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PROSPECTS OF THE PROPOSED WEST AFRICAN OPTIMUM CURRENCY AREA

BY

EBENEZER YIDANA

(10414482)

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DECLARATION

I Ebenezer Yidana, declare that this thesis is the outcome of my research under the guidance of my supervisors towards the academic award of the Master of Philosophy (MPhil) Degree in Economics in the Department of Economics, University of Ghana. No part of this thesis has been submitted in this or any other university for the award of a degree.
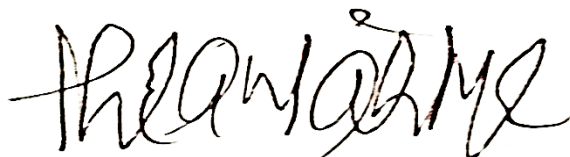
EBENEZER YIDANA

(10414482)

(12/10/2020)

DATE

SUPERVISORS:

DR. ALFRED BARIMAH   **DR. RICHARD AYISI**

(12/10/2020)   **(12/10/2020)**

DATE   DATE

Abstract

The adoption of the Euro by the European Economic and Monetary Union (EMU) has spurred the various Regional Economic Communities (REC) of the African Union (AU) to pursue their long-term aim of forming monetary unions and adopting common currencies. As part of the regional integration into monetary unions, ECOWAS has been pursuing a monetary union since 1987 which it finally agreed to launch a common currency (the ECO) in 2020. Even though the ECOWAS countries have not been able to simultaneously meet the revised six convergence criteria, the optimum currency area (OCA) literature also requires countries intending to adopt a single currency to have a symmetric response to demand, supply, and foreign shocks which will increase the net benefits as countries in a monetary union will have to lose autonomy over monetary policy and nominal exchange rates variability. A symmetric response to the shocks affecting the member countries will make the adoption of the ECO beneficial and sustainable to the sub-region. This research used vector autoregression (VAR) to examine whether the WAMZ countries have symmetric responses to foreign price shocks from the US, EU, and China since ECOWAS trade with these countries constituted about 50 percent of exports and imports in 2019. Using CPI and GDP growth data from 1980 to 2018 the impulse response functions and variance decomposition from the VAR system found that the WAMZ countries do not have real convergence and for that matter prices and output respond asymmetrically to price shocks from these countries. The study concludes that the WAMZ countries are not symmetric in their response to foreign price shocks and should therefore not proceed with the adoption of the ECO until further convergence is achieved and intra-regional trade is improved. The research recommends that efforts towards the attainment of the convergence criteria should be increased and intra-ECOWAS trade should also be promoted by all member states.

Dedication

I dedicate this thesis to God and to my beloved parents; MR. Samuel Yidana (Late) & MRS. Comfort Yidana and to all friends and love ones who contributed in diverse ways to the successful completion of my MPhil studies.

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AU	African Union
CFA	African Financial Community
CMA	Common Monetary Area
EAC	East African Community
EC	European Community
ECOWAS	Economic Community of West African States
EMU	European Economic and Monetary Union
ERM	Exchange Rate Mechanism
EU	European Union
G-PPP	Generalized Purchasing Power Parity
IFS	International Financial Statistics
IMF	International Monetary Fund
MCC	Macroeconomic Convergence Criteria
OCA	Optimum Currency Area
REC	Regional Economic Community
SADC	Southern African Development Community
SVAR	Structural Vector Auto Regression
VECM	Vector Error Correction Model
WACB	West African Central Bank
WAEMU	West African Economic and Monetary Union
WAMI	West African Monetary Institute
WAMZ	West African Monetary Zone
WDI	World Development Indicator

CHAPTER ONE

INTRODUCTION

1.1 Background

The successful implementation of the European Economic and Monetary Union (EMU) and the eventual adoption of the Euro as its common currency since the 1990s has spurred the African continent to pursue its long-term aim of achieving an integrated economic and monetary union within the continent of 54 countries (Abdoulie, 2013; Gitimu, 2018; Harvey and Cushing, 2015).

Countries in a Monetary Union irrevocably fix their exchange rates to one another or adopt a single currency being issued by a supranational central bank. Monetary Unions enjoy economic benefits like low inflation, reduction in transaction cost, exchange rate stability, economic bargaining power, and larger markets (Mongelli, 2002). Due to the several benefits, the African Union (AU) as an intergovernmental organization aspires to have a monetary union (African Monetary Union) with a single currency (Afro or Afriq) and a single central bank (Africa Central Bank) responsible for issuing and redeeming currency notes and coins and also managing its monetary policy, just as the European Union has done (Abdoulie, 2013; Nkwatoh, 2018). AU therefore, adopted the Abuja treaty on 3rd June 1991, to create the African Economic Community (AEC) which was to be followed with the establishment of the African Central Bank by 2028 to kick start the single currency implementation process (Gitimu, 2018).

However, several challenges including political instabilities, influences from colonial masters, diversities in terms of languages, weak economic structures, and lack of the political will have made the African Union encourage the creation of the Regional Economic Communities (REC)

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with the intention that when the REC successfully integrate into monetary unions, then the various monetary unions will eventually merge to form a continent-wide monetary union (Amoah, 2013).

AU so far have only three successful monetary unions; The West African Economic and Monetary Union (WAEMU), the Central African Economic and Monetary Community (CEMAC), and the Common Monetary Area (CMA) out of the eight Regional Economic Communities in the continent, (Uzowanne, 2012; Gitimu, 2018). Amoah (2013) advises that the inclusion of some countries into more than one regional bloc complicates and confuses the harmonization process thus delaying the implementation of their common currency. Notwithstanding the hindrances, the protocol establishing the African Continental Free Trade Area (AfCFTA) that was adopted on March 21st, 2018, with the main objective of creating a single market for goods and services, facilitated by movement of persons to deepen the economic integration of the African continent and following the Pan African Vision of "An integrated, prosperous and peaceful Africa" enshrined in the Agenda 2063" is another buoyant step towards a future monetary integration in the continent. The secretariat of the African Continental Free Trade Area is headquartered in Ghana, West Africa (WAEO, 2020).

According to Mohamed (2015), the WEAMU has been successful due to the convergence of real economic indicators and the price stability being recorded in the zone. Fielding and Shields (1999) also acknowledged that the CFA Zones have a high degree of correlation in inflation and that they converged at a lower inflation rate vis a vis the Non-CFA Zone countries. Due to the successes of these regional blocs, other regional blocs like the East African Community (EAC) and the Economic Community of West African States (ECOWAS) have also been working towards further integration into Economic and Monetary Unions (EMU).

The Economic Community of West African States (ECOWAS) has been pursuing a monetary integration since its inception in 1975 and has signed and ratified various protocols to ensure its successful implementation. As enshrined in its Lagos treaty on 28th May 1975, its mission is to promote economic integration and foster trade among both the Anglophone and Francophone countries in the region as well as harmonize economic policies to create a monetary union (Uzonwanne, 2012; Harvey and Cushing, 2015). As part of the steps towards monetary integration, the ECOWAS Monetary Cooperation Programme (EMCP) was set up in 1987 with the intent of implementing a monetary union by the year 2000. It spelled out a set of macroeconomic convergence criteria to assess countries' readiness for the common currency; however, member states were unable to meet them within the period.

The non-compliance to the 2000 deadline led the countries to propose a two-phase approach to speed up with the process of implementation. Crystallized in the two-phase project of the creation of the single currency was an agreement by the Anglophone countries to form a monetary union (West African Monetary Zone) and to launch a single currency called the 'ECO' and phase two was to be the merger of the West African Monetary Zone (WAMZ) with the West African Economic Monetary Union (WAEMU) (Mohamed, 2015). However, hurdles have always circumvented and led to the non-compliance of the various deadlines set by the West African Monetary Institute (WAMI). In December 2019, the ECOWAS Heads of State and Government reviewed the progress towards the establishment of the Monetary Union and urged the various committees to ensure the take-off of the 'ECO' by 2020 (Africa, 2020).

With the renewed enthusiasm among the African countries to achieve monetary integration, complications like European sovereign debt crises in 2010, the Greece financial crises, and the

current 'Brexit' should send caution to the various regional blocs like the EAC and ECOWAS who are pursuing to implement single currencies by 2023 and 2020 respectively.

The various researches that have been done so far have been inconclusive on the optimality of WAMZ and ECOWAS as currency unions. While various recommendations have been made for the successful implementation of the ECO, researchers have cautioned that 2020 would be an unrealistic timeframe given that they have not been able to achieve real convergence.

Also, data from the West African Monetary Institute (WAMI) 2019 shows that the various countries have not simultaneously met the convergence criteria which is a prerequisite for the adoption of the single currency for the sub-region. From 2001 to 2010, only Gambia and Nigeria were able to meet all the four primary criteria. In 2018, only four countries were able to meet all the six of the revised convergence criteria. Countries' inability to simultaneously meet the primary and secondary convergence criteria means there is no nominal convergence and a monetary union would not be able to use a common monetary policy to absorb economic shocks since countries do not converge. ECOWAS has now adopted a fast-track approach where countries that are ready and have met the convergence criteria will implement the single currency program so that others who later meet the criteria will join (Nkwatoh, 2018).

The new approach to the theory of optimal currency areas has however suggested that, if there exists real convergence of the economies; meaning if the countries have similar shocks and symmetric response to the shocks, then the net benefit for forming a Monetary Union (MU) will be positive (Mongilli, 2002).

Considering the huge benefits that ECOWAS stand to gain if it can successfully adopt a single currency, this research seeks to test the feasibility of the ECOWAS monetary union. The research

seeks to find out whether ECOWAS has the real convergence to ensure that a common monetary policy would be able to bring about economic stability for all economics in the monetary union. It seeks to examine whether the WAMZ faces similar responses to external price shocks which is a sine qua non to ensuring the sustainability of the common currency. This work builds on the work of Abdoulie (2013), by using Vector Autoregression (VAR) to examine whether the WAMZ constitute an optimum currency area (OCA) imploring impulse response functions and Variance decomposition to investigate the symmetry with which prices and GDP growth in the various WAMZ countries respond to price shocks from the US, the EU, and China as they have become Africa's major trading partners.

1.2 Statement of Problem

The attainment of macroeconomic convergence is very crucial in the OCA literature if countries are to sustainably implement a successful monetary union. The ECOWAS adoption of the Maastricht-type treaty for member countries to attain convergence in macroeconomic indicators is accurate according to the orthodox OCA literature. However, according to Amoah (2013) and Nkwatoh (2018), none of the monetary unions that existed in history ever completely complied with the convergence criteria before ceding. The CFA Franc Zones were formed not by macroeconomic convergence but by political relations with France. Others also argue that although the European Union met the Maastricht treaty before proceeding to adopt the Euro, the European sovereign debt crises, the financial issues in Greece, and the "Brexit", highlights the fact that meeting a particular convergence benchmark is not sufficient to form a sustainable monetary union (Nkwatoh, 2018). Onwioduokit (2002) and Amoah (2013) are of the view that the Macroeconomic

Convergence Criteria (MCC) advocates for nominal rather than real convergence. According to Amoah (2013), nominal convergence deals with "*the development of costs and prices and their underlying determinants, while the real convergence is of working conditions and living standards and the convergence of economic institutions*". The West African Economic Outlook, 2020 added that the "*success of the ECO will depend on sound macroeconomic fundamentals rather than political expedience*". Real convergence therefore, requires countries to have similar shocks and to respond similarly to shocks, since adopting a single currency means having a common central bank and using one common monetary policy in the wake of shocks that confronts the zone (Harvey and Cushing, 2015).

Therefore, since the MCC advocates for nominal convergence while the literature advocates for real convergence, it is expedient to test whether ECOWAS has the real convergence to ensure the sustainability of a monetary union even if it successfully meets the MCC. Abdoulie (2013), stated that, "*the cost of a monetary union will depend on the extent to which price and output shocks are correlated across the union and the decree of similarity in the long-run effects of shocks on the macro-economy*" and Chuku (2012), also added that a monetary union will be sustainable if all the countries in the union are faced with symmetric shock, implying the cost will be low and more benefits.

Moreover, the West African Currency Board which existed during the colonial era among the Anglophone countries did not have to meet any convergence criteria even though this was before Nigeria and Ghana started producing crude oil. A single currency circulating among them could mean they had symmetric shocks, however, Ghana and Nigeria now producing crude oil could imply asymmetry of shocks among them which is not suitable for a single currency now (Harvey and Cushing, 2015). Since using a common currency is not new to the WAMZ countries, it is

needful to test whether these countries face symmetry shocks to enable them sustainably adopt the ECO.

The question of whether ECOWAS should proceed to adopt the ECO without any reference to the convergence criteria just as the CFA franc zone and the West Africa Currency Board did or not, considering the successes of the CFA Franc zones and WACB will depend on how symmetric these economies are. However, the need for convergence before proceeding cannot be overlooked since it has become central in economic literature for countries ceding to a currency union to be affected by similar underlining economic disturbances to guarantee its success (Onwioduokit, 2011; Amoah, 2012; Uzonwanne, 2012).

