

Baumol (1994), refer to seven different nominal concepts of convergence in the literature. According to Leape, Jenkins and Thomas (1996), nominal convergence is convergence in the Maastricht criteria variables. Convergence in the Maastricht criteria variable has dominated current interest in economic integration in Europe. The Maastricht criteria variables focuses mainly on five key indicators; inflation, long term interest rates, GDI as percentage of GDP, budget deficit as a percentage of GDP and public debt as a percentage of GDP. It is envisaged that convergence in the

Maastricht criteria variables will lead to a higher form of regional integration like the monetary union.

The first measure of nominal convergence is homogenization which refers to the reduction of the dispersion among some set of countries in terms of some performance measure. Homogenization can be applied to many other measure of a country's performance. If applied to per capita income, it is referred to as sigma convergence. The statistic that is normally used to measure convergence is the coefficient of variation or standard deviation as a percentage of the mean. Convergence occurs when the coefficient of variation declines overtime for a country group. This therefore implies that one country is catching-up with another when the gap closes.

Catch-up convergence is the second concept of convergence. Catch-up convergence according to Bezuidenhout (2003), is determined if there is a narrowing in the variable in question and that of the other countries in a region. Dorwick and Nguyen (1989), Baumol et al (1994), and Bezuidenhout (2003) argue that homogenization is not catch-up convergence but they go hand in hand even though they are not equivalent. They argue that most policy decisions are based on catch-up convergence rather than homogenization.

Thirdly, we have Gross convergence which can be applied to either homogenization or catch-up. It refers to those countries that are experiencing some degree of convergence in the variable in question, without correcting for the influence exercised by other pertinent variables. The fourth concept of convergence is explained convergence. This refers to the statistical evaluation of the role of the pertinent and measurable variables that can reasonably be

expected to influence the time path and degree of convergence experienced in some countries.

The fifth concept of convergence is residual convergence which refers to the possibility that after a statistical removal of the effect of the variables estimated in the explained convergence calculation, the remaining and statistically unexplained residue in behavior of the dependent variable will itself prove to display convergence among the countries studied. The sixth concept is asymptotically perfect convergence which refers to a situation whereby two countries converge when in the long run the pertinent variables for the two countries asymptotically approach precisely the same level.

The last concept of convergence is bounded convergence. Two countries are undergoing a process of bounded convergence if the time paths of the pertinent variables are heading towards destination points that are not necessarily identical but can be deemed to be reasonably close to another on some explicit and pre-selected criterion.

Figure 1 gives a summary of the concepts of economic convergence as outlined in this section.

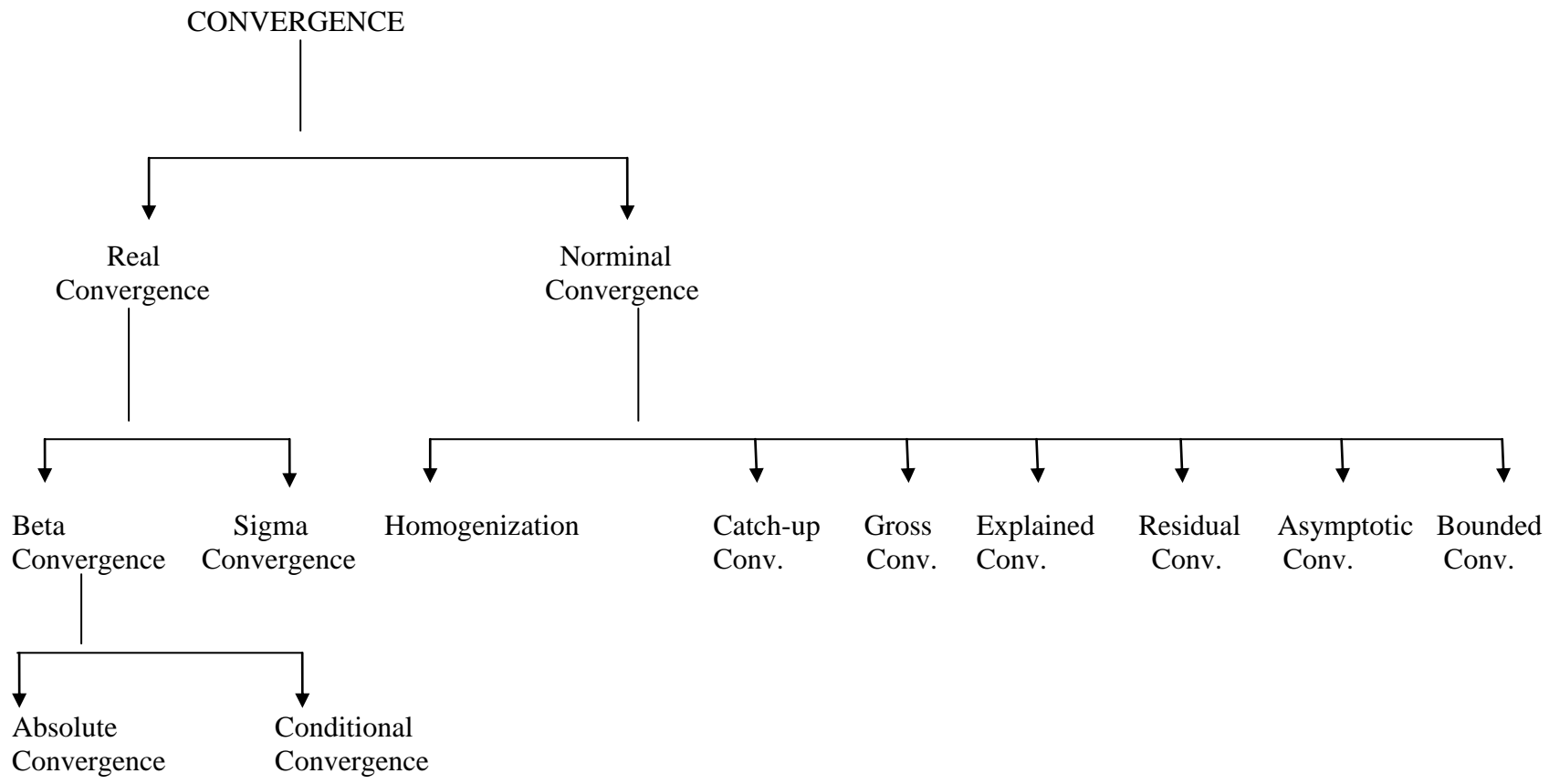


Figure 1: SUMMARY OF CONCEPTS OF CONVERGENCE

Since regional integration agreements and co-operation influence output performance, economic development and macroeconomic behavior, these issues thus need to be mentioned. Economic theory explains that for policy coordination and regional integration to be beneficial, some degree of convergence must exist between countries. This section proceeds on to consider regional integration and convergence.

Economic growth theory indicates that regional economic integration and co-operation will increase economic growth potential but that these benefits are not evenly distributed among and within different member countries. Piazzolo (2002) states that regional integration arrangements increase the trade activities between the partner countries at large. The exchange of goods and services affects the standard of living of these countries since export revenue from trade can provide necessary foreign exchange to overcome the foreign exchange bottleneck thus enabling the country to import the much needed capital and intermediate goods as well as increasing capability to finance its foreign debt. Because of regional integration resources are allocated according to competitive advantage of a country. This enhances its output performance and induces more efficient investments which creates spillover effects due to externalities generated by exports and imports.

Due to the mentioned economic benefits of integration, West African countries strive to provide their economies with substantial economic growth by deepening their regional economic agreements. There are different forms of regional economic association cited in Vernables (1999). The first form of regional economic integration is a free trade area characterized by free trade among member countries. Under this arrangement countries remove all

impediments to free trade. The second form of regional economic integration is a customs union characterized by free trade among members with a common external tariff. The third form is a common market characterized by free trade among members, a common external tariff and mobility of factors of production. The fourth is an economic union characterized by free trade among members, common external tariff, the mobility of factors of production and economic policy harmonization.

Empirical Literature Review

An overview of the literature will be incomplete if studies that have analyzed the relationship between nominal and real convergence are not mentioned. The topic of economic growth and convergence has drawn considerable and increasing attention in view of the large number of countries that have experienced rapid and non-inflationary growth accompanied by generation of employment (Bezuindenhout, 2003). A number of arguments have been raised about the occurrence of income convergence among countries within a region and the potential conditions and policies that trigger convergence through their positive impact on economic growth. Empirical studies have been conducted to support either side of the argument.

Empirical analysis to arbitrate among conflicting theoretical claims has been carried out in the literature. Most studies on economic convergence have been carried out in developed countries but with the same principles and fundamentals that can be applied to the case of developing countries. Some studies on this topic have tried to come up with a better or improved methodology of testing for convergence and thus growth in a particular area.

Romer, Mankiw and Weil (1992) suggest that an augmented Solow model which expresses growth explicitly as a function of determinants of the ultimate steady state and the initial level of income is a natural starting point to study convergence. The argument they put forward is that, running regressions with conditions for the determinants of steady state, like investment rate in the Solow Model, then initial income coefficient will be negative. What their model states is that within countries approaching the same steady state, the poor ones will grow faster in the period under consideration.

The earliest contributions to the debate of convergence of income were in the form of cross-sectional framework and estimated using OLS. The analysis were carried out for a large set of countries as well as regions e.g. Neven and Gouyette (1995), Armstrong (1995), Tondl (1999), Martin (2000). The studies concluded that Convergence between EU regions took place at around 2-3 percent in the 1960's and slowed down to 1.7 percent after 1995. Studies with cross-sectional approach include Baumol (1986) and Delong (1988) that consider the question of absolute (unconditional) convergence with samples of 16 and 23 countries respectively, for the period dating 1870-1979. Their findings generally illustrate the existence of convergence among the mostly industrialised countries (with the exception of Chile and East Germany). Considering conditional convergence, Barro (1991), Mankiw, Romer and Weil (1992) and Sala-i-Martin (1996) demonstrate support for convergence among relatively homogeneous developed countries such as US and European countries. In particular, Mankiw, Romer and Weil (1992) controlled for population growth, human and physical capital.

The utilisation of cross sectional techniques has been widely criticized in the literature for econometric reasons. For instance, Friedman (1992) emphasized that convergence is a concept closely related to dispersion and a negative relationship between cross-sectional distribution of income and growth rate does not adequately represent such dispersion. Bernard and Durlauf (1996) illustrate that the cross-section procedures cannot distinguish between local and global convergence hypotheses. Moreover, most cross-section procedures require homogeneity assumptions (similar first-order autoregressive dynamic and structures; and no permanent cross-economy differences) and arbitrary inclusion of condition variables which are sometimes endogenous as they are correlated with economic growth. An inverse interaction between growth rate and the initial level of income, required in a cross-sectional framework for the justification of convergence, may imply numerous behaviours inclusive of a static cross-section distribution of incomes (Quah, 1993).

Reacting to criticisms of cross-sectional framework, researchers are increasingly adopting time series methods in investigating convergence of incomes, among countries. Specifically, non-stationarity tests are often utilised to verify the existence of stochastic convergence. Using time series approach, Carlino and Mills (1993) examine stochastic convergence across U.S. regions during the 1929-1990 period and allowing for an exogenous trend break at 1946. The findings provide evidence for convergence in three of the eight U.S. regions, after allowing for structural break, without which the findings indicate no evidence for convergence for the sampled period. In another study dealing with convergence on same U.S. regions, Loewy and Papell (1996) adopt

techniques that permit endogenising both break date (which includes Zivot and Andrews, 1992) and lag length. With the endogeneity techniques, Loewy and Papell (1996) establish evidence for convergence in seven out of the eight U.S. regions with higher degrees of significance.

Bernard and Durlauf (1995) examine income convergence in a sample of 15 Organisation for Economic Co-operation and Development (OECD) countries for 1900-1987 period. Employing Cointegration tests in a framework of no structural breaks, results demonstrate little evidence of conditional convergence but substantial evidence for common trends. Greasley and Oxley (1997) investigate the presence of convergence among several OECD countries using annual time series data dating 1900–1987. Based on time series unit root tests such as ADF approaches and Zivot and Andrews (1992), Greasley and Oxley (1997) identify bilateral convergence within: Australia and the United Kingdom; Italy and France; Belgium and the Netherlands; and Denmark and Sweden. Li and Papell (1999) employ (an endogenously determined) one-break unit root test of Perron (1997) to assess the possibility of stochastic convergence among 16 OECD countries for the period length of 1990-1991. Evidence supports convergence in 14 of 16 OECD countries and the findings further reveal that World War II is a major cause of structural shifts in relative per capita output.

Strazicich, Lee and Day (2004) utilise the two-break unit roots test of Lee and Strazicich (2003) to test for convergence in 15 OECD countries for the period dating 1870-1994. Findings reveal the rejection of null hypothesis of unit root in eleven of the fifteen countries, thus proving the presence of stochastic convergence among the countries. Dawson and Strazicich (2010)

increase the sample size to 29 countries (to include non-OECD countries). The paper reveals evidence showing convergence of income in 23 of the 29 countries. Similar to the findings of Li and Papell (1999), World War II is revealed to be a major reason for structural changes in incomes of the countries.

Due to the problems associated with cross sectional framework as enumerated above, papers on African studies have largely applied panel unit root techniques in implementing their investigations of convergence in Africa, with the exception of Carmignani (2006). Among the studies on Africa with panel unit root approach is McCoskey (2002) who assess convergence of income for 37 Sub-Saharan African countries, using six proxies of well being. With panel unit root test, McCoskey (2002) fails to establish evidence of convergence across the whole sample for the real GDP-based variables. The findings remain same even for more homogeneous groupings such as Southern African Development Community (SADC) and the Southern African Customs Union (SACU). Islam (1995) also proposed to set up convergence analyses in a panel data framework where it is possible to control for individual-specific, time-invariant characteristics of countries using fixed effects.

Barro and Sala-i-Martin (1991, 1992) undertook tests of the convergence hypothesis for 47 of the components states of the USA states, for regions of Europe and later carried the same study for Japanese districts. Using data for 1880-1990 for the United States, convergence was tested using fixed effects panel equation formulation. These studies show that most evidence of unconditional (absolute) convergence has come from within country studies. In both cases, they find evidence of β -convergence over long

sample periods, that is, 110 years for USA states and 60 years for Japanese districts. De la Fuente (2002) in his study across Spanish regions recorded evidence of β -convergence in 3 decades between 1965 and 1995.

Gonzalez and Arenas (2002) carried out a study of regional convergence analysis of the Chilean economy between 1960 and 1996 using the neo-classical growth model based on the works of Barro and Sala-i-Martin (1992). Barro and Sala-i-Martin (1992) found evidence of conditional convergence of 98 countries which included Chile. What Gonzalez and Arenas (2002) did was to verify the convergence hypothesis inside the country implementing the same framework to the geopolitical subdivision of Chile. They verified the hypothesis and found that the rate or speed of convergence around that period was one percent which was similar to the results found by Cavalcenti (2000) in the Brazilian Case.

According to Trivedi (2002), the empirical evidence in developing countries has not been that encouraging. Studies in China and Mexico showed no evidence of convergence. Cashin (1995), as cited by Trivedi (2002), using cross sectional regression analysis reported convergence in the Indian states though the speed or rate of convergence estimated was not significant.

Ben-David (2000) concludes that there has been divergence in income per capita across countries over the period 1960-1985. He found club convergence however in countries at the bottom end of the income distribution which is not due to welfare improvements but due to the down fall in countries which were initially better off. His study finds convergence across countries which have opened up to international trade, more so if the countries actually trade among themselves.

