REGIONAL INTEGRATION AND ECONOMIC GROWTH EVIDENCE FROM ECOWAS

BY

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DECLARATION

This is to certify that this thesis is the result of research undertaken by JAKOBA RADONIAINA RAZANAPARANY towards the award of MPhil Economics in the Department of Economics, University of Ghana. I hereby declare that with exception of references made to works of other researchers, this thesis is entirely my work under the guidance of my supervisors.

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ABSTRACT

Since its inception, the performance of the ECOWAS regional integration in terms of economic growth has not been encouraging. Numerous reforms were implemented to enhance the level of integration in the region including the revision of the ECOWAS of 1993. This study aims to examine the effect of the regional integration on economic growth, and, particularly, the effect of the revised treaty of 1993 on economic growth in the ECOWAS. We estimate a standard growth model using a panel dataset on 14 ECOWAS countries over 44 years (1975-2019) by a fixed effects regression with the Driscoll-Kraay Standard Errors method. This technique provides consistent and robust estimators, overcomes heteroscedasticity, autocorrelation, and cross-sectional dependence that might generate bias on statistical results. The study found that regional integration exhibits a positive relationship with economic growth in the ECOWAS. Hence, ECOWAS economic growth is stimulated by regional integration through openness to international trade and physical capital stock accumulation while FDI and human capital accumulation were found to be not statistically significant at level. Besides, the effect of the ECOWAS revised treaty of 1993 on economic growth was positive. This reform was been associated with an increase in the ECOWAS GDP growth rate by 1.627 percent. The findings, the study recommends the implementation of policies toward a more open economy into international trade, the establishment of the business environment to attract FDI and promotes domestic investment, and lastly, the implementation of reforms to deepen regional integration.

DEDICATION

This thesis is dedicated to my family.

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The Author takes the whole responsibility for any omissions or mistakes in the present thesis.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AFTA	ASEAN Free Trade Area
ARII	Africa Regional Integration Index
ASEAN	Association South East Asia Nations
CDP	Community Development Program
CET	Common External Tariff
COMESA	Common Market for Southern and Eastern Africa
EC	European Community
EFTA	European Free Trade Area
EAC	East African Community
ECA-WA	Economic Commission for Africa-West Africa
ECOWAS	Economic Community of West African State
EPA	Economic Partnership Agreements
EPDPA	Economic Partnership Agreements Development Program
EU	European Union

FDI	Foreign Direct investment
GDP	Gross Domestic Product
FTA	Free Trade Area
GMM	Generalized Method of Moments
OLS	Ordinary Least Square
REC	Regional Economic Community
RTA	Regional Trade Agreements
SADC	Southern African Development Community
UNCTAD	United Nations Conference on Trade and Development
US	United States
WAEMU	West African Economic and Monetary Union
WTO	World Trade Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The ultimate goal of regional integration is economic growth and development. Empirical studies have shown inconclusive results concerning the impact of regional integration on the economic growth of country members (Ijjo and Tumwebaze,2015; Ogboabour, 2019; Premaratne et al, 2018; Park and Claveria, 2018). However, there is a consensus that regional integration is affecting economic growth through multiple channels.

A study conducted by Kamau (2011) examines how economic growth was impacted by regional integration among Common Market for Southern and Eastern Africa (COMESA), East African Community (EAC), and Southern African Development Community (SADC) over 1970-2008, and found a positive correlation between economic growth and regional integration.

Premaratne et al (2018) examined whether regional integration stimulates economic growth in the Association of Southeast Asia Nations (ASEAN) over the period 1970-2010. They found a positive and significant growth effect of South East Asia regional integration. They suggest that the enhancement of regional integration and economic growth is subject to the implementation of public policies toward the elimination of corruption and the stabilization of macroeconomics and political environment as well as the promotion of international trade. Plummer (1997) assessed the dynamic effects of regional integration in the ASEAN. He concluded that the ASEAN Free Trade Area (AFTA) and additional measures for a deepen regional integration will continuously

beneficial for ASEAN countries. Hence, it will boost the flow of investment, stabilize the macroeconomics environment, and promotes the transfer of technology.

Berthelon (2004) developed a new way to measure the regional trade agreements (RTAs) by combining the membership of a country with the share of partners' world Gross Domestic Product (GDP). His findings suggested that RTAs are positively related to economic growth. Particularly, the north-north agreement had a positive growth effect while that of the south-south agreement was ambiguous and that of the north-south agreement was not clearly defined. His study started from 1970 to 1990.

Vamvakidis (1998) studied how regional integration impact economic growth for 138 countries across the world. He concluded that regional integration has a positive effect on economic growth for large, open, and developed neighboring countries while there is no growth effect for closed, small, and less developed neighboring countries.

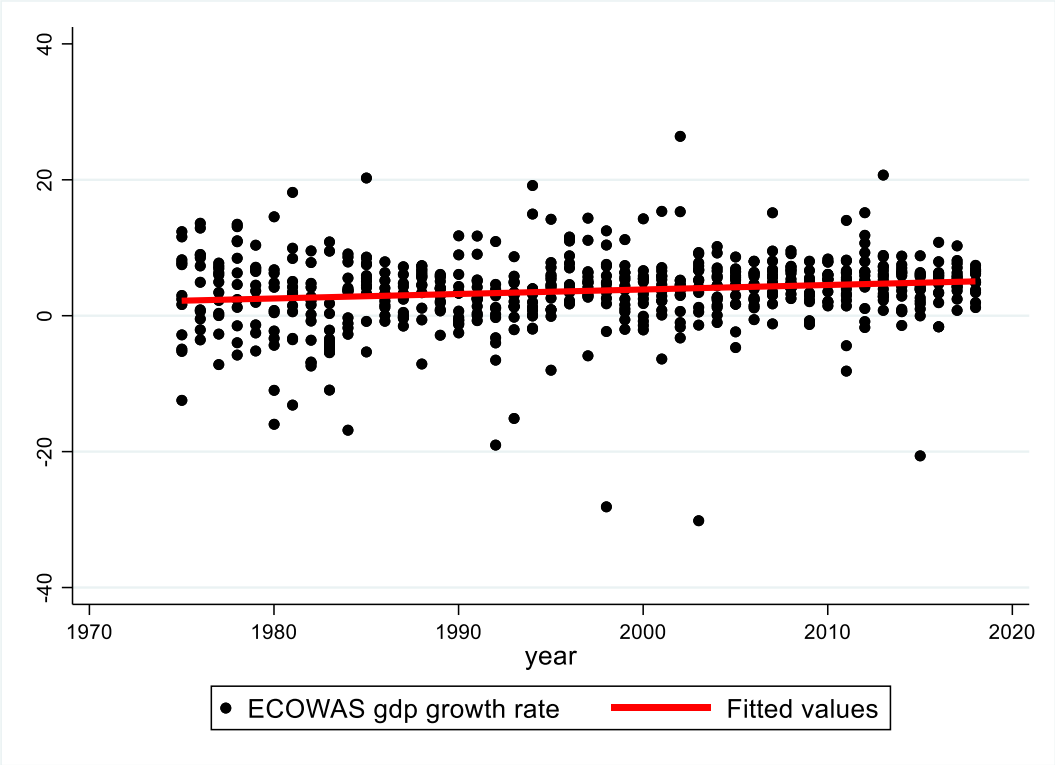
Ougboabor et al. (2019), performed a study about the relationship between the West African Monetary Union (WAEMU) and economic growth in the region throughout 2000-2015. Their findings suggested that the WAEMU did not have a significant impact on economic growth in the region. Meanwhile, they found that WAEMU was stimulating economic growth by physical and human capital accumulation, Foreign Direct Investment (FDI), and the quality of the public institution.

Economic Community of West African States (ECOWAS) is one of the hugest regional economic communities in the African continent. It was established in 1975 to promotes economic growth and development among member states. ECOWAS is made by 15 countries which including Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Ghana, Gambia, Liberia, Guinea, Guinea Bissau,

Mali, Niger, Nigeria, Sierra Leone, Senegal, Togo. ECOWAS was destined to reduce poverty by the removal of all intra-trade barriers impeding free capital mobility across the region (USAID, 2018). The economic geography in the ECOWAS is particularly challenging because it is generally composed of a large number of small and isolated economies. 11 out of 15 country members of the ECOWAS have a GDP of less than 5 billion $US per year, 8 have less than 10 million people, 6 counts on transnational river basin as water resources and 3 are landlocked (Ranganathan and Foster, 2011). Also, economic activity in the region is more concentrated along the coast but also in central and northern Nigeria. In these regions, GDP might exceed 1 billion $US per 100 kilometers square. Inversely, the intensity of economic activity decreases gradually as one moves inland. In the Sahel region, GDP reaches its lowest level which is only 10 million $US per kilometers square. Regional integration in the ECOWAS is considered as the only solution to overcome these disabilities. It will allow individual economy members to join a bigger market and increase trade, gain scale economies, and harness regional public goods, to stimulate infrastructure and economic development for the least developing country. Also, we could see that the level of economic development is considerably unequal from one region to another. The regional integration is likely the one way to get an equitable economic development among regions within the ECOWAS.

Despite various reforms implemented within the ECOWAS during the past decades, economic growth and the level of economic development in the sub-region are still quite lower than expected as shown in figure 1.1 below.

Figure 1. 1 ECOWAS GDP growth rate 1970-2019



Source: Author with UNCTAD data

Eleven out of fifteen ECOWAS countries belong to the group of least-developed countries (United Nations Committee for Development Policy, 2018). About eight countries among ECOWAS members have low human development (World Population Review,2019). In 2018, the meeting of ECOWAS presidents held in Abuja, Nigeria expected economic growth of about 3.2 percent against 2.3 percent in 2017 and 0.2 percent in 2016.

1.2 Statement of the problem

The goal of the creation of the ECOWAS regional integration was to enhance the economic growth within the region. However, as noticed in figure 1.1, the performance of the ECOWAS in terms of economic growth has been very disappointing during the past decades. Notwithstanding, studies have shown that regional integration promotes economic growth (Premaratne et al (2018), Kamau

(2011)). According to Rouis and Tabor (2013), economic integration promotes economic growth through economic diversification and job creation. To improve the economic performance of the ECOWAS member states, several reforms and policies have been implemented since the establishment of the intergovernmental organization. The ECOWAS Trade Liberalization System was adopted in 1979 to boost the free movement of goods and services across the sub-region. Additionally, as part of efforts to increase the benefits from the regional integration, the ECOWAS Heads of state and government in 1993 revised the founding treaty of 1975, extending it to include both economic and political cooperation member states with the economic objectives of achieving a common market and adopting the single currency. The 1993 treaty was aimed at promoting trade, a policy of harmonization, conflict resolution, environmental issues, promotion of small and medium scale enterprises, education initiatives, and gender inequality with the ultimate objective to improve economic performance and economic growth of the regional community as a whole and among country members (Economic Commission for Africa).

However, limited integration reduces the potential of regional integration to boost economic growth. Besides, the Economic Commission for Africa (2015) review that ECOWAS was confronted with several issues that prevented benefiting from the economic integration scheme. The main purpose of this thesis is to know how the economic growth in the ECOWAS reacts following further measures targeting for more deepen integration among country members. For that, we are considering the growth effects of the revision of the ECOWAS treaty in 1993.

Morinov (2005) states that regional integration is most often apprehended as a way to improve economic development and growth. Hence, this paper aims also to study whether ECOWAS regional integration promotes economic growth. We are also expecting to find channels through which ECOWAS regional integration is affecting the economic growth of its country members.

That will be very useful for the formulation of macroeconomic policies and reforms implementation. We have also seen earlier that level of economic growth and development are unequal across the ECOWAS. In this thesis, we are also attempting to test whether there is evidence for a conditional and sigma convergence.

1.3 Research questions

In this study, we pose the following questions:

1) What has been the impact of the Revised Treaty of 1993 on economic growth in ECOWAS?

2) Does physical capital accumulation, human capital accumulation, FDI, and trade openness have a significant influence on economic growth in the ECOWAS?

1.4 Research Objectives

The objectives of this study are to:

-examine the effect of the revised treaty of the ECOWAS of 1993 on economic growth;

-examine whether physical capital accumulation, human capital accumulation, FDI, and trade openness affect economic growth in the ECOWAS.

1.5 Significance of the study

Our research is carried out to examine the relationship between economic growth and ECOWAS regional integration. The research seeks to analyze the growth effect of regional integration. We are also looking for the determinants of economic growth in the region. These determinants can be used as tools for the implementation of macroeconomic policies. In this study, they are covering domestic investment, education, FDI, and openness to international trade. This study is also significant insofar as it is trying to analyze the convergence among countries from the ECOWAS.

One of the biggest significance of this study is also to establish the effect of the implementation of the revised treaty of the ECOWAS in 1993 on economic growth. It will allow us to appreciate the reaction of the economic growth in the ECOWAS following the implementation of further measures targeting a more deepen regional integration.

1.6 Organization of the study

This thesis comprises of six chapters. Chapter one contains an introduction, while Chapter two covers the overview of regional integration in the ECOWAS. Chapter three discusses the theoretical and empirical reviews of the literature on regional integration and economic growth. The theoretical framework and methodology of the study are contained in chapter four. In chapter five, we will present the analysis of data, empirical results, and discussion. In chapter six, we outline the conclusion, policy recommendations, and limitations of the study.