Additionally, data shows that China is gradually overtaking the traditional trade partners of the African continent and for that matter ECOWAS. Both imports and exports of goods and services, as well as capital investment between Africa and China, have grown steadily over time. According to the John Hopkins University's China Africa Research Initiative, trade between Africa and China stood at $185 billion in 2018, up from $155 billion in 2017 (http://www.sais-cari.org/). Therefore, empirical studies to test for the effects a giant economic trade partner like China is having on the WAMZ Countries is very crucial in making informed decisions concerning the proposed monetary union. Because, as trade with these new partner countries intensifies, previous analysis considering other countries and global effects might not be relevant in policymaking regarding the sources and response to common external shocks.

The question is whether the WAMZ countries have the real convergence to ensure they respond similarly to economic shocks to afford them benefit from adopting a common currency? Even if the WAMZ is able to meet the MCC should it continue with the ECO? Will a common monetary

policy be ideal to restore stability to all countries in the wake of external shocks? These are some of the research questions this thesis seek to answer.

Chuku (2012), tested for the symmetry and speed of adjustment to shocks among the ECOWAS economies and found evidence for symmetry of external disturbances whereas Harvey and Cushing (2015) studied the WAMZ countries using structural VAR and concluded that due to the asymmetry in the response to common supply, demand and monetary shocks by the various countries, ECOWAS should not proceed with the single currency now or in the near future.

Uzonwanne (2012) citing from Mason and Patillo (2005) and Debrun et al. (2009) showed that there is low intra-regional trade among the WAMZ countries and that they exhibit high fiscal asymmetries which will not make them benefit from forming a monetary union.

Although there are challenging situations with the ECOWAS countries, a monetary union will doubtless be beneficial considering the astronomical achievements of the West African Economic and Monetary Union (WAEMU). The major concern to ECOWAS is not just about meeting the MCC but also about whether the ECOWAS economies face symmetric shocks from its external trade partners which will lower the cost of adopting a single currency and increasing the benefits involves.

This study seeks to build on previous studies to analyze the appropriateness of the WAMZ countries to form a successful currency union that would later be merged with the WAEMU. The study will use VAR to study for the countries making up the WAMZ and also making use of recent data to examine if the 2020 deadline will not be postponed like previous deadlines (2003, 2004, 2009, 2014 and 2015).

1.3 Objective of the study

The objectives of this research are to use VAR to examine if the West African Monetary Zone (WAMZ) constitutes an Optimum Currency Area. Specifically, it is to examine;

1. Empirically whether there exists symmetry of response to external price shocks from China, EU, and US by the West Africa Monetary Zone countries.
2. If a common currency will be beneficial and sustainable to the countries constituting the West African Monetary Zone and ECOWAS as a whole.

1.4 Significance of the study

Considering the eminence of the ECOWAS Monetary union, and the scanty nature of recent empirical works on the topic as well as the lack of empirical study of the proposed currency area concerning its trade with East Asian countries who are becoming one of Africa's biggest trade destinations, this will constitute a pool of findings to aid in policymaking. It will also add to the existing literature as a reference for future studies in the area of study. It is also expected that the outcome of this study will contribute to the current debate about the feasibility of creating the ECOWAS single currency, and guide policymakers and governments of the ECOWAS member states about their decision to join the proposed monetary union. The work also contributes to the existing literature on monetary unions by examining how the WAMZ countries respond to economic happenings in their foreign partners. This research differs from previous works by considering how the various WAMZ countries respond to shocks from specific foreign countries, which is crucial because the WAMZ countries have different volumes of trade with different foreign countries.

1.5 Scope of Work

The study would consider the WAMZ countries in ECOWAS since they were to form a single currency before merging with the WAEMU countries. Data will be used from 1980 to 2018 to ensure data availability. The study comprises of five WAMZ countries Gambia, Ghana, Guinea, Nigeria, and Sierra Leone, Liberia is excluded because of data challenges. The external economies used are China, the EU, and the United States since they are the largest economies in terms of GDP and major consumers of African produce. According to the West African Economic outlook, these 3 countries (China, EU, and U.S) account for about 43 percent of West Africa exports and 57.9 percent of the region's imports (Africa, 2020).

1.6 Organization of work

The thesis is divided into six chapters including this introduction. Chapter two contains an overview of ECOWAS economies with respect to historical synopsis, trade integration, and the convergence criteria, while chapter three and four outlines a review of the literature on Optimal Currency Areas and the methodology to be used respectively. Chapter five of this thesis provides the interpretation of the empirical results while the conclusion, and recommendations are presented in chapter six.

CHAPTER TWO

GENERAL OVERVIEW OF ECOWAS

2.1 Introduction

This chapter gives an overview of the Economic Community of West African States (ECOWAS) highlighting the historical synopsis, geographical location, and economic trends of the intergovernmental organization. The chapter also throws more light on the West African Currency Board which existed during the colonial era and concludes with the WAMZ countries' performances vis a vis the Macroeconomic Convergence Criteria (MCC).

2.2 Overview of ECOWAS member states

The Economic Community of the West African States (ECOWAS) is made up of 15 countries from the West African sub-region. It consists of Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal, and Togo. It was established on 28th May 1975 through the treaty of Lagos to promote economic integration among the Anglophone and Francophone countries in the sub-region. Parts of its objectives are to bring harmonization of economic policies that will lead to the adoption of a single currency in the sub-region, to promote shared prosperity and regional stability, and to overcome the economic and political weaknesses of the individual countries (www.ecowas.int). The ECOWAS countries share both cultural and geographic ties which intensify the need for economic integration to promote growth and development.

2.2.1 Historical synopsis

In 1972, the effort to unite all the states in the sub-region began by the concerted efforts of the president of Nigeria; General Yakubu Gowon and his Togolese counterpart Gnassingbe Eyadema. Through their effort, the treaty that established the intergovernmental organization was signed in 1975 but later revised in 1993 with an expansion in scope and powers to include both political and economic relations. ECOWAS currently have 15 members with one of its founding member nations (Mauritania) leaving the organization in 2000 while Cape Verde a non-founding member joined in 1976. The main objectives of ECOWAS as enlisted in its founding treaty includes; To promote cooperation and integration leading to the establishment of an economic union in West Africa to improve the standard of living its people, to maintain and enhance economic stability, to foster trade relations among the Member States to contribute to the progress and development of the African Continent (www.ecowas.int). It aims at promoting the welfare of the populace by the harmonization of policies that will lead to a borderless movement of people and resources across national borders.

Institutions in ECOWAS includes; the Authority of Heads of States and Governments, the Council of Ministers, the ECOWAS Parliament, the Economic and Social Council, the ECOWAS Court of Justice, the Executive Secretariat, with the Authority of the Heads of States and Governments being its supreme governing body. The organization is seen as one of the successful intergovernmental organizations in the world considering its progress in the attainment of regional peace and poverty reduction, even though the majority of its countries are still considered poor in the world (www.ecowas.int).

There are three official languages spoken in the region; French, English, and Portuguese which are the languages of each country's colonial master. The Francophone countries are made up of Benin,

Togo, Niger, Cote D'Ivoire, Senegal, Mali, Guinea, Burkina Faso whiles the Anglophone countries constitutes Gambia, Ghana, Liberia, Nigeria, and Sierra Leone while Cape Verde and Guinea Bissau are the Portuguese speaking nations in the sub-region.

The region comprises of the West African Economic and Monetary Union (WAEMU) and the West Africa Monetary Zone (WAMZ) which would be discussed extensively in this chapter.

2.2.2 Geographical location

Figure 1. Location of ECOWAS on the African Map

Source; ECOWAS geography.name

Geographically, figure 1 shows that ECOWAS is located in the western part of the African Continent; it is situated a little above the Equator and below the Sahara Desert. The region is

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bordered to the south and west by the Atlantic Ocean and to the north by Mauritania and Algeria while the eastern part is bordered with the countries of Chad and Cameroon.

ECOWAS has a total land size of about 5,115,000 km^2, which is about 17 percent of the total land size of the African continent. The largest country in terms of land size is Niger which has a land size of 1,267,000 km^2, about 25 percent of the region's land size followed by Mali which controls about 24 percent whiles the countries with the smallest land size are Guinea Bissau, The Gambia and Cape Verde which has 36, 11 and 4 thousand square kilometers respectively, a total of less than 1 percent of the land size of the region.

The total population was estimated to be 377,437 thousand in 2018 according to data from the WAEO, 2019. With so much diversity in terms of the country's population size and density, Nigeria, the most populous nation in Africa constitutes about 52 percent of the total population the sub-region. Nigeria has about 36 states with over 200 different ethnic groups. Ghana is the second most populous in the region followed by Côte d'Ivoire and Niger whiles Gambia and Guinea-Bissau have the smallest population sizes of 2,164 and 1,907 thousand respectively.

The level of demographic heterogeneity among the economies in the sub-region will result in to labour moving from very populated countries like Nigeria to take advantage of opportunities in less populated countries. However, this might result to citizens of the less populated country agitating because of the loss of their job opportunities which labour from the over populated countries are taking advantage of.

According to the WHO's health indicators, the region has an average life expectancy of 57.4 years, with Cape Verde having the highest life expectancy of 73.2 while Sierra Leone having the lowest at 52.6. These indicators show that the region is among the poorest in the world despite its enormous natural resource endowments. Notwithstanding the level of poverty in the region, the

population growth rate stood at 2.7 in 2018 above the Africa's average of 2.5. Concerning age distribution, the region has a very high youthful population which will translate into a higher supply of labour force; about 44 percent are below 15 years of age whiles 53 percent are between 15 to 64 years as of 2018 (Africa, 2019). The region has major potential in the future, in terms of labour supply and increasing demand for goods and services. Major steps need to be taken to promote growth in the region in order to reduce the high poverty levels, this highlights the eminence of the use of a single currency in the region.

West Africa is highly endowed with natural resources such that in the region, primary products contribute greatly to its GDP with the agricultural sector being the highest employer of the region's labour force.

2.2.3 Economic Trend

The ultimate objective of ECOWAS is to achieve macroeconomic convergence that would lead to the successful adoption of a single currency (ECO) with a common West African Central Bank (WACB). ECOWAS as an organization has indefatigably worked to ensure greater poverty reduction and economic growth as well as sustained peace in the sub-region. Even though ECOWAS has achieved colossally in terms of economic growth, the region is still considered as one of the least developed areas in the world, the UN in 2015 reported that, 34 out of the 48 LDC's were from sub-Saharan Africa of which the ECOWAS is an integral part (https://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=277).

Economically, the individual economies in the sub-region are diverse across various dimensions of development. In 2019, the region recorded real GDP growth of 3.8 up from 3.4 in 2018. Real GDP growth in 2016 slowed down at 0.5 below the continent's average of 2.1 due to negative

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growth recorded in big economies in the region like Nigeria which recorded -1.6. Economic growth in the sub-region has always been impeded by the region's heavy dependence on primary exports, weak commodity prices, and unfavorable terms of trade, (Africa, 2019).

Table 1: GDP growth statistics

Country	2012	2013	2014	2015	2016	2017	2018	2019
ECOWAS	**5.1**	**5.8**	**6.1**	**3.2**	**0.5**	**2.7**	**3.4**	**3.8**
Ghana	9.3	7.3	4.0	3.8	3.5	8.1	6.3	7.0
Cote d'Ivoire	10.1	9.3	8.8	9.2	8.8	7.7	7.4	7.5
Senegal	4.4	3.5	4.3	6.5	6.7	7.1	6.7	6.0
Guinea	5.9	3.9	3.7	4.5	5.2	10.0	5.8	5.9
Burkina Faso	6.5	5.8	4.3	3.9	5.9	6.3	6.8	6.0
Benin	4.8	7.2	6.4	2.1	4.0	5.4	6.7	6.6
Guinea Bissau	-1.7	3.3	1.0	6.1	6.1	5.9	3.8	4.6
Mali	-0.8	2.3	7.0	6.0	5.8	5.4	4.7	5.0
Niger	11.8	5.3	7.5	4.0	5.0	4.9	6.5	6.3
Togo	6.5	6.1	5.9	5.5	5.1	4.4	4.9	5.1
Cape Verde	1.1	0.8	0.6	1.1	3.9	3.7	5.1	5.0
Gambia	5.9	4.8	0.9	4.3	2.2	4.8	6.5	6.5
Sierra Leone	15.2	20.7	4.6	-21.1	5.2	3.8	3.5	5.0
Liberia	8.2	8.7	0.7	0.0	-0.5	2.5	1.2	0.4
Nigeria	4.3	5.4	6.3	2.8	-1.6	0.8	1.9	2.3

Source: Authors own compilations from AfDB and various central banks.

Nigeria, the largest country in terms of population and GDP had an estimated GDP of $448 billion which represents about 75 percent of the ECOWAS GDP according to the world bank in 2019. Table 1 shows that countries like Côte d'Ivoire, Guinea, Mali, Niger, and Senegal have been recording the highest growth since 2014 with an average growth above 5 percent. Economic growth in 2019 ranged from a high of 7.5 in Cote d'Ivoire to a low of 0.4 in Liberia. Economic growth within the WAEMU has been fairly well above the region's average. Per capita income stood at $4,483 ranging from $1,005 in Niger to $7,282 in Cape Verde in 2018 according to the Africa Development Bank. Recent challenges in economic growth can be attributed to the Ebola outbreak, flooding, fall in commodity prices as well as political instability and security challenges,

in various countries that have contracted growth in the region (Africa, 2019). The high growth rates recorded by the WAEMU zones emphasizes the importance of ECOWAS adopting a common currency.