The role of Trade Openness and FDI in economic growth and income convergence

The link between convergence and openness to trade across history is noted by Williamson (1991) who argued that convergence and global economic integration is linked to the Industrial Revolution of 1850. He argued that there is evidence of income convergence in two sub-periods during which the movement of goods and factors occurred relatively freely, 1870-1913 and post-1950. Williamson (1991) reported that even though income gaps appear to grow over time, countries that trade extensively with one another tend to exhibit a higher incidence of income convergence.

Ben – David and Kimhi (2000), using data from 1960 to 1985, set out a study to examine how trade flows influence the process and speed of income convergence. Ben-David and Kimhi (2000) showed that an increase in trade flows led to an increase in the speed of income convergence. The study used 127 pairs of countries on the basis of export data and 134 pairs of countries on the basis of import data. This study confirmed the conclusion of Sachs and Warner (1995) who found that international trade causes income convergence. Further, Zhang (2001) explored the role of trade and FDI in a cross-country convergence analysis, indicating that export and FDI tend to accelerate the convergence process in the Asian newly industrialized economies and Japan. However, Rodriguez and Rodrik (1999) examined and identified the weaknesses of some prominent empirical studies on the relationship between trade barriers and economic growth. They observed that it is relatively easy to come up with cases of regions of the world which have diverged or converged

in ways unrelated to trade policy and therefore casts doubts on whether there is a systematic relationship between trade liberalization and convergence (see also Milanovic, 2006).

Slaughter (2001) also used a difference-in-difference approach to analyze whether trade liberalization contributes to per capita income convergence across countries. The analysis focused on four post-1945 multilateral trade liberalizations. The author did not find any forceful evidence demonstrating that trade liberalization has positive effects on the speed of convergence among countries. In fact, much evidence suggested that trade liberalization diverges incomes among Liberalizers. The work of Balamoune-Lutz (2001) gave an unambiguous support to the findings of Slaughter (2001). Balamoune-Lutz (2001) used panel data to find evidence for income convergence on the basis of trade openness. The results from fixed-effect and adjusted fixed effect (regional-effect) failed to substantiate the proposition that greater openness facilitates convergence to higher income levels.

Ahmed and Fida (2009) analyzed trade among and the convergence of per capita income for India, Pakistan, Bangladesh, and Sri Lanka. The study attempted to examine the impact of trade liberalization on the per capita income convergence of these selected South Asian countries and their trade partners for the sample period 1972-2005. In the study, pre-liberalization and post-liberalization were defined as the periods 1972-1988 and 1989-2005, respectively. The extent of trade and its relationship with the magnitude of income convergence is studied among these countries and their trading partners. The study used intra-trade convergence and the difference-in-differences approach for the estimations. The results demonstrated that an

increase in trade between the groups decreases the per capita income differential. The results of the study suggest that trade liberalization policies could be effective in achieving convergence. More importantly, the authors found that the per capita income of source countries converged more rapidly under post-liberalization regimes than pre-liberalization regimes.

Wei, Yao and Liu (2007) attempted to reconcile the positive effect of FDI on economic growth with its potential 'negative' effect on regional inequality employing an augmented Cobb-Douglas production function. They examined regional inequality from three different perspectives: inter-province, intra-region and inter-group (each pair of two regions). The study employed more determinants of income growth such as FDI and transportation into the β -convergence estimation, with special attention on FDI and its role in the economic convergence process across the country and within each geo-economic region as well as regional groups. The study further examined the same issue of FDI on spatial growth differences and income inequality with various model specifications and estimations as a means of providing a comprehensive anatomy on whether FDI has caused regional income inequality, which they believe is a controversial issue in the literature with significant policy implications on economic growth and development of China and any other similar less developed economy in the world.

Using the largest panel dataset for the Chinese regions over 1979-2003 and employing both cross-section and panel data approaches, the findings of Wei, Yao and Liu (2007) are summarized as follows: (1) regional income inequality rises in the data period; (2) regions can converge to their own steady states only after controlling for the differences in saving rate,

population growth, human capital endowment, transportation, and above all FDI and exports; (3) the same factors that have a significant effect with national level data have similar effect with regional (or groups of regions) level data; (4) FDI is singled out to have played a consistent and positive effect on growth differences in all specifications except for the West region and the combined West/Central regions; and (5) FDI is highly unevenly distributed among the regions, with a very small share in the West region. All these findings point to the conclusion that FDI is an important factor of economic growth but it is the uneven distribution across regions rather than FDI itself, which has been a cause of the regional income inequality.

Similarly, Jawaid and Raza (2012) investigated the impact of FDI on income convergence in addition to the relationship between FDI and economic growth by using seven years average annual data of 129 countries across the world from the period of 2003 to 2009. These countries are grouped into low, middle and high income by the World Bank. Results indicated significant positive relationships between foreign direct investment and economic growth in all countries. Results of conditional convergence based on foreign direct investment suggest that the low and middle income countries are converging with each other more rapidly. This shows that chances of converging with high income countries remain steady in the presence of FDI.

Fuduka and Toya (1995) examined the conditional convergence of government spending in East Asia. The authors using a fixed effect panel model reported that the inclusion of government expenditure worsens the initial results obtained when export was the main regressor in the convergence

model. The conclusion is that, government expenditure though positive on growth had rather ensured income disparity widening in East Asia.

Finally, a clear sign of productivity convergence was also found in the Mercosur countries (Camarero *et al.*, 2006). Camarero *et al.* explained that this evidence of productivity convergence is mainly the result of higher integration of the economies, through increased trade flows among the member countries. Similarly, Holmes (2005) found a strong evidence of convergence among the member countries of the Central American Common Market (CACM) in Latin America.

Although there seems to be much compelling evidence that regional integration leads to income convergence, some studies found contrary evidence and believe that there is no systematic relationship between trade openness and convergence. Among the most cited studies are Rodriguez and Rodrik (1999), Slaughter (2001) and Baldwin (2003). For example, Slaughter (2001), using a sample of developed countries and LDCs, finds no strong, systematic link between trade liberalization and income convergence. In contrast to the results of accelerated convergence among samples of Free Trade Areas (FTAs) presented in Sohn and Lee (2006), Slaughter (2001) suggests that, if anything, trade seems to have caused income divergence. On the other hand, Rodriguez and Rodrik (1999) examined and identified the weaknesses of some prominent empirical studies on the relationship between trade barriers and economic growth. They observed that it is relatively easy to come up with cases of regions of the world which have diverged or converged in ways unrelated to trade policy and therefore casts doubts on whether there is a systematic relationship between trade liberalization and convergence.

Baldwin (2003) concluded that one must take caution in attributing any single economic policy, such as lowering of trade barriers, as being a sufficient government action for accelerating the rate of economic growth.

Economic Convergence in the European Union (EU)

Economic integration in the European Union has been fastest among all the regional groupings. Since 1972, some less industrialized countries with distinctly lower per capita income levels joined the union. Until the early 1980's there was strong convergence among 12 EU countries in productivity as opposed to incomes. After 1973 productivity convergence continued at a slower pace while incomes continued to diverge. During 1986-1990 convergence in income was re-established. In this convergence figures there is strong growth in the four peripheral economies that joined EU after 1972. These peripheral economies are Greece, Spain, Ireland and Portugal.

For European countries, the empirical evidences of income convergence are found for example in Mankiw *et al.* (1992), Ben-David (1993) and Bunyaratavej and Hahn (2005). Ben-David examined the episodes of major postwar trade liberalization within specific groups of countries and found a strong link between the timing of trade reform and income convergence among countries (see also Ben-David, 1996; and Ben-David and Kimhi, 2004). Furthermore, European integration has resulted in significant growth improvements of its member countries most likely through technology transfer mechanism (Henrekson *et al.*, 1997; and Okko, 2003).

Divergence within the developing world

As noted earlier, over the past three decades, the developing countries as a whole have failed to come closer to the developed countries. Simultaneously, there has been a strong divergence within the developing world itself where countries with low initial per capita incomes have fallen further behind the others. Increased dispersion has been accompanied by a significant increase in absolute income gap between the richest and poorest developing countries. In 1960, the richest developing economy, in terms of PPP was Venezuela, with a per capita income of \$6,338 and the poorest was Lesotho with only \$313. By 1990 the richest was Hong Kong (\$14,849) and the poorest Chad (\$399).

Studies of income convergence for the African continent are few and so far there are very few that are specific to the continent's regional integration initiatives, that is, the various African regional economic communities (RECs). The earlier study of Ghura and Hadjimichael (1995) found that there is evidence of conditional convergence of per capita income in the group of 29 sub-Saharan African (SSA) countries during the 1981–92 period. However, the evidence was characterized by a slow income convergence of 2 percent per annum, which usually exemplified a diverse group of countries. On the other hand, using time series stochastic convergence based on 37 countries in SSA, McCoskey (2002) showed that income disparity in the region at large did not show any tendency to fall over time. McCoskey claimed that the lack of convergence in sub-Saharan Africa might be due to the huge intra and inter-regional differences among the countries considered.

Akanni-Honvo (2003) examines the implications of regional integration agreements on the process of convergence or divergence of member economies in developing regions between 1975 and 2000. The results show that the creation of regional integration groupings in less advanced regions does not automatically lead to absolute convergence across member countries, and that conditional convergence that appears in some regions is weak.

In East Asia, Sato and Zhang (2006) observed that its remarkable sustained economic growth was accompanied by the outward looking, export-oriented development strategy and its spontaneous and rapid regional integration. The East Asian integration, however, is more of a market driven phenomenon and has occurred in the absence of a formal institutional framework. Sato and Zhang (2006) found that the East Asian countries exhibit some business cycles synchronization and co-movements in real output variables in both the short run and the long run, which may be interpreted as an implication of convergence in output. The income convergence in the ASEAN and East Asian countries was supported by Heng and Siang (1999) and Njuguna and Rambaldi (2001).

Meanwhile, the dynamics of convergence of per-capita GDP that is perceived in Africa, ASEAN in Asia and MERCOSUR in Latin America is supported by concerted investment policies in infrastructures, complementary production capacities, the diversification of economic structures, and finally the capability of more advanced economies in the groupings to generate the necessary and sufficient spillover effects on other member countries. In

addition the frontier effects have a contrasting impact on the economic growth of member states and on the convergence process within the groupings.

Economic Convergence in ECOWAS Region

In Africa, studies on convergence are rather few in spite of the importance of the issue for the region. The work of Jones (2002) on absolute and conditional convergence in ECOWAS finds the existence of both β -convergence and σ -convergence in the grouping. His study concludes that the member countries of ECOWAS form a convergence club. Dufrenot and Sanon (2005) also test the process of β -conditional convergence of per-capita GDP in the same grouping between 1985 and 2003 under the assumption of parameter heterogeneity and contrary to Jones (2002) they find no evidence of real conditional convergence. Bernard and Durlauf, (1995), using time series methods found beta-convergence in the Ecowas region over the period 1960-1990.

For the West Africa Economic Monetary Union (WAEMU), Fielding and Shields (2004) investigated whether monetary unions augment the extent of macroeconomic integration. While they identified a positive impact on intra-regional trade, the effect of business cycle synchronicity was found to decline over time. They argued that this was because of both the lack of a common central bank and of coordination of economic policies. A recent study of integration processes in this region is from Hammouda, Karingi, Njuguna, and Jallab (2007). Their hypothesis is that regional integration does not improve income convergence in Africa. First they show empirically that ECOWAS have quite low unconditional and conditional convergence and

conclude that there was little progress in the African integration processes. These authors conclude that in ECOWAS, member states individually follow their long-run growth paths. In this respect they recommend active coordination of policies to reduce the structural heterogeneity.

Government Expenditure and Convergence

Empirical econometric literature on the impact of government expenditure on income convergence is very sparse. As far as the researcher knows, only Fuduka and Toya (1995) have conducted a substantive econometric investigation on the impact of government expenditure on income convergence. In particular, Fuduka and Toya (1995) examined the conditional convergence of government spending in East Asia. The authors using a fixed effect panel model reported that the inclusion of government expenditure worsens the initial results obtained when export was the main regressor in the convergence model. The conclusion is that, government expenditure though positive on growth had rather ensured income disparity widening in East Asia.

Conclusion

This section gives a synthesis of both the theoretical and empirical literature review. In achieving that, the section sets out not only to give a summary of both the theoretical and empirical literature but also how different theoretical framework and empirical studies can be blended together.

The Neoclassical growth models predict that countries in a regional trading bloc should converge. Assuming identical and exogenous technologies, the convergence dynamics rests on the decreasing returns to

capital. Countries with low capital stocks and per capita income should have a higher marginal product and return to capital. As a result opening up the country in an integration process should therefore trigger a convergence process since capital should flow to capital scarce countries take advantage of higher returns. This should lead to more rapid capital accumulation and faster growth in poor countries than in richer ones. This line of reasoning is held by Sala-Martin (1991, 1995), Barro (1997), Baumol et al (1994) and has formed the basis for conventional theories of economic integration. Models with the neoclassical assumptions tend to predict income, price and cost convergence in countries in a regional grouping.

These conditions of the Neo-classical theory were then challenged by the new growth theorists like Schumpeter (1934), Romer (1986), Krugman (1991). These theorists do not conclude or predict economic convergence between rich and poor countries. The conclusion of these new growth models do not believe returns to capital is decreasing as proposed by the neo-classical economists, rather they believe returns to capital is increasing.

The new growth theories and Krugman (1991) in a separate argument argue that integration and trade can lead to increased spatial income inequality as opposed to the prediction of Neo-classicalists. The theoretical literature review therefore is less than fully conclusive as to whether or not on its own economic integration generates convergence since if the neoclassical assumptions are replaced a totally different conclusion is drawn from their predications.

Different studies have been carried out mostly in developed countries in the area of economic growth and regional economic convergence. Most of

the literature has come-up with a wealth of different measures (concepts) which are presently being debated. Convergence studies have in the literature originally been based on the cross – sectional studies and were estimated using OLS. The seminal paper in this area was Barro (1991) from which Barro and Sala-i-Martin (1991) and other studies have based their analysis. However, the methodology produced by Barro and Sala-i-Martin (1991) has been criticized for econometric shortcomings thus prompting the use of other econometric models that make use of econometric and statistical analysis such as panel date analysis. Some studies that used Panel data analysis in explaining convergence are Islam (1995) and Badinger, Muller and Tondl (2002). However, OLS analysis continues to be the most appealing econometric analysis method used.

Most studies on economic convergence have shown the convergence hypothesis to hold in the European Union, USA, Chile, Brazil and OECD countries, as proposed by the neo-classical theory and the Heckscher-Ohlin-Samuelson theory. On the other hand studies in developing countries have tended to give a prediction against convergence. In Sub Saharan Africa, studies show a very low convergence rates.

The literature on income convergence and growth is abundant, even if it only concentrates on the most relevant. For example, there are many convergence analyses on special regional integration areas such as MERCOSUR (Mercado Común del Sur) or on continents like Africa,(Madariaga, Montout, and Ollivaud (2003), Tsangarides (2005) and Camarero, Flôres, and Tamarit (2003) for contributions; for world-wide samples we refer to Mankiw, Romer and Weil (1992), Barro (1991), Sala-i-Martin (1996a), and

Lee and Pearsan (1997), to mention only the most relevant and most cited contributions. What they have in common with our study is the question: Do poor countries grow faster than richer countries in the long-run, and finally attain a catching-up? While some papers ask this question in general, others concentrate on particular integration or agreement areas like we do. In contrast to them, we fix the testing period along the real commencements of contracts more carefully than all previous studies.