CHAPTER TWO

OVERVIEW OF REGIONAL INTEGRATION IN THE ECOWAS

2.1 Introduction

This chapter provides an overview of regional integration in the ECOWAS. It includes a historical synopsis and the evolution of the ECOWAS, some policy implications of the trade liberalization scheme, and the variations of some economic indicators over the period considered.

2.2 Historical synopsis of the ECOWAS

The creation of ECOWAS was inspired by the United Nations Economic Commission for Africa (ECA). That commission had divided Africa into various regions for economic development purposes in the mid-1960s (Okolo,1985). The project of West African States grouping included fourteen West African countries. Regarding the project to form an economic community in West Africa, numerous specialized meetings had called by the ECA. At the first meeting, they highlighted the projected benefits of regional integration in the sub-region, and an interim council of the Minister was formed to govern the prospect of the Economic Community of West Africa. Through the effort of the council, a meeting was held in April 1968 (Monrovia, Liberia) which 9 out of the 14 countries signed the protocol to establish the West African Regional. A meeting was supposed to be held at the capital city of Burkina Faso in March 1969 to sign and seal a West African Common Market but it was never materialized. By the end of 1972, a formal launching of ECOWAS came after the meeting between Yakubu Gowon (President of Nigeria) and Eyadema (President of Togo). They communicated their decision to create an economic grouping between their two countries. The Nigeria-Togo union was created to serve as a basis for the most inclusive community in west Africa. A conference held in Lagos (Nigeria) announced the cooperation

between Togo and Nigeria regarding various areas to promote trade, industrial development, and the removal of tariff barriers which hampered economic growth. The President of Nigeria Gen. Gowon organized a summit between the Head of states and government from the ECOWAS to talk about the prospect of regional integration in the sub-region. A draft treaty was produced by the Togo and Nigeria Commission of expert and in December 1973, it was reviewed by ministers from ECOWAS member states, and the basic principles of ECOWAS were established. A treaty establishing ECOWAS regional integration was finally signed in 1976 after numerous meetings and summits.

The planners of ECOWAS were conscious of the importance that the organization might have to the economic development of his country members. Hence, they had declared it on the treaty preamble (ECOWAS revised treaty 1993, p.1 and p.2):

> *"CONSCIOUS of the over-riding need to encourage, foster, and accelerate the economic and social development of our States in order to improve the living standards of our people;*
>
> *CONVINCED that the promotion of harmonious economic development of our States calls for effective economic co-operation and integration largely through a determined and concerted policy of self-reliance;*
>
> *NOTING that the present bilateral and multilateral forms of economic co-operation within the region open up perspectives for more extensive co-operation;*
>
> *ACCEPTING the need to face together the political, economic, and socio-cultural challenges of the present and the future, and to pool together the*

resources of our peoples while respecting our diversities for the most rapid and optimum expansion of the region's productive capacity;

CONSIDERING also the need to modify the community's strategies to accelerate the economic integration process in the region."

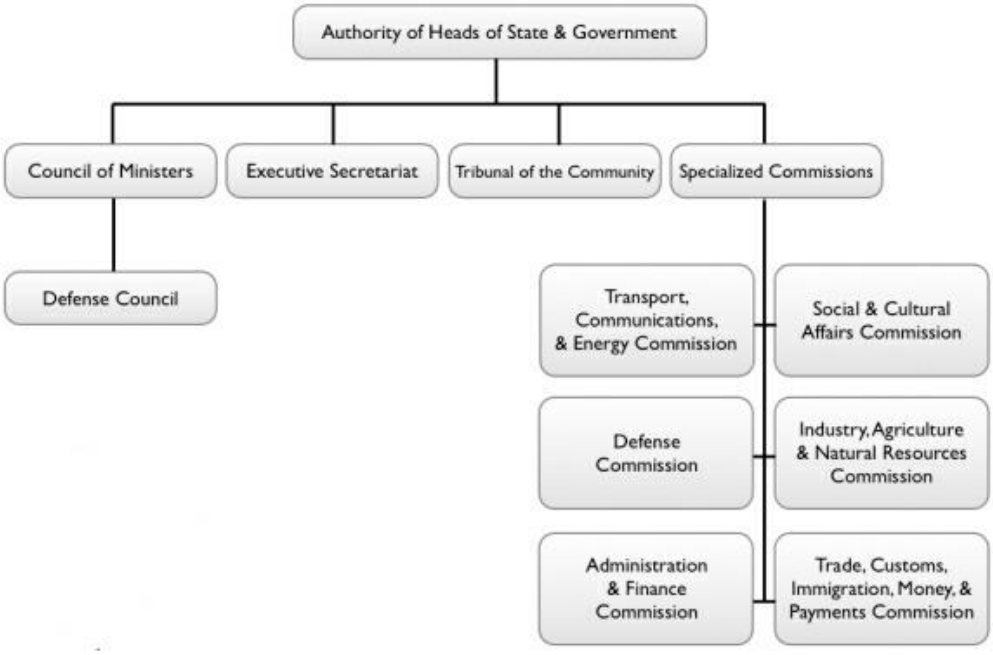
Geographically, the ECOWAS is bounded in the south and southwest by the Gulf of Guinea and by Nigeria in the Southeast while Mauritania is the Northwest boundary and Niger in the north. The superficies of ECOWAS is about 5.1 million kilometers square. The region contains three landlocked countries (Mali, Burkina Faso, and Niger) and one island (Cape Verde) as well as twelve coastline states. The ECOWAS region has a lot of variety of natural resources such as mineral resources, petroleum, natural gas, tin, lead, zinc, bauxite, gold, diamonds, etc. Besides, there is little diversity regarding the ECOWAS total exports. It is closely related to extractive products (gold, natural gas, and petroleum, etc.) and some agricultural commodities (cocoa, cotton, etc.).

2.3 Evolution of ECOWAS regional integration

2.3.1 ECOWAS organization according to the Chart of 1975

The composition of the ECOWAS according to the treaty of 1975 is represented by figure 2.1 below:

Figure 2. 1 ECOWAS organization according to the Chart of 1975



Source: Goodridge (2006)

Each of these authorities, council, and commission were endowed their respective and specific function. For instance, the roles of *the Authority of Heads of States and Government* are to ensure the general management of the Community. It is also charged to take care of the development of the organization and implement the required policy and reforms to concretize its objectives. *The Council of Ministers* is charged to review the features of the community according to the treaty, and advise the authority. The attribution of the *Defense Council* was established to conserve peace

and security in the region. The Executive Secretary has to ensure the daily administration of the organization and its institutions.

The Community Tribunal is charged to judge and settle the existing conflict among member countries and to interpret the provisions of the treaty.

Specialized Commissions execute their respective attributions as per instructions of the treaty.

2.3.2 The ECOWAS Organization according to the revised treaty of 1993

The ECOWAS treaty was been revised to extend the economic and political cooperation between ECOWAS member states and to realize economic objectives namely the project of a common market and single currency. The revised treaty was shown that the original one was lacking and testify the willingness of the organization to reach its objectives. Much of ECOWAS activities were impeded by political and security problems in the Sub-region. The area covered by the action of ECOWAS was, therefore, extended. From promoting trade, free movement, and policy harmonization, it concerns now social and political areas such as the resolution of conflicts, environmental matters, strengthening international laws, as well as the development of small and medium scale enterprises.

Changes in ECOWAS are also reinforced by various facts. Particularly, the lack of coordination and the implementation of policy at the country-level impeding the onward motion of the community, the disability of the government to adopt financial resources (shortage of financial resources to fund regional integration programs) as well as the absence of links between a particular State member and the Executive Secretary, boosted the necessity for the revision of the ECOWAS accord.

In 1993, the Head of states authority has adopted the creation of new other institution such as:

-The Community Parliament, the Economic and Social Council;

-the Community Court of Justice, and the Fund for Co-operation; Compensation, and Development.

The Community Parliament was created to be a consulting body composed of a representative from each country's members. It is in charge of various attribution namely the creation of institutions, the implementation of action plans toward the improvement of the economic integration process, and the reinforcement of cooperation links between member states.

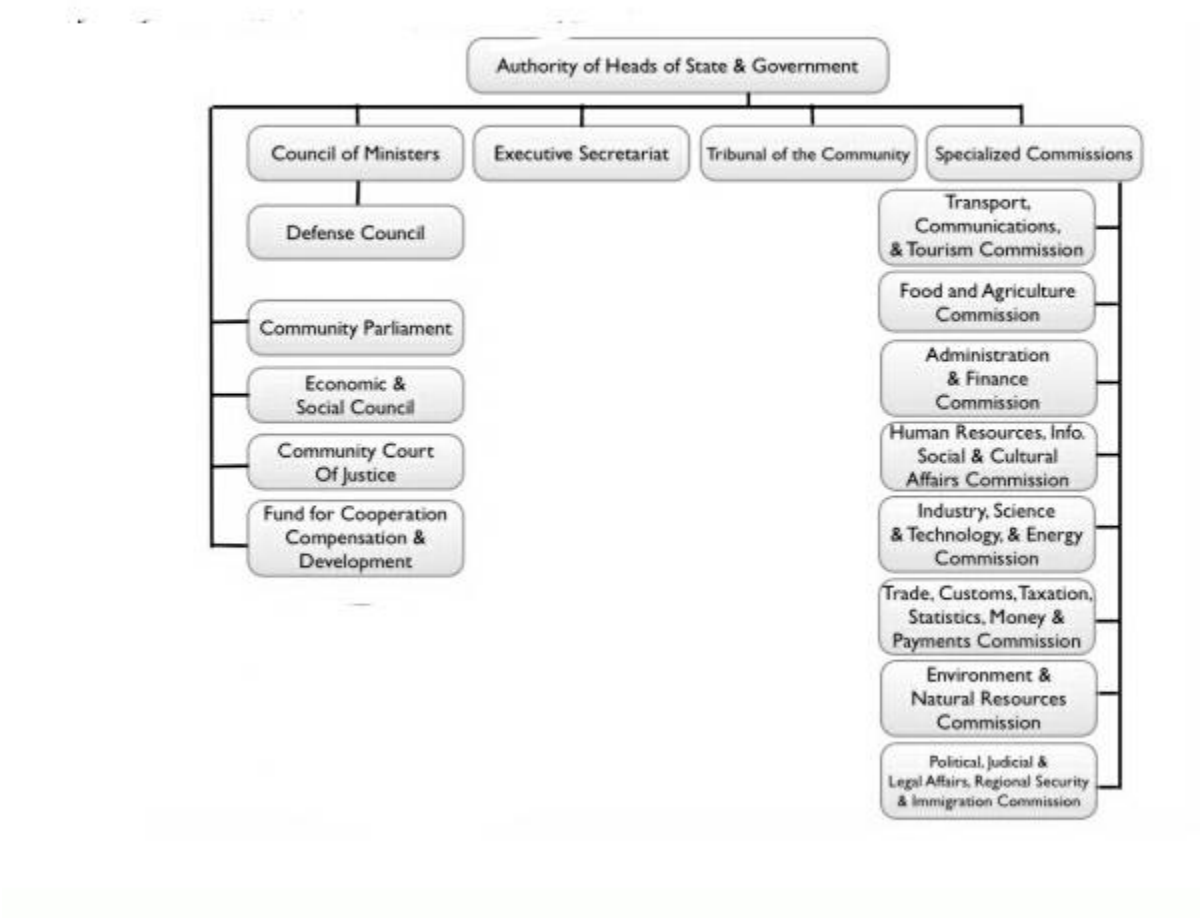
Economic and Social Council are in charge to advise the Council of Ministers.

The Community Court of Justice is dealing with complaints from member States and institutions of ECOWAS. It gives sanction to defaulting country members.

The Fund for Co-operation, Compensation, and Development: The administration of the fund is executed by a Board director which has a chief executive as a Manager Director.

Further, the revised treaty of 1993 created also new other specialized Commissions as represented in figure 2.2 below:

Figure 2. 2 The ECOWAS Organization according to the revised treaty of 1993



Source: Goodridge (2006)

Table 2. 1 ECOWAS in a glance

Headquarters	Abuja (Nigeria)
Date of establishment	28 May 1975 (Lagos, Nigeria)
Country members	Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea- Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo. (Mauritania left ECOWAS in 2010)
Surface area	5 113 000 km^2
Population	308 million in 2012
Mission	Promotion of the integration and cooperation among the ECOWAS State members to form an Economic and Monetary Union
Institutions	The Heads of State authority The Council of Ministers The Commission The parliament of the Community The Economic and Social Council The Community Court of Justice ECOWAS Bank for Investment and Development
Specialized Agencies	West African Health Organization The West African Monetary Agency The West African Monetary Institute The Intergovernmental Action Group against Money Laundering in West Africa The Water Resource Coordination Unit The ECOWAS Gender Development Center The Brown Card The ECOWAS of Youth and Sports Development Centre The West African Power Pool The ECOWAS Centre for Renewable Energy and Energy Efficiency
Main Programmes	The free movement of goods and people The Trade Liberalization Scheme The ECOWAS regional agricultural policy The Community Development Programme … etc.
Country Representations	National ECOWAS Units Special Representatives of the Commission President (in 2014: Côte d'Ivoire, Mali, Burkina Faso, Guinea, Guinea Bissau)
Financing	Community levy Partner funds

Source: United Nations, Economic Commission for Africa-West Africa (2015)

2.4 Trade, Custom policy and Free movement of persons and Goods

2.4.1 Free movement of persons

The principle of free movement of goods, capital, and persons is the core of a regional integration scheme. Regarding the ECOWAS regional integration process, the free movement of persons and residence was already initiated by the organization of 1975 but reinforced by various reforms targeting to improve the freedom of movement and residence across the territory of the ECOWAS.