Table 2: Inflation Statistics

Country	2014	2015	2016	2017	2018	2019
ECOWAS	**8.2**		**12.7**	**12.9**	**9.4**	**8.5**
Togo	0.2	1.8	0.9	-0.2	0.9	1.4
Benin	-1.1	0.3	-0.8	1.8	0.8	-0.3
Burkina Faso	-0.3	0.9	-0.2	0.4	2.0	1.1
Cape Verde	-0.2	0.1	-1.4	0.8	1.3	1.2
Côte d'Ivoire	0.5	1.2	0.7	0.7	0.4	1.0
Guinea Bissau	-1.0	1.4	1.6	1.1	1.4	-2.6
Senegal	-1.1	0.1	0.8	1.3	0.5	1.0
Mali	0.9	1.5	-1.8	1.8	1.7	0.2
Niger	-0.9	1.0	0.2	0.2	2.7	-1.3
Gambia	6.3	6.8	7.9	8.8	6.5	6.9
Ghana	15.5	17.2	17.5	12.4	9.8	9.3
Guinea	9.7	8.2	8.2	8.9	9.8	8.9
Nigeria	8.1	9.0	15.7	16.5	12.1	11.3
Sierra Leone	8.3	8.1	10.8	18.2	16.9	15.7
Liberia	9.9	7.8	8.8	12.4	23.5	22.2

Source: Author's compilation.

From table 2, it is obvious that the region has been badly affected by high inflation over the years. From 2014 to 2017 the region's average inflation was estimated to have risen from 8.2% to 12.9%. The inflation rate falling to 9.4 in 2018 and 8.5 in 2019 up from 12.9 in 2017 reflects the effort of achieving single-digit inflation to fast-track the adoption of the single currency. Inflation pressure in the sub-region is affected by the exchange rate depreciation since the region depends largely on imported factor inputs. However, for the WAEMU, the inflation rate is little below the region's average. The WAEMU countries are consistently recording inflation below 3 percent whiles the non-WAEMU countries most recording double-digits (Liberia, Nigeria, and Sierra Leone) in 2019.

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Inflation in the region has been driven by high budget deficits, government expansionary fiscal policies, fall in supply, and local currency depreciation. According to the AfDB statistics, Nigeria and Ghana's currencies depreciated considerably between 2014 and 2016 because of a fall in commodity and crude oil prices (Africa, 2019).

Unemployment is high in the region considering the number of people in the working class. In 2010, unemployment stood at 4.2 percent but declined to 3.7 in 2015. However, recent statistics reveal that unemployment in the region has surged to 5.2 in 2018. Niger had the lowest unemployment rate of 0.3 whiles Cape Verde had the highest at about 12.3 percent. Other countries with high unemployment include Gambia, Mali, and Nigeria. This rising level of unemployment calls for much effort to be exerted to implement and take advantage of the single currency zone to expand economic growth and reduce unemployment (Africa, 2020).

Sector contributions to GDP have been similar across the region in which the service sub-sector contributes about 50 percent whiles the agriculture and industry sub-sectors contributed about a quarter each in 2018 (Africa, 2019). Structural transformation in most countries in the region is very weak, the industry sub-sector contributes the least while the services sub-sector highest to GDP growth in the region. The manufacturing sub-sector in the region largely produces light processing of primary material and production of consumer goods. In 2018, the contribution by the service sector to GDP stood at 70.1 in Cape Verde whiles Liberia had the lowest contribution of 20.3 to GDP. Services accounted for 2.0 percent of West Africa's 3.4 percent GDP growth in 2018 whereas agriculture accounted for 1.0 percent, and industry accounted for 0.4 percentage points.

The service sub-sector dominated economic growth in 9 out of the 15 countries in the region, ranging from 47.4 percent contribution to GDP growth in Mali to 81.8 percent in Cape Verde.

Structural transformation is required to make ECOWAS countries competitive in the global market and to promote intra-regional trade. The unconventional nature of structural transformation in the region is a worry as transition moved from the Agricultural sector to the service sector without improvement in the manufacturing and industrial sectors. Policies need to be adopted to boost the industrial sector to add value to the natural resources for exports.

The region's exports are mainly primary commodities; crude oil, cocoa, gold, bauxite, zircon, and cotton, they are therefore net importers of industrial products which is the reason for low intra-regional trade. The heterogeneity in economic structures and export commodities is likely to make the ECOWAS countries face asymmetric shocks.

Table 3: Intra–Economic Community of West African States trade, 2011–16

Flow	2011	2012	2013	2014	2015	2016
Exports ($ billions)	15.3	13.5	14.0	12.7	9.8	12.0
Imports ($ billions)	9.1	9.4	12.1	9.0	8.3	9.7
Total intra-ECOWAS trade ($ billions)	24.4	23.0	26.1	21.7	18.1	21.7
Intra-ECOWAS exports (% of total exports)	10.0	8.0	11.8	9.8	13.6	11.9
Intra-ECOWAS imports (% of total imports)	8.8	12.2	13.7	9.7	10.7	11.1
Total intra-ECOWAS trade (% of total trade)	9.4	10.1	12.7	9.8	12.1	11.5

Source: ECOWAS 2017.

In terms of intra-regional trade which is one of the main channels with which the sub-region can benefit from a single currency due to the elimination of transaction cost and access to a larger market, much effort has not been made to encourage intra-regional trade despite the implementation of the ECOWAS Trade Liberalization Scheme (Africa, 2020). Table 3 shows that trade among the West African countries has been averagely 11 percent, which has been stable over the period. This was confirmed by the African development bank which states, "*Intra-regional*

trade in ECOWAS averaged about 11 percent of total ECOWAS trade and it has continued to decline since 2016" (Africa,2020).

The region trades more with external economies than with its members, the region's trade with China, the EU and, the US was 43 percent of imports and 57.9 percent of exports in 2018. While the share of Intra ECOWAS exports in total ECOWAS export rose only to about 13 percent in 2015 and fell to less than 12 in 2016. This reveals that more trade needs to take place among member countries to afford them benefit from the adoption of the ECO. Nigeria being the economic giant of the region had the highest share of intra-regional exports of about 32.5 from 2011 to 2016 whiles its share of total intra-regional imports was 9.8. The low intra-regional trade can be as a result of poor transportation networks and the production and exports of similar primary products by all the countries in the region. However, the concentration on similar primary exports in the region affords them to have symmetric response to external shocks.

Uzunwanne (2012) also added that trade linkage among the ECOWAS countries is very low and that a monetary union would not be beneficial. This calls for the removal of trade barriers and the facilitation of transport networks across the region to foster intra-regional trade. Before the adoption of the Euro in 1999, Hadjimichael & Galy, (1997) reported that 60% of total EU exports were intra-EU trade compared to ECOWAS 11% in 2016.

2.3 The West African Currency Board (WACB)

The West African Currency Board (WACB) was formed as a monetary arrangement between Britain and her West African colonies during the early 20th century in which Britain issued a currency that was pegged to the Pounds sterling for her West African colonies. During the era of

colonization, Britain dominated over her colonies through the WACB which was however abandoned after colonies gained independence and rolled out their separate and independent national currencies. The sub-region was dominated not only by the British colonial masters but the French as well, which is evident in the official languages spoken in the region today. The countries that were under the French colonial rule still maintained strong financial ties with France after their independence (Uche, 2002; Harvey and Cushing, 2015; http://wiredspace.wits.ac.za/bitstream/handle/10539/1748/002Chapter2.pdf;jsessionid=89B9F22 90CC2F0C692EBC0AA10A66E8D?sequence=4).

Before colonization, Cowrie shells were among the major items that were used for transactional purposes in West Africa up until the 20th century. It is purported that the Ghanaian Cedi is named after the Cowrie. Gold dust and coins were also known to have been used by the people in the Gold Coast (Ghana) and Ivory Coast; this was made possible by the abundance of gold in the Ashanti Empire. Other items that were used in the form of money for the exchange of goods and services in the region included salt, iron, cattle, goats, axes, beads, arrowheads, ring money (Hogendorn and Cemery, 1988).

However, during the period of colonialism, colonial powers introduced their national currencies to their colonies or produce a local version of their currencies. Uche, (2002) reported that Britain and France replaced the existing currencies in the region with European currencies since taxes were to be paid in European currency denominations. The British colonial power banned the use of local currencies and began importing British silver coins into West Africa until the British West African Currency Board was established in 1912. According to Uche (2001), circulations of local currencies were prohibited to make the British pound supreme.

A Currency board can be regarded as a monetary authority that issues notes and coins with the mandate of maintaining a fixed exchange rate with another currency or an external reserve asset. They are required to hold enough foreign currency reserve such that all holders of its notes and coins can convert them into the reserve currency on-demand at fixed rates. Therefore, there must be unconstrained convertibility between the domestic currency and the foreign currency at fixed rates without any restrictions on trade.

Monetary policy under Currency Boards is determined by market forces. Currency Boards are not allowed to lend to the government, the government cannot print money to finance is expenditures; it can only finance its expenditures through borrowing and taxes. They make a profit by holding high interest-bearing assets that are usually given to the government after deducting other expense costs. The interest rate and inflation of these countries follow closely to that of the pegged currency nation (Carney, 1961).

It is said that the main motive behind the establishment of the WACB was "*based on the desire to raise currency issuance as a source of seigniorage while avoiding the dangers of depreciation against the Pound Sterling*". This was because, during the early periods of the 20th century, West Africans demanded the British silver coins even more than it was demanded in Britain. Therefore, the importation of British pound to British West Africa was increased but the British government was unwilling to share seigniorage from the minting of coins with the West African governments (Hogendorn and Cemery, 1988).

A committee that was formed in 1898 to explore the possibility of a separate West African currency recommended that the British silver coins should be maintained in West Africa but that half of the seigniorage revenue should be given to the governments of West Africa whiles the remaining is

kept as gold reserves. However, the British treasury rejected the idea (*http://www.countrystudies.us/nigeria/53.htm*).

By 1912 the seigniorage revenue from the British silver coins had risen due to a fall in silver prices in the early years of the century. Increased pressure on the advantages of West Africa having its separate currency resulted in the setting up of another committee chaired by Lord Bill Emmot. This committee recommended the setting up of a currency board to issue coins and notes in West Africa in which the startup cost was to be taken by the colony's government. The board was required to keep reserves in gold and other securities in London where the board had its headquarters. It was also recommended that the West African pound be convertible to sterling at a fixed rate of one to one. This was similar to what was happening in the Francophone West African zone.

The West African Currency Board was established in 1912 as a result of the recommendation made by the Emmot committee and it became operational in 1913, having regional branches in Ghana, Nigeria, Gambia, and Sierra Leone. The mandate of the board included;

- The supply of currency to the British colonies in West Africa (manage monetary policy).
- It was also required to hold 100 percent assets in pounds sterling against its notes and coins in circulation (Uche, 2002).

Liberia, also used the currency until it switched to the dollar in 1943.

The success of the WACB led to the replication of the currency board in East Africa, Southern Rhodesia as well as in Libya and Somaliland. However, Uche (2002) argued that the WACB did not benefit the West African countries, he reasoned that the colonial masters only used their colonies to produce raw materials for Europe and also used their colonies as a hub for their

industrial exports. Because the development of inter colony trade was not the aim of colonization, the colonial Government did very little to promote the development of inter colony infrastructure in the region, only trade linkages for the transport of raw materials to the ports for exportation were developed. Although the Bank of British West Africa (BBWA) was the first bank to be established in the region with branches in all four countries, it did not promote intra-regional trade despite the ease with currency convertibility. In general, the WACB was designed to help Europe loot West Africa and not to promote closer co-operation among its West African colonies (Hogendorn and Gemery, 1988).

Because the WAP was pegged to the pound sterling and backed 100% by the sterling exchange system, it possessed the strength and weaknesses of the pounds sterling (appreciating and depreciating with it in value). This made the WACB not to be able to pursue an independent monetary policy so inflation and interest rate in the region reflected that of Britain. Confidence in the stability of the WAP was high since it was pegged to the Sterling. However, Hogendorn and Gemery, (1988) said, the WACB was just an "*automatic money exchange organization issuing as much local currency as the banks wanted to buy for sterling and vice-versa*". It was managed by the board based in London where the headquarters was located but also had local agents in the various West African colonies. The board invested its sterling funds in assets chosen by the secretary of state for colonies. However, any time the income from the investment exceeded 10% of its principal plus other expenses, the excess was always distributed to the four countries as profits which the various governments anticipated since they could not print money to finance their expenditures (Carney, 1961). From 1912 to 1950, Nigeria, Ghana, Sierra Leone, and the Gambia received 4.5, 3.3, 0.7, and 0.2 million Pounds respectively in sum as profits made from the minting of the West African coins from the board (*http://www.bis.org/pub/bppdf/bispap17.pdf.*).