CHAPTER FOUR

METHODOLOGY

Introduction

The chapter outlines the method and procedure to be employed in this study. It shows the theoretical framework and empirical model used in assessing convergence. These models have been used widely in developed countries by several authors, (Barro and Sala-i-Martin, 1991 and 1996; Cavazos, 2001; Bukenya, Gebremedhin and Schaeffer, 2002; Quah, 1995) and developing countries by: (Bezuidenhout, 2003; Leape and Thomas, 1998) to test the convergence hypothesis.

The convergence hypothesis as explained earlier asserts that, fairly restricted set of countries, such as those in ECOWAS are undergoing a process that brings their levels of Output Performance, Economic development and Macroeconomic behavior increasingly closer to one another (Baumol et al, 1994). Real Per Capita GDP, Life Expectancy at birth, adult literacy rate, Human Development index value, Gross Domestic Investment as % of GDP and Gross National Savings as % of GDP are the variables used to test the convergence hypothesis within the framework of the predictions of the Neo-classical growth theories. Ingram (1992) argues that the same logic of convergence can be applied to any measures of a country's performance.

Theoretical Framework

The study is essentially guided by the human capital-augmented version of the basic neoclassical growth model (HC-ASM) which is a modification of the Solow model by Mankiw, et al (1992). The authors found human capital as an important input of production, which also exhibit diminishing returns and therefore, included as a separate variable in the original Cobb-Douglas production function. The addition of human capital to the production function by Mankiw et al (1992) was justified on the grounds that, human capital accumulation contributes positively and strongly to productivity in a similar manner as physical capital accumulation.

Human capital which could be defined as acquired skills, knowledge, and health among others is able to improve the productivity and efficiency of labour just like physical capital and therefore, is regarded as a vital input of production. The authors also see human capital accumulation as a factor of and not a resource for production. As a consequence, they argued that human capital accumulation should be an integral component of the fundamental production function underlying growth and convergence. This conclusion is consistent with the findings of many studies including Kalbasi (2010), Morris (2008), Ghosh (2007), Fuduka and Toya (1995) etc.

Some of the key assumptions of the HC-ASM include a constant return production function with diminishing returns to inputs, closed economy without government activities in the economy. Based on these and other assumptions, the authors predicted that when differences in population growth rate, saving or investment rates, both in physical and human capital among countries are accounted for, cross-country data generally support conditional convergence so that, convergence occurs even without the need for international trade. Moreover, it was assumed by the authors that, differences

in initial capital-labor endowments would be eliminated over time which would in turn lead to convergence in per capita incomes. This stands to reason that, the convergence hypothesis rests on the assumption that, along an economy's transition to its steady state position, growth rate is inversely proportional to the capital-labour ratio, i.e. the lower the initial capital-labour ratio, the higher the growth rate will be and the converse also holds. Thus countries with lower initial capital per capita tend to grow faster compared to those with higher initial capital per capita. In other words, if capital exhibits diminishing returns, then an economy with lower capital-labor ratio exhibits a higher marginal product of capital and thus, grows faster compared to a similar economy with a higher capital-labor ratio so that per capita income differences across countries would tend to fade out over time, with per capita income and its growth rate gradually converging until reaching an identical long-run equilibrium level for both countries, respectively.

Further, income convergence holds that, for a group of countries that share similar characteristics or otherwise, the countries with lower initial income tend to grow faster than their richer counterparts. The former relates to conditional convergence while the latter connotes absolute convergence (Mankiw, et al, 1992). There are several measurements⁴ of convergence but all of which aim at measuring the reduction in the differences of welfare levels among countries or regions within a State. In all case, convergence has to do with growth sources and the conditions and policies that trigger them (Puyana and Romero, 2002). Hence, a cross-country convergence regression requires a negative relationship between initial per capita income and subsequent growth rate in income per capita.

Also, convergence between two series requires that their differences cannot be characterized by a boundless drift. Thus, for two or more non-stationary series, convergence implies that they share a common stochastic trend. This in turn means that, there is convergence if the difference between the per capita GDP of two countries evolves towards a stationary process (Carmignana, 2007, 2006; Greene, 2003).

In this study, income convergence is used loosely to represent a case where the disparity in the growth of income per capita among countries disappears overtime. Sala-i-Martin (2002) found conditional convergence as the most robust empirical evidence in data. In addition, Jawaid and Raza, (2012) and Fuduka and Toya (1995) also found that when the special roles of FDI and exports are accounted for, subsequent growth rates in per capita GDP are negatively related to the initial level of per capita GDP.

Based on these concerns, the econometric model for the study is derived as follows. The model starts with the Cobb-Douglass production function of the form:

$$Y = AK^\alpha L^\beta \tag{1}$$

Where:

Y = Total output K = Stock of physical capital L= Units of labor

A = efficiency parameter, measuring technology and knowledge

β = output elasticity of labour α = output elasticity of capital

Resulting from the argument raised by Mankiw et al, (1992), the Cobb-Douglas production function underlying the Solow growth model is modified and augmented with stock of human capital by Mankiw et al (1992) and this modified Solow model therefore became known as the Human Capital –

Augmented Solow model (i.e. HC-ASM) as is explicitly specified as shown in equation (2) below:

$$Y = AK^\alpha H^\beta L^{1-\alpha-\beta} \quad (2)$$

Y = Total output K = Stock of physical capital

L = Units of Labor H = Stock of human capital

A = efficiency parameter, measuring technology and knowledge

β = output elasticity of labour α = output elasticity of capital

$1-\alpha-\beta$ = output elasticity of labour

It is further assumed by Solow (1956) and Mankiw et al (1992) that L and A grow exogenously at the rates n and g respectively while a constant fraction of output, s, is invested. Also, physical capital stock (K) and human capital stock (H) are assumed to grow as follows:

$$g(K) = s_k Y - dK \quad (3)$$

$$g(H) = s_h Y - dH \quad (4)$$

Where:

$g(K)$ = growth of physical capital stock

$g(H)$ = growth of human capital stock

s_k = saving rate in physical capital stock

s_h = saving rate in human capital stock

d = rate of depreciation of both physical and human capital stocks (both physical and human capital are assumed to depreciate at the same rate).

k = physical capital per effective labour, $k = K/AL$

h = human capital per effective labour, $h = H/AL$

y = output per effective labour, $y = Y/AL$,

A country's movement towards its steady state is governed by:

$$gk(t) = sk y(t) - (n+g+d) k(t) \quad (5)$$

$$gh(t) = sh y(t) - (n+g+d) h(t) \quad (6)$$

$$y = k^\alpha h^\beta \quad (7)$$

Where:

gk = evolution of physical capital per labour

gh = evolution of human capital per labour

sk = saving rate in physical capital

sh = saving rate in human capital

y = output per effective labour

k = physical capital per effective labour

h = human capital per effective labour

n = population growth rate g = growth rate in technology

d = rate of depreciation of both physical and human capital

d and g are assumed to grow at a constant rate

t is time (usually measured in years)

Solving the steady values of k , h and y in (5), (6) and (7) above yield the following:

$$k^* = [sk / (n + g + d)]^{1-\beta / 1-\alpha-\beta} \cdot [sh / (n + g + d)]^{\beta / 1-\alpha-\beta} \quad (8)$$

$$h^* = [sh / (n + g + d)]^{1-\alpha / 1-\alpha-\beta} \cdot [sk / (n + g + d)]^{\alpha / 1-\alpha-\beta} \quad (9)$$

$$y^* = [sk / (n + g + d)]^{\alpha / 1-\alpha-\beta} \cdot [sh / (n + g + d)]^{\beta / 1-\alpha-\beta} \quad (10)$$

K^* = Steady state value of physical capital per effective labour

h^* = Steady state value of human capital per effective labour

y^* = Steady state value of output per effective labor

To obtain an expression for per capita GDP, the steady state value of output per effective labor in (10) is substituted into the production function in (2) above. Linearizing the ensuing production function by taking natural logs yields equation (11) as:

$$\ln\left(\frac{Y}{L}\right)^* = \ln A(0) + gt + \frac{\alpha}{1-\alpha-\beta} \ln Sk + \frac{\beta}{1-\alpha-\beta} \ln Sh - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+d) \quad (11)$$

The term $A(0)$ does not reflect only technology but also resource endowment, climate, institutions etc. and so it may differ across countries. The term A is usually referred to as Total Factor Productivity (TFP) which measures the growth of output which does not come from either capital or labour stock. Thus, $A(0)$ measures TFP at a given time and it is a country-specific variable which could be time variant or invariant. It is decomposed into two component i.e. $\ln A(0) = a + \varepsilon$, where a is a constant and ε is a country-specific shock leading to:

$$\ln\left(\frac{Y}{L}\right)^* = a + \frac{\alpha}{1-\alpha-\beta} \ln Sk + \frac{\beta}{1-\alpha-\beta} \ln Sh - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+d) + \varepsilon_{it} \quad (12)$$

$\ln(Y/L)$ = the log of real per capita income.

$\frac{\alpha}{1-\alpha-\beta}$ is the coefficient on savings in physical capital (Sk)

$\frac{\beta}{1-\alpha-\beta}$ is the coefficient on savings in human capital (Sh)

$\frac{\alpha+\beta}{1-\alpha-\beta}$ is the coefficient of the log of population growth rate (n)

ε_{it} is a country specific shock or a well behaved error term,

i measures cross-sections i.e. countries while

t measures time series i.e. years.

In effect equation (12) shows how income per capita depends on saving in both physical and human capital, and population growth.

Now, to test for convergence, Solow (1956), and Mankiw et al (1992) introduced initial per capita income to the right-side of (12) with the crucial assumption that there is convergence if the coefficient on initial per capita income is negative; otherwise there is divergence. This assumption stems from the assertion that, initial income per capita should be negatively related to subsequent growth rates of income per capita so that poor countries will tend to grow faster than rich countries. This modification is given by:

$$\ln\left(\frac{Y}{L}\right)^* = a + \lambda PCY(0) + \frac{\alpha}{1-\alpha-\beta} \ln Sk + \frac{\beta}{1-\alpha-\beta} \ln Sh - \frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+d) + \varepsilon_{it} \quad (13)$$

Where:

PCY(0) is the log of real income per capita at some initial time (0),

$\lambda < 0$ implies convergence, otherwise divergence.

Also, to allow for the estimation of the velocity or speed of convergence in per capita income, the convergence equation in (13) can be written as:

$$\ln\left(\frac{y(t)}{y(0)}\right)^* = a + (1-e^{-\psi})\lambda \ln PCY(0) + (1-e^{-\psi})\frac{\alpha}{1-\alpha-\beta} \ln Sk + (1-e^{-\psi})\frac{\beta}{1-\alpha-\beta} \ln Sh - (1-e^{-\psi})\frac{\alpha+\beta}{1-\alpha-\beta} \ln(n+g+d) + \varepsilon_{it} \quad (14)$$

so that the velocity or speed of convergence (ψ) could be solved

through a partial differentiation as:
$$\frac{d \ln y(t)}{dt} = -\psi [\ln y(t) - \ln y^*]$$

where $\psi = (n+g+d)(1-\alpha-\beta)$, is the velocity or speed of convergence.

Specification of Empirical Model

We develop an empirical model that will be applied to ECOWAS to test for absolute and conditional convergence. This cross-sectional

specification in equation (13) was extended to the case of panels by Islam (1995).

This study is a cross-country study and thus, in specifying the empirical model for the study, equation (13) is transformed into an equation conforming to the processes involved in estimating absolute β -convergence in a panel model, given by

$$PCY_{it} = a + (1 - \beta).IPCY_{it} + \mu_{it} \quad (15)$$

Where:

PCY_{it} = log of per capita GDP of country i at time t

$IPCY_{it}$ = log initial per capita GDP of country i at time t-1

“a” and β are constants. $0 < \beta < 1$, μ_{it} = error term.

The requirement $\beta > 0$ implies convergence. A higher coefficient β corresponds to a great tendency of convergence. The disturbance term captures temporary shocks on the production function. We assume that μ_{it} has mean zero, the same variance for all economies and is independent over time and across economies.

The requirements that all countries approach the same equilibrium growth rate is too restrictive. In reality, countries follow their own growth path. Hence equation (14) is also extended to evaluate the crucial role play by savings, real effective exchange rate and government expenditure on convergence in ECOWAS. While equation (15) is estimated to either validate or nullify convergence in ECOWAS, equation (16) as shown below is estimated to test for conditional convergence.

$$PCYG_{it} = \beta_0 + \beta_1 IPCY_{it} + \beta_2 \ln Gov_{it} + \beta_3 POPG_{it} + \beta_4 \ln Sav_{it} + \beta_5 \ln k_{it} + \beta_6 \ln Prim_{it} + \beta_7 \ln Exch_{it} + \varepsilon_{it} \quad (16)$$

Where:

PCYGit is GDP per capita growth rate in time t in country i.

IPCYit is initial GDP per capita

Gov is total government expenditure as a fraction of GDP .

k is capital investment,

POPG is population growth rate,

lnsav is log of savings,

ln PRIM is log of primary school enrolment,

ln Exch is the log of real effective exchange rate

μ_{it} is the error term.

In both equations (15) and (16), per capita income convergence holds if β_1 , i.e. if the coefficient on initial per capita income is negative. However, if this condition is violated in either equation, then there is divergence of per capita income.

Sigma Convergence

The dispersion of income within the ECOWAS region is measured by the income deviation (standard deviation) of each country from the regional mean or average. If there were convergence within the ECOWAS region, the expectation would be that the standard deviation or the dispersion of the per capita incomes would be reducing over time.

Justification, Measurement of Variables and Sign Expectations

Real GDP per capita (RGDP)

The variable that is used as a proxy for economic growth and is the dependent variable. It is defined simply as the total monetary value of all the final goods and services produced in the economy in a period of one year adjusted for the price changes. It can also be defined as an inflation-adjusted measure of the value of goods and services produced in a given year, expressed in base-year prices.

Real GDP is used in the analysis as a measure of real sector activities. The choice of this variable is guided by theory. This variable captures actual changes in GDP from the previous year to the current year and thus, if the economy has grown, it will be positive and if it has not grown, then it will be negative. Researchers such as Levine et al (2000) and Beck and Levine (2002) also used this variable as proxy for economic growth.

Coefficient of the initial real GDP per capital has to be negative. This reflects that there is an inverse relationship between the annual average growth in real GDP per capita and initial real GDP per capita thus implying that lagging countries are catching-up with the leading countries. Leading countries output performance must grow slower than the laggards in order for convergence to occur.

Population growth (POPG)

To understand the role of demography on per capita GDP, what matters is not the population growth rate per se, but the consequences in terms

of changing age structure of the population (Kelly & Smith, 1995). A large share of non-working population lowers labour input per capita, depresses the accumulation rate, thereby reducing the growth of per-capita GDP. Conversely, if the demographic growth is associated with an ability to absorb an expanding labour force, then the impact on GDP is positive (Linhd and Malmberg, 1999). For our sample, we expect an ambiguous sign.

Primary school enrolment (PRIM)

In light of the results obtained in the literature, we expect an ambiguous impact of human capital (proxies by primary school enrolment) on per-capita GDP. Some authors documented a very low effect of human capital investments on growth. Accordingly, one may expect to find small coefficients for our variables (possibly, non-significant coefficients). Schultz (1999) reported that the impact can be negative when countries have low endowment in human capital. Human capital can also positively affect the level of GDP, through its effects on productivity and economic policies. All in all, the signs of our human capital variable can be either positive or negative.