In 2014, the ECOWAS Head of states conference determined new rules governing the free movement of a person. According to the Economic Commission for Africa-West Africa,2015, these rules are as follows:

-substitution of the ECOWAS travel certificate by a biometric identity card as a travel card;

-ability of workers to get employed at any ECOWAS member states.

2.4.2 Free movement of goods

The effort for the creation of a unified common market

The creation of the ECOWAS free trade area was started in 1979. It was characterized by the removal of tariffs for all products and traditional works of art. A new form of ECOWAS trade liberalization scheme encouraging state members to adopt a new strategy of free trade before 2004 was implemented in 2003. The particularity of this new form of free trade area is the loss of revenue following the cancelation of tax and customs. However, this new system envisages the compensating financial mechanism for these losses.

According to the Economic Commission for Africa-West Africa (2015), the financial mechanism of compensation of losses due to the removal of tariffs are as follows:

-100 % in 2004;

-80 % in 2005;

-60 % in 2006;

-30 % in 2007;

- and 0 % from January 2008.

The issue with the financial compensation system is that it depends on the contribution of state members. The rule of origin is used to check whether any importation or goods included in the liberalization of trade is approved.

The executive secretary is in charge to approve the origin of any products while the attribution of the ECOWAS Court of justice is in charge of pronouncing a decision without appeal in case of conflict among stakeholders.

According to the Economic Commission of Africa-West Africa (2015), there are two very important steps regarding the implementation of the ECOWAS trade liberalization scheme namely: the creation of a Free Trade Area and the formation of a Common External Tariff (ECOWAS-CET).

The Creation of the Free Trade Area

It is intended to remove all forms of barriers to trade within the ECOWAS region. Theoretically, the removal of these trade barriers generates the reinforcement of the market power and the reduction of the cost of imports implying, therefore, an improvement of well-being.

According to the Economic Commission for Africa-West Africa (2015), the following actions are implemented in the context of the creation of the Customs Union namely*:*

-Exemption from taxes and customs duties for all raw and handicraft product originating the ECOWAS;

-a gradual reduction of tariff barriers in the counterpart of equivalent imports for industrial products from the ECOWAS.

The formation of a Common External Tariff (CET) :

Economic Commission for Africa-West Africa (2015) reported that in the context of the discussion for Economic Partnership Agreements with the EU. In that perspective, the transformation of the ECOWAS FTA into Customs Union was ineluctable to allow them to negotiate as one voice.

Economic Commission for Africa-West Africa (2015) mentioned that ECOWAS-CET has made numerous significant achievements since its establishment by the Head states authority in 2006. Economic Commission for Africa-West Africa (2015) enumerated these significant achievements as follows:

-the creation of a fifth band at 35 percent in the ECOWAS;

-the authorization of ECOWAS country members to trade within the fifth band under common eligibility criteria;

-the adoption of a plan to concretize the CET.

The final structure of CET was approved by the Head states and government authority in 2003.

2.5 The ECOWAS trade liberalization scheme

2.5.1 Intra-community trade and competition

Two major policies are implemented regarding this topic according to the Economic Commission for Africa-West Africa (2015) namely:

-the implementation of regional trade policy of competition, and;

-the regulation of the regional informal trade in the ECOWAS by launching a Regional Support Program.

2.5.2 Common External Trade Policy

The Common External Trade Policy is apprehended by two dimensions: trade negotiations and trade and development.

Trade negotiations

negotiations for Economic Partnership Agreements (EPA) between ECOWAS and EU was done. In general, the negotiation for the EPA was successful and its objectives were achieved. The EPA suggests the establishment of the Economic Partnership Agreements Development Program (EPADP). According to the Economic Commission for Africa (2015), the five ultimate goals of the EPADP are:

-to diversify and expand the capacity of production;

-to develop the trade within the ECOWAS region and to facilitate the integration to the international market;

-to enhance regional and national infrastructures related to trade;

-to implement a suitable adjustment project that considering other changes required for the development of trade;

-to get and handle regulations and trade policy, and to implement, monitor, and evaluate the EPA.

Trade and development

This program aims to facilitate the integration of ECOWAS countries into the world economy. This program consists of*:*

-promoting the expansion of partnerships;

-elaborating and implementing a regional action plan for the aid of trade;

-reinforcing intra-African trade;

-organizing workshops and training treating topics related to the matter of trade (Economic Commission for Africa, 2015).

Trade Capacity Building

Two trade capacity building program was implemented by the commission such as*:*

-the Trade Negotiation Capacity Building (TNCB) program, and,

-the Enhancing Trade Capacity in ACP Countries: Hub & Spokes II Programme. Several workshops are organized for the Member States within this framework (Economic Commission for Africa-West Africa,2015).

2.6 Economic Trends

Now, we are going to perform Daniel's trend test (commonly known as Spearman's rank correlation test) to evaluate the trend of the major macroeconomic indicator in the ECOWAS from 1975 to 2019. The hypotheses of this test are as follow:

-Ho: the trend is not significant;

-Ha: the trend is significant.

Table 2. 2 Daniel's trend test of major macroeconomic indicators in the ECOWAS (1975-2019)

Variables	Observations	Spearman's rho	p-value
GDP growth rate	612	0.205	0.000
Per capita GDP	614	0.161	0.000
Investment	556	0.222	0.000
Human capital	409	0.672	0.000
FDI	597	0.534	0.000
Trade openness	612	0.142	0.000

Source: Author

Table 2.2 contains some elements of Spearman's rank correlation analysis. Our results show that ECOWAS regional integration has positively affected the whole of the indicators considered since their p-value are all less than 0.05. Therefore, we can reject the null hypothesis and conclude that each variable exhibited a trend over 1975-2019. However, we can see that the magnitudes of the trend are moderate except for FDI and human capital. Particularly, the positive trend on trade openness can be defined as the trade creation effect of ECOWAS regional integration. This analysis provides to us already some preliminary results such that regional integration is positively associated with economic growth either in terms of per capita GDP or its growth rate. Furthermore, ECOWAS regional integration boosted domestic investment, FDI, and education in the region. The reason for moderate coefficients of trend is likely because of the lack of integration in the ECOWAS as demonstrated by the 2019 Africa Regional Integration Index (ARII) as shown in table 2.3 below.

Table 2. 3 ECOWAS scores of Africa Regional Integration Index (2019)

Overall score And Rank			Scores and ranks by dimensions									
Country	**Regional integration**	**Rank**	**Trade integration**	**Rank**	**Productive integration**	**Rank**	**Macroeconomic integration**	**Rank**	**Infrastructural integration**	**Rank**	**Free movement of people**	**Rank**
Côte d'Ivoire	0.667	1	0.772	1	0.718	1	0.449	5	0.656	1	0.667	4
Burkina Faso	0.561	2	0.530	4	0.271	5	0.832	2	0.278	8	1.000	1
Senegal	0.516	3	0.567	3	0.388	3	0.449	5	0.503	2	0.667	4
Togo	0.504	4	0.580	2	0.226	7	0.449	5	0.276	9	1.000	1
Nigeria	0.464	5	0.456	9	0.540	2	0.252	15	0.349	5	0.667	4
Mali	0.454	6	0.517	5	0.101	9	0.379	12	0.287	7	1.000	1
Ghana	0.434	7	0.475	6	0.273	4	0.253	14	0.474	4	0.667	4
Benin	0.391	8	0.474	7	0.174	8	0.417	10	0.242	10	0.667	4
Guinea	0.389	9	0.304	12	0.061	12	0.862	1	0.214	11	0.667	4
The Gambia	0.386	10	0.442	10	0.057	14	0.541	4	0.290	6	0.667	4
Cabo Verde	0.363	11	0.210	14	0.087	11	0.417	11	0.500	3	0.667	4
Niger	0.321	12	0.467	8	0.000	15	0.449	5	0.071	15	0.667	4
Sierra Leone	0.316	13	0.275	13	0.060	13	0.550	3	0.122	12	0.667	4
Guinea-Bissau	0.314	14	0.307	11	0.095	10	0.449	5	0.113	13	0.667	4
Liberia	0.298	15	0.198	15	0.251	6	0.288	13	0.103	14	0.667	4
Average	**0.425**		**0.438**		**0.220**		**0.469**		**0.298**		**0.733**	
Standard deviation	**0.101**		**0.150**		**0.193**		**0.171**		**0.165**		**0.133**	

Source: African regional integration index 2019

The ARII established various indexes to measure the level of regional integration in Africa based on five major socio-economic dimensions like trade integration, productive integration, macroeconomic integration, infrastructural integration, and free movement of people. These indexes contain scores on a scale of 0 (low) to 1 (high) and ranking of respective countries. Table 2.3 shows the scores and ranking of ECOWAS countries. We can see that the majority of countries

have lower scores about respective dimensions (less than the mean which is 0.5) except for the free movement of people. For instance, the average trade integration score in the ECOWAS is 0.438 out of 1 where the maximum score is attributed to Cote d'Ivoire with a score of 0.772 and the minimum score is for Liberia with a score of 0.198.

The average productive integration score in the ECOWAS is 0.220 out of 1 where the highest is attributed to Cote d'Ivoire with a score of 0.718 and the lowest for Niger with a score of 0.0000.

The average macroeconomic integration score within the ECOWAS is 0.469 out of 1 where Guinea is classed on the top of the list with a score of 0.862 and Nigeria on the bottom with a score of 0.252.

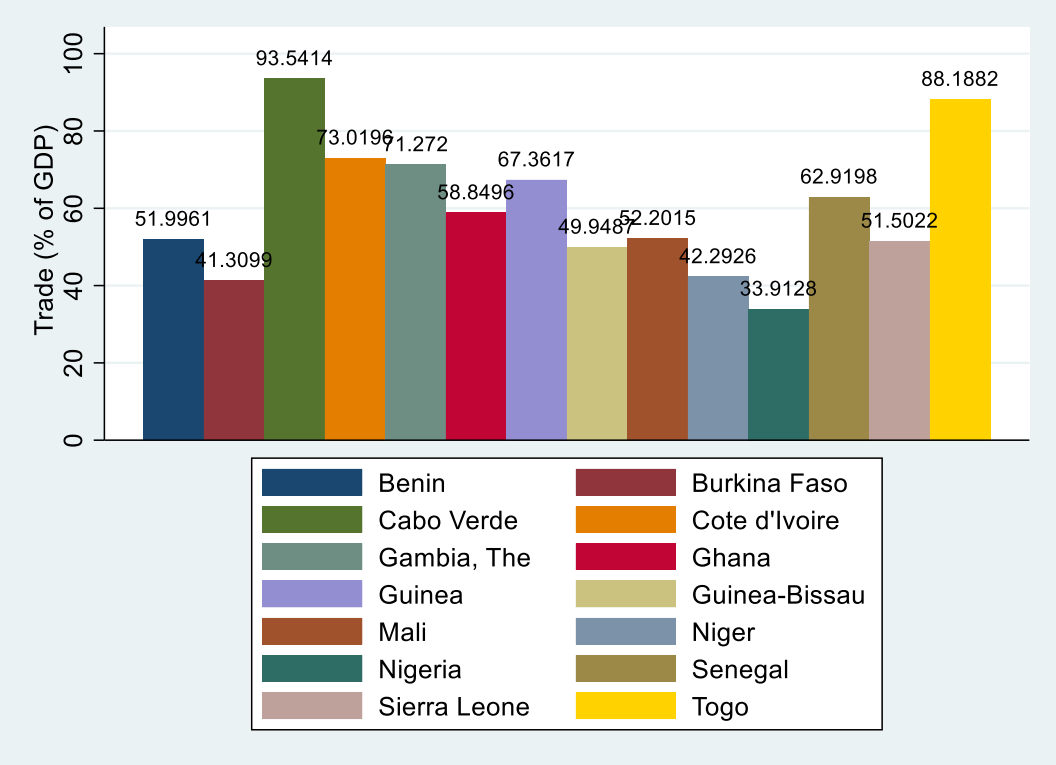
The average infrastructural integration in the region is 0.298 out of 1 where the maximum is attributed to Cote d'Ivoire with a score of 0.656 out of 1 and the minimum is for Niger with 0.071.

Unlike previous indexes, the average score of free movement of people within the ECOWAS is very high with a score of 0.733.