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Because the currency board was tied to the monetary system of the UK, the WAP was fully convertible to the sterling therefore confidence in the stability of the WAP was high leading to increased foreign investments. There was time consistency in inflation and the mechanism was cheaper and easier to manage than central banks.

The disadvantages of the system included;

- the quantity of money supplied was determined solely by the volume of exports and not by the growth of domestic production and trade.
- the reserves were not given as loans in West Africa but invested in the London money market which did not encourage investment in West Africa.

Uche 2001 stated that "*Africans, in general, saw the WACB system as the financial hallmark of colonialism*" therefore doing away with the system was, therefore, an essential part of becoming independent. Therefore, when the struggle for independence began after the second world war, the debates as to whether to maintain or abandoned the WACB were magnified. Those who opposed the idea of a currency board held the view that;

- Currency boards hold so much reserves which could have been loaned out to local banks.
- Currency boards do not permit the use of an independent monetary policy to promote economic growth
- The banking system would be stable if there were central banks to act as lenders of last resort.

The proponent of the currency board system argued that the establishment of the central banks can easily cause inflationary pressure due to deficit financing. They also argued that the cost involves

in training enough people to manage these central banks will be huge. It is said that the World Bank also recommended the maintaining of the currency board since the cost of running central banks was more than running a currency board (Hopkins, 1973).

However, as political independence without economic independence is inconsequential, Ghana was the first West African country to gain independence in 1957; therefore, the Accra branch of the currency board was converted to the central bank of Ghana and started issuing notes in 1958. Nigeria gained independence in 1960 and opened its central bank. Sierra Leone became independent in 1961 and established her central bank in 1964. The Gambia finally established her central bank in 1971 then the WACB was finally abandoned (Uche, 2002).

These central banks were among other things too;

1. Manage the supply of money in their respective countries
2. Act as advisers to the government about financial-economic policies
3. Manage the external value of the domestic currency and control the foreign exchange rates.
4. Act as lenders of last resort to commercial banks.

West African governments then had the freedom to pursue policies and create institutions that could lead to their economic development. However, the lack of independence of these central banks coupled with immerse pressure due to weak economic and political structures led to the central banks expanding money supply without necessarily increasing reserves resulting in high inflation and currency inconvertibility which has impeded growth among them (Uche, 2001).

Finally, in 1973, Nigeria introduced the Naira and Ghana also introduced the Cedi while Gambia and Sierra Leone used the Dalasi and Leone respectively. Due to political ambitions, the currency board operated successfully for almost half a century. This reveals that the political will of the

leaders of the ECOWAS member countries is key if ECOWAS wants to implement the ECO within the shortest time.

2.4 The West African Economic and Monetary Union (WAEMU)

Francophone West Africa is made up of Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Niger, Senegal, and Togo. They have a common currency (CFA franc) which they inherited from their political and economic relations with France. As stated earlier, French West Africa maintained strong financial ties with France after independence and went further to consolidate monetary integration through the UMOA and WAEMU with staunch financial support from France (Uche, 2002). The West African Economic and Monetary Union (WAEMU/UEMOA) was established in 1994 with a single central bank; *Banque Centrale des Etats de l'Afrique de l'Ouest* (BCEAO) and a common currency (CFA Franc) which is fully convertible within the zone (Ogbuabor et. al 2019; Hadjimichael and Galy, 1997). According to Bawumia (2002), the CFA franc zone can be regarded as one of the longest surviving monetary union in the world. The CFA Franc zone currently comprises two currency zones; The West African Economic and Monetary Union (WAEMU) and the Central Africa Economic and Monetary Community (CEMAC) as shown in table 4.

Table 4: Countries of WAEMU and CEMAC

WAEMU	CEMAC
Benin	Cameroon
Burkina Faso	The Central African Republic
Cote D'Ivoire	Congo Republic
Guinea Bissau	Gabon
Mali	Chad
Senegal	Equatorial Guinea
Togo	
Niger	

Source: Authors compilation

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France issued the CFA franc to her African colonies to ensure a fixed exchange rate with the France franc, free capital mobility in the zone, and the pooling of their international reserves. It was launched in 1945 when France became a member of the IMF and was pegged to the France Franc but now pegged to the Euro when France joined the EMU in 1999. The name CFA originally stood for *Colonies Francaise Africaine,* or French Colonies of Africa but changed after independence to mean *Communaute Francaise Africaine* or French Community of Africa (*http://wiredspace.wits.ac.za/bitstream/handle/10539/1748/002Chapter2.pdf;jsessionid=89B9F2 290CC2F0C692EBC0AA10A66E8D?sequence=4* ; Kirk and Bach, 1995).

The two CFA Franc zones have different CFA francs that are of equal value and had identical parity with the French Franc (now the Euro), they are however, legal tender only in their respective currency zones. They were initially issued in France but later transferred to two regional issuing banks in Africa; the BCEAO located in Senegal (Dakar) issues the West African CFA whiles the BEAC is located in Cameron (Yaoundé) issues the Central Africa CFA.

After independence, French West Africa signed an agreement on the 12th of May 1962 that birth UMOA to have a common currency issued by a common central bank whiles French Central Africa also consolidated to form UDEAC that same year. These new agreements resulted in new central banks even though with names as the old central banks to serve as central banks for the two zones. The banks were to issue the CFA franc which was to be fully convertible to the France franc, keep external reserves with the French treasury, managing monetary policies, and regulating banks and other financial institutions. All member countries including France had only one vote each in decision making. UMOA was headed by the conference of heads of states while the BCEAO is headed by a council of ministers made by ministers of finance from each member country. The BCEAO was governed by the board of directors comprising of two appointees from each country

of which one is appointed as the head. Uche, 2001 stated, "*The involvement of France ensured sound monetary management and prevented fiscal policy indiscipline in the region".* This ensured the supranational central bank independence from political interferences.

For about three decades, the Franc zone had outperformed the rest of sub-Saharan Africa in terms of economic growth and inflation. The Standard of living in the franc zone was fast improving because, the pace of economic growth was even higher than population growth. Foreign investments were also high because of monetary stability. Inflation, for instance, averaged at 5.1 percent in the late 1970s while the WAMZ countries averaged 26.2 percent (Hadjimichael and Galy, 1997).

However, UMOA and UDEAC were consolidated into WAEMU and CEMAC in 1994 respectively due to the fall in commodity prices at the world market and the appreciation of the French franc against the US dollar in the 1980s. In the 1980s, commodity prices fell sharply, and the French franc also appreciated vis-à-vis the Dollar, these resulted in severe external shocks. Due to these, the CFA franc also appreciated such that exports from the zone became less competitive in the world market relative to other countries. Large fiscal imbalances led to substantial domestic and external payment arrears and weakening of the banking system in the zone (Hadjimichael and Galy, 1997). Therefore, growth began to fall, for example, GDP growth in the zone fell from 3.6 in 1987 to 0.8 in 1994 while in Cote d'Ivoire it fell from 2.4 to 1.8 in the same period and debts were also escalating (Hadjimichael and Galy, 1997).

The heads of states and governments of the Franc zone decided on January, 1994, to devalue the CFA Franc by 50 percent vis-à-vis the French Franc. It became 100 CFAF to 1FF from the previous 50 CFAF. From the devaluation, the UMOA countries consolidated to form the WAEMU to create a common market through a common external tariff structure and the elimination of internal tariffs

between member states and to promote free movement of capital and human resources. Some acknowledged that, even though the WAEMU is supposed to increase intra-regional trade by eliminating national trade barriers, drive economic diversification and structural transformation among member countries, economic growth in member countries has not been generally impressive. France's involvement has doubtless brought monetary stability and currency convertibility to the region. However, there is an argument that France's involvement in the monetary integration was not to promote intra-regional trade but for France to benefit from negotiating from a collective body rather than individual countries (Uche, 2001).

WAEMU was, therefore, established on 10th January 1994 by heads of states of and governments of the UMOA member states at the treaty of Dakar with an expansion of the functions of UMOA to include diverse economic spheres.

The CFA franc is pegged to the Euro at 656 to 1 through operations with the French treasury in which they were required to hold 65 percent of their foreign exchange reserve in the French treasure and 20 percent to cover for financial liabilities. Members have one central bank (BCEAO), one monetary policy and governments cannot monetize fiscal deficits. The monetary union aims at achieving greater economic competitiveness, through common markets, coordination of sectoral and fiscal policies by adopting common external tariffs and trade policies (Onwioduokit, 2011). WEAMU is a customs union with a common external tariff, complete pooling of monetary reserves, a common currency, and substantial integration of their financial markets. The successes of the WEAMU and its Economic achievements can be seen from the economic growth of the member countries which averages above five percent since 2015 whiles achieving very low inflation of an average of less than 3 percent within the zone. These achievements espouse the need for a single currency for the whole of the ECOWAS sub-region.

According to Onwioduokit (2011), the West African Franc-zone has been a monetary union for more than four decades even though it has not met most of the economic requirements that make up an OCA, such as high factor mobility, product diversification, and price and wage flexibility between regions.

This highlights the debate as to whether countries aiming to form a monetary union should meet convergence criteria ex-ante or ex-post. Frankel and Rose (1998) argument that as countries tend to trade more with one another it can lead to the synchronization of their business cycle and thus increase the symmetry of shocks, results to the asking of the question whether ECOWAS should proceed to implement the ECO even if member states do not meet the macroeconomic convergence criteria?

However, others express doubt if the francophone countries will be willing to sacrifice their time-tested relationship with France for an ECOWAS single currency considering the support it has gained from France (Hadjimichael and Galy, 1997).

2.5 The West African Monetary Zone (WAMZ)

The WAMZ consist of Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone with the sole aim of achieving a monetary integration to adopt a single currency; the ECO, which will later be merged with the West African CFA Franc zone to form a monetary union for the whole of ECOWAS.

The decision to form the WAMZ emerged when the ECOWAS countries could not simultaneously attain the macroeconomic convergence criteria which they were to achieve to afford them to adopt the single currency by the year 2000. Therefore, as part of the ways to fast track the process of the implementation, the presidents of five of the countries in ECOWAS agreed under the ECOWAS

single currency framework to form another monetary union known as the WAMZ via the Accra declaration in April 2000, which would be later merged with the WAEMU. The Accra declaration contained the objectives, institutional arrangements as well as the action plan for the successful implementation of the monetary union. Liberia later acceded to the WAMZ agreement in February 2010 and therefore became a member. The first date for the launch of the single currency was the 1st of January 2003 but due to the non-compliance to the macroeconomic convergence criteria by the member countries, the set dates have been postponed several times with the current date for the implementation being 2020 (Harvey and Cushing, 2015).

The West African Monetary Zone is administered by the following conventional institutions;

- The Authority of the Heads of State and Government;

- The Convergence Council;

- The Technical Committee;

- The West African Monetary Institute;

- The West African Central Bank;

- The WAMZ Secretariat;

- The Stabilization and Cooperation Fund;

- The West Africa Financial and Supervisory Authority.

The West African Monetary Institute (WAMI) is one of the key institutions that was established by an agreement of the heads of states in Bamako in 2000 and was set up in Accra-Ghana in January 2001. This institution has been tasked with the smooth establishment of the West African Central Bank as well as undertaking the technical preparations that will ensure the single currency is successfully launched for the monetary zone. The mandate of the institution also includes the

facilitation of trade integration, financial synchronization, and the development of a smooth payment system as well as harmonizing statistical data across the zone (www.wami-imoa.org).

One of the key undertakings of the WAMI has been the setting up of the 10 MCC for the WAMZ countries. The macroeconomic convergence criteria (MCC) are to ensure that countries intending to adopt the single currency will converge to a certain benchmark to minimize the effects of asymmetric shocks that will affect the monetary zone. This is in line with what the European Union did with the Maastricht convergence criteria. The MCC will eliminate the differences that exist among the various member economies to ease the process of countries losing control over their monetary policy. The convergence criteria consist of four primary and six secondary MCC.

The primary convergence criteria

(i)   Attain price stability by recording a single-digit inflation rate by 2003 and 5 percent by 2004.

(ii)   Ensure a sustainable government fiscal position by reducing the budget deficit (excluding grants) to GDP to 4 percent or less from 2003–2005.

(iii)   Central Bank's financing of government budget deficits should not be more than 10 percent of the previous year's tax revenue.

(iv)   Maintain official foreign exchange reserves to cover for at least 3 months of imports.

The secondary convergence criteria

(v)   Prohibition of new domestic arrears and liquidation of existing ones

(vi)   Tax revenue to GDP ratio equal to or greater than 20 percent

(vii)   Wage bill to tax revenue ratio equal to or less than 35percent.

(viii)   Public investment to tax revenue equal to or greater than 20 percent.

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(ix)   Maintain real exchange rate stability.

(x)   Positive real interest rate.

Table 5: Number of criteria met by each WAMZ country

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Gambia	3	2	2	5	6	7	5	6	6	4
Ghana	2	1	4	3	4	5	5	2	3	2
Guinea	5	5	2	2	3	2	4	3	3	1
Nigeria	6	5	5	6	7	7	7	6	6	4
Sierra Leone	4	4	1	3	3	2	2	2	1	2

Source; authors own compilation from WAMI and AfDB websites.