Government Expenditure (GOV)

In a standard open economy, public spending has a positive demand impact, especially in the short-run (demand boom being associated with a higher growth). Meanwhile, this effect can be overwhelmed by negative supply-slide influences, if the increased spending implies distortionary taxes. In the latter case, one may expect a negative coefficient. Ratio of government

expenditure to GDP (GOV) variable enters the model as a policy variable and also to complete the components of the GDP.

Keran, 1971 stated that changes in government spending affects total spending, corporate earnings and thereby affecting share prices. Government expenditure, according to the Keynesian proposition is expected to raise economic growth. It could, however, reduce economic growth because of the crowding out effect on private investment and the inflationary pressures it can lead to (Allen & Ndikumana, 2000). However, given that all things remain constant and following Keynesian proposition, we expect GOV to have a positive sign.

According to the Keynesian proposition, an increase in government expenditure, if bond financed, raises aggregate demand, which leads to an increasing demand for cash balance. Government expenditure is expected to propel economic growth without a crowding out effect on the private sector. This study follows the works of Easterly & Rebelo (1993) and Malla (1997) but it would be used as a policy variable for economic growth in this study since an increase in government expenditure especially in productive activities like road construction, provision of electricity can boost economic growth. It is expected to have a positive sign.

Real Effective Exchange Rate (RExch)

This shows the price of the domestic goods and services relative to the price of goods and services of other countries. This variable is chosen because changes in the exchange rate affects the country's foreign direct investment. The real effective exchange rate is obtained by the product of the nominal

effective exchange and effective relative price indexes or nominal exchange rate i.e. an index of tracking a country's average exchange rate divided by price deflator (Afari, 2004; Nyugen and Haughton, 2002 and Agyapong 2012). The study expects negative relationship between real effective exchange rate and real income per capita.

Gross Fixed capital formation (K)

Gross fixed capital formation (K) formerly gross domestic fixed investment includes plants, machinery and equipment. It also includes the construction of roads, railways, and others such as schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. The variable is used as a proxy for capital stock. Gross fixed capital formation as a proxy for capital has been used in several other studies such as Aryeetey and Fosu (2005), and Mansouri (2005).

The role of capital accumulation as a central element of sustained growth in Africa has been extensively documented in the literature, so that the coefficient of the investment rate must be positive (Berthelemy and Soderling, 2001). The higher the rate of investment the higher the growth rate of the economy, all other things being equal. This is in line with both the neoclassical and endogenous growth predictions.

Gross Domestic Savings (Sav)

According to the World Bank, Gross national saving is derived by deducting final consumption expenditure from Gross national disposable income, and consists of personal saving, plus business saving, plus

government saving, but excludes foreign saving. The figures are presented as a percent of GDP. A negative number indicates that the economy as a whole is spending more income than it produces, thus drawing down national wealth (dissaving).

The conventional perception is that savings contribute to higher investment and hence higher GDP growth in the short run (Bacha, 1990; DeGregorio, 1992; Jappelli and Pagano, 1994). The central idea of Lewis's (1955) traditional development theory was that increasing savings would accelerate growth. Kaldor (1956) and Samuelson and Modigliani (1966) studied how different savings behaviors induced growth. On the other hand, many recent studies have concluded that economic growth contributes to savings (Sinha and Sinha, 1998; Salz, 1999; Anoruo and Ahmad, 2001). Carroll, Overland, and Weil (2000) demonstrated that "if utility depends partly on how consumption compares to a habit stock determined by past consumption, an otherwise-standard growth model can imply that increases in growth can cause increased saving." Edwards (1995) found that per capita growth is one of the most important determinants of both private and public savings.

The role of savings in per capita income growth is emphasized in the neo-classical growth models by the Solow growth model. Thus, it is predicted that a country with a high rate of savings will grow faster. Hence it is expected that saving should have a positive effect on growth.

Post Estimations

Some sensitivity analyses were carried out in the study. They include panel unit root, heteroscedasticity, autocorrelation, and multicollinearity among others tests. While the unit root test is a pre-estimation sensitivity analysis, heteroscedasticity, autocorrelation, and multicollinearity are largely post-estimation analysis. This is to ensure the general fitness of the variables as well as the models that are employed in this present study.

Stationarity or Unit Root Test

According to Gujarati (2003), “a stochastic process is said to be stationary, if its Mean, and Variance are constant overtime and the value of Covariance between any two time periods depends only on the distance between the two time periods and not on the actual time at which the Covariance is computed”. Although econometricians generally believe that unit root is usually a problem of Time Series data, it is both appropriate and important that the variables in a panel dataset are also tested for Stationarity. This is to avoid the occurrence of unrelated regressions, sometimes known as spurious regressions. In the study, the Fisher test ($\rho\lambda$) is employed. The Fisher-type test uses p-values from unit root tests for each cross-section i . The formula of the test looks as follows:

$$p = -2 \sum_{i=1}^N \ln p_i \quad (17)$$

The test is asymptotically chi-square distributed with $2N$ degrees of freedom ($T_i \rightarrow \infty$ for finite N).

Heteroscedasticity, Autocorrelation and Multicollinearity

The problems of heteroscedasticity (which is usually associated with cross-sectional data) and autocorrelation (which is usually a time series data) are sometimes observed even in panel datasets. The modified Wald test for group-wise heteroscedasticity and the Wooldridge test or the Lagrange-Multiplier test for autocorrelation model are employed to test for heteroscedasticity and autocorrelation respectively. A test for the severity of multicollinearity is carried out using the Variance Inflation Factor (VIF) technique.

This study adopts the procedure described in Caselli et al. (1996) in estimating the relationship described in Equation (15 &16). Caselli et al. used a generalized method of moments (GMM) to address simultaneously the problems of correlated individual effects and endogenous explanatory variables that result in inconsistent estimates, which characterized many growth studies.

Estimation techniques

Equations (15) and (16) above are estimated for a panel of member states in the grouping under consideration to test for absolute and conditional beta-convergence respectively. Secondly, we compute the standard deviation of the GDP per capita of member countries in the sub-region at the beginning and at the end of the period. The comparison of the two values of this inequality measure shed light on whether the dispersion of real per capita income across member economies tends to fall over time (σ -convergence).

We have chosen the estimation procedure that doesn't tend to overlook the relative size or importance of each country, treating all observations as equal (cross section weights). This is justified by the disparity that exists among member states in West Africa. Finally, in order to take into consideration the pace of reforms in the sub-region, and the fact that business cycles are not synchronized across member countries, we first cover the whole period 1975-2012, and after we divide it into four sub-periods: 1975-1985, 1986-1995, 1996-2005 and 2006-2012.

Sources of Data

This study employs secondary data for its variables. The data is from the following sources: ECOWAS Statistics, World Development Reports. The type of data used in the analysis is panel data set.

Conclusion

This chapter explored the main theoretical underpinning for the study. Based on theory and empirical studies, a number of variables which are thought of influence per capita income convergence have been included in the model of the current study. The chapter also dealt with the issue of variable description, measurement, justification for their choice as well as their *a priori* economic expectation particularly, in terms of signs. Panel data set on gross savings, real effective exchange rate, primary school enrolment, population growth rate, gross fixed capital formation to GDP ratio and government expenditure as a share of GDP from 1975 to 2012 was employed for the study based on the relaxation of the assumption of closed economy without

government activity. In both estimations, per capita income growth is the dependent variable. Also, in both estimations, a negative coefficient on initial per capita income implies convergence, otherwise, there is divergence.

Further, empirical models and some econometric estimation techniques relevant to the study have been specified and discussed. Discussion on the various sensitivity analyses aimed at ensuring the fitness of variables and models has also been made. By this, the chapter has set out a good platform for the estimation and discussion of results.

CHAPTER FIVE

RESULTS AND DISCUSSION

Introduction

This chapter gives the results and discussions of the study, the chapter is basically divided into three main parts. The first section presents the descriptive statistics of the variables used in the data. This descriptive includes basic summary statistics of the variables, graphs of the relationship between the variables, interrelationship between the main variable of interest and the variables and the basic correlation between the main explanatory variables and the dependent variable. The panel unit root was also examined to obtain the stationarity status of the variables. The second section presents the results and discusses the outcomes of the results in line with the objectives of the study. The last section presents the summary of the results and discussion presented in the study.

Descriptive Statistics

Under this section, basic characteristics of the variables in question are presented. This includes graph of trends of the variables, the correlation among the variables and summary statistics of the variables are presented. The summary statistics presented consist of mean, median, maximum value and the minimum values, Kurtosis, as well as the basic distribution of the variable.

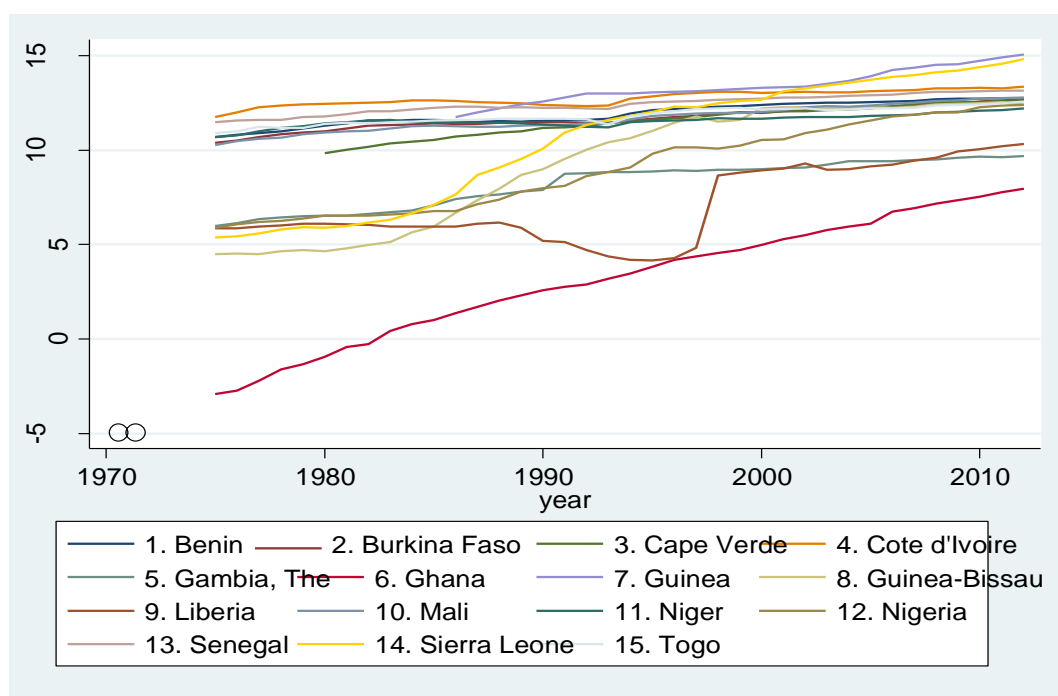


Figure 2: Log of Per Capita income growth for ECOWAS member countries from 1975 to 2012

With regard to some empirical facts, little evidence is found to substantiate claims of convergence within the ECOWAS countries. Figure 2 shows the log of per-capita GDPs. From the study, the graph suggests that all the countries follows the same growth path with the exceptions are Cape Verde, Côte d'Ivoire and Niger. This observation is in line with a usual empirical finding in the literature that the Sub-Saharan economies evolve close to their steady-state equilibrium (Sperlich, 2010). The study further observes that, distances between the curves do not narrow therefore the economies follow their own long-run growth path.

The study further reveals that, evidence of convergence is observed between Benin and Ghana on one side and between Burkina Faso, Mali and Nigeria on the other side (high growth rates since the mid nineties helped Burkina Faso to close the gap with other richer countries). it was also observed

that Senegal is catching up with Côte d'Ivoire, due to the slow growth rates of the latter since 1999. From the look of Figure 2, it can be noted that the member states in the ECOWAS sub regions are gravitating towards a particular level of growth between 14% and 15%. These findings play against the convergence hypothesis.

To get a clearer picture of the trends over the various years, the graph of the trends were done on a periodic basis. The period of ten years were graphed from 1976 to 1985, 1986 to 1995, 1996 and 2005 and 2006 to 2012. The last period is five year since the estimation and data used for the period were having missing observation for the year 2013. Figure 3 presents the graph of the Per Capita for the period of 1976 to 1985. The graph shows the dispersion of per capita growth within the ECOWAS region for the period under consideration.

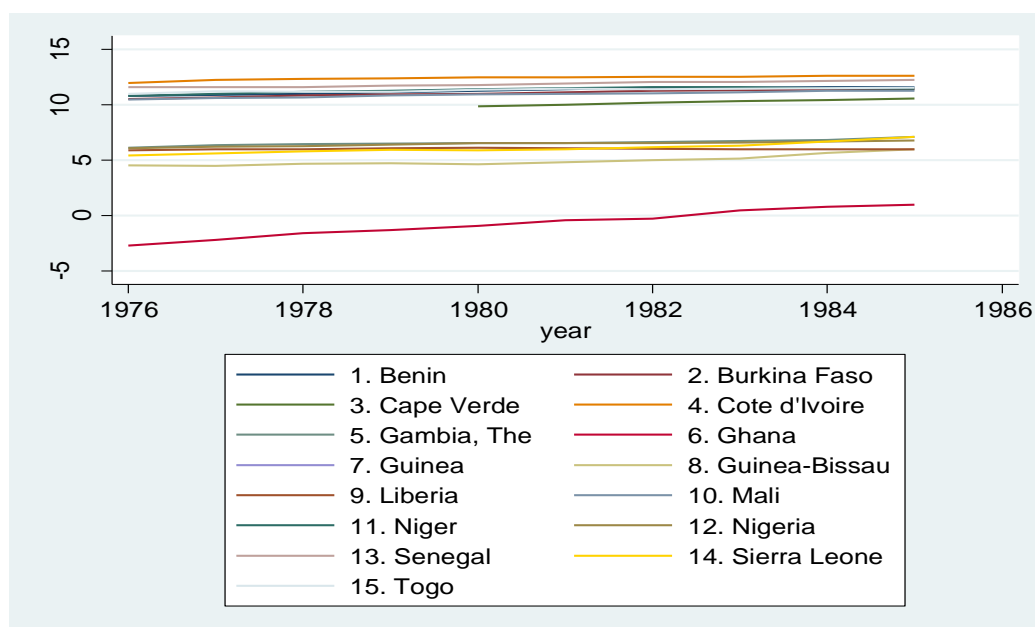


Figure 3: Growth of Per Capita Income from 1976 to 1985

Source: Generated from WDI (2013) dataset

From Figure 3, it is interesting to note that for the 1976 to the 1985, there is no significant difference in the growth rate of the ECOWAS member states. The curves were almost horizontal for almost all the countries, except Ghana which is observed to be rising from the negative to the positive growth rate.