Overall, the average regional integration score of the ECOWAS is 0.425 out of 1 where Cote d'Ivoire is the well-integrated and Liberia is the worst. We can conclude that the ECOWAS region is not well integrated yet and it might be the reason for the lower economic growth within the region. Therefore, more deepen regional integration within the ECOWAS might lead to more trade integration, more productive integration, more financial and macroeconomic integration, more infrastructural integration thereby more economic growth in the region.

In terms of trade openness, figure 2.3 below shows to us that Cape Verde is the more opened to international trade in the ECOWAS with an average of 93.5414 percent of GDP, followed by Togo with 88.188 percent of GDP while Niger is the least opened with only 33.912 percent.

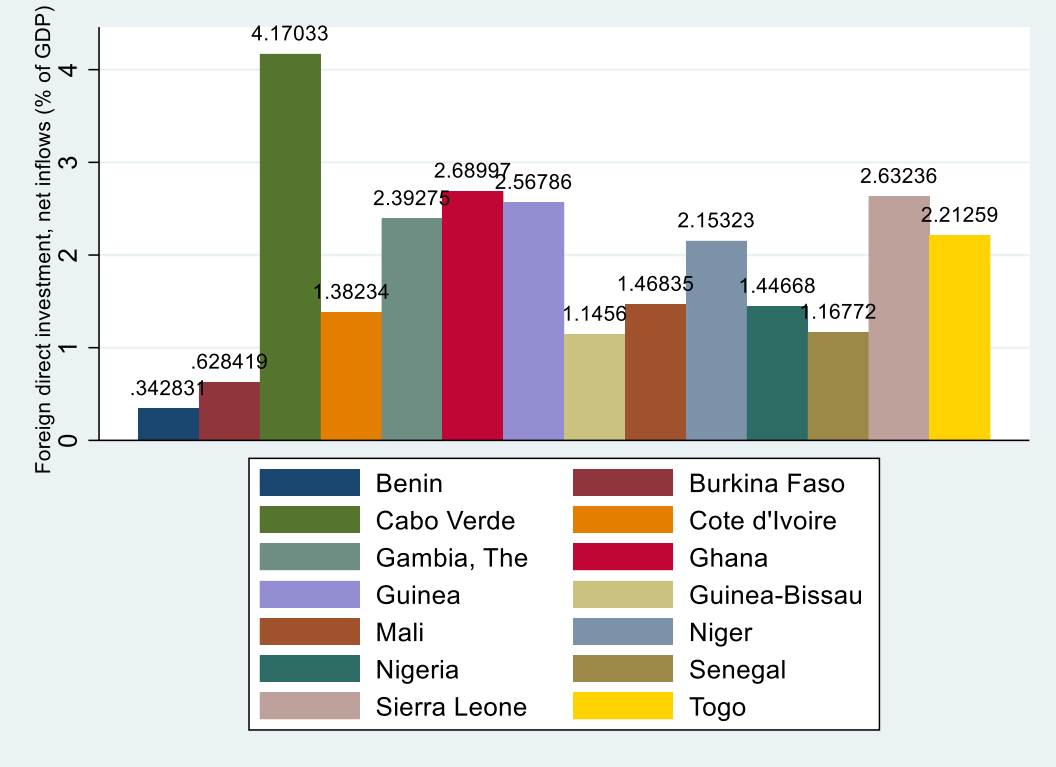
Figure 2. 3 Average Trade openness in the ECOWAS over 1975-2019



Source: Author, World Bank's WDI

In terms of FDI inflow in the percentage of GDP, we can say that Cabo Verde is the most attractive that recorded 4.170 percent of GDP followed by Ghana with 2.689 percent and the least attractive is Benin with only 0.342 percent as shown in figure 2.4 below.

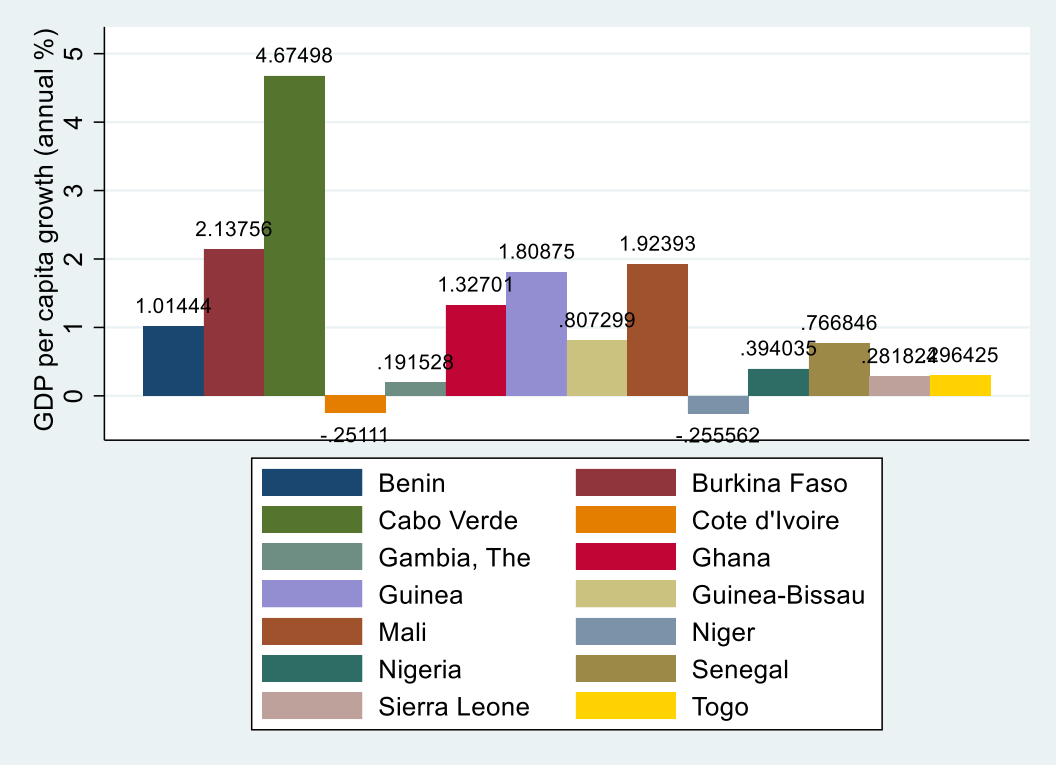
Figure 2. 4 Average Net Inflow FDI in the percentage of GDP in the ECOWAS over 1975-2019



Source: Author, World Bank's WDI

Considering the average growth rate of per capita GDP, Cabo Verde is the most performant with an averagely 4.674 percent annually followed by Burkina Faso with 2.137 percent per year and the last is Niger with -0.255 percent average GDP per capita growth. Niger had an average negative growth rate probably due to the instability in the region.

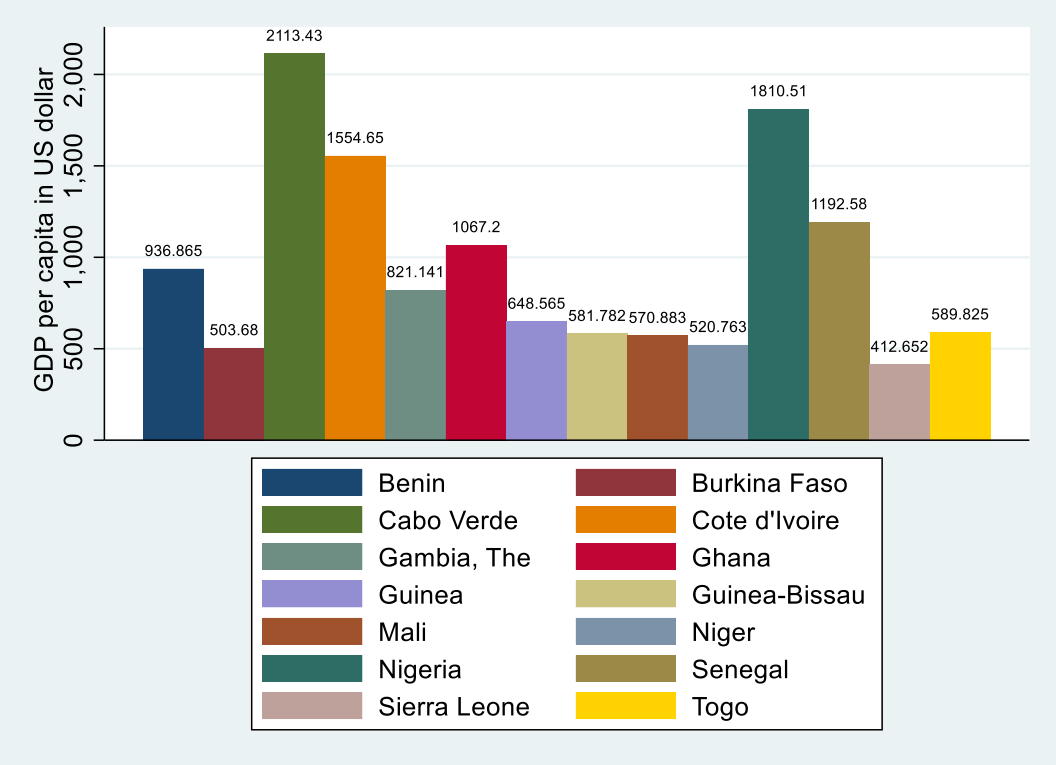
Figure 2. 5 Average per capita GDP growth rate in the ECOWAS 1975-2019



Source: Author, World Bank's WDI

Cabo Verde had a higher average per capita GDP in the ECOWAS over 1975-2019. It was recorded averagely of 2113.43 US dollars and followed by Nigeria that has recorded 1810.51 US dollars. The last one is Siera Leone which recorded 412.652 US dollars.

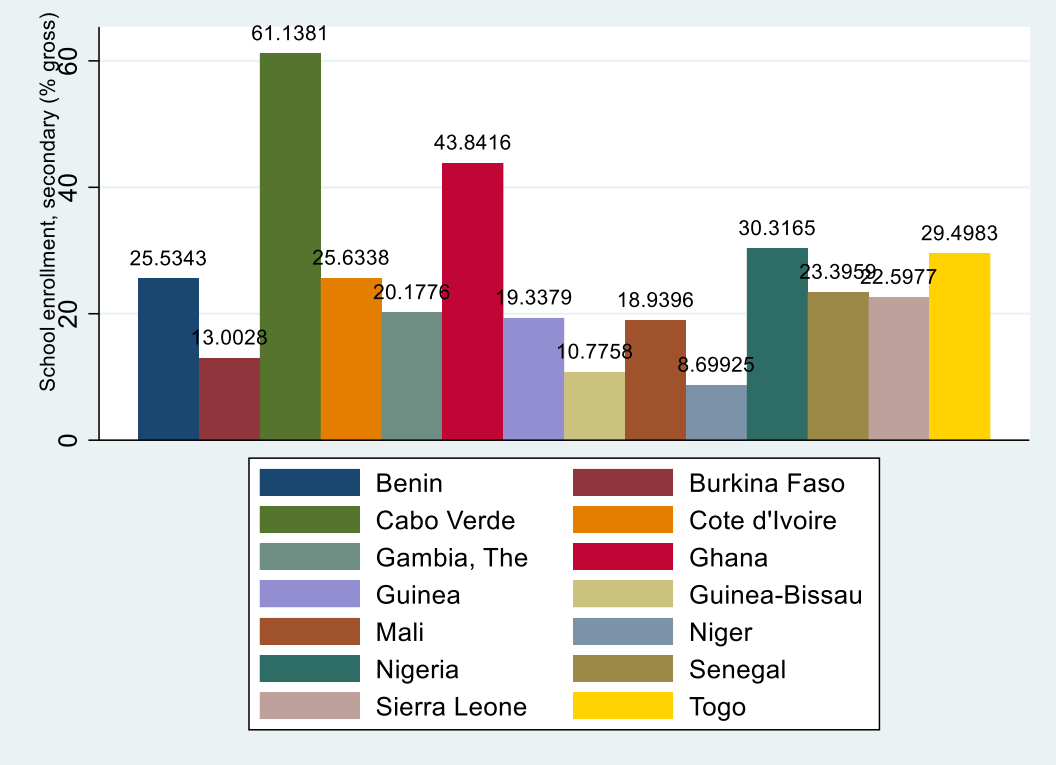
Figure 2. 6 Average ECOWAS per capita GDP in US dollar over 1975-2019



Source: Author, World Bank's WDI

Cabo Verde has recorded the highest average gross of secondary school enrollment in the ECOWAS over 1975-2019. It recorded about 61.138 percent. It was followed by Ghana with 43.841 percent and the last is ended by Niger figuring 8.699 percent.