The primary criteria are to ensure that the economies of the member states converge in the sense of having symmetric shocks while the secondary criteria would ensure fiscal convergence (Harvey and Cushing, 2015). From table 5, it can be seen that from the period 2001–2010, only the Gambia and Nigeria satisfied up to 7 out of the 10 MCC. Those same countries were the only countries that satisfied all four primary criteria in 2007 and 2008 and satisfied 6 of the criteria in 2008 and 2009. Ghana, Guinea, and Sierra Leone did not perform well in meeting the criteria within the period. The highest number of the criteria met by Ghana was 5. As for Guinea and Sierra Leone, their performances within the period were deplorable as shown in table 5.

Table 6 also shows that the tax to GDP ratio was one of the major criteria which was hardly met by any country due to the inability of these countries to mobilize tax. Nigeria's tax revenue contributed less than 10 percent to GDP (Chuku,2012). No country met this criterion in 2010.

Due to the countries' over-reliance on primary exports as well as high importations, the criterion on exchange stability deteriorated from 5 countries meeting it in 2001 to only 2 in 2010 (Onwioduokit, 2011). Most of the countries were able to attain the foreign exchange reserve cover

of 3 months of imports; almost all countries attained it in 2009 and 2010. Performance regarding the attainment of budget deficit to GDP less than 5 percent had been bizarre.

By the end of 2009 only Ghana, Gambia and Nigeria had met three of the primary criteria while Sierra Leone met only one criterion. Guinea recorded the worst performance since it met only one of the criteria.

Table 6: Number of countries that met the convergence criteria in WAMZ

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Budget deficit/ GDP	1	1	1	1	2	3	4	3	1	0
Inflation	3	2	0	1	1	3	2	2	3	3
External reserves	3	3	3	4	4	4	4	3	5	5
Central bank def. Financing	4	2	1	3	5	4	6	4	4	3
Tax revenue/GDP	0	0	1	1	2	1	1	1	1	0
Wage bill /tax revenue	1	1	2	3	3	3	3	3	3	0
Public investment / tax revenue	1	1	2	2	1	2	2	2	2	3
Real interest rate	2	2	0	0	1	1	2	1	1	1
Real exchange rate stability	5	5	4	4	4	3	1	2	2	2

Source; authors own compilation from WAMI and AfDB websites.

These developments brought a lot of doubts about the possibility of a successful introduction of the ECO in the WAMZ since all countries are not able to meet the criteria simultaneously. Debrun et al. (2005), are of the view that the proposed monetary union is not incentive compatible for most of the existing non-CFA members of ECOWAS unless there are institutional changes. The political will of these countries plays a very significant role in their macroeconomic policies.

Due to the noncompliance, the ECOWAS Heads of States and Governments in 2014 had to realign the MCC by scaling them down to six with the ultimate goal of merging both the WAMZ and WAEMU into a single monetary zone by the start of 2020 (Nkwatoh, 2018).

The revised primary criteria include:

- Every member country's budget deficit to GDP should not be more than 3%

- Single-digit average annual inflation of not more than 5% by 2019.

- Central Bank deficits financing should not exceed 10% of the previous year's tax revenue.

- Gross reserves should not be less than three months of imports.

The revised secondary criteria required that:

- The public debt to GDP ratio should not be more than 70%.

- Nominal exchange rate variation should be within +/-10%.

Table 7: Total Number of Primary and Secondary Convergence Criteria met Per Country

Country	2013	2014	2015	2016	2017	2018
Benin	6	6	5	5	5	5
Burkina Faso	5	6	6	5	5	5
Cape Verde	4	4	4	4	4	4
Cote d'Ivoire	6	6	6	5	5	5
The Gambia	3	2	2	2	4	4
Ghana	3	2	2	2	4	4
Guinea	5	5	3	4	5	5
Guinea Bissau	6	6	6	5	6	6
Liberia	5	5	5	6	4	4
Mali	6	5	6	5	6	6
Niger	6	5	5	5	5	5
Nigeria	6	6	5	4	4	5
Senegal	5	5	5	5	6	6
Sierra Leone	4	5	5	2	2	2
Togo	5	5	4	4	5	6
No. of countries met all	**6**	**5**	**4**	**1**	**3**	**4**

Source; WAMZ

Table 7 shows that member countries have failed to simultaneously meet the criteria. The number of countries meeting all the criteria fell from 6 countries in 2013 to 1 in 2016 and improved to 4 in 2018. Most of the countries meeting the convergence criteria have been the WAEMU countries while the WAMZ countries have been recording double-digit inflation. Guinea Bissau, Mali, Senegal, and Togo are the only countries that met the primary criteria in 2017 while only Liberia

met the primary criteria in 2016. However, there was an improvement in 2018 but not general satisfactory since only 4 countries (Togo, Senegal, Mali, Guinea Bissau) met both primary and secondary criteria in 2018. Sierra Leone has been meeting only 2 out of the 6 criteria since 2016. The WAEMU countries who already have a common currency are performing well in the attainment of the MCC than the WAMZ countries; four WAEMU countries met the 6 MCC in 2018 whiles no WAMZ country met all the criteria in 2018.

Table 8: Total number of countries that met the convergence criteria in ECOWAS

CRITERIA	Target	2011	2012	2013	2014	2015	2016	2017	2018
Primary Criteria									
Ratio Budget deficit (including grants)	≤3%	9	6	9	6	6	3	7	5
Average annual inflation	≤10%	12	12	12	14	14	12	11	12
Central Bank financing of the Budget Deficit	≥10%	12	13	14	13	12	13	12	14
Gross external reserves	≥3	14	13	13	14	12	13	14	14
Secondary Criteria									
Nominal exchange rate variation	±10%	13	14	14	13	13	12	12	14
Public debt to GDP	≤70%	13	13	13	11	11	11	12	12

Source; WAMZ

Table 8 also shows that consistently, Nominal exchange rate variation, Ratio of public debt to GDP, Gross external reserves, Central Bank Deficit financing criteria have been met by several countries, averaging above 10 countries yearly. This is as a result of the achievements of the WAEMU countries. But with the criteria on inflation and budget deficits, they are constantly not being met by several countries; always below average. The ECOWAS convergence report in 2017 reported that the domestic currencies of Liberia, Nigeria, and Sierra Leone fluctuated above the range of ± 10 percent. Meanwhile, Nigeria had the highest reserve level of about 12.9 months of import cover. Burkina Faso and Sierra Leone had the highest budget deficit at 7.5 percent of GDP and 8.9 percent of GDP, respectively in 2017. It also reported that the countries with the highest

debt to GDP were Gambia and Cape Verde with 116.2 percent of GDP and 125.3 percent of GDP, respectively in 2017. Due to weak resource mobilization, these countries borrow to spend. Countries have failed to simultaneously meet the convergence criteria dashing the hopes of the ECO in the sub-region (ECOWAS convergence report, 2017).

2.6 Conclusion

Inflationary pressures, poor resource mobilizations, and weak institutional structures have adversely affected the sub-region. These have affected the ECOWAS countries, preventing them from simultaneously meeting the convergence criteria. Efforts, therefore, need to be put in place to ensure that countries meet the MCC to ensure sustainable implementation of the ECO. The chapter shows that the various ECOWAS countries are heterogeneous across diverse economic structures; none of the WAMZ countries met all the criteria in 2018. However, the question still stands whether the ECOWAS countries have real convergence that can enable them to benefit from a common currency even if they do not meet the convergence criteria? The successes of the WACB and the WAEMU highlights the fact that a monetary union in the WAMZ is possible and would be beneficial.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The theory of Optimum Currency Areas (OCA); propounded for over half a century now has gone through several refining stages. Several scholars in their quest to establish the superiority of either the fixed or flexible exchange rates regimes led to the birth of this famous theory. This chapter highlights the various stages that the OCA theory has been through and the various contributions by scholars in the field. It summarizes the theoretical and empirical reviews on the theory and finally throws light on the Maastricht convergence criteria of the Euro Zone.

3.2 Theoretical literature review

The debate concerning the importance as well as the superiority of the various exchange rates regimes after the Second World War and during the period of the Breton Woods system led to the birth of the OCA theory. Scholars began to compare the economic developments in the United States which had a common currency to the European countries which had several currencies at the time; this resulted in research about the benefits of a group of countries using a common currency (Mongelli, 2002). Gandolfo (2016) stated that if flexible exchange rates were proven to be superior then there would not have been the need for any discussion on the OCA theory and if the fixed exchange regime was proven to be superior then the OCA theory would have coincided with the world's monetary system. Therefore, as the debate on fixed versus flexible exchange rates has proven to be inconclusive, the discussion on the need for currency areas continues.

The theoretical establishment of the theory of Optimum Currency Areas started with the pioneering work of Robert Mundell (1961) which later earned him the Nobel Prize. During the period of the

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Breton Woods system of international monetary arrangements characterize by fixed exchange rates and international capital controls, Milton Friedman wrote an article "The Case for Flexible Exchange Rates" published in 1953, that stressed on the importance of flexible exchange rates as very crucial in restoring both internal and external economic equilibrium, he as well elaborated the cost of fixing the exchange rate of a country in the presence of downward rigidities of wages and prices. Robert Mundell (1961) in opposition to Friedman's argument tried to find out the appropriate domain within which it would be beneficial to fix the exchange rate and as a result, came up with the OCA theory (Gitimu, 2018). Other authors including Ronald McKinnon (1963), Peter Kenen (1969), and Fleming (1971) also expounded on various aspects of the theory revealed by Mundell. The European Union's attempt to further integrate into a monetary union revived the interest of scholars and researchers into the field again which resulted in the emergence of the new approach to OCA theory (Mongelli, 2002). Even though Milton Friedman did not talk on the theory of optimum currency areas, it is said that he laid the fundamental doctrine upon which Mundell established the OCA theory (Gitimu, 2018). Quoting from Cesarano (2006), Gitimu (2018) wrote "*Mundell's objective was to identify criteria that would make the abandonment of a flexible exchange-rate regime less costly than as implied in Friedman's paper, ''The Case for Flexible Exchange Rates*''.

An optimum currency area (OCA) refers to the optimal domain of a single currency, or of several currencies which their exchange rates are permanently pegged among themselves (Mongelli, 2002). Formally, it is a monetary arrangement where a group of countries agrees to irrevocably fix their exchange rates among themselves or in an extreme case adopt a single currency being issued by a common central bank. The pegged currencies can only fluctuate in unison against other currencies (Mongelli, 2002). A currency area is described as optimal if it possesses certain

characteristics that would eliminate the need for nominal exchange rate adjustments within the currency area to restore equilibrium.

Because, in the macroeconomic open economy analysis, the "*impossible trinity*"/ Mundell-Fleming "*trilemma*" argues that in the presence of free capital mobility, countries that fix their exchange cannot effectively pursue an independent monetary policy to bring about economic stability. Thus, it is argued that a country cannot simultaneously maintain a fixed exchange rate, free capital movement, and an independent monetary policy. This is because a country in this situation that tries to pursue, for example, an expansionary monetary policy would experience deficits in both the current and capital and pressure to devalue. And to maintain the pegged value of the currency, it would have to use its reserve to maintain the fixity of the currency. But since the reserves are limited, it would eventually have to adjust by deliberately reversing the money expansion or allow automatic adjustment of the money supply through devaluation. This means that countries in OCAs do not have control over autonomous monetary policy and will have to hand it over to a supranational central bank; thus, countries in OCAs cannot use independent monetary policies to restore economic disequilibrium which will be a major cost as explained by Friedman (Adu et. al. 2019; Gitimu, 2018). Countries that join a currency area relinquish control over their monetary policy to a supranational body.

The OCA theory after it was propounded has gone through diverse theoretical and empirical scrutiny over the years. The various stages shall be explained below as the Traditional OCA theory which represents the *Pioneering phase*, the *Refining phase* which represents the New OCA approach and the final Phase will be the *Empirical phase*. The OCA theory has become the centerpiece of economic monetary discussions due to the several benefits enjoyed by the CFA franc zones and the Eurozone and the widespread intellectual rehabilitation of the theory.

3.2.1 The Pioneering Phase

The *Pioneering phase* refers to the period from the late 1950s to the early 1970s; it is referred to as such because it was the stage where the various properties of the theory, as well as the appropriate domain of a currency area, were defined. The main deficiencies of this phase were its inability to reconcile the various properties of the OCA theory into a unifying framework and its inability to evaluate the various properties in terms of prominence (Mongelli, 2002). This was also the period of the Bretton Woods system of fixed exchange rates with greater capital controls. One significant characteristic in the period was the adoption of the *Werner report* by the EU in March 1971 to enhance Europe's role in the world monetary system and to turn the European Union into a truly unified market.

The objective of writers like Mundell, McKinnon, and Kenen was to establish the possibility of having a fixed exchange system among countries but not incurring so much cost as Friedman tried to explain. To the traditional OCA view, before countries can successfully form a currency area among themselves, they need to satisfy certain features (characteristics or prerequisites) so that the cost associated with the loss of control over their nominal exchange rate and monetary policy will not be huge. They required countries intending to form a currency union to meet these benchmarks before proceeding to implement. Attaining these entrance criteria ex-ante requires that countries intending to form the monetary union to coordinate their economic policies to ensure convergence. As elaborated by the various authors, the traditional approach requires countries having free mobility of labour and factors of production, price and wage flexibility, economic openness, diversification of output, the similarity in inflation rates, fiscal integration, and political integration to be good candidates of a currency area. These properties focus on different economic variables

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but invariably, they are targeted at ensuring that countries in currency areas would not require the use of nominal exchange rates for internal or external stability purposes. This is because monetary policy (exchange variation) is seen to ensure both internal and external equilibrium than fiscal policy (Mankiw, 2009). The various entrance criteria are explained below.