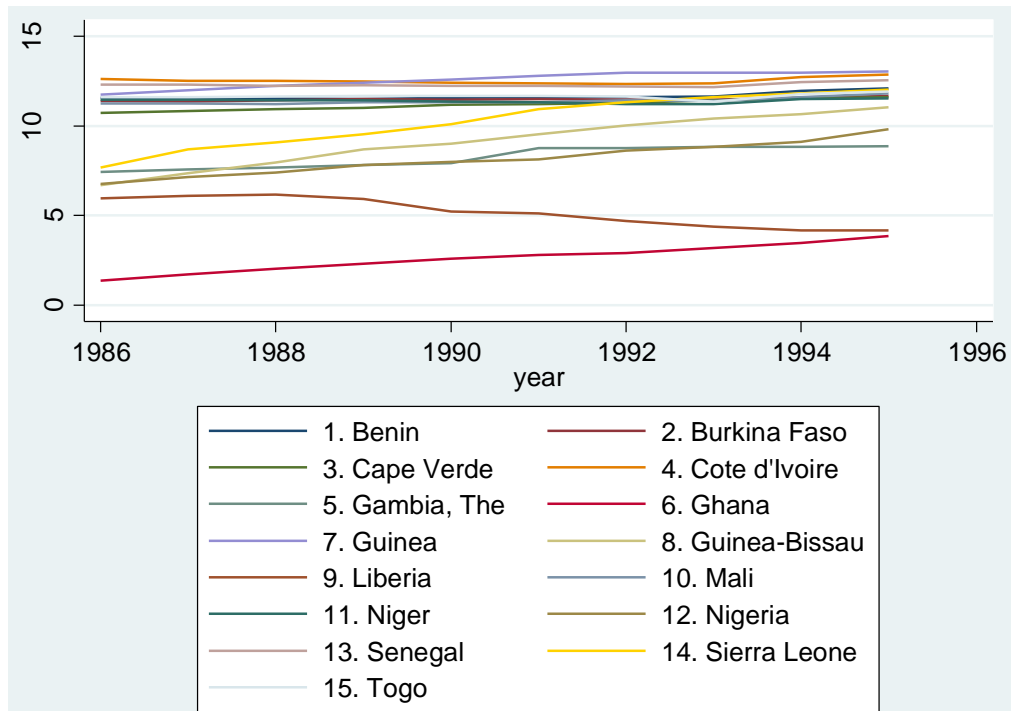


Figure 4: Per Capita growth for ECOWAS member states from 1986 to 1995

Source: Generated from WDI (2013) data set

Figure 4 shows that GDP per capita growth started to converge to about 12% to 13% for most Ecowas member states. However, few countries that had high growth rates dropped out to the low region. The countries that were lagging behind experienced a high growth rates. For example Ghana's GDP rose above 0% per capita growth rate. The countries in the ECOWAS region were experiencing positive growth after the 1986. This could be attributed to the massive structural adjustment programmes (SAP) that were

embarked on during the early 1980 and 1990s. During this period, there were big moves in per capita income growth. This finding for the period is similar to the finding of Njuguna et al (2010).

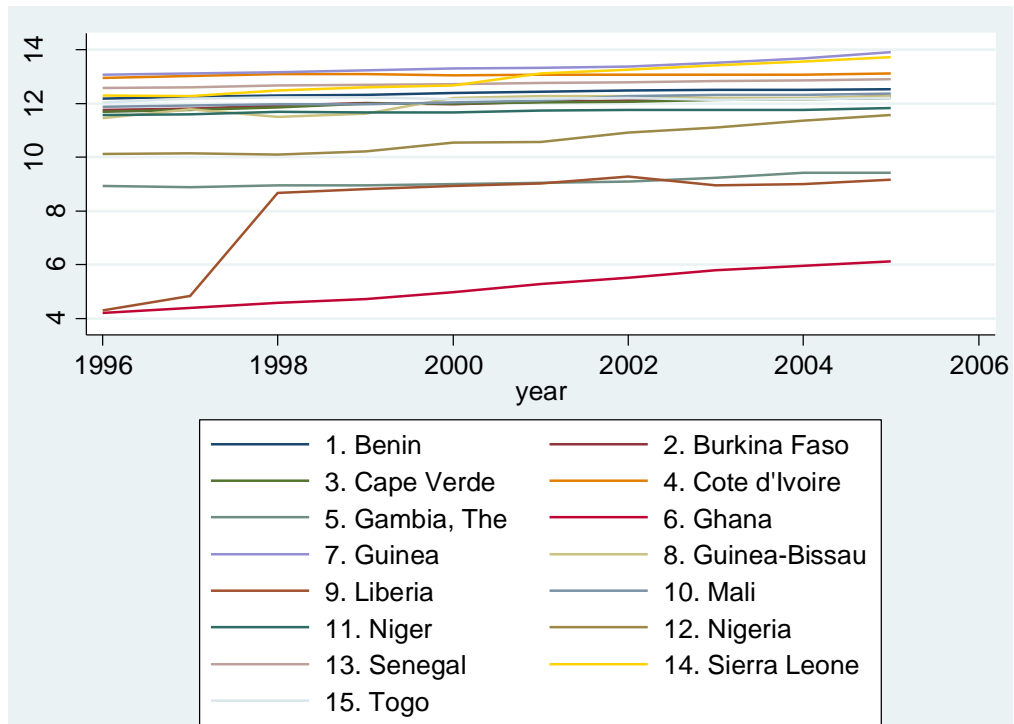


Figure 5: Per Capita growth for ECOWAS member states from 1996 to 2005

Source: Generated from WDI (2013) data set

Similarly, for the period “1996 to 2005”, the growth rate of GDP in the ECOWAS region saw more countries diverging around 11% to 14% growth rate. The countries were seemingly getting closer to the mean growth rate of the region. Though the countries with lower growth rates moved to a higher growth rate levels of per capita income, there was still a wide difference between these countries. The trends exhibit parallel growth rate between them. In the conventional convergence wisdom, it is expected that the trends in the GDP growth should be moving toward one particular direction. But as the

economies grow in the ECOWAS region, the gap between them keeps on widening as purported by Aboagye and Turkson (2014).

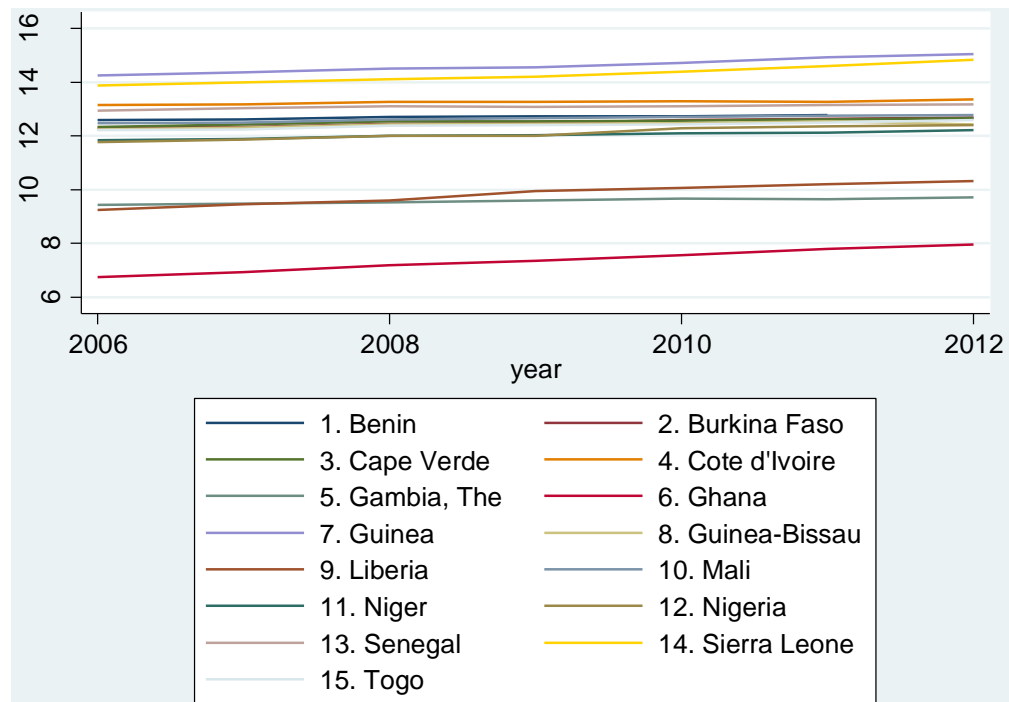


Figure 6: Per Capita growth for ECOWAS member states 2006 to 2012

Source: Generated from WDI (2013) data set

However, for the period between 2006 and 2012, the ECOWAS member countries experienced a continuous high growth. The growth of the countries was consistently rising. It is evident from many studies that African economies are experiencing a very high per capita growth in the past few years (Sperlich, 2010).

Summary Statistics

The summary statistics of the variables used in the regression were examined. The results are presented in Table 2. The statistics shows that the mean per capita growth for the ECOWAS sub-region is 10.32% for the period under consideration. The maximum level of growth for the region was 15%

and the minimum for the period was -2.92%. The standard deviation suggests that, the growth in per capita income deviate from the mean by 3.13. However, the growth is skewed to the left of the mean. The skewness turn to suggest that majority of the countries in ECOWAS region has growth that is less than the mean for the period between 1975 and 2012.

Table 2: Summary statistics of variables

Variable	Mean	Max	Min	Sd	Skewness	Kurtosis	N
REER	71.23611	6658.033	0.0001149	3.115	-1.72859	6.391	552
SAV	2.28E+08	1.07E+11	705738.5	1.990	3.16554	16.701	552
POPG	13.91545	2529.635	0.1610243	1.039	-0.37398	8.271	553
GDP	30363.61	3457272	0.0537345	3.127	-1.54552	5.33	552
GOV	2.47E+09	2.06E+11	1.14E+08	1.396	0.387677	3.334	534
PRIM	62.77865	132.8047	14.11695	0.484	-0.7772	2.987	522
K	4.20E+08	2.67E+10	1960422	1.462	0.01671	3.192	520

Source: Generated using WDI (2013) dataset

The log of real effective exchange rate had the mean of 71.24 with a standard deviation of 3.1. This implies that, the deviation of the observations from the mean is 3.1. This shows that the observed values of LREER fall either below or above the mean by 3.1 units and suggest a very widely disperse values for log of real effective exchange rate. This is clear from the maximum value of 6658.033 and a minimum value of 0.0001149. The maximum and the minimum values suggest that there are wide variations in the data if the range for the data is calculated. The data however is skewed toward the left and with a kurtosis of 6.4. From the skewness and the kurtosis,

it could be concluded that the variable log of real effective exchange rate is not normally distributed.

For the savings, the highest value for the sub-region during the period under consideration in this study is $1.07E+11$ with the lowest value of 705738.5. The mean for savings was calculated to be $2.28E+08$. Comparing the mean with the standard deviation of 1.990, it is clear that savings is not highly spread. The kurtosis and the skewness also show signs of normality in the distribution of the variable in consideration.

It is considered that, the African continent is one of the continents with the greatest population growth rate compared with the rest of the world (World Population Review, 2009). The mean of the population growth rate (POPG) is 13.92 which is considered low for the ECOWAS region. The population growth for the region recorded a highest value of 2529.64 for the panel of countries involved in the analysis and the lowest growth rate in population is 0.16. The standard deviation of 1.04 is suggestive of less varied observation. In other words, the population growth of the ECOWAS region is clustered around the mean value but slightly and negatively skewed to the left.

Government expenditure had a mean of $2.47E+09$ and a maximum of $2.06E+11$ with a minimum of $1.14E+08$. The standard deviation of 1.39 and the skewness for the variables was 3.5. Gross primary education had a mean of 62.78 with a maximum value of 132.80 and a minimum value of 14.12.

Relationship between per capita growth and explanatory variable

The classical theory suggested a positive relationship between labour and productivity. Such that increase in labour force is supposed to result in high

per capita income. Figure 9 predicts a positive relationship between per capita growth and labour force. This correlation was significant at 1 percent.

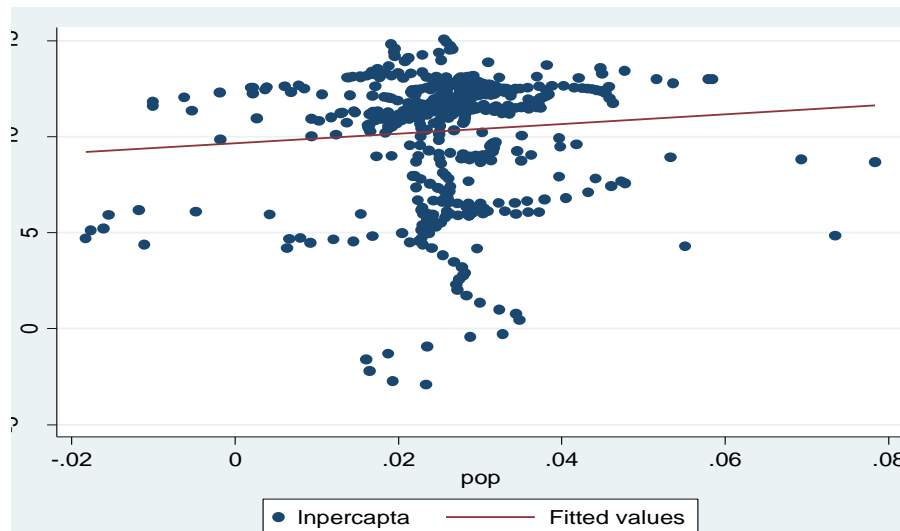


Figure 7: Per capita income and population

Source: Generated from WDI (2013) dataset

The sign of the labour support the theoretical conclusion that it contributes positively to growth of GDP both in the short and long run since the correlation between labour and per capita GDP growth in these two periods is positive and significant (Ayibor, 2012).

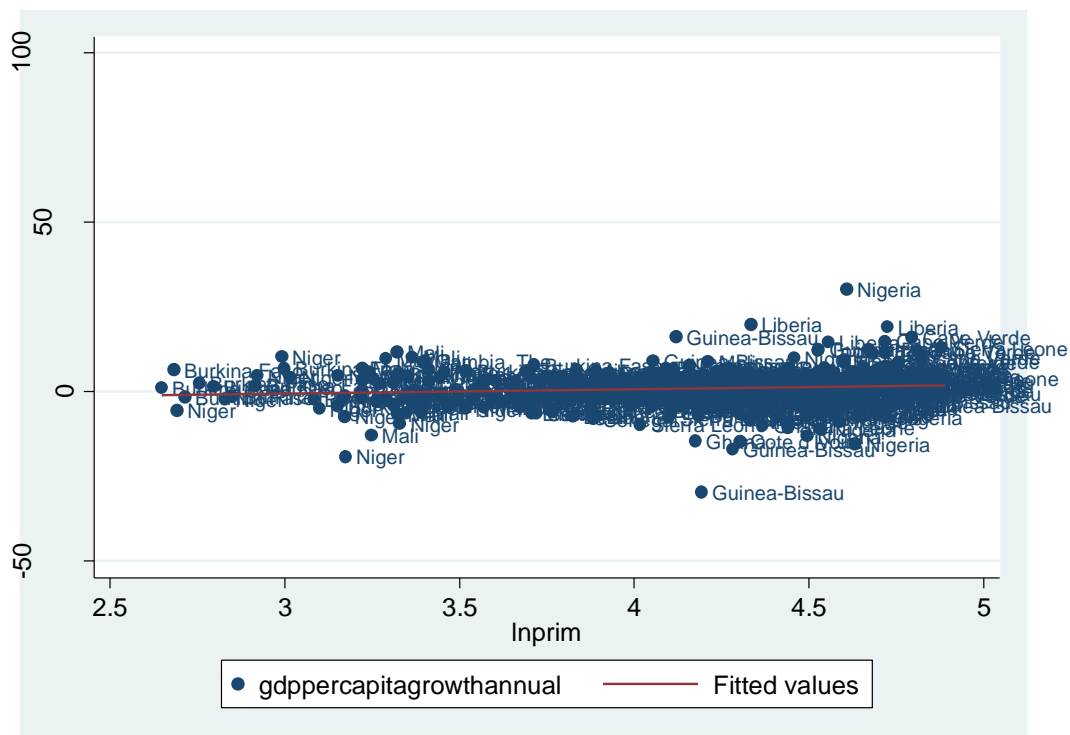


Figure 8: Per capita income and log of primary school enrolment

Source: Generated from WDI (2013) dataset

The relationship between school enrolment and the per capita income was not statistically significant. This supports the findings of Easterly (2002) that education has not yielded the required impact on economic growth. The relationship between the two variables suggest similar pattern in the ECOWAS region. The result suggests rather that over the years, education does not result in any change in the growth in per capita income. This is however in contrast with the Barro (1998) findings showing that education has more influence on per capita income.