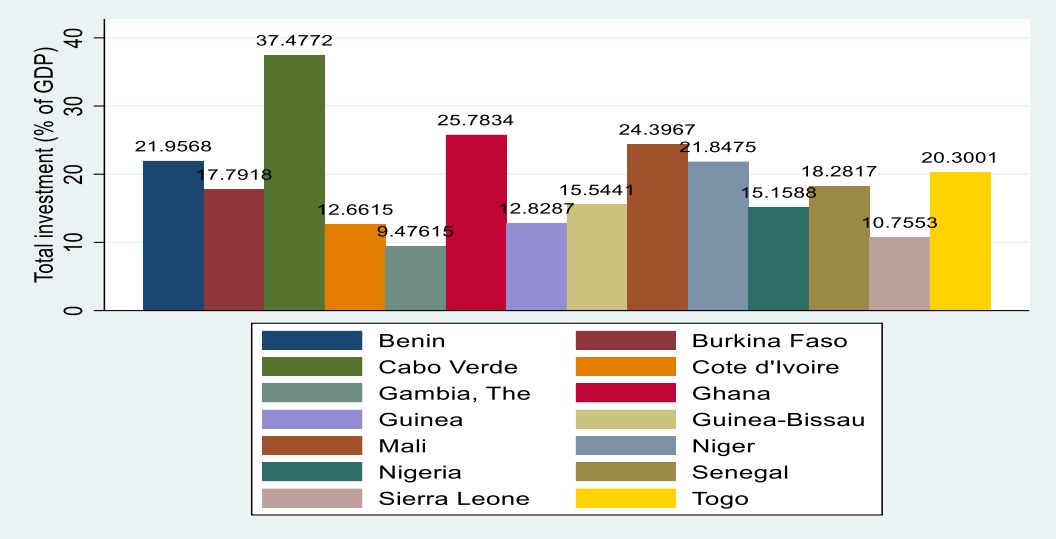
Figure 2. 7 School enrollment, secondary (% gross) in the ECOWAS over 1975-2019



Source: Author, World Bank's WDI

We finish this overview of the economic trend in ECOWAS by the physical capital accumulation that is captured by the total investment in the percentage of GDP. Again, Cabo Verde has recorded the highest average physical capital accumulation in the ECOWAS with 37.477 percent which is followed by Ghana with 26.783 percent and the last one is the Gambia with 9.476 percent.

Figure 2. 8 Total investment (% of GDP) in the ECOWAS over 1975-2019



Source: Author, World Bank's WDI

We have seen throughout these analyses that in general countries like Cabo Verde and Ghana which are politically more stable and having more control of corruption performed well than countries that are unstable and having less control of corruption like Niger, Siera Leone, and Guinea.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

In this chapter, we will talk about theoretical and empirical literature on regional integration. We will deal with definitions, objectives, and the different degrees of regional integration in the first part. The theoretical effects of regional integration will be approached. A part of this chapter will be devoted to mention some empirical findings by various authors about the study.

3.2 Theoretical framework

3.2.1 Definition

The precedent chapter had shown us that regional integration is the result of a long process, numerous meetings, summits, and conferences implying the signature of various protocols, adoption of policies, and implementation of different programs. Thus, regional integration can be defined by its objectives such as the intensification of intra-regional economic activities, and the improvement of economic development and growth for all state members by promoting economic co-operation and the progressive integration of economies. To achieve its goals, regional integration might subject to various significant reforms and evolutions.

Carbaugh (2004) states that regional integration is a process to decrease and remove barriers to trade and factor mobility but also attempt to increase economic activities among country members.

According to Biswaro (2003), regional integration requires economic convergence and trading among state members.

Ramon and Yiju (2009) consider regional integration as a policy targeting to remove all kinds of economic and trade barriers to allow goods and services to move freely.

Marinov (2005) identified various economic determinants of regional integration in developing countries. The first one is the development perspective. So, for developing countries, regional integration is rather apprehended as an instrument of development than trade or customs policy. The theory of regional integration treats more about long-run growth effects of increased integration, education enhancement, poverty reduction as well as regional peace and stability.

There is also the macroeconomic policy coordination. This point is very crucial for regional integration to be durable. The coordination of policies concerns not only macroeconomics (fiscal, monetary, and exchange rate policy) but also might be extended to other areas (environmental, education, transport, industrial, etc…). The lack of policy harmonization reduces the effects expected from the integration.

Next, there are the benefits of regional integration in terms of production and employment. Marinov (2005) argues that regional integration increases the possibilities and the rate of employment by the rise of the intensity of the flow of worker which is increasing labor force supply.

The positive effects of regional integration should not be restricted only to production and consumption according to Marinov (2005) but should be extended to education, employment, competitiveness, technology, etc…

Marquez-Ramos et al (2011) argued that regional integration is mainly created for an economic and geographical reason. However, the contribution of socio-political factors and democracies in the creation of regional integration is not negligible.

3.2.2 Levels of regional integration

The concept of regional integration can be considered as a means for economic and social development in the context of globalization, especially for less developed countries. The promotion of growth and economic development remains the central justifications of economic integration. According to the classical point of view of regional integration, this one can take several forms in the function of the degree of political and economic engagement of member states. Hence, arrangements could start from the decrease or cancelation of tariff and non-tariff trade barriers to the adoption of a common fiscal and monetary policy which is considered as the more highest level of integration. As long as restrictions on trade and investment diminish more deepens the regional economic integration.

Balassa (1961) revealed five levels or degrees of integration namely *Free Trade Areas, Custom Unions, Common Markets, Economic Unions, and Total Economic integration*.

1- Free Trade Areas: consist of all State members to remove all trade impediments for each other but remain to have their policies vis a vis a non-participant country and the rest of the world.

2-Custom Unions: this is very similar to free trade areas but only it implies that State members must adopt and conduct a common external trade policy and relation.

3-Common Markets: they are a kind of customs union with the free mobility of factors across the borders of each country member. It implies that capital, labors, technology, and enterprises can move freely from a country member to another one.

4-Economic Unions: they are like common markets asking for common and harmonization of fiscal and monetary policies. It implies for participants to introduce a central authority controlling

these matters. In practice, the monetary union (country members adopt one single currency) can come before the economic unions.

5-Complete political Union: it is the final phase of the process and necessitated an entity made to take decisions in the place of the group for various fields like social, economic, and political domains, and that in compliance with agreements and protocols signed by States members. Also, it appears like a final product of a process for unifying economic policies among State members which imply necessarily the institution of a monetary union between them and removing completely all forms barriers to trade. It advocates also for the free mobility of capital and labor.

Table 3. 1 Presentation of the characteristics of the integration scheme

Type of Arrangement	Fee Trade among members	Common Trade Policy	Free flow of factor mobility	Common monetary and fiscal policy	One government
Preferential Trade Area	No	No	No	No	No
Free Trade Area	Yes	No	No	No	No
Custom Union	Yes	Yes	No	No	No
Common market	Yes	Yes	Yes	No	No
Economic Union	Yes	Yes	Yes	Yes	No
Political Union	Yes	Yes	Yes	Yes	Yes

Source: Economic Commission of Africa, 2015

3.3 Theoretical effects of regional integration

3.3.1 Static Effects

The static effects of regional integration are referring to changes operated by the formation of regional integration on the market equilibrium of price-quantity. Viner (1950) had revealed that there are a couple of static effects of regional integration namely trade creation and trade diversion.

There is evidence for *trade creation* when the signature of a regional integration implements a low cost of production in the place of the high cost one. Hence, trade is supposed to be created when countries decide to substitute the production of commodities and services that they have produced less efficiently with the same commodities or services produced more efficiently by a partner country. Besides, regional trade agreements enhance welfare when it can introduce a low-cost partner country in the place of a higher-cost domestic production. Trade creation occurs also when regional trade agreements boost and raise the volume of trade through the removal of trade barriers (tariffs and non-tariff)(Economic Commission fr Africa). We can also distinguish the external trade creation which is designing the substitution of expensive domestic production in favor of a cheaper import from the rest of the world due to the reduction of tariffs in the context of CET which characterize particularly customs union.

There is a trade diversion when the low cost of production of a given commodity is substituted by a high cost of production in the context of regional integration. Trade is also diverted when consumption is oriented toward higher production costs within the RTA rather than lower production costs from a third country or the rest of the world. Theoretically, trade diversion generates a loss of consumer surplus, regional uncompetitiveness, and inefficiency.

Viner (1950) underlined that trade creation and trade diversion occur especially in the context of the preferential trade regime. This tends also to move the welfare into opposite directions. In

summary, trade diversion is the replacement of expensive imports from country partners by cheaper imports from a third country or the rest of the world. Supply-side diversion occurs when there is a replacement of expensive exports to the rest of the world by cheaper exports to country partners.

However, other authors like Cline (1978) have identified other static effects of regional integration such that the labor opportunity effect (occurs when there is an increase of the output because of regional integration and it allows the employment of supplementary labor with a wage less than the minimum rate), the economy of scale effects (occurs when because of the augmentation of the market size by the regional integration, firms can use their full productive capacity), and foreign exchange saving effect (country members save forex exchange by increasing intra-regional import and reducing import from the rest of the world). Cline (1978), considers the trade creation and trade diversion by Viner as traditional static effects of regional integration

3.3.2 Dynamic effects

Static effects of regional integration refer to temporary effects while dynamic effects refer to medium and long-term effects.

First, we have expanded the market and economies of scale effect. The link between them is that the expanded market offers greater possibility by the exploitation of economies of scale. Thus, economies of scale enable firms to produce with lower cost and make available a large number of consumers with a heterogeneous taste that allows firms to diversify their production. The ability to operate within other country partners is also considered as benefits from the expanded market in the context of regional integration. The domestic market is insufficient for firms to produce optimally while an expanded market will allow firms to expand their production to the optimum level.

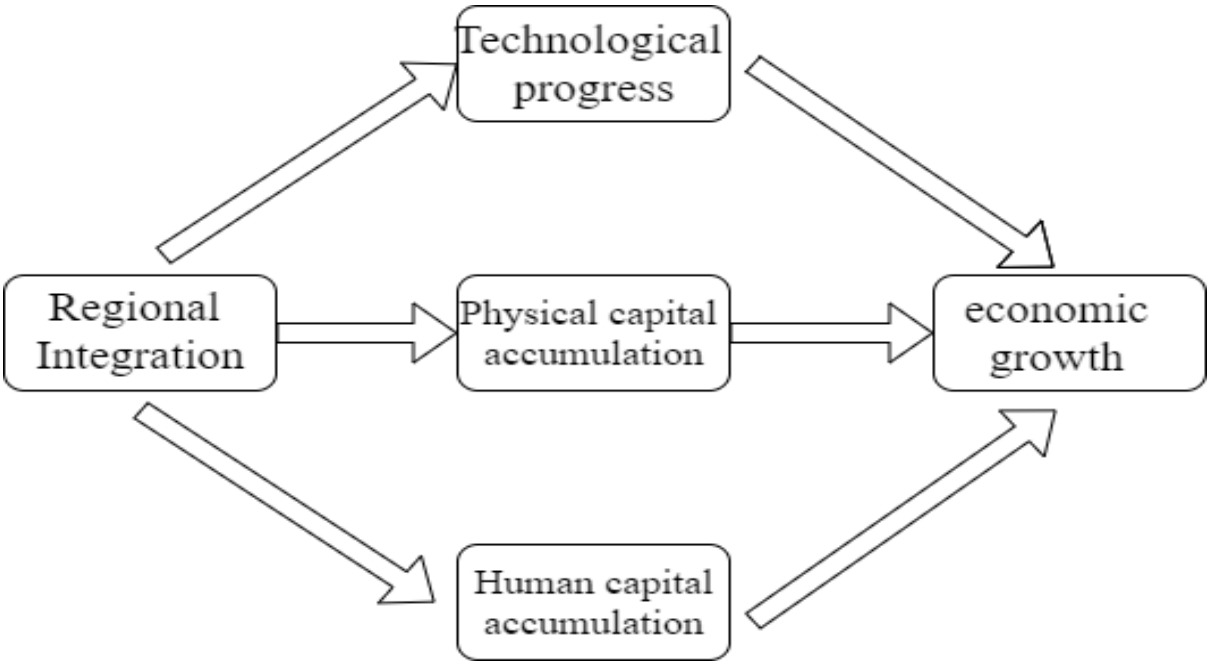
Regional integration generates a competition effect. Due to the expanded market, foreign products are inserted in the domestic market. Consumers have a larger variety of choices and become more sensitive to price changes and the quality of products. That rise the competition between firms and only competitive firms will survive while non-competitive firms will drive away from the market.

Next, we have the investment effects of regional integration. Hence, regional integration has various important effects on investment. For instance, regional integration may reduce the risk and uncertainty when firms invest in partner countries due to changes in foreign trade policy. Regional integration may lead also to investment creation. The removal of tariffs under free mobility of capital will imply a higher rate of return of capital. However, the investment effect of regional integration may vary from one firm to another. On one hand, there are non-competitive firms that cannot compete in the context of regional integration. On the other hand, there are competitive firms endowed by the excess capacity of production. That kind of firm can compete and able to satisfy the raise of demand due to regional integration by more intensive use of their existing machine and can raise their investment progressively. Regional integration has, in general, a long-run effect on investment and the temporary effect will disappear over time.

3.4 Theoretical link between growth and regional integration

Theoretically, regional integration can impact economic growth rate through various channels which can be summarized by the diagram below:

Figure 3.1 Theoretical link between regional integration and economic growth



Source: Author

In this figure, we are also considering three variables through which regional integration affects economic growth. However, we can add again more other macroeconomic variables like inflation, exchange rate, FDI, trade openness, etc… We can also add social factors and institutional factor-like democracy, control of corruption, political stability, etc…

3.5 Empirical evidence of the growth effects of regional integration

In this part, we would like to point out different empirical findings of the growth effects of regional integration using a various econometrical methodology.