The traditional OCA approach requires that countries intending to adopt a common currency should have **free factor mobility** among themselves. According to Friedman (1953), in a world where wages and prices are rigid downwards, nominal exchange variability becomes a major tool for ensuring economic equilibrium in times of shocks. However, Mundell (1961), explained that even in the presence of rigid wages and prices, if factor mobility is high among countries, exchange rate variability becomes redundant in ensuring economic equilibrium. He defined an OCA as an "*area within each of which factor is mobile but between each of which factor is immobile*". With high factor mobility among countries, the international adjustment would just be like the adjustment between different regions of the same country where no balance of payments problems does exist between them. In the explanation of Mundell, when two countries (A and B) fix their exchange rates between themselves, in a moment where country A demand for more of countries B exports implying country B is experiencing excess demand while A is experiencing low demand (country A in trade deficit). The implication of this is that prices and wages would rise in country B with employment increasing while in country A unemployment will increase with prices and wages being the same because they are sticky downwards. Country A would need to devalue its currency to boost exports and reduce imports to restore equilibrium. However, since exchange rates are fixed in OCAs, factor need to be so mobile that workers can easily move from country A to country B to find jobs whiles capital would also move from country B to country A to take advantage of the higher interest rates due to the fall in demand. This will result in the restoration

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of equilibrium without the need for any exchange devaluation. According to Mundell (1961), when factor mobility is high among countries, exchange rates variability will not be an effective tool in reducing unemployment-inflation trade-off contrary to Friedman's arguments in favor of flexible exchange rates where he said that abounding exchange rates as a stabilizing tool to cushion against shocks in the presence of sticky wages and prices will be costly.

Countries do not need nominal exchange rate variability as a macroeconomic stabilization tool to cushion against shocks if there exists free mobility of factor among them even in situations where wages and prices are sticky downward (Gitimu, 2018). But when wages and prices are sticky downwards, like Friedman, Mongelli (2002) stated: "real flexibility could be achieved through exchange rate Adjustments". Therefore, it would be costly to lose control over nominal exchange rates when wages and prices are sticky downwards. Mongelli, (2002) however, argued that equilibrium restoration in the very short run will require wage and price flexibility since the cost of relocation will affect labour mobility in the short run. The cost of relocation and the language barrier will be some of the major factors that will affect labour mobility among ECOWAS countries since labour mobility can bring adjustment to permanent shocks in the long run. Krugman and Obstfeld (2003) observed that labour mobility within the EU was hampered by the government's regulations and that the Americans and the Japanese were more footloose than Europeans.

Thus, in the presence of downward rigidities of wages and prices, factor mobility will ensure a successful currency area.

Additionally, McKinnon (1963) stressed the need for any country intending to join an already existing currency union or to form a new one to be **highly open to trade**. This is measured by the

ratio of traded goods (exports and imports) to non-traded goods in the national output. A country that is very open to trade, meaning it produces and consumes more commodities that are traded internationally, will benefit from adopting a fixed exchange rate or joining a monetary union. But countries that traded goods are relatively fewer compared to non-traded goods in their national output should adopt flexible exchange rates systems. This is because a very open country will be impacted greatly by changes in the nominal exchange rate. Countries that have a high degree of openness experience a high transmission of international price changes to the cost of living of the country and this makes the nominal exchange rate less usable as a tool of adjustment (Gitimu, 2018).

An example is, an economically opened country experiencing a balance of payments deficit, if it decides to devalue the exchange rate to restore equilibrium, it would result in inflation. This is because, devaluation increases the exports and price of the imports so more resources will move from the non-traded sector to the traded sector, and this will increase the wages of those in the traded sector (no money illusion) and also increase the demand and price of the non-tradables. Therefore, due to the level of openness in the economy, the devaluation to restore the balance of payment deficit has resulted in unintended inflation. In a similar conclusion, Mongelli (2002) added that a higher degree of openness leads to more changes in international prices of tradables, which will be transmitted to the domestic cost of living. According to Gandolfo (2016), a situation like this will require that a country would adopt fixed exchange rates and *expenditure-reducing policies* to effectively reduce imports and encourage exportation of a sufficient amount of exported goods previously consumed domestically. Small countries are therefore good candidates for monetary unions because they are very open to trade. However, others argue that the use of exchange rates as a stability tool will still be crucial if the cause of the balance of payment

disequilibria is from a foreign country, contrary to McKinnon's assumption that the external economy is stable.

Product diversification is one of the macroeconomic prerequisites that a country should meet ex-ante before ceding to join a monetary union. This feature was elaborated by Peter Kenen in 1969. Countries are required to be diversified in the composition of their product before they can benefit from the formation of a monetary union. When a country diversifies its export production, except for shocks that affect all exports, shocks that have opposite impacts on various products will ensure that there is equilibration of the impact of the shock. Thus, whiles the shock is having a negative impact on other commodities, it is at the same time having a positive effect on other commodities which in the end they will cancel out.

Diversification reduces the need for changes in the terms of trade via the nominal exchange rate variation since it can ensure the effects of shocks are equilibrated and canceled out. Diversification of portfolio of jobs and diversification in imports and exports reduces the need for nominal exchange rate adjustments (Mongelli, 2002). However, the specialization argument put forward by Krugman (1992) says that as countries engage in a monetary union and trade increases, they tend to specialize in the production of goods for which they have a comparative advantage thereby increasing the risk of asymmetric shocks.

Furthermore, even though Mundell (1961) did not specify the type of factor, it has been assumed it was labour mobility he was referring to. Notwithstanding, Ingram (1962) highlighted the need for countries intending to form a monetary union to have **full financial integration** among themselves. Financial integration can lead to the free flow of capital resources in a currency union to minimize the effect of asymmetric shocks on demand and supply. With an increase in unemployment due to a fall in demand in a member country, capital can easily flow into that

country from other countries in the monetary union to boost production to restore the temporal demand shock. In the long run, the interest rates in the zone will be equalized. Capital mobility, therefore, restores equilibrium just as nominal exchange rate adjustments.

In the view of Mongelli (2002), full financial integration can improve the mobility of capital and facilitate the financing of external imbalances and reduce the need for exchange rate adjustments. Ishiyama (1975) noted that financial integration can cushion against temporary shocks and also smoothen the long-term adjustment process of shocks.

Fleming (1971) also showed the need for countries to have a **similar inflation structure** before forming a monetary union, this he argued that it will ensure stable and favorable terms of trade for both countries such that it will not call for the use of exchange rates to bring stability. Differences in national inflation rates could lead to *external imbalances*. Low and similar inflation structures will lead to stables terms of trade and equilibrate the current account transaction, reducing the need for nominal exchange variations to restore equilibrium. However, other scholars like Frankel and Rose (1998) are of the few that this criterion is achieved ex-*post* rather than *ex-ante*. According to them, even if countries are not similar in terms of their inflation, as trade increases among them in the monetary union, it leads to the synchronization of the inflation structure across the region. The variation in inflation among the WAMZ countries makes them unsuitable according to this criterion. However, as seen among the WAEMU countries, a common currency can lower the inflation rate among the WAMZ countries.

Another prerequisite for the formation of the monetary union is the need for a **strong political will** among the intending countries. Evidence has shown that the several currency unions that existed in history could be traced to the strong political will that existed among the nation that formed them. Others say that the political will to adopt a single currency plays a major role even than the

economic benefits involves (Mongelli, 2002). The political will to integrate is regarded by some as the single most requirements for forming a currency area (Gitimu, 2018; Uzonwanne, 2012). For a group of countries to successfully integrate into a monetary union, they need to be convergence in their preferences toward growth, inflation, and unemployment (Chuku, 2012). Uche (2002) talking about WEAMU said a "*political will on the part of the government of the member countries was important if any meaningful progress was to be made towards integration*".

Finally, Corden (1972) argues in favor of limited **fiscal integration** by contending that monetary integration does not require parallel fiscal integration. Countries in a monetary union should adopt a fiscal transfer system whereby countries in an adverse shock will be provided with funds to reverse the effect of the asymmetric shock. The willingness to share risk will help in this to ensure that the need for nominal exchange changes is minimized. This would allow funds to be redistributed to countries affected by the asymmetric shocks. An adjustment mechanism like unified a budget can automatically redistribute funds from countries experiencing a strong economy to those suffering from a recession, however, others argue that fiscal transfers are only suited to dealing with temporary demand shocks while others are of the view that the coordination of fiscal policies in a currency union will foster economic development because a centralized fiscal policy will be less costly to manage (Chemia et. al. 1994).

The traditional OCA approach established the criteria for which the countries proposing to form or join a monetary union must possess ex-ante. Member countries achieving these prerequisites will make it easier to lose control over monetary policy and hand it over to a supranational power and to eventually adopt a common currency without any negative effect on external and internal economic equilibriums. However, the several weaknesses with the pioneering stage did not allow

any group of countries to adopt any monetary union at the time until further economic researches were done to provide other approaches to the theory like the cost benefits approach.

The weaknesses of the Pioneering stage of the OCA theory includes:

1. The causes, magnitudes, and time it will take for shocks facing the monetary union to eventually dissipate was not considered. This is very crucial because shocks might have different impacts on different countries in the monetary union.

2. According to Mongelli (2002) "The main drawback of the pioneering phase was that it was difficult to weigh and reconcile the diverse OCA properties as a unifying framework"

3. It was difficult to measure the various OCA properties objectively and evaluate them against each other. The problem of inconclusiveness of the properties that were of greater importance, others supported price and wage flexibility with factor mobility while others supported political will.

4. Could not appropriately measure the cost and benefits of OCAs.

Therefore, during the refining phase, a New OCA approach came up to correct the weaknesses that were encountered by the Traditional approach such that it led to the adoption of the Euro by the EU.

3.2.2 The Refining Phase

The *refining phase* upgraded the Traditional OCA approach to include the formation of expectations, time consistency, and credibility issues, and exchange rate determination by introducing the cost and benefits approach to OCAs (Gitimu,2018). The New OCA approach anticipates more benefits than the cost from forming a monetary union than the Traditional theory predicted. This *refining phase* overcame the deficiencies of the pioneering phase by unifying the

various OCA properties to appropriately measure the cost and benefits of OCAs and concluded that the cost of forming currency unions is far lower than the benefits involves.

The main circumstances that spurred the study into inventing a new approach to OCA theory were the renewed interest for the monetary unification in the European Union during the period, the collapse of the Bretton Woods system, and the adoption of new models of econometric analysis (meta property) (Mongelli, 2002).

Most of the costs that were envisaged by the traditional OCA theory were scaled down by the new OCA theory. The new OCA theory, therefore, advocates for currency areas because it discovered more benefits and few costs of forming monetary unions (Gitimu, 2018).

After the collapse of the Bretton Woods system of fixed exchange rates and the pegging of the US dollar to the gold parity in the 1980s, various circumstances led to the research into the causes of the collapse and also the better ways to reorganize international systems. During the period exchange rates and monetary policies could not be effectively used to circumvent the rising unemployment and rising inflation which was against the assumption of the Philips curve (Mongelli, 2002). The natural rate of unemployment replaced the Philips curve since policymakers could only determine the level of inflation and not unemployment.

The new OCA theory started to identify and test for factors that will determine the cost and benefits involves in forming a currency area in various scopes; the symmetry of shocks, fiscal integration, real exchange rate cointegration, the OCA index, and trade integration (Gitimu, 2018). These methods of analysis were made possible by the improvement in the econometric technique and the availability of economic data.

Symmetric shock assessment

The major achievement of the refining phase of the OCA theory was its discovery on the symmetry of shocks property. The symmetry of shocks property is that countries experiencing similar macro-economic disturbances are more fit to form and benefit from a monetary union since they will require a common monetary policy to bring stability in times of shocks (Gitimu, 1994). When countries wishing to form a monetary union are facing asymmetric shocks, then using a single monetary policy to restore stability would not be appropriate. This will mean each country should maintain an independent monetary policy and flexible exchange rates which it can use to restore stability in times of external shocks. According to Chamie et. al (1994), the cost of losing monetary policy independence increase when countries are faced with asymmetric shocks.

The macroeconomic *trilemma* also known as the *impossible trinity* discussed above postulates that a country cannot operate a fixed exchange rate system, free capital mobility, and an independent monetary policy at the same time. So, countries in a monetary union (the fixed exchange rate and free capital mobility) cannot use monetary policy anymore. The loss of monetary policy independence is a key cost to the participating countries since they cannot use it any longer in the wake of asymmetric shocks. So, when a group of countries faces similar demand, supply, and external shocks, then it would be more sustainable and beneficial to adopt a common currency.