The result of the correlation between log of government expenditure and the growth of per capita is positive. Figure 9 shows such a relationship. However the plot suggests the presence of influence of outlier on the relationship between the growth of per capita and government expenditure.

This result is in support of the traditional Keynesian analysis that government expenditure propels growth which does not support the classical assumption.

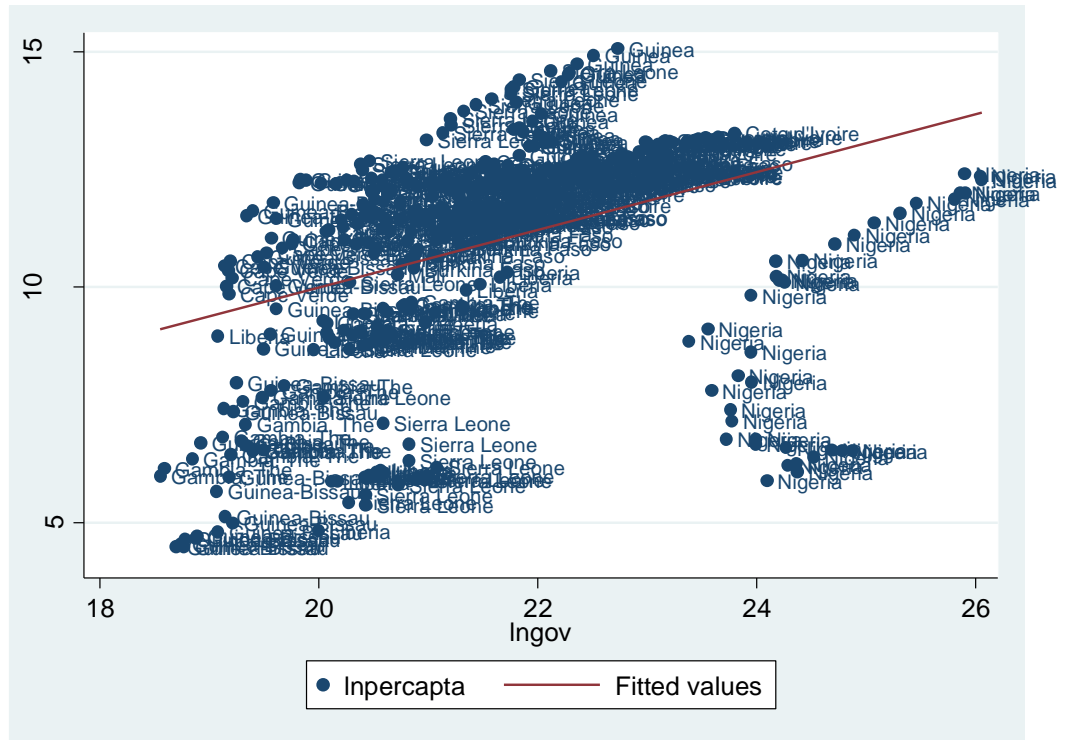


Figure 9: Per capita income and government expenditure

Source: Generated from WDI (2013) dataset

Figure 9 also suggests that Nigeria seems to be an outlier for the log of government expenditure. This is not surprising due to the large size of government, of the Nigerian economy. But the positive relationship between government expenditure and per capita income growth is not affected by the outliers in the ECOWAS region.

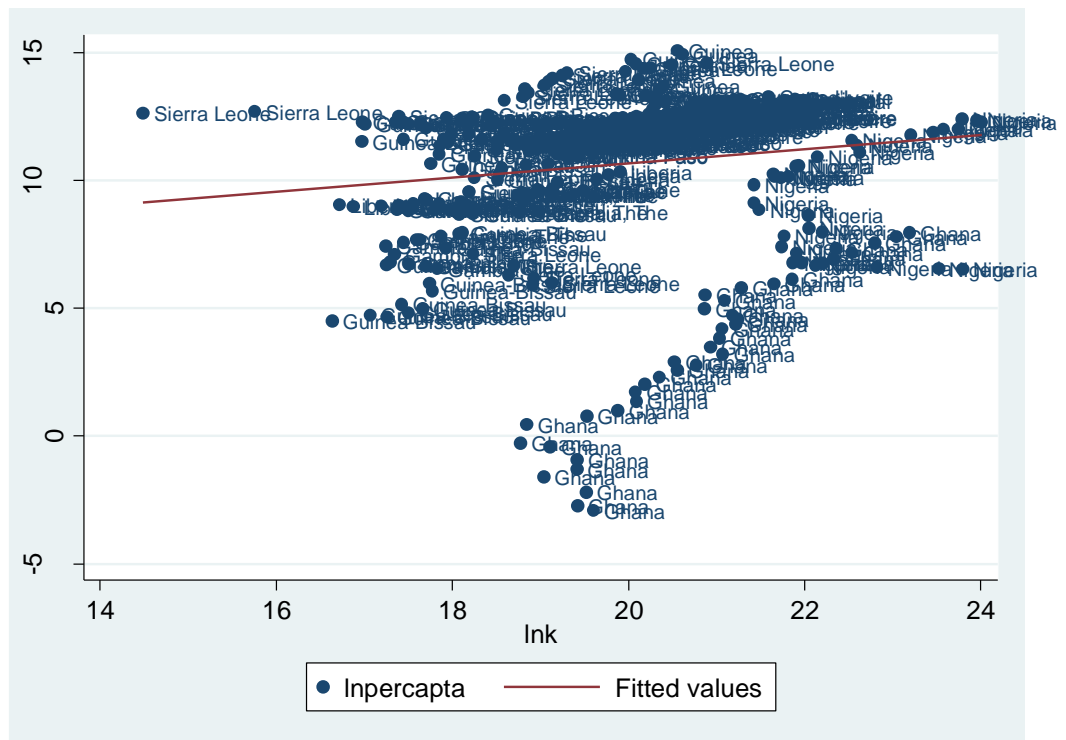


Figure 10: Per capita income and physical capital

Source: Generated from WDI (2013) dataset

Physical capital accumulation contributes positively and strongly to productivity and is regarded as a vital input of production. From Figure 10, Physical capital stock has been identified to have a positive relationship with per capita income. Aryeetey and Fosu (2005), findings support this assertion that physical capital influence the growth of GDP positively and as well as per capita.

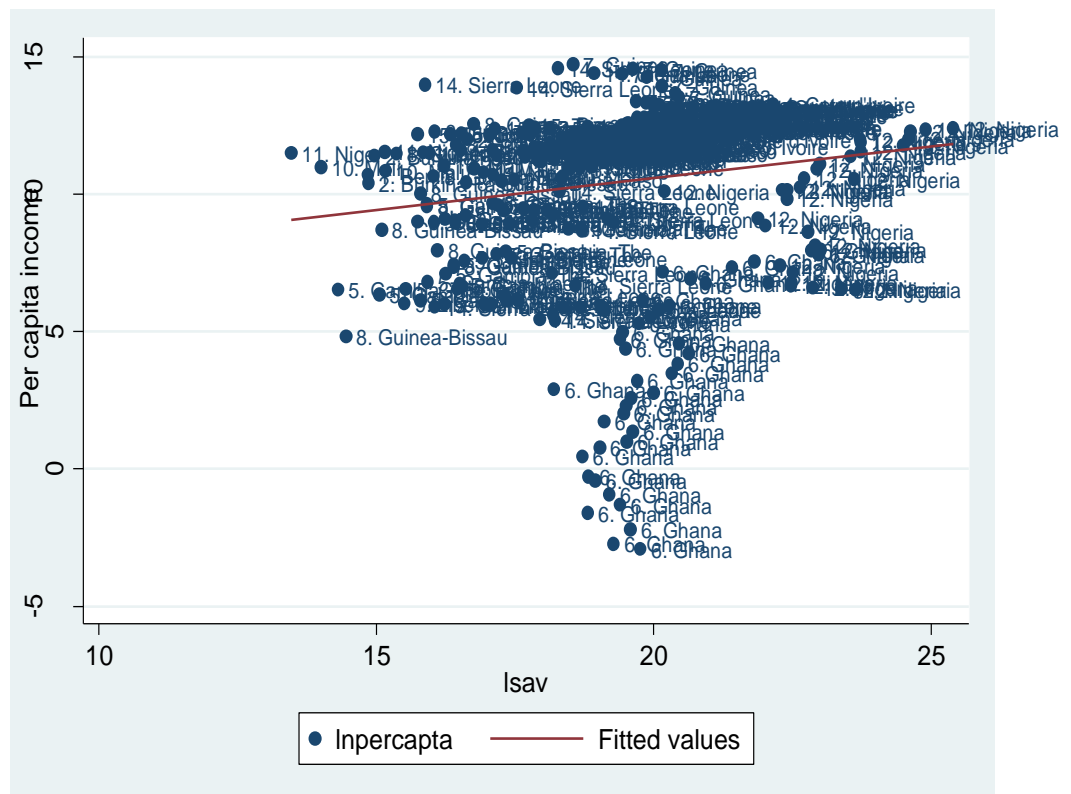


Figure 11: Per capita income and savings

Source: Generated from WDI (2013) dataset

Figure 11 shows that savings have a positive effect on Per capita income. This relationship is well documented in the literature (Kyriacou, 1991).

Stationarity or Unit Root Test

In order to estimate conditional convergence, we introduce other explanatory variables (Gross domestic savings, government expenditure, real effective exchange rate, Gross physical capital formation and Gross primary enrolment), stationarity status of all the variables in the convergence model specified for the study was determined. This was done so as to avoid spurious results.

Table 3: Fisher Unit root test of Variables

	Inverse chi-squared		Inverse normal		Inverse logit		Modified inv. chi-squared	
Lnexch	86.7217	0.0000	-	0.0351	-	0.0001	7.3227	0.0000
			1.8104		3.9905			
Lnsav	70.7720	0.0000	-	0.0001	-	0.0000	5.2636	0.0000
			3.6560		4.1754			
LPrim	273.1857	0.0000	-	0.0000	-	0.0000	16.3730	0.0000
			10.947		12.015			
Lnk	47.5238	0.0121	-	0.0009	-	0.0018	2.6090	0.0045
			3.1368		3.0163			
Lngov	183.1397	0.000	-	0.000	-	0.000	9.8731	0.000
			7.6961		8.0142			
Log of Per Capita	20.8673	0.0524	-	0.0773	-	0.0992	1.8100	0.0351
Log Initial per capita	158.9519	0.0000	-	0.0980	-	0.0000	16.6476	0.0000
			1.2267		7.7727			
Pop growth	76.3478	0.0000	-	0.0907	-	0.0006	5.9835	0.0000
			1.3366		3.3512			
Primary education	48.3379	0.0183	2.7583	0.9971	2.2231	0.9855	2.3674	0.0090

The results of stationarity test of the variables employed in the study are presented in Table 3. As a measure of robustness, four different unit root test statistics were computed. All the four tests reject the null hypothesis that all the panels contain unit roots. Choi (2001) argued that, when the number of panels is finite, the inverse chi-square test is powerful and applicable. The study has a finite number of panels and as a consequence, on the basis of the inverse chi-square test, the null hypothesis of unit root is strongly rejected. The conclusion is that at least one of the panels has no unit root and this removes the tendency of possible spurious regressions or unrelated regressions.

Convergence in the ECOWAS region

Under this section, the result on the convergence which is the main focus of the study was presented. To examine the convergence, the study uses both, sigma convergence and beta convergence. This section presents the results from the examination of the beta and the sigma convergence.

Income convergence

In this objective, the study seeks to examine, on the basis of the neoclassical model, if less advanced economies grow faster than wealthy ones. The convergence possibility among ECOWAS countries to a similar level of income per capita is examined at two levels; absolute convergence and conditional convergence. The results of the GMM estimation for absolute convergence are reported in Table 4.

Absolute convergence

The second notion of convergence considered in this study is the beta convergence as discussed earlier. The beta-convergence is divided into two aspects, namely absolute convergence and conditional convergence. This study adopts the procedure described in Caselli et al. (1996) in estimating the relationship described in Equation (15) and (16). In their study, they used a generalized method of moments (GMM) to address simultaneously the problems of correlated individual effects and endogenous explanatory variables that result in inconsistent estimates, which characterized many growth studies. Caselli et al. followed the procedure from those described in Holtz-Eakin, Newey and Rosen (1988) and Arellano and Bond (1991).

The result of the absolute convergence as presented in Table 4 indicates that, coefficient of the log of initial per capita for all the five estimation periods from the GMM are positive instead of the expected negative sign. This implies that, for the period of estimation, there was no clear evidence of convergence among the ECOWAS member countries. To be specific, the period were divided into four period, covering ten years each, in an attempt to avoid the effect of business cycle fluctuation on the rate of convergence as has been done in Njuguna et al. (2007).

For the first period (1976 to 1985), the empirical result shows that 75 percent of variations in the growth rate of per capita GDP is well explained by the initial per capita GDP. The coefficient of log initial GDP per capita (Beta) had a positive coefficient of 0.932, contrary to the hypothesized sign, an indication of income divergence during the period under consideration. In addition, the coefficient is significant at 1%. Similarly, for the second period

(1986 to 1995), the result shows that 85 percent of variations in the growth rate of per capita GDP are well explained by the initial per capita GDP. The convergence criterion was not met using the beta convergence measure. However, the coefficient of the beta rose to 0.95. The implied divergence, which shows the speed of divergence, also increased during this period.

Table 4: Estimated results for absolute convergence among ECOWAS member countries

Variables	1975-1985	1986-1995	1996-2005	2006-2012	1975-2012
Beta	0.932*** (0.0230)	0.950*** (0.0144)	0.626*** (0.325)	0.922*** (0.0241)	0.967** (0.0241)
Implies λ	0.06	0.13	0.01	0.15	0.071
R ²	0.75	0.85	.70	.832	.92
Observations	118	148	150	104	520
Number of countries	14	15	15	15	15
chi2	1643***	4322**	644.2*	1471***	32397***
Sargan	57.31	116.8	158.9	86.30	639.9
VIF	2.02	2.01	2	1.87	1.76

Source: Authors estimate *Note: * 10%, ** 5% and *** 1% significant level*

Between the years 1996 to 2005, the coefficient of the beta reduced from 0.95 from the previous period to 0.62, while the implied divergence also fell to 0.01. That shows that for this period, though the economies of the

ECOWAS region were not converging per the criterion, the divergence between the rich and the poor was somewhat minimal compared to the previous period. The possible explanation is that, since the latter half of the 1990's most of the African Economies has experience tremendous growth. Therefore, it would have been expected that these countries would converge but they are rather diverging from each other. This result is consistent with the finding of Aboagye and Turkson (2014) who found no evidence of the convergence criterion on for Sub-Saharan African countries for the same period.

For the entire study period, the convergence criteria are still not met. This implies that, instead of the economies in the ECOWAS region converging, the divergence between them were widening. Similar finding has been presented by studies done by Njuguna, Hammouda, Karingi, and Jallab (2007). They found that for the period of 1980-2003 that there was income divergence in the ECOWAS region.

The study used the wald test to examine the joint significance of the variable in the model, the R-square was used to examine the explanatory power of the variable to the variations in the dependent variable, the sargan test for over identification restrictions and the VIF (variance inflation factor) to examine the robustness of the models presented for the analysis. To start with, the wald test was statistically significant at 1% for all the models that was estimated. This implies that, for all the models estimated, the variables in the model jointly explain the variations in the per capita growth in the ECOWAS region.