Zahonogo (2017) assessed the linkage existing between trade and economic growth for 42 Sub-Saharian countries over 1980-2012. He estimated a dynamic growth model by a Pooled Mean Group estimation technique. His empirical results revealed the existence of threshold trade This

Author, suggest that, below the trade threshold, higher openness into international trade will generate more economic growth while higher trade openness will decline economic growth above the trade threshold.

Seck et al (2020) used spatial dynamic panel data to estimate to spillover effects of economic growth in Africa over 6 years (2000-2016). Their key finding argued that the growth effects of neighboring his higher through trade than geographical proximity. However, the scale of the benefits from the spillover effects is smaller in African developing countries than those from developed ones (for instance, US or EU).

Badinger (2001) examined the effect of regional integration for EU countries over 1950-2000 by using instrumental variable estimation, Least Square Dummy Variable, and One-step first diff-GMM. His finding suggested that EU regional integration was spurred economic growth after the Second World War.

Henreksen et al. (1996) were investigated the eventual impact of regional integration on economic growth in Europe using panel data techniques over 1975-2000. They concluded that the European Community (EU) and European Free Trade Area (EFTA) exhibited a positive and significant relationship with economic growth in the region. They also argued that the improvement of the internal market is a significant determinant of long-run economic growth.

Licandro (2004), investigated the impact of regional integration on economic growth and convergence in the East African Community over 1980-2007 using the cointegration test and Eliot, Rosenberg-Stock unit root test with the per capita GDP. He found a complete convergence in the region and the convergence can be used as a tool for successful integration in the EAC.

Park and Claveria (2018) used a multidimensional approach to study the impact of regional integration on growth, inequality, and poverty across the various region in Asia, Africa, Latino America, and the European Union over 2006-2016. they have estimated their model through a sys-GMM technique. their findings suggested that regional integration has a positive and significant effect on economic growth through 3 dimensions, namely, regional value chain, infrastructure and connectivity, and institutional and social integration.

Ijjo and Tumwebaze (2015) studied the growth effect of COMESA regional integration over 1980-2010 using GMM procedures. Their findings suggested that COMESA influences positively the economic growth of its members through the growth of physical capital stock, world GDP, and trade openness.

Ouedraogo and Drabo (2019) investigated the effect of the dynamic regional integration on economic growth in the WAEMU. For that, they employed autoregressive vector analysis and panel data over 2000-2013. They have found that WAEMU countries have contributed 0.5 percent of the variation of the long-run GDP growth in the region.

Mann (2015) studied the impact of regional integration on economic growth in Central Eastern Europe. For that, he estimated a convergence equation based on the augmented Solow model for a panel of 10 countries over 1995-2010. His findings suggested that in the medium term, regional integration has a positive growth effect but the magnitude is low.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter presents the theoretical model, empirical model, description of variables, and their expected sign as well as a discussion of data sources.

4.2 Theoretical model

The recent theories of growth consider that physical and human capital accumulation are important factors determining economic growth. Hence, the rise of human capital accumulation and the productivity of capital will raise the level of domestic production and therefore rise in economic growth.

Consider a simple Cobb-Douglas production function:

$Y = AK^{\propto}L^{(1-\propto)}$ (4.1) , where Y represents the output, A is the technology progress, K is the physical capital and L is the human capital accumulation. α is the elasticity of output with respect to K and (1-α) with respect to L.

From the above equation, we can compute the annual growth of output as follows:

$y = a+\propto k + (1-\propto)l$ (4.2), where *y*, *a*, *k*, and *l* represent respectively the growth rate of Y, A, K, and L.

4.3 Empirical Model

In this study, we are using a standard growth model which is an extension of the model employed by Te Velde (2011) and Kamau (2011) that is represented as follows:

$g_{i,t} = \propto_{i,t} + \beta_1 lnY_{0i,t-1} + \sum_{j=2}^{6} \beta_j X_{i,t} + \varepsilon_{i,t}$ (4.3)

Where: t and I represent respectively time and country; α is a constant β_j is the coefficient on respective independent variables; ε is the random error.

g represent the annual growth rate of per capita GDP;

Y_o represents the log of the initial level of GDP per capita which is captured by the per capita GDP lagged by one period;

X represents a set of explanatory variables that the functional form can be expressed as follows:

$$X_{i,t} = f\{lnk_{i,t}, lnhc_{i,t-1}, FDI_{i,t}, lntrade_{i,t}, dummy_{i,t}\} \quad (4.4)$$

$lnk_{i,t}$ is the natural logarithm of physical capital accumulation;

$lnhc_{i,t-1}$ is the initial level of capital accumulation. It is the logarithm of human capital accumulation lagged by one period;

$FDI_{i,t}$ is the foreign direct investment;

$lntrade_{i,t}$ is the log of trade openness;

$dummy_{i,t}$ is a dummy variable taking the value 1 since the ECOWAS treaty was been revised i.e. 1993-2019 and 0 otherwise i.e. 1975-1992.

We can rewrite our empirical model as follows:

$$g_{i,t} = \propto_{i,t} + \beta_1 lnY_{0i,t-1} + \beta_2 lnk_{i,t} + \beta_3 lnhc_{i,t-1} + \beta_4 FDI_{i,t} + \beta_5 lntrade_{i,t} + \beta_6\, dummy_{i,t} + \varepsilon_{i,t} \quad (4.5)$$

The model is not autoregressive since the lagged value of per capita GDP is different from the per capita GDP growth rate.

4.4 Estimation techniques

Here we are checking four different technics of estimation such as Pooled OLS, random effects, fixed effects, and regression with Driscoll-Kraay Standard errors.

First of all, we will choose between Pooled OLS and random effects model by using a Breush-Pagan test under the null of no heterogeneity across panel units. If the null hypothesis is rejected then we can say that random effects are appropriate.

Next, we will continue with the random effects and fixed effects model. Random effects assume that the individual heterogeneity is not correlated with regressors while if it is correlated with regressors then we will take the fixed effects model. We use the Hausman test to test for random effects against a fixed-effects model.

Next, we will do post estimation sensitivity analysis by testing for heteroscedasticity, serial correlation, and cross-sectional dependence.

Macroeconomic Panel data are most often confronted with heteroscedasticity, autocorrelation, and cross-sectional dependence. Fixed and random effects cannot always be applied to estimate regressions in that case because they assume homoscedastic, no autocorrelation, and no cross-sectional dependence models. Hoechle (2007) has stated that cross-sectional dependence in the estimation of panel models might generate bias in statistical results.

As an alternative to fixed effects, we use the regression with Driscoll-Kray Standard errors because it overcomes heteroscedasticity, autocorrelation, and cross-sectional dependence problems.

4.5 Variables description and their expected signs

The initial level of per capita GDP: the advanced neoclassical theory of growth has revealed that the initial level of real per capita GDP and the growth rate of per capita GDP exhibit a negative relationship. Hence, according to their convergence hypothesis, countries starting with lower the initial real per capita income will have a higher economic growth rate of per capita output. In the long run, the growth rate among countries tends to be the same through the diffusion of common knowledge. Therefore, the sign of the coefficient of the initial level of the growth rate of GDP is expected to be negative In this study, it is represented but the log of per capita GDP lagged by one period.

Physical capital accumulation: is supposed to promote the quantity of capital per worker that will lead to an expansion of the overall productive capacity. The productivity and per capita income level is stimulated by investing in better technology, and research-development. Physical capital seems a robust determinant of economic growth. Hence, its coefficient is expected to be positive. Here, it is captured by total investment in the percentage of GDP.

The initial level of human capital: in this study, represents the role of education on economic growth. Especially, it is represented by the log of gross enrollment in secondary school (in percentage) lagged by one period. The coefficient of the accumulation of human capital is expected to be positive. Education is supposed to stimulate economic growth according to the Solow growth model and neoclassical production. Human capital can affect growth positively because educated workers are supposed to be more productive, inventive, and innovative. Also, a better-educated worker has more abilities in acquiring new skills when a new sector emerges. Hence, the accumulation of human capital can be accompanied by higher productivity and a higher growth rate of GDP per capita.

Foreign direct investment: The effects of FDI on economic growth is now ambiguous. On one hand, it is known to stimulate economic growth in the host country by providing direct capital financing, enhancing competition, boosting employment creation, diffusing new production methods. FDI is also carrying so many other positive externalities via a transfer of technology and knowledge for instance. On the other hand, some empirical studies have found that FDI crowded out domestic investment. Hence, the coefficient of FDI is expected to be positive or negative. In this study, we are using the net inflow FDI in the percentage of GDP.

Trade openness: is given by $\frac{\text{Import+Export}}{\text{GDP}}$ i.e. trade in the percentage of GDP. The trade-led growth hypothesis reveals that openness to international trade has positive growth effects through the efficiency in resource allocation, to the enhancement of the economy of scale, competition, and technology. Therefore, the coefficient of trade openness is expected to be positive.

Dummy variable: it is a categorical dummy used to capture the growth effect of the revision of the ECOWAS treaty in 1993. It is taking the value of 1 since the revised treaty was implemented (1993-2019) and 0 otherwise (1975-1992).

4.6 Sources of data:

In this study, we are using panel data including fourteen country members of ECOWAS (Liberia is dropped because of lack of data) over 44 years (from 1975 to 2019). All of the indicators and variables used in this study are downloaded from the website of the world bank's WDI.

CHAPTER FIVE

PRESENTATION AND DISCUSSION OF RESULTS

5.1 introduction

In this chapter, we are going to present and interpret the results of our data analysis. That will include a descriptive statistics analysis, correlation analysis, diagnostic tests for robustness, and regression with Driscoll-Kraay Standard Errors.

5.2 Descriptive statistics analysis

The following table contains some elements of descriptive statistics like mean, standard deviation, minimum and maximum values of each respective variable. We are considering 3 different panels. The first one represents descriptive statistics for the period 1975-1992 i.e. before the ECOWAS treaty was revised. The second represents the period since the ECOWAS treaty was revised i.e. 1993-2019. And the last one covers the overall period i.e. from 1975 to 2019.

Table 5. 1 Descriptive statistics

Variable	Mean	Std.Dev.	Min	Max
PANEL A				
Per capita GDP growth (%)	-0.083	5.523	-19.186	18.182
GDP per capita (US$)	842.052	459.866	326.682	2471.015
Physical capital(%)	17.253	10.43	3.148	49.441
human capital (%)	14.313	8.923	1.622	37.938
FDI (%)	0.478	2.335	-28.624	11.27
Trade openness (%)	57.667	25.753	6.32	140.86
Dummy	0	0	0	0
PANEL B				
Per capita GDP growth (%)	1.72	4.316	-29.462	21.028
GDP per capita (US$)	1013.697	688.848	272.991	3907.653
Physical capital(%)	19.712	9.968	2.663	51.159
human capital (%)	35.782	21.522	6.319	96.659
FDI (%)	2.743	3.385	-3.379	32.301
Trade openness (%)	60.693	20.758	20.723	121.842
Dummy	1	0	1	1
PANEL C				
Per capita GDP growth (%)	1.03	4.888	-29.462	21.028
GDP per capita (US$)	947.723	616.347	272.991	3907.653
Physical capital(%)	18.943	10.17	2.663	51.159
human capital (%)	25.231	19.736	1.622	96.659
FDI (%)	1.863	3.214	-28.624	32.301
Trade openness (%)	59.526	22.841	6.32	140.86
Dummy	0.6	0.49	0	1

Source: Author, World Bank's WDI

On average, the economic situation in the region was significantly improved after the revision of the ECOWAS treaty in 1993. For instance, the ECOWAS per capita GDP growth rate was increased to 1.72 percent after the revision of the treaty while it was -0.083 before and 1.03 percent in general. The average per capita GDP of the ECOWAS is in general 842.052 US dollars. It was 1013.697 US dollars after the revision of the ECOWAS treaty and 947.723 US dollars before.

The average total of investment in the percentage of GDP before the revision of the ECOWAS treaty was 17.253 percent while it was increased to 19.712 percent after and it was 18.943 percent in general.

The mean of the gross enrollment on the secondary school was 25.231 percent over 1975-2019 while it was only 14.313 percent for 1975-1992 and 35.783 percent over 1993-2019.

The net inflows FDI was averagely 1.863 percent of GDP for the overall period and it was 2.743 percent after the implementation of the revised treaty of the ECOWAS while it was only 0.478 percent before the revision of the ECOWAS treaty.

The openness to international trade was significantly increased after the revision of the ECOWAS treaty. It was averagely 60.693 percent of GDP while it was 57.667 percent before and 59.526 percent in general.

5.3 Sensitivity analysis

In this section, we are going to carry out a sensitivity analysis by testing for multicollinearity with a Pearson's correlation and testing for unit root test within the regression.

5.3.1 Correlation analysis

The correlation analysis is used to measure the association among variables. We can see from table 5.2 below that, in general, the coefficient of correlation does not exceed 0.8. Therefore, we can conclude that multicollinearity is not a problem for the present study.