Alesina et. al (2002) added that countries with large co-movements of outputs and prices will have the lowest costs when they enter a monetary union. Blanchard and Quah (1989) decomposed the shocks to supply and demand shocks and explained that supply shocks have permanent effects on both output and unemployment whiles demand shocks only have transitory effects on output and employment. The symmetry of shocks property measures the shocks, their impulse over time, and

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their response to policy across countries. In an argument made by Fielding and Shield (1999), the cost of countries forming a currency area will depend on the extent to which their price and output shocks are correlated across the countries and how the shocks affect the economies in the long run. The symmetry of shock property is able to capture some underlining features of economic, financial, wage, and price structures thus it is a "catch-all" property capturing the interaction between several OCA properties (Mongelli, 2002). However, Mundell (1973) analyzed that if there is full financial integration, the symmetric of shocks before ceding to a currency area will no longer be viable. This empirical work will adopt this method to examine the symmetry of response to external price shocks faced by the WAMZ countries.

The real exchange rate convergence analysis

When the real exchange of a group of countries converges, the new OCA theory postulates that they will be good candidates for a monetary union since the cost involves will be low whiles the benefits they will stand to derive will be high. Enders and Hurn (1994) explained that when a group of countries have their real exchange cointegrated, then they will be good candidates for an OCA: "*a positive finding of cointegration means the existence of a currency Area*". Cointegration of real exchange rate means that various countries' exchange rates have a long-run relationship and a single monetary policy will be appropriate to restore equilibrium simultaneously in all countries in the periods of shocks. According to Gitimu (2018), "*a higher cointegration of real exchange rates for a group of countries correspond to lower monetary union cost and higher benefits for countries once they establish a currency union*". Cointegration of exchange rates of a group of countries means they have similar shocks or factors affecting their external sectors which imply symmetry of shocks for them.

Two methodologies used under the real exchange rate analysis when assessing the feasibility of an OCA are the General- Purchasing Power Parity (G-PPP) cointegration analysis and the OCA indexing. According to Adu et al. (2019), the G-PPP theory suggests that the fundamental economic variables determining RER are non-stationary and if the fundamentals are sufficiently integrated, as in a currency area, the real rates will share a common trend.

The various criteria set by the traditional OCA approach all have impacts on the real exchange rate. Therefore, instead of assessing the various criteria independently which has been inconclusive because of the level of subjectivity, the new OCA theory examines the effects of the various countries' economic variables on the nominal exchange. So, if all the countries' variables have similar effects on their exchange rate, then it means they are apt for a single currency. In effect, it observes the behavior of the exchange rate in relation to the traditional OCA properties. Therefore, in the domain of a monetary union, there should be a convergence of real exchange rates.

Trade integration

Under the new OCA approach, Frankel and Rose (1998) challenged the Traditional OCA view of countries meeting convergence criteria ex-ante, by contributing that countries that did not attain the convergence put forward by the traditional OCA theory can still converge ex-post. They said, "*the examination of historical data gives a misleading picture of a country's suitability for entry into a Monetary Union since the OCA criteria are endogenous*". This was a major critique of the traditional OCA approach. This means if countries are asymmetric in their macro-economic structures, as they trade more with each other due to the elimination of trade barriers and transaction costs, their economies will eventually converge. To them, as countries adopt a single currency, transaction costs and uncertainties regarding exchange rates are eliminated, and therefore

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trade among the countries in the currency area increases which will lead to the synchronization of their business cycle. Increased economic integration among countries increases convergence among them and therefore leading to a reduction in the cost of forming a monetary union in terms of exchange controls.

According to Frankel and Rose (1998), "*a country is more likely to satisfy the criteria for entry into a currency union ex-post than ex-ante*". However, authors like Mongelli (2002) asked the question, should any group of countries just form a currency union not considering their convergence in the hope that they will eventually converge? And how long will it take them to converge? These are the questions that still make the endogeneity approach incomplete. The argument on the specialization of countries as they enter into a currency union also stands in opposition to the endogeneity approach. The models used to empirically test the OCA endogeneity criteria approach is the gravity approach (Gitimu, 2018). It mostly tests the potential of bilateral trade to increase among countries that intend to form a currency area since trade mostly is affected by the elimination of trade barriers. Rose and Engel (2002) concluded that "*members of international currency unions tend to experience more trade, less volatile exchange rates, and more synchronized business cycles than do countries with their currencies*". Fischer (2011) also reiterated that the choice of a countries anchor currency should be determined by its trade integration.

Tavlas (1993) noted that when you compare the new OCA theory to the traditional OCA theory, the new OCA theory produces more benefits and less cost than as perceived by the early authors. The new OCA theory discovered that some of the costs that were envisaged by the traditional OCA theory were not relevant.

For example, the new OCA theory found out that to an extent monetary policy seems to be ineffective in restoring equilibrium. The loss of control over monetary policy was seen as the main cost to any country deciding to join a currency area; however, circumstances after the collapse of the Bretton Woods system proved that countries could not use monetary policy to achieve an equilibrium trade-off between inflation and unemployment as put forward by the Philips curve. The monetarist view that money is a veil means in the long-run monetary policy cannot be used effectively to determine unemployment but inflation due to the assumption that the natural rate of unemployment is vertical. The Phillips Curve, therefore, needs to be augmented by expected inflation and perfectly anticipated policy changes since labour negotiates in terms of real wages rather than nominal wages. According to Gitimu (2018), although the Philips curve still exists in the short run, in the long run, unemployment and inflation are not harmonized effectively by the monetary policy. This means the cost that was associated with the loss of monetary policy was overstated. They concluded that in the long-run monetary policy can only determine the level of inflation but not unemployment.

Similarly, as explained above, the endogeneity argument was also brought forward to prove that the cost would not be much if countries do not achieve the convergence properties before proceeding to form the monetary area since the increase in trade after convergence will lead to the synchronization of economic structures.

The other criterion which required similarity of inflation by countries aiming for monetary integration was also scaled down by Prescott and Kydland (1977) in their argument of time consistency and credibility issues regarding fiscal policies. They argue that countries with time-inconsistent policies lack credibility before the public and this can even lead to persistent and high inflation. However, when a high inflation country joins a low inflation country in a monetary

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union, it gains credibility because it has *tied its hands* such that its inflation structure would reflect that of the low inflation country. Therefore, as concluded by Gandolfo (1992), similarities in inflation rates is no longer a precondition but could be a possible outcome of participating in a monetary union.

The new OCA theory, therefore, refined the Traditional OCA theory and advocates for more monetary unions since their benefits are seen to be more than their cost.

3.3 Benefits of Optimum Currency Areas

There are several benefits of forming OCAs which are the main reasons why the New OCA theory has dominated recent arguments on currency areas. However, Ishiyama (1995) acknowledges that countries will have to measure the cost and benefits based on their self-interest, social preference, and welfare function.

Firstly, **saving of exchange rate reserve** is one of the major ways countries can gain from joining a monetary union. Since the exchange rates of countries forming the monetary union are permanently fixed or even the adoption of a common currency, it eliminates the need for holding foreign reserves as a way to cushion against shocks from member countries. It improves the efficient use of money as a unit of accounts and for transactional purposes in the currency area. The formation of currency unions leads to the pooling of the union's international reserves, making them stronger in the international front.

Secondly, forming a monetary union leads to **strong political and bargaining power**, as monetary union becomes integrated economically, they can have a stronger voice in international economic policy decision making. Examples are the European Economic Union and that of the United States have the strongest bargaining powers due to their sizes.

Again, it leads to higher **trade integration and economic development** due to the elimination of transaction costs and the uncertainties surrounding the changes in nominal exchange rates. As countries form a monetary union, the transaction cost that existed in exchange from one currency to the other would be eliminated and this will boost intra-unions trade thereby leading to economic growth. It also improves on the efficiency of the use of money by the whole currency area eliminating the uncertainties surrounding flexible exchange rate and improving trade and cross-country investments. It also eliminates the need for hedging against changes in exchange rates. It is said that the fast-growing economies in the monetary union can pull the slow-growing economics along leading to higher development for the union as a whole. Efficiency in the use of factor resources will be improved since there will be an increase in demand (larger market).

Another benefit derived from forming monetary unions is the **credibility that countries can gain from the management of inflation**. Time inconsistent policies lead to loss of credibility and therefore costly to manage inflation. But as countries hand over control over autonomy over monetary policy, they tend to *tire their hands* such that governments can no longer use monetary policy to inflate the economy. Therefore, countries with a reputation for persistent high inflation can achieve low inflation overnight without incurring any loss to production and employment by fixing their exchange rates to a country with a reputation for low inflation. Alesina and Barro (2000) contend that forming a currency union involves trading off the benefits of a commitment to price stability against the loss of independent stabilization policy.

Another benefit that countries stand to gain from being part of a monetary union is **political integration**. As countries integrate economically to the extent of adopting a common, it can lead to the establishment of integrated political structures in the monetary union. It also results in the synchronization of economic policies which all contribute to world peace just as the main reason

for Europe was after WORLD WAR II. Today there is no doubt that the European monetary integration process has helped advance the political goals of its founders by giving the European Union a stronger position in international affairs (Mongelli, 2002).

3.4 Cost of Optimum Currency Areas

The costs associated with the implementations of OCA according to the new OCA theory are not much as compared to the benefits, so it is prudent for countries to pursue monetary integrations;

The **loss of autonomy over monetary and exchange rate policies** as economic stabilizers in the wake of asymmetric shocks is deemed to be the main cost. Since countries in a monetary union are required to hand over the control over monetary policy to a supranational central bank, it means that when the need arises for a particular country to use monetary policy or exchange rates variation to restore country-specific shock, it would not be able to do so. The supranational central bank is to use a common monetary policy to restore stability for all countries, but the problem would always arise when countries are not affected similarly by the same shock. A country could have used expenditure switching policies to restore equilibrium whenever it is faced with adverse external demand but due to the fixed exchange rates in the monetary union, it has to resort to expenditure reducing policies like fiscal tightening, which is not ideal as compared to expenditure switching policies like exchange rates variation.

Secondly, countries will lose the **Seignoirage revenues** they gain from the printing of currencies. Governments can now only borrow from a larger capital market to finance deficits but cannot, as usual, print currency to inflate away its national debt.

Lastly, other **administrative costs** associated with the adoption of new currency like the purchase of new machines, redenomination of values, revaluation of contracts, and also other psychological costs in using a new currency are also involved, however, it is expected that with time, these costs would die out.

3.5 Empirical literature review

Empirical investigations of the feasibility of a group of countries to successfully form OCAs have been carried out in diverse ways in line with both the traditional and the new OCA approaches. However, recent empirical works on OCAs have centered majorly on the various aspects of the new OCA theory as explained in section 3.2.2 above. But from the European experience at the Maastricht Treaty, aspiring countries need to meet certain economic convergence to prove their readiness. Some empirical findings on the OCA literature are discussed below;

Fielding and Shields (1999) were among the first to empirically test whether the WEAMU was an optimal currency area using Structural VAR. They found that there was a high level of symmetry of inflation in the WAEMU while the WAMZ countries did not have any convergence in their level of inflation. Using a modified method of Blanchard and Quah (1989), they identified shocks as output and price shocks. Their outcome showed that output shocks were not symmetric as compared to the shocks to inflation within the WAEMU and that inflation in the WAEMU converges more than among the WAMZ. This proves that the CFA franc used within the WAEMU affords them more benefits since they converge at a lower inflation rate than the WAMZ.

Abdoulie (2013) also examined the feasibility of ECOWAS implementation of the ECO by using a Reduced VAR to determine the response of some ECOWAS nations to external price shocks from the UK, France, and the USA. He found out that the response of the countries to the shocks

have been asymmetric across the sub-region. And for that matter, not suitable for a common currency. Specifically, he investigated the effects of external price shocks on output growth, price, and domestic money demand on the ECOWAS countries and the results showed diversity in the response to the shocks. He then called for the further convergence of economic structures before proceeding with the ECO. However, using the Generalized Purchasing Power Parity (G-PPP), he tested for the cointegration of the real exchange rate and found that the real exchange rates were cointegrated proving that a currency union will be successful for the ECOWAS.

Adu, Litsios, and Baimbridge (2018), in an attempt to examine real effective exchange rate (REER) responses to shocks in exchange rate determinants for the WAMZ, used a structured VAR and IRFs. They identified the shocks as oil price, demand, and supply shocks and the outcome revealed there were significant differences in the responses of these countries to the various shocks. They, therefore, concluded that the WAMZ countries face asymmetric shocks and not suitable for a common currency. Using the IRFs revealed that oil price shocks had appreciative effects on Ghana, Nigeria, and Guinea but had depreciative effects on Sierra Leone and The Gambia. While demand shocks had similar effects on REER with different magnitudes, supply shocks had asymmetric effects on REER across countries. This research will use country-specific shocks rather than global shocks to trace how each country responds to shocks from various countries.

Omotor and Niringiye (2011) in a similar study to assess the feasibility for a common currency in WAMZ used a *bivariate* vector autoregressive (VAR) model to measure the symmetry of shocks using a data set from 1981 to 2008. To determine the symmetry of demand and supply shocks using price and output growth respectively, the outcome suggested that the WAMZ economies are weakly symmetric both in terms of supply and demand shocks. They also added that output and prices of the economies moved in the same direction when they are hit by both supply and demand

shocks which is contrary to the AS-AD framework which says output and prices move in opposite directions when hit by supply shocks. They, therefore, concluded that WAMZ is suitable for a common currency since demand shocks were symmetric throughout.