The VIF which was used to measure the presence of multicollinearity was conducted. The threshold for the mean of the VIF should be 10. If it is greater than 10, then the problem of multicollinearity exist. Therefore, this test was conducted after the model was estimated. The mean values for the respective regressions suggest that there is no dependence among the variables used in the estimation.

The most important test for the GMM estimation is the Sargan test for over-identification. The over identification restriction test is based on the null-hypothesis that the over-identification restrictions are valid. That is there is no identification problem in estimating the model. The result for the Sargan test was statistically significant. Therefore, the null hypothesis could not be rejected. Hence it is concluded that, the identifications restriction impose on the models are valid. Based on this, it is argued that the models that have been interpreted are robust and efficient.

Conditional convergence

To examine the factors that affect the rate of convergence among the member states for the ECOWAS region, the study went on to examine the conditional convergence of the ECOWAS member states in the region. In examining the conditional convergence, the study considered other variables like investment in physical capital, population growth, government expenditure, real effective exchange rate to measure the effect of the external economy on the countries, the human capital was also measured by the gross enrolment in primary schools and level of savings.

It is obvious fact that most of the variables such as government expenditure, real effective exchange rate would be affected by the growth rates of the economy. This would call for instrumental variable estimations. Therefore, the study adopted the GMM due to its ability to correct for endogeneity problem that exist among variable in the estimation and the fact that it uses internal instrument to correct for the problem of endogeneity (Roodman, 2009). Equation (16) was estimated for the same periods as mentioned above to observe conditional convergence of development levels within the economic grouping. The results of the conditional convergence are presented in Table 5.

The conditional convergence was estimated for the same period (1975 to 2012). The estimation for each of the periods suggests that there is no convergence in the ECOWAS region for the period under estimations, this is evident by the positive value of the betas. The coefficient of beta in the first period, 1975 to 1985 was 0.59 and reduced to 0.52 for the period of 1986 to 1995. Divergence seemed to be very high in these periods compared to the last period of estimations. Such huge conditional divergence rate suggests a much wider disparities in income among the ECOWAS member countries during the period of investigation. However, for 1996 to 2005, the coefficient of the beta reduced drastically to about 0.24 and further reduced to 0.14 in the last period (2006 to 2012) and was statistically significant at 1% and 5% respectively.

The observation from the results is that, the population growth was statistically significant in the model. This means that the divergence or income disparity may stem from the difference in population or labour force availability among the ECOWAS countries.

Table 5: Results on conditional convergence

	1976 - 1985	1986 - 1995	1995 - 2005	2006 - 2012	Over all
Beta	0.592*** (0.102)	0.521*** (0.0424)	0.204*** (0.0528)	0.143** (0.0636)	0.697*** (0.0281)
Lnsav	0.0652** (0.0267)	0.0256*** (0.00946)	0.0292*** (0.00789)	0.0681*** (0.0124)	0.0332*** (0.00700)
Pop	15.50** (6.085)	4.603*** (1.758)	1.923 (1.196)	-5.245 (5.140)	1.920** (0.806)
Lngov	0.547*** (0.169)	0.508*** (0.0712)	0.641*** (0.0647)	0.774*** (0.0726)	0.304*** (0.0385)
Lnexch	-0.228** (0.0661)	-0.482*** (0.0366)	-0.698*** (0.0507)	-0.775*** (0.0873)	-0.257*** (0.0222)
Lnk	0.292*** (0.0751)	0.190*** (0.0459)	0.0852*** (0.0286)	0.152*** (0.0349)	0.144*** (0.0199)
Lnprim	0.267 (0.227)	0.0351 (0.0925)	0.172*** (0.0422)	0.181** (0.0727)	0.0125 (0.0271)
Obs	118	105	109	108	520
Countries	15	13	15	15	15
Sargan	53.37	140.2	118.1	56.00	451.1
AR test	0.00641	0.411	1.692	2.374	-0.0448
Wald test	154***	474***	325***	173***	264**

Source: Authors estimate *Note: * 10%, ** 5% and *** 1% significant level*

(Standard errors in parentheses)

Similar result is shown in the 4th period which is between 2006 and 2012. The result still indicated that there is no convergence since beta has a positive sign. This is inconsistent with the convergence hypothesis that the lag coefficient of per capita income should be negative. This implies that in the conditional sense, ECOWAS member states diverge.

In general, the estimation results do not render support to the

hypothesis of per capita income convergence among countries in the ECOWAS region during the period under consideration. Contrary to the prediction of the Human Capital Augmented Solow model, initial per capita income is found to be significant and positively related to per capita income growth which is a clear indication of divergence. This is in sharp contrast to the prediction of Paola (2007), and especially Mankiw et al. (1992) whose work concluded that once population growth, investment in physical and human capital are controlled for, cross-country data generally support per capita income convergence. These results are however consistent with the conclusions of Parikh and Shibata (2004), Sala-I-Martin (1996), Islam (1995).

Further, Mankiw et al (1992) predicted conditional income convergence for similar (homogeneous) countries but contrary to this prediction, the ECOWAS region does not form a homogenous set of countries in many respects. Countries in the region differ strongly in terms natural endowment, educational system, macroeconomic targets, population structure, political administration and structure *inter alia*, all of which tend to affect their per capita income growth. As a result the convergence hypothesis as predicted by Mankiw et al (1992) may not apply to the ECOWAS region. Also, though Jones (2002) investigated into the convergence effect of regional integration in West Africa on the assumption of cross-country homogeneity, he failed to find a strong evidence for per capita income convergence among the so-called homogeneous ECOWAS countries.

Sigma convergence

The main objective here is to know whether the economic catch-up phenomenon has enhanced the closing-up of development levels of member states in the grouping. To estimate the sigma convergence of an integrated area like the ECOWAS region, the various measures of dispersions is usually used in the literature. The coefficient of variation or the standard deviations and variance are commonly used. For this study we have chosen a measure of inequality, which is the standard deviation of GDP per capita in the grouping. It helps to highlight the importance of the dispersion of development levels during the period 1975-2012 with respect to the year considered as the beginning of the period of the analysis.

By looking at the dispersion of income within the Ecowas region, one can make an observation whether the disparity of income among the member countries has a tendency to fall over time. Here, the dispersion is measured by the income deviation (standard deviation) of each country from the regional mean or average. If there were convergence within the integrated region, the expectation would be that the standard deviation or the dispersion of the per capita incomes would be reducing over time.

A plot of the sets of standard deviations against time from, 1975 to 2012 is also shown in Figure 12:

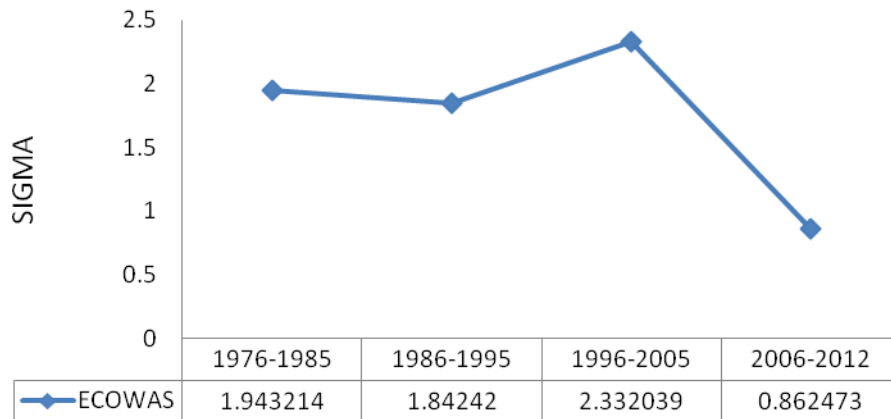


Figure 12: Plot of standard deviation of per capita income among Ecowas States

Source: Author’s calculation.

Figure 12 tells different stories of convergence among the member countries of ECOWAS. According to the results, income disparity among the ECOWAS countries was increasing rather than decreasing over the entire time period until the last period (2006-2012). This implies a weak income convergence is occurring among the ECOWAS countries in terms of their income distribution. The income distribution in ECOWAS countries is however narrow as shown by its smaller per capita income standard deviation. In the first period (1976 – 1985), ECOWAS per capita standard deviation was 1.9432, but in second period (1986 – 1995), this standard deviation had decreased to 1.8424 showing a clear indication of a tendency towards some form of convergence in income. Figure 13 further provides convergence in income from 1976 - 1985 up to 1986 – 1995. However the average income disparity in ECOWAS started to rise in the third period (1995 - 2005), a clear indication of income divergence. But it picked up a downward trend again in the last period (2006-2012), showing a level of sigma convergence. The plot

of income dispersion across ECOWAS countries shows a tendency for sigma income convergence in the sub region.

This result is in line with findings by Njuguna et al (2007), they also found sigma divergence in the ECOWAS region between the period 1995 to 2003. Earlier studies have found that for most African economies, there is no clear income convergence between them (Gbetnkom, 2006). Hence the convergence hypothesis fails to hold and each country moves around their growth path.

Which Factors Inhibit Growth And Which Spur Growth?

The role of savings in per capita income growth in the neo-classical growth models has been emphasized by the Solow growth model. Thus, it is predicted that a country with high rate of savings will grow faster. Saving, therefore is expected to have a positive effect on growth. The results found in the study suggest that the effect of log of saving is positive and statistically significant at 1% for the four sub periods of the estimation.

The effect of human capital on economic growth has been extensively examined. Human capital which could be defined as acquired skills, knowledge, and health among others is able to improve the productivity and efficiency of labour just like physical capital and therefore, should be regarded as a vital input of production. A positive effect of human capital (proxied by primary school enrolment) in the growth model is expected. It is argued that a higher level of human capital stock leads to increase in productivity and technological growth (Kyiadou, 1991). This is then expected to improve the growth of the low income countries to help them catch-up.

The empirical results shows that, the effect of human capital on the growth of the member states in the early 1975 to 1986 and 1986 to 1995 was not statistically significant. However, in the third and fourth periods, human capital is statistically significant at 1%. The divergence as measured by the beta reduces in these periods.

For the overall model, human capital seems not to have any effect on the growth of income in the region. Although surprising, these results are however in line with the conclusions found in other studies. For instance, to explain the negative sign of enrolment rates in growth equations, Knight et al. (1993) observe that in poor countries enrolment rate continue to rise up, even when growth rates fall. Easterly (2000) has also pointed out that education seems to have no role on the growth of economies. For the estimation period, the effect of human capital development on growth is inconclusive and depends on which periods the study examined.

The effect of Physical capital on economic growth has been emphasized in the growth literature. Physical capital stock has been identified by Aryeetey and Fosu (2005), and Mansouri (2005) to influence the growth of GDP positively and hence per capita also. The result from the study confirms these earlier studies on some ECOWAS countries (Sperlich, 2010). The result in table 5 shows a positive relationship between capital stock and economic growth. The coefficient of capital stock was 0.29, 0.19, 0.085 and 0.15 for 1976 to 1985, 1986 to 1995, 1996 to 2005 and 2006 to 2012 respectively. These coefficients of capital stock were significant at 1%. For the overall model of the estimation period, the results indicated that if capital stock increases by 1%, the income per capita growth increase by 0.14%. This

positive effect is consistent with growth theories that capital accumulation engenders growth in productivity and income. The study supports the findings of Aryeetey and Fosu (2005), their study found positive relationship between capital stock and GDP growth for countries in SSA.

Again, the result indicates that there is no effect of population growth on the growth of per capita income in the ECOWAS region for the period 1996 to 2005. Nevertheless, for the full study period, the estimates suggest a significant and positive relationship between population growth and growth in per capita income. This is consistent with the recent study by Aboagye and Turkson (2014). The positive effect of population growth on per capita income growth could be explained from the view of availability of labour supply. Increase in population would mean availability of cheap labour for employment to increase productivity. Once this happens, the income of the economies increase and per capita income also increases.

The elasticity of government consumption ratio is positive and was significant at 1% significance level, which reflects a predominance of demand-side effects (part of this category of expenditures comprises wages and salaries). Further, it is worth pointing out that, in the empirical literature, fiscal deficits (implied by a reduction in government consumption) negatively affects growth in countries with unfavourable macroeconomic condition. For countries with a modicum of macroeconomic stability (for instance those with a low inflation rate), increased public deficits do not dampen growth. For instance, Baldacci et al. (2003) find that increases in current government spending were compatible with higher growth in Benin, the Gambia and Senegal. The positive sign in our equation may be explained by the fact that

our sample comprises a majority of WAEMU countries, for which macroeconomic stability is reflected by low levels of inflation rates.

Comparing WAEMU and ECOWAS Region

Table 6: Results on absolute convergence in WAEMU and Non-WAEMU countries

VARIABLES	WAEMU (1975 – 2012)	Non-WAEMU (1975 – 2012)
Beta	-0.141** (0.0712)	0.262* (0.143)
Constant	-1.616*** (0.309)	-3.850*** (0.970)
Observations	193	113
Number of countries	8	6
R ²		0.89
chi2		30096***
Sargan		540.9
VIF		1.68

Source: Authors estimate (2014) using IFS data (2013) Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results in table 6 show some evidence of convergence for WAEMU member countries and no evidence of income convergence for Non-WAEMU countries. The estimation results shows that the beta coefficients in

the absolute convergence model are significantly negative and falls between zero and one, which is the requirement for income convergence. It is also noted that though there is income convergence among the WAEMU countries, the rate of divergence in the Non-WAEMU countries is greater, and this accounts for the divergence in the ECOWAS region.

The group of francophone countries (WAEMU), has realised a higher level of integration than ECOWAS. WAEMU members has established a common accounting system, periodic reviews of member countries' macroeconomic policies based on convergence criteria, a regional stock exchange, and the legal and regulatory framework for regional banking system. Tariffs among the member countries have been eliminated and a Common External Tariff exists already since its formation in 1994. The adoption of a common currency (the CFA) among others account for income convergence in the WAEMU bloc.

Why Income Divergence in ECOWAS region

Divergence in the standard of livings is observed in the Ecowas region, meaning that some countries are escaping from poverty while others are trapped. Lack of convergence across the ECOWAS countries can be explained by a strong heterogeneity of the economic structures, which implies that the countries evolve along different long-run paths. In an attempt to explain such findings of divergence in the ECOWAS region, the argument by Giannetti (2002) for growth divergence among countries or regions is been used. Giannetti (2002) asserts that unequally distributed manufacturing industry locations lead to income divergence at country or regional-level because

convergence depends on the possibility of knowledge spillover. This is poorly stemming from economic geography and is clear in the case of ECOWAS countries given the trends in foreign inflows and Multi National Corporations industrial choice of locations.

The study indicates that there are only limited income convergences that are found in sigma-convergence at best in ECOWAS. What then explains this slow speed towards income convergence in ECOWAS?

Weak Growth, Low Growth in Factor Intensities

In this study, weak growth is discussed as one possible explanation for the slow income convergence in Ecowas. Sachs and Warner (1997) alluded to the possibility that little convergence among African countries is due to their slow growth. They argue that this is due to the lack of and a result of limited investment, which provides only slow accumulation of capital.