Table 5. 2 Correlation Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1)Per capita GDP growth	1.000						
(2)initial level of GDP per capita	0.101	1.000					
(3)Physical capital	0.340	0.225	1.000				
(4)initial level of human capital	0.106	-0.101	0.165	1.000			
(5)FDI	0.256	0.325	0.411	0.025	1.000		
(6)Trade openness	0.163	0.314	0.222	-0.050	0.333	1.000	
(7)Dummy	0.248	0.262	0.349	0.097	0.435	0.038	1.000

Source: Author, World Bank's WDI

5.3.2 Panel unit root test

We are going to carry a Fisher-type panel unit root test based on Augmented Dickey-Fuller to prevent our model for eventual spurious effect due to the non-stationarity of variables on our regression results. According to Choi (2001), the inverse Chi-squared test applicable and powerful with finite numbers of panels. The hypothesis of this test is as follows:

H_o: stationarity

H_1: non-stationary.

Table 5.3 contains the Chi-square statistic of our ADF Fisher test, p-value associated, and respective conclusions for each model.

Table 5. 3 ADF Fisher Panel Unit Root test (inverse Chi-squared)

Variables	Statistics	P-value	Conclusions
Per capita GDP growth	456.109	0.000	Stationary
The initial level of GDP per capita	329.656	0.000	Stationary
Physical capital	76.689	0.000	Stationary
The initial level of human capital	150.950	0.000	Stationary at first difference
FDI	119.600	0.000	Stationary
Trade openness	56.940	0.001	Stationary

Source: Author, World Bank's WDI

5.4 Estimation of the model

In this section, we are going to choose which panel technic is more appropriate to estimate our econometrical model. For that, we are going to choose between Pooled OLS, random-effects, and the fixed-effects model.

Consider the model below:

$Y_{it} = \propto + \beta X_{it} + U_{it} + \epsilon_{it}$ (5.1)

i indicates countries and t indicates time;

α is a constant;

β is a vector of parameters;

Y is the dependent variable, X is a vector of independent variables,

U is called individual heterogeneity;

ε is the error term.

5.4.1 Pooled OLS or random effects

Here we are going to use to choose between Pooled OLS and random-effects.

For that, we perform a Breusch-Pagan test. The hypotheses of the test are as follows:

-H_0: U=0

-H_1: U≠ 0

Pooled OLS is preferred to random effects if there is not individual heterogeneity i.e. U=0. Meanwhile, if U≠ 0 the there exist individual heterogeneity then the random effect is appropriate.

Table 5. 4 Breusch and Pagan Lagrangian multiplier test for random effects

H_0: Pooled OLS is appropriate	
Chibar2(01)	5.43
p-value	0.01

Source: Author

As the p-value is less than 0.05, we can reject the null hypothesis and conclude that random effect is appropriate. The Pooled OLS regression is represented in the appendix.

5.4.2 Random effects or Fixed effects

Here we are estimating random effects and fixed effects. After that, we will use a Hausman test to choose between random and fixed effects.

Table 5. 5 Random effects and fixed effects estimations

Variables	Random effects	Fixed effects
(log)Initial level of per capita GDP	-0.961	-4.126***
	(0.614)	(1.215)
(log)the initial level of human capital	2.742	2.388
	(3.306)	(3.32)
(log)physical capital	2.069***	2.048***
	(0.544)	(0.703)
FDI	0.135	0.181*
	(0.095)	(0.097)
(log)trade openness	1.352*	2.441***
	(0.728)	(0.918)
Dummy	1.215**	1.627***
	(0.58)	(0.624)
Constant	-4.992	11.498
	(4.513)	(8.018)
No of observation	290	290
R-squared	0.146	0.199
Pvalue	0.000	0.000
Mean dependent var	0.951	0.951
SD dependent var	4.469	4.469

Source: Author

Notes: *** p<0.01, ** p<0.05, * p<0.1 ; Standard error are reported in parentheses. Per capita GDP growth rate is the dependent variable.

From table 5.5, we can see that from the estimates of random effects and fixed effects.

Random effects assume that individual heterogeneity (U) is not correlated with regressors (X) while fixed effects assume that U are correlated with regressors. Therefore, if U and X are correlated then the fixed effects model is going to be chosen but if not random effects model is sufficient.

5-4-3 Hausman test

We use a Hausman test to choose between random and fixed effects. The hypotheses of the Hausman test are as follows:

H_0: U and X are not correlated

H_1: U and X are correlated

The result of the test is indicated in table 5.6 below:

Table 5. 6 Hausman test

Ho: difference in coefficients not systematic	
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)	15.75
p-value	0.0151

Source: Author

Since the Hausman test indicates a p-value is less than 0.05, it is suggesting that the null hypothesis is rejected and we should use a fixed-effects model.

5.5 Diagnostic tests for robustness

5.5.1 Test for heteroscedasticity

We are going to perform a Modified Wald test for group-wise heteroscedasticity in a fixed effect regression model. The hypotheses of this test are as follows:

H_0: Homoskedasticity

H_1: heteroscedasticity.

The result of the test is contained in the table below:

Table 5.7 Modified Wald test for group-wise heteroscedasticity

H_0: sigma(i)^2 = sigma^2 for all i	
chi2 (14)	218.75
p-value	0.000

Source: Author

As the p-value is less than 0.05, therefore we are strongly rejecting the null hypothesis and conclude that there is heteroscedasticity in the model.

5.5.2 test for autocorrelation

Now, we are going to test for autocorrelation by the use of the Wooldridge test for autocorrelation in panel data. The hypotheses of the test are as follows:

H_0: there is no serial correlation

H_1: there is a serial correlation

The result is shown in table 5.8 below:

Table 5.8 Wooldridge test for autocorrelation in panel data

H_0: no first-order autocorrelation		
F(1, 13)	14.107	14.107
Pvalue		0.0024

Source: Author

From the above table, we have detected serial correlation among error terms.

5.5.3 Test for cross-section correlation

To do so, we are going to perform a Pesaran's CD-test for cross-section dependence. The hypotheses are this test is as follows:

H_0: cross-section independence

H_1: data are correlated across panel groups

Results of the test are presented in table 5.9 below:

Table 5. 9 Pesaran's CD-test for cross-sectional dependence

Variables	CD-test	p-value	average joint T	mean ρ	mean abs ρ
Growth	4.107	0.000	42.49	0.07	0.15
Initial level of GDP	14.554	0.000	42.63	0.24	0.46
Initial level of human capital	3.103	0.002	14.99	0.09	0.27
Investment	3.753	0.000	38.57	0.06	0.35
FDI	19.195	0.000	41.26	0.31	0.32
Trade openness	3.147	0.002	42.49	0.05	0.28
Dummy	63.992	0.000	45	1	1

Source: Author

Note: CD follows the normal law with parameters (0,1).

The above table 5.9 is indicating us that p-values are all close to zero, so we reject the null hypothesis and conclude that there is cross-sectional dependence.

5.6 Regression with Driscoll-Kraay Standard errors

We are remarking that results provided by this technic are very similar to the fixed effects model estimation contained in the table insofar as estimated parameters remain entirely the same. Their differences are located on the values of standard errors. On the average, we have identified an increase of standard error values with Driscoll-Kray Standard error regression (except the log of human capital accumulation) comparing to the these that provide by the fixed-effects model. This rise of values of standard errors has probably implied the reduction of the level of statistical significance of variables that making FDI no longer significant with the regression with Driscoll-Kraay Standard errors.

As discussed in 4.4, I use this technic because it assumes that error terms are heteroskedastic, autocorrelated up to some lag, and perhaps cross-sectional dependent. The Driscoll-Kraay Standard errors will be heteroscedasticity and autocorrelation consistent and very robust for a very general form of cross-sectional and temporal dependence when the time-series is sufficiently large

(Hoechle, 2007). Thus, this method does not put any restriction on the size of the panel. Besides, as we are working with highly unbalanced panel data, this method is appropriate because it can handle the missing values.

Table 5. 10 Regression with Driscoll-Kraay standard errors

Method: Fixed effects regression Dependent variable: per capita GDP growth rate			
Variables	Coef.	Drisc/Kraay Std.Err.	P-value
(log)Initial level of per capita GDP	-4.126***	1.363	0.004
(log)initial level of human capital	2.388	3.014	0.433
(log)physical capital	2.048**	0.956	0.038
FDI	0.181	0.113	0.117
(log)trade openness	2.441***	0.909	0.01
Dummy	1.627**	0.746	0.035
Constant	11.498	8.382	0.178
No of observation	290		
Within R-squared	0.199		
F(6,39)	12.28		0.000

Source: Author

Notes: Driscoll-Kraay Standard errors are reported; *** p<0.01, ** p<0.05, * p<0.1.

Now, we are going to discuss the results contained in table 5.10.

The coefficient on the logarithm of the initial level of per capita GDP is found to be negative and statistically highly significant at level. That is in line with Barro's (1996) and neoclassic growth model prediction. This provides evidence for conditional convergence in the ECOWAS. It suggests that poorer countries will have a higher growth rate than richer ones in the ECOWAS. Besides, the ECOWAS economy converges toward its long-run position by 4.126 percent annually.

The coefficient on the physical capital accumulation is found to be positive and statistically significant at the 5 percent level as expected. Hence, if other variables remain constant, a percentage of change in physical capital is associated with an increase of 2.048 percent of the

growth rate of per capita GDP in the ECOWAS. That is in line with Bong and Premaratne (2018) which is suggesting that when the physical capital accumulation rise, the productive capacity of the economy rise as well therefore the economic growth is also rising.

We found also that the coefficient on the log of trade openness is positive and statistically significant at the 1 percent level. Hence, if the level of openness on international trade increase by 1 percent, we expect the ECOWAS per capita GDP growth rate to rise by 2.441 percent. That is in line with Ijjo and Tumwabze (2015) suggesting that trade liberalization is impacting the economy positively through spillover effects.

The coefficient on the initial level of human capital accumulation is found to be positive but not statistically significant at the level either in the Driscoll-Kraay Standard Errors regression or in the fixed effects model as not expected.

Meanwhile, the coefficient on FDI is found to be positive and statistically significant in the fixed effects model but is no longer significant in the Driscoll-Kraay Standard error regression. That suggests that FDI is not a robust determinant of economic growth in the ECOWAS. This conclusion is consistent with the finding of Alege and Ogundipe (2014).

The coefficient on the dummy is found to be positive and statistically significant as expected. This suggest that the revised treaty of 1993 have positive effect on economic growth in the ECOWAS and if other effects held constant, this reform is associated with a rise of ECOWAS per capita GDP growth by 1.627 annualy. That is in line with Plummer (1997) which is arguing that additional measures for a deepen regional integration will continuously beneficial for country members.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Introduction

In this chapter, we are going to deal with a conclusion, recommendation, and the limitation of the study.

6.2 Summary and conclusion

Economic growth belongs to the central aspect and the main goal of regional integration. A large pool of research and studies have been performed by different researchers from various regions across the world that deal with the impact of regional integration on economic growth. The findings and results of this research were been ambiguous. Despite the large pool of literature and study examining the effect of regional integration on economic growth, there exist limited study on the ECOWAS sub-region. Thus, there is a gap to be filled about that. The main motivation of this study was to examine whether reforms within regional integration trigger economic growth in the ECOWAS. To do so, we employed a panel dataset of 14 ECOWAS countries, mainly provided by the World Bank's WDI from 1975 to 2019. The empirical results were obtained by estimating an extension of a standard growth model (Te Velde, 2011). We have incorporated a dummy variable in the regression that is capturing the growth effect of the ECOWAS revised treaty of 1993. The Hausman test supported the use of the fixed-effects model for the estimation. However, the diagnostic tests indicated the presence of heteroscedasticity, autocorrelation, and cross-sectional dependence in the fixed effects regression. Hence, estimators from fixed effects might be inconsistent and the statistical results might be biased. To fix these problems, we have adopted a robustification of the standard error by introducing a fixed effects regression with Driscoll-Kraay

Standards Errors. This technique provides a consistent estimator and seems to be robust in the face of various forms of cross-sectional dependence. Thus, it controls for heteroscedasticity and autocorrelation.

Our results indicate that trade openness and physical capital accumulation have positive effects on economic growth in ECOWAS while FDI and initial level of human capital was found not statistically significant at level. In other words, we found evidence of a positive effect of regional integration on economic growth in the ECOWAS through openness to international trade and domestic investment. Furthermore, the effect of the revised treaty of 1993 on economic growth was found to be positive. Hence, if other effects are held constant, the ECOWAS revised treaty of 1993 should be associated with a 1.627 percent rise of economic growth in the region. Lastly, the hypothesis of conditional convergence was also verified for the ECOWAS since the coefficient on the initial level of per capita GDP was found to be negative and statistically significant at level. However, we found an increase in the dispersion of per capita income in the ECOWAS throughout the study, therefore, we did not detect evidence of sigma convergence (details of the analysis are presented in the appendix).

6.2 Policy recommendations

The findings of the study a positive relationship between regional integration and economic growth in the ECOWAS. However, the benefits of regional integration are reduced by the limited integration in the region. The present study recommends that public authority and government should implement policies and reforms towards deepening integration in the ECOWAS. We found also that ECOWAS regional integration promotes economic growth through various drivers such that domestic investment, trade openness. We encourage the implementation of policies targeting

the expansion of domestic investment by increasing domestic innovations and the reduction tariffs associated with the import of capital goods.