In a similar study, Chuku (2012) used SVAR to test for the symmetry and speed of adjustment to shocks among 66 pairs of ECOWAS economies. Using global GDP as a measure for external shocks, he found symmetry in response to external shocks but asymmetric response to demand and supply shocks. He as well found out that the speed of adjustments among the ECOWAS countries were highly dissimilar.

Before the adoption of the Euro, Chamie, et. al (1994) tested for the symmetry of shocks in the EU and comparing it to the symmetry of shocks in the US and they concluded that the symmetry of supply and demand shocks were high in the US as compared to the symmetry of shocks in the EU. They tested for the symmetry of shocks among 13 EU countries and symmetry of shocks among 9 US states. Only Germany and Switzerland had shocks that were strongly symmetrical. Using structural VAR, they used money supply, CPI, and industrial output as their variables.

Nkwatoh (2018) did a qualitative assessment of the ECOWAS countries' economic performances regarding the convergence criteria and concluded that the MCC were not strictly being adhered to by the ECOWAS countries and that further efforts needed to be put in place to ensure convergence before proceeding to implement the ECO. This was also in line with the study made by Uzonwanne (2012) who agreed that political will among the ECOWAS governments should be intensified to ensure simultaneous achievements of the convergence benchmark.

Similar studies done by Harvey and Cushing (2015) used a structured VAR to measure the variance decomposition, impulse response functions, and the linear dependence of underlining structural

shocks. They modeled the VAR to determine the symmetry of supply, demand, and monetary shocks among the WAMZ countries. They found that the WAMZ countries face divergent degrees of shocks from demand, supply, and monetary disturbance. They concluded that the WAMZ countries should ensure further convergence before proceeding with the implementation. Although VAR is widely used in the measure of the symmetry of shocks due to the robustness of the methodology, it requires a very long time series for estimation.

Gitimu (2018), also used the Generalized-Purchasing Power Parity (G-PPP) to test the level of cointegration of real exchange rates among the East African Community (EAC) to determine the feasibility of the EAC implementing a common currency. The results showed that there existed a long-run relationship among the bilateral real exchange rates of the countries and that proceeding to form the Monetary union will be beneficial however she discovered that the EAC countries had not all consistently met the convergence criteria. Using recent data sets (exchange ratios for the five EAC nations versus the US dollar from 2000 (Q1) to 2015 (Q4) and exchange rates ratios of the EAC versus Kenyan Shilling from 2011 (M1) to 2015 (M12)), she found results contrary to Rusuhuzwa and Masson (2012) who concluded the real exchange rates in EAC countries were not cointegrated, even though she used a similar methodology.

On the European Union, Bayoumi and Eichengreen (1997) divided the European countries into three groups to measure their level of readiness to adopt a single currency using the OCA index they developed. They found out that there was the stability of the bilateral real exchange rate variability between France and Germany.

Bangaké (2008) studied the African continent's ability to form an OCA by using the OCA index and concluded that adding Ghana to the WAEMU will be beneficial whiles adding Nigeria to the

WAMZ will not be beneficial since Nigeria had so much exchange rate variability. He also concluded that the OCA index for CEMAC was high indicating that it doesn't constitute an OCA.

Amoah (2013), studied the feasibility of the WAMZ to form an OCA using an OCA index. He found out that the exchange rate of the Naira was the most stable and that Nigeria stands to benefit more from a single currency in the WAMZ. He, therefore, recommended that Nigeria and Ghana should proceed to form the monetary union with the Gambia joining later.

Several empirical research on the New OCA theory have been the center of recent empirical studies on OCAs. They are now used to conclude as to whether a group of countries can benefit extensively from a currency area or not. However, as the European Union did during the Maastricht treaty, countries intending to form a monetary union are supposed to meet certain macro-economic benchmarks to ensure convergence before proceeding to either peg their currencies or adopt a common currency.

3.6 The Maastricht convergence criteria (MCC)

As noted in the previous chapters, ECOWAS and WAMZ lined out a set of Macroeconomic Convergence Criteria to be attained by its member countries before proceeding to adopt the ECO in line with what the European Union did before the adoption of the Euro. Before the final adoption of the Euro, the European countries that were intending to join the Economic and Monetary Union (EMU) set out convergence criteria for the countries to meet to ensure that countries converged in their macroeconomic variables such that there won't be any negative international spillover effects and that a common monetary policy will be optimal for the whole monetary union. According to Amoah (2013), the Maastricht convergence criteria was one of the ways of assessing the readiness of the countries to adopt the Euro.

Whiles other authors argue that the MMC calls for just nominal convergence whereas the OCA theory calls for real convergence, they also stressed that nominal convergence of the MCC does not mean the countries have real convergence. However, others also are of the view that consistent attainment of these MCC will lead to real convergence of economic indicators. Both nominal and real convergences are therefore preconditions for the sustainability of a monetary union. Nkwantoh (2018) assert that whiles the convergence criteria may guarantee macroeconomic stability in a monetary union, he also pointed out that the convergence criteria are insufficient and inconsequential to the formation of monetary union. Even though the MCC is to ensure that the common currency would be sustainable and beneficial to all countries, it is found that none of the existing currency union ever met all the OCA properties before proceeding to adopt their common currency. Countries are therefore expected to meet not just the MCC but also to attain real convergence (Amoah, 2013). But Rusuhuzwa, (2012) is of the view that these criteria can be considered as post conditional factors.

In the Maastricht treaty in 1992, the European Economic Community (EEC) laid down five macro-economic convergence benchmarks for countries that would want to participate in the Economic and Monetary Union (EMU) should attain a priori;

1. An inflation rate of not more than 1.5% above the average of the lowest three inflation rates in the EMS;

2. An interest rates within 2% of the same three countries chosen for the previous condition;

3. Must have been a member of the narrow band of fluctuation of the ERM for at least two years without realignment;

4. Budget deficit must not exceed 3% of GDP;

5. Government debt to GDP must not exceed than 60%;

Although the European Union laid now five macroeconomic convergence criteria, as seen in chapter 2, ECOWAS sets out 10 MCC and reduced it to 6 in 2014 probably to overcome the challenges that the Euro Zone encountered during the European debt crises (Amoah, 2013). The European Council agreed in 1995 that the third and final stage of implementation of the European Economic and Monetary Union (EMU) was to begin on January 1, 1999, with the introduction of the single currency (the Euro) and the adoption of a single monetary policy managed by the European Central Bank (ECB). EU member countries that were eligible to start the use of the Euro were to be decided by the Heads of state of EU in 1998 using each country's economic performance at the end of 1997 with regards to the convergence criteria. EU countries that did not join the EMU from the start could join later after the European council certifies that they have observed the convergence criteria.

However, the endogeneity argument by Frankel and Rose (1998) says that "*the examination of historical data gives a misleading picture of a country's suitability for entry into a Monetary Union since the OCA criteria are **endogenous**"*. They mean that countries even if they do not meet the preconditions can proceed to form the monetary union because the criteria can be attained after the countries have formed the monetary union and trade increases among them. Again, they said, "*the suitability of European countries for EMU cannot be judged based on historical data since the structure of these economies is likely to change dramatically as a result of European Monetary Union (EMU)*". This should not, however, suggest that any group of countries can proceed to form a currency union without recourse to their macro-economic indicators.

Others who oppose the convergence criteria idea, state that they are insufficient and inconsequential. Insufficient because they are only nominal values and not real values as the theory

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of OCA requires. The OCA theory requires that countries ascending to form a monetary union should converge in real terms and not nominal variables.

The convergence criteria are viewed to be inconsequential due to the view that the monetary unions that existed in history did not require any convergence criteria. According to Nkwatoh (2018), the Maastricht convergence criteria were not strictly adhered to by countries that adopted the Euro. Referring to Harrison (2010), Nkwatoh (2018), explained that Belgium and Italy had a debt to GDP of more than 70 percent and budget deficits of more than 3 percent even though the Maastricht convergence required not more than 60 percent of debt to GDP and 3 percent of deficit to GDP respectively. Specifically, he highlighted that Greece had a debt to GDP of about 152.6 percent and the deficit was 11.47% of its GDP. However, the compromises of these countries might be the cause of the prolonged European debt crises and the Greece financial crises. The prolonged nature of the European sovereign debt crises calls for more caution by the ECOWAS countries. The United States which is viewed as one of the most successful currency unions in the world, he argued, did not meet any convergence benchmark but only based on political will. This also calls for the development of a very strong political will by the ECOWAS leaders to ensure the implementation and sustainability of the ECO.

3.7 Conclusion

Going through the evolution of the OCA theory from the Traditional Approach to the New OCA approach and viewing the various arguments reveal that countries aspiring to form a monetary union should strategically ensure convergence of real economic indicators before proceeding. The argument continues, whether the ECOWAS countries should go ahead and adopt the ECO without

any reference to the convergence criteria as the CFA zone did decades back? But the European debt crisis is a caution to the ECOWAS countries. Strict adherence to the convergence criteria should not be compromised as the Eurozone did, this will make the WAMZ and ECOWAS avoid the challenges that confronted the Eurozone. Real convergence will lead to a sustained currency area in the sub-region that will boost intra-regional trade and economic development. An ECOWAS single currency will benefit the monetary union if the various countries have similar responses to foreign shocks. We then proceed to test if the WAMZ countries have similar responses to foreign price shocks even as they have not met the MCCs.

Chapter 4

METHODOLOGY AND DATA DESCRIPTION

4.1 Introduction

This chapter explains the conceptual and theoretical frameworks of the methodological technique. It elaborates on the data used for the analysis and expounds on the procedures used for the technical analysis to achieve the research objectives. The methodology used for this analysis is the Vector Autoregression (VAR) model imploring the Impulse Response Functions (IRF) and the Variance Decomposition (VD) to determine the similarity of response by WAMZ countries to external price shocks.

4.2 Conceptual framework

From chapter 3, it can be deduce that there is no one absolute measure for empirically assessing the suitability of countries attempting monetary integration. The several OCA approaches discussed in chapter 3 are usually used in assessing the suitability and sustainability of incipient monetary unions. An emerging monetary union will be practicable if it meets the requirements of both the Traditional OCA approach and the New OCA approach. When countries meet these macroeconomic benchmarks, it makes it easier to adopt a single currency since a common monetary policy can be used to bring about economic stability for all economies. The reason for the convergence criteria is to eliminate the differences that exist among the various member countries' economies to reduce the cost of countries losing control over their monetary policy as an economic stabilizer.

The New OCA theory is the approach used in this empirical work to analyze the feasibility of the WAMZ to form an OCA by assessing the symmetry of their response to external price shocks. The New OCA theory inspects the success of a group of countries to form an OCA in diverse ways including; the symmetry of response to shocks facing the proposed currency union, the level of fiscal integration, intra-regional trade effects, OCA index, and real exchange rate cointegration, which according to Gitimu (2018) are used to judge whether a group of countries should form a monetary union or not.

The approach for this study will be to test how symmetrical the WAMZ countries respond to common shocks. This is essentially, to investigate whether or not the WAMZ countries have symmetric response to external price shocks from the US, the EU, and China by using the impulse response functions (IRF) and variance decomposition (VD) to determine the symmetry with which foreign price shocks from these countries causes variations in domestic output and prices among the WAMZ countries. The costs of losing monetary autonomy will be lower when the magnitudes of the underlying shocks are small and the responses to the shocks are symmetric across the region (Alesina et al. 2002; Bayoumi, 1994).

Since from our study in chapter two, the ECOWAS countries have consistently failed to simultaneously meet the convergence criteria to enable them to adopt the ECO, Harvey and Cushing (2015) stated that "*Achieving ex-post optimum currency area can be ensured if there are common sources of shock and shock symmetry across the region*". This study will seek to determine the behavior of output growth and prices among the WAMZ countries to foreign price shocks.

It implores the Vector Autoregressive (VAR) approach as used by Abdoulie (2013); a modified approach of the method used by Blanchard and Quah (1989). This is because of the robustness of VAR and the ease of the interpretation of the results since it affords us to use the Impulse Response Function and the variance decomposition to interpret the symmetry of the response to shocks. VAR models are also simple and easy to estimate (Amoah, 2015).

4.3 Theory behind the methodology

Vector Autoregressive models have been used by several researchers in assessing the symmetry of economic shocks. It was first introduced into econometrics by Christopher Sims and used by researchers like Blanchard and Quah (1989), Bayoumi and Eichengreen (1993), and several other researchers as noted in the empirical literature review (Sims, 1980). According to Amoah (2015), VAR models have become popular because traditional time series models are not able to fully explain the interrelationship among macroeconomic variables. Formally, VAR is a set of linear dynamic equations where each variable is specified as a function of an equal number of lags of itself and all other variables in the system (Verbeek, 2004). Brooks (2014) advocates for the use of VARs in place of large-scale simultaneous equation models.

Simultaneous or structural equation modeling requires the system to either be exactly or overly identified before