Empirical studies have showed that Africa's productive activity depends more on labor than capital and total factor productivity. Ecowas member countries lack technology to push growth. But the slow growth is dependent on the evolution of factor intensities and contribution of total factor productivity (TFP). In explaining the income convergence in the OECD countries, Dowrick and Nguyen (1989) investigated extensively what might explain convergence by looking at the growth in the factor intensities and catch-up in total factor productivity of member countries. Dowrick and Nguyen (1989) found a compelling evidence that convergence in OECD is driven by technology catch up, and in this study we similarly argue that it is the lack of capital and employment deepening and low TFP that have slowed

down convergence in ECOWAS countries. In their studies, Njuguna et al. (2006) found that there have been generally low capital, low employment deepening and low growth in the TFP in ECOWAS resulting in weak output growth, which might explain the lack of progress in income convergence.

The empirical results in the previous section indicated that the income dispersion in ECOWAS is quite small. ECOWAS countries appear to have depended mainly on labour to drive their growth. However, the accumulation and productivity of this labour has remained the same over the years and across the countries. In fact, there has been no change in the growth dynamics of ECOWAS. This implies that there have been little investments that would have been expected to contribute to factor accumulation. Lack of structural shift in the rate of factor accumulation explains the failure of the ECOWAS to experience factor intensity driven growth of a significant nature (Njuguna et al., 2006; Sperlich, 2010).

Little Progress in Regional Economic Integration

We discussed earlier that many empirical studies suggest that income convergence is partly a result of higher integration of economies within the regional integration. This would mean an increased intra-regional trade and higher movements of both capital and labor. This section showed that the lack of the basic ingredients of economic integration in ECOWAS contributed to the slow progress of their income convergence.

Low Intra-Regional Trade

In 2010, Economic Community of West African States (ECOWAS) adopted its “West African Common Industrial Policy”. One of its key objectives is to increase the share of intra-regional trade from currently around 12% of total trade to 40% in 2030, with a vision to “maintain a solid industrial structure, which is globally competitive, environment-friendly and capable of significantly improving the living standards of the people by 2030” (ECOWAS, 2010). This is the latest step in a long history of ambitious attempts for regional integration in West Africa, and it follows a global trend towards regionalisation of trade integration.

The increasing interest in regional integration is often attributed to the disappointing progress of multilateral trade negotiations in the WTO. But there also appears to be a widespread notion that regional trade – in some way – is “better” for developing countries than trade with the rest of the world. For example, the recently published fourth report on Assessing Regional Integration in Africa (African Development Bank, African Union, UN Economic Commission for Africa, 2010) emphasises the importance of regional trade for development and poverty reduction in Africa. At the same time, aid for trade projects are increasingly taking a regional focus, for instance by providing technical support for regional institutions, cross-border transport corridors, and other trade facilitation measures.

Despite the above described political efforts, the share of regional trade in ECOWAS has remained more or less constant at a rather low level over the past two decades (between 10% and 15% of total exports go to regional markets with some fluctuation, but no clear trend). However, this aggregate figure is very much dominated by Nigeria’s heavy weight in the regions total

exports. These consist mainly of oil and are to a large extent directed to the global market. For other member countries, regional trade plays a much more important role.

Figure 13 shows export shares by destination for all ECOWAS countries with data availability in the COMTRADE database between 2004 and 2012. Calculations are made over the average for all years with available data in order to get a consolidated trend and reduce the impact of short term fluctuations. A few product groups that comprise mainly re-exports of (sometimes used) goods are omitted from the calculations in order to reduce distortions through non-domestically produced goods to the extent possible (See Appendix A).

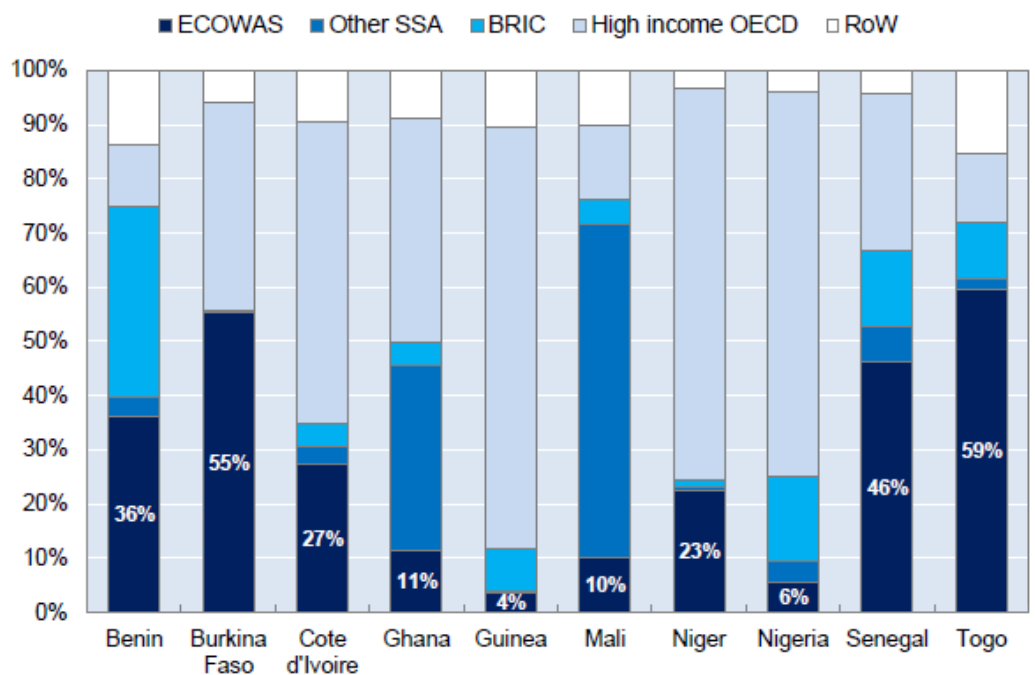


Figure 13: Export shares by region for ECOWAS countries 2004 and 2012

Source: Author's calculation based on data from COMTRADE.

In this breakdown, only Nigeria and Guinea have single digit shares of exports to ECOWAS. For other countries in the region, this ratio can be as high as 59% (Togo), 55% (Burkina Faso), or 46% (Senegal). The composition of exports to ECOWAS partners is quite different to that of exports to other African countries (other SSA), major emerging markets (BRIC = Brazil, Russia, China, India), high-income OECD countries (hiOECD), and the rest of the world (RoW). The main exception here is Nigeria, whose exports to all regions are strongly dominated by crude oil. This being said, there does not appear to be a clear-cut pattern across countries in terms of what is exported regionally and what is exported globally. For some countries, the share of manufactured goods is substantially higher among ECOWAS exports than among exports to global markets:

- Benin exports manufactured Food, Beverages and Tobacco (including substantial amounts of cigarettes) and some construction materials (mainly steel and cement) to ECOWAS, while exports to BRIC and RoW consist mainly of agricultural products (Cotton, some cashew nuts).

Cote d'Ivoire exports mainly refined petroleum products⁶ to ECOWAS. Exports to hiOECD comprise agricultural (cocoa), mining (crude oil) and food products (cocoa butter).

- Ghana exports manufactured wood, plastic and textile products to ECOWAS. Exports to other SSA are dominated by semi-processed gold to South Africa. Exports to other regions comprise a large percentage of traditional agricultural exports, mainly cocoa.

- Senegal exports refined petroleum products, construction materials (steel and cement) and food products to the ECOWAS region. Exports to BRICs are dominated by refined petroleum products, while exports to hiOECD comprise mainly fish and other seafood.
- Togo, the country with the highest share of intra-ECOWAS exports (59%), exports construction (steel and cement) and packaging material as well as some food products (margarine, flour, mineral water) to ECOWAS. Export to other regions comprise mainly agricultural (cotton, cocoa) and mining (phosphates) products.
- For Burkina Faso, exports to all regions are dominated by one agricultural product, cotton. Exports to ECOWAS also comprise a few food and tobacco products (cigarettes, sugar, vegetable oil), while hiOECD also contain some semi-processed gold.
- Guinea has very low regional exports, about half of which are in fish. Exports to other regions are dominated by aluminium and gold in different degrees of processing.
- For Mali, agricultural products (live animals) are the main export items to ECOWAS. Agricultural products (in this case, mainly cotton) also play an important role in its export portfolio to BRIC, hiOECD and RoW. The main export item, however, is semi-processed gold, which is exported to South Africa and hiOECD.
- Niger exports agricultural products (live animals, onions) to ECOWAS and uranium ore and semi-processed gold to hiOECD.

Africa remains a marginal player in world trade with a historically low share in world exports. In 2006, Africa's share of world total exports was only 3 percent, albeit somewhat higher than its lowest record in 1998 of about 2 percent. Nonetheless, this figure remains way below the level of the 1960s and 1970s of about 5 percent (WTO, 2007). Hence, the creation of regional integration is seen as one of the ways to increase the share of trade in many African countries. In principle, regional integration with trade agreements benefits all member countries through the increased volume of commodity traded within the region. Unfortunately, African regional trade integration also remains low.

Conclusion

The chapter presented the results and discussion of the results of the study. The descriptive statistics were presented to show the pictorial effect of the variables on the growth of per capita income, the simple two way scatter was employed to show the variables effect on the dependent variable. This was confirmed with the regression estimates.

The results from the study confirmed that for the ECOWAS sub region, there is nothing like income convergence for the member state however the results gave evidence of income convergence among the WAEMU countries. The sigma convergence test showed that the income disparity among member countries is reducing over time. Lack of convergence across the ECOWAS countries can be explained by a strong heterogeneity of the economic structures, which implies that the countries evolve along

different long-run paths. The heterogeneities are symptomatic of differences in the efficiency of capital utilization, in the capacity of absorption of aid, in competitiveness, in the conducting of economic policies.

It is clear from the conditional convergence results that variables like population and the level of human capital development, physical capital stock and the level of savings matter for the economic growth of the ECOWAS member state.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter is divided into three main sections. The first section presents the summary of the study and gives the main findings of the study. The second section presents the conclusions that are drawn from the main findings of the study. The last section then draws policy recommendation from the study as well as making recommendation for future research

Summary

The study aimed at examining the income convergence criterion for the ECOWAS member states. To achieve this, the study set out to examine the conditional convergence, the absolute convergence as well as sigma convergence in the neo-classical framework to see if the inequalities in income among member states are closing up over the years. The study included all the 15 member countries of the ECOWAS region with panel data spanning from 1975 to 2012. The data for the analysis were obtained mainly from the World Development Report from the World Bank data set.

The analysis of the data was done in two levels. The first was to examine the trends and the correlation between the main explanatory variables used in the study. Therefore to see this, the study employed both graph and regression analysis to examine the hypothesis set for the study. The variables that were used as control variables included log of saving, log of physical

capital stock, human capital (which was proxied by gross primary school enrollment), population growth, and real effective exchange rate.

After this trend analysis, the second analysis was done. The study modeled a convergence growth model using the difference GMM estimators since there was a potential of having endogeneity in the growth models. Under this, the absolute convergence and conditional convergence were examined. However before any conclusion and explanations of result would be done, the study subjected the regression analysis to diagnostic test to know the reliability and the efficacy of the result presented in the model for analysis.

The empirical evidence for the absolute and conditional beta convergence estimations showed that, there is income divergence among the ECOWAS member states. This implies, countries with low initial per capita income are not growing fast enough to catch up with countries with high initial per capita income. However, for the sigma convergence estimation, the study found evidence that income disparity among member countries have reduce over the estimation period. The study also revealed that income convergence exist among the WAEMU sub- groupings. This could be attributed to efforts towards greater integration among the francophone countries in West Africa.

The results from the conditional convergence estimation showed that, the rate of income convergence is influence by the population and human capital. The study also found that saving and capital stock has positive effect on per capita income growth among member states. However, education on the overall, do not have any effect in the ECOWAS region while real effective exchange rate depreciation had negative effect on economic growth.

Conclusions

From the general findings, the following conclusion could be drawn from the studies:

1. It could be concluded that there exist income divergence among the 15 ECOWAS countries in complete disagreement with the prediction of the Human Capital-Augmented Solow Model (HC-ASM) over the period 1975 to 2012.
2. The study also finds weak income convergence as income disparity increased among the 15 ECOWAS countries over the period 1975 to 2005 but slightly declined over the period 2006 to 2012. This implies that member states in the ECOWAS region are experiencing sigma convergence.
3. The evidence of income divergence in ECOWAS is found to be explained by weak and low growth in factor intensities. Little progress in regional economic integration and low intra-regional trade.
4. The rate of depreciation of real effective exchange rate is detrimental to the development of economic growth. The economies in the ECOWAS region become less competitiveness due to high depreciation of their currencies. This affect the performance of their economies in terms of economic growth
5. Also, greater economic integration in the form of economic and monetary union has great impact on the rate of income convergence in the regional bloc. This is shown by the evidence of absolute income convergence among the WAEMU subgroup in the region.

6. The level of human capital development, physical capital stock, rate of real effective exchange rate and the level of savings are important determinants of economic growth in the ECOWAS region.

Recommendation

From the conclusions made, the following recommendation could be drawn from the study.

1. ECOWAS member countries, especially Non-WAEMU member states should continue with efforts towards greater economic and monetary union. This can be facilitated by the adoption of a common currency in the region. Efforts towards the adoption of the single currency (ECO) should be hastened.
2. Although, the formal institutional framework that exist in ECOWAS, may help in facilitating regional integration, a lesson from the East Asian emerging countries suggests that a spontaneous and rapid regional integration can be achieved through market driven phenomena and sustained economic growth.
3. Furthermore, though the presence of physical capital accumulation might have also cause per capita income divergence in the region, it had significant and positive impact on per capita income growth. This suggests that some policies should be formulated to ensure more physical capital accumulation in the ECOWAS region.

Suggestions for future research

The study uses the neoclassical assumption that the economies are less open to international transactions. The relaxation of this assumption would affect the capital and labour mobility. However this study does not relax the assumption to include capital account openness and trade openness. Relaxing these assumptions could have a tremendous effect on the convergence hypothesis in the sub-region. It is therefore recommended that future research should try to include these variable in examine the conditional convergence.

Secondly, future studies could consider different version of estimation techniques that allow the use of external instrument to control for endogeneity issue. The version of the GMM used, uses internal instrument by using the leads and lags of the variable as instrument. However this has been proven to be less efficient when there is endogeneity resulting from simultaneity. But due to the difficulty of getting external instrument, the study uses these approach under the condition that it does not affect the result obtain from the study. Therefore, future study should endeavour to find external instrument and employ a GMM approach that allow for the inclusion of external instrument.

Lastly, Since the HC-ASM could not establish per capita income convergence in SSA, future research should explore the convergence hypothesis in ECOWAS using alternative growth models such as the R&D and AK growth models.

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APPENDIX A

Omitted Product Groups

The omitted product groups are the following two digits chapter from the 2002

UN Harmonized System:

HS84 - Nuclear Reactors, Boilers, Machinery and Mechanical Appliances;
Parts Thereof

HS85 -Electrical Machinery and Equipment and Parts Thereof; Sound
Recorders and Reproducers, Television Image and Sound Recorders and
Reproducers, and Parts and Accessories of Such Articles

HS86 - Railway or Tramway Locomotives, Rolling-Stock and Parts Thereof;
Railway or Tramway Track Fixtures and Fittings and Parts Thereof;
Mechanical (Including Electro-Mechanical) Traffic Signalling Equipment of
All Kinds

HS87 - Vehicles Other Than Railway or Tramway Rolling-Stock, and Parts
and Accessories Thereof

HS88 - Aircraft, Spacecraft, and Parts Thereof

HS89 - Ships, Boats and Floating Structures

HS90 - Optical, Photographic, Cinematographic, Measuring, Checking,
Precision, Medical or Surgical Instruments and Apparatus; Parts and
Accessories Thereof

HS93 - Arms and Ammunition; Parts and Accessories Thereof