Additionally, ECOWAS country members must create a business environment to attract more FDI into the region.

Lastly, policies in favor of the rise of the level of openness in international trade should be implemented. This can be made possible by reducing tariff and non-tariff barriers to promote intra-ECOWAS and also trade with the rest of the world.

6.3 Limitations of the Study

In this study, we are also limited to some macroeconomic variables like domestic investment, the initial level of capital accumulation, FDI, trade openness. However, it can be extended with several factors with capturing financial stability like inflation and exchange rate or capturing social factors like democracy, control of corruption, and political stability.

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APPENDICES

APPENDIX 1

Testing for Sigma Convergence in the ECOWAS

We are interested in the variability of income per capita in the ECOWAS. To test whether the ECOWAS per capita income decrease over time. The sigma convergence refers to the decrease of the standard deviation of the variable y (here, it is the per capita income). However, we are going to use the coefficient of variation to measure the sigma convergence as recommended by Simionescu (2014). The Coefficient of variation is given by the standard deviation and mean ratio.

Consider the variance of y is given as follows:

$\sigma_i^2 = \frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2$(6) where I denote country and n denote observations.

Thus, the standard deviation is given by the square root of the variance.

$\sigma = \sqrt{\sigma^2}$(7)

Recall, $\bar{y}$ is the arithmetic mean of y. Therefore, we obtain the expression of the coefficient of variation of y:

$CV = \frac{\sqrt{\sigma^2}}{\bar{y}}$(8), where

$\sigma_i^2 = \frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2\ (p_i - 1)$(9); $p_i$is the weight of the country.

We will conclude that there is evidence for sigma convergence in the ECOWAS if the coefficient of variation of the per capita income decrease over time.

Table A. 1 Sigma Convergence in the ECOWAS over 1975-2019

YEAR	SD	MEAN	CV	YEAR	SD	MEAN	CV
1975	163.7877	288.2553	0.568204	1998	298.8454	481.9884	0.620026
1976	191.4192	303.1467	0.631441	1999	319.8231	506.2848	0.631706
1977	222.1397	335.9199	0.661288	2000	284.4883	459.975	0.618486
1978	253.6419	390.1767	0.650069	2001	281.1771	470.9294	0.597068
1979	287.581	452.7523	0.635184	2002	310.4013	506.7732	0.612505
1980	306.8909	500.9223	0.612652	2003	408.4863	598.2231	0.682833
1981	534.7835	562.266	0.951122	2004	457.8358	690.4653	0.663083
1982	443.2838	512.6799	0.864641	2005	487.2466	737.7968	0.660408
1983	290.6774	421.6328	0.689409	2006	564.6468	844.2558	0.66881
1984	226.5022	373.1183	0.607052	2007	744.4203	1016.119	0.732611
1985	223.3696	373.3269	0.598322	2008	872.2428	1184.411	0.736436
1986	238.568	405.2028	0.588762	2009	802.8708	1102.396	0.728296
1987	257.1546	442.8833	0.580637	2010	806.2786	1140.297	0.707078
1988	246.1375	454.5756	0.541467	2011	896.304	1244.983	0.719933
1989	229.3299	434.9713	0.52723	2012	859.3084	1246.62	0.68931
1990	255.3065	492.072	0.51884	2013	951.5414	1381.91	0.68857
1991	241.673	512.8365	0.471248	2014	957.7677	1382.081	0.69299
1992	274.5883	504.0127	0.544804	2015	824.7959	1252.63	0.658451
1993	330.5066	499.6664	0.661455	2016	787.9298	1242.391	0.634204

1994	251.4473	416.6389	0.603514	2017	800.1828	1288.577	0.620982
1995	293.2389	484.9339	0.604699	2018	870.9172	1396.999	0.62342
1996	296.6586	503.7951	0.588848	2019	885.8865	1402.003	0.631872
1997	280.7247	475.4536	0.590436	-	-	-	-

Source: Author

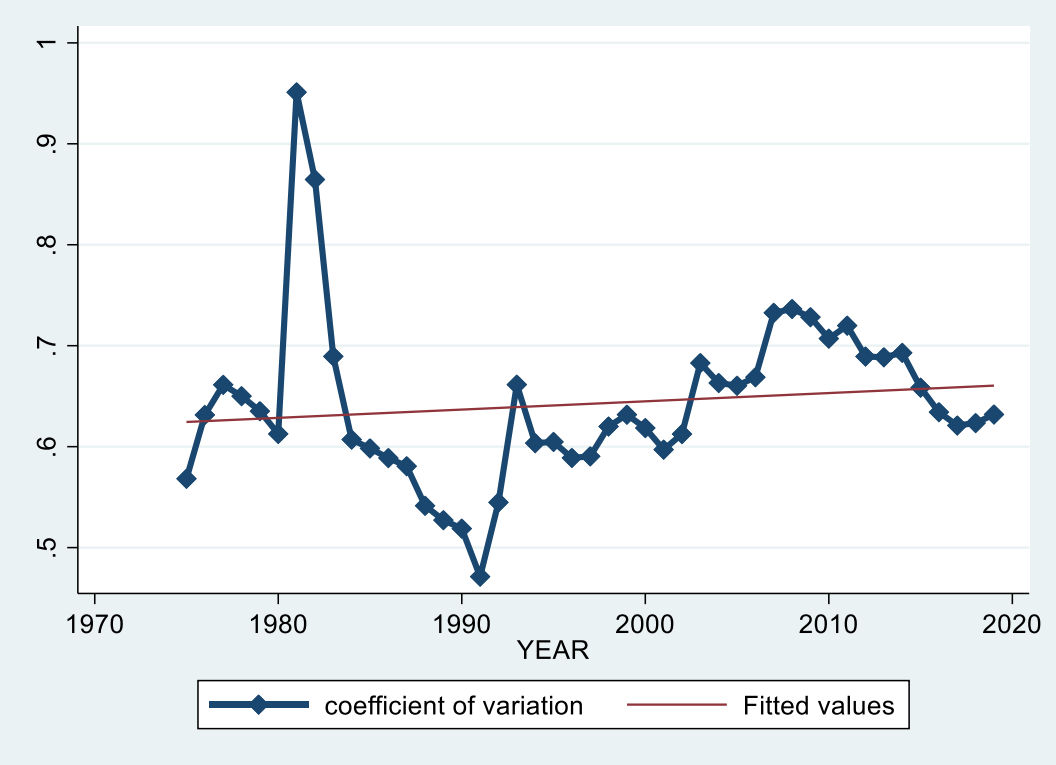
SD is the standard deviations based on the population of the ECOWAS per capita GDP in US$

MEAN is the arithmetic mean of the ECOWAS per capita GDP

CV is a coefficient of variation of the ECOWAS per capita GDP.

Graphically, it yields:

Figure A- 1 The variability of per capita income in the ECOWAS over 1975-2019



Source: Author

From figure A-1, we can see that the dispersion of per capita income is rising over time in the ECOWAS. Therefore, we detect no evidence for sigma convergence of ECOWAS per capita income. Rather, we detect divergence. However, figure A-1 is telling us that the magnitude of the divergence is low. Monfort (2008), argued that sigma convergence is preferred to beta convergence. Hence, sigma convergence describes the reduction of variability of per capita income across the region while beta convergence is only referring to the catching-up processes. Beta convergence is necessary but not sufficient for sigma convergence.

APPENDIX 2

Table A. 2 Summary Statistics by countries

Countries	Variables	growth	GDP	investment	education	FDI	Trade
Benin	Mean	1.014	936.865	21.957	25.534	0.343	51.996
	std.dev.	3.033	132.99	7.195	16.955	0.902	7.483
	Min	-7.16	745.781	9.818	8.333	-1.337	38.3
	Max	6.991	1259.808	46.563	59.043	3.054	65.268
Burkina FASO	Mean	2.138	503.68	17.792	13.003	0.628	41.31
	std.dev.	2.896	147.545	3.309	11.432	0.879	10.011
	Min	-4.261	326.682	10.758	1.705	-0.092	28.374
	Max	7.987	822.378	25.186	40.71	3.648	64.036
Cabo Verde	Mean	4.675	2113.425	37.477	61.138	4.17	93.541
	std.dev.	4.459	1135.75	5.624	33.63	3.886	13.019
	Min	-2.453	680.493	27.862	7.503	-0.005	60.306
	Max	15.904	3907.653	49.79	96.659	12.667	117.817
Cote d'Ivoire	Mean	-0.251	1554.648	12.662	25.634	1.382	73.02
	std.dev.	4.624	356.727	5.29	13.538	1.015	13.432
	Min	-14.812	1132.548	4.039	12.05	0.177	45.597
	Max	8.042	2471.015	22.716	51.027	6.027	95.07
The Gambia	Mean	0.192	821.141	9.476	20.178	2.393	71.272
	std.dev.	3.607	40.712	4.981	12.024	2.435	26.886
	Min	-10.862	747.003	3.733	9.616	-1.072	39.089
	Max	8.912	903.541	19.999	51.032	7.799	131.485
Ghana	Mean	1.327	1067.197	25.783	43.842	2.69	58.85
	std.dev.	4.463	331.257	12.384	12.954	2.917	28.947
	Min	-14.509	693.949	4.158	33.298	-0.66	6.32
	Max	11.315	1884.285	51.159	71.32	9.517	116.048
Guinea	Mean	1.809	648.565	12.829	19.338	2.568	67.362
	std.dev.	2.129	106.935	3.799	9.106	4.158	20.667
	Min	-3.362	513.194	5.462	9.996	-0.84	42.415
	Max	7.926	920.831	24.764	39.334	18.811	121.842
Guinea-Bissau	Mean	0.807	581.782	15.544	10.776	1.146	49.949
	std.dev.	6.821	55.365	8.248	9.48	1.076	8.725
	Min	-29.462	488.767	6.247	2.729	-0.119	31.132
	Max	16.362	761.585	39.087	34.162	4.274	67.678
Mali	Mean	1.924	570.883	24.397	18.94	1.468	52.201
	std.dev.	5.074	120.399	6.292	14.038	1.696	8.208
	Min	-9.308	389.368	15.746	6.078	-0.773	32.037
	Max	18.182	793.451	49.441	44.018	6.345	64.818

Table A.2 Continued

Countries	Variables	Growth	GDP	investment	education	FDI	trade
Niger	Mean	-0.256	520.763	21.847	8.699	2.153	42.293
	std.dev.	4.674	82.511	13.43	5.695	3.164	9.545
	Min	-19.186	426.684	3.148	1.622	-1.535	25.903
	Max	10.231	723.039	49.524	24.254	12.265	54.412
Nigeria	Mean	0.394	1810.509	15.159	30.316	1.447	33.913
	std.dev.	5.38	424.884	2.307	12.142	1.242	12.438
	Min	-15.45	1324.297	10.654	7.652	-1.151	9.136
	Max	12.457	2563.9	20.072	56.205	5.791	53.278
Senegal	Mean	0.767	1192.583	18.282	23.396	1.168	62.92
	std.dev.	3.231	138.257	5.465	14.307	1.044	8.73
	Min	-8.122	1002.41	7.98	10.54	-0.988	49.637
	Max	6.174	1584.472	27.701	50.936	3.649	86.963
Sierra Leone	Mean	0.282	412.652	10.755	22.598	2.632	51.502
	std.dev.	7.337	73.839	7.799	12.171	7.602	16.713
	Min	-22.312	272.991	2.663	11.578	-28.624	23.03
	Max	21.028	567.834	41.93	43.998	32.301	93.274
Togo	Mean	0.296	589.825	20.3	29.498	2.213	88.188
	std.dev.	5.654	62.671	6.592	12.19	3.554	17.105
	Min	-16.848	445.264	3.924	13.69	-3.379	56.478
	Max	12.427	733.46	32.223	61.846	18.818	140.86

Source: Author

APPENDIX 3

POOLED OLS REGRESSION

Variables	Coefficients	Standard Err.	p-value
(log)Initial level of per capita GDP	-1.052	1.251	.416
(log)the initial level of human capital	.532	.904	.566
(log)physical capital	2.005***	.445	.001
FDI	.169*	.095	.098
(log)trade openness	.651	.864	.464
Dummy	.948***	.34	.015
Constant	-2.725	5.592	.634
No of observation	342		
R-squared	0.161		
F-test	189.623		0.000

Source: Author

Notes : *** p<.01, ** p<.05, * p<.1 ; robust clustered standard errors are reported.

APPENDIX 4

Summary statistics for **Regression with Driscoll-Kraay standard errors**

Variables	Mean	Std.Dev.	Min	Max
Growth	0.951	4.469	-19.186	18.182
Initial level of GDP	6.700	0.571	5.860	8.227
Initial level of human capital	0.042	0.076	-0.233	0.278
Investment	2.877	0.587	1.147	3.935
FDI	1.869	3.192	-28.624	12.667
Trade openness	4.021	0.425	1.844	4.879
Dummy	0.586	0.493	0	1

Source: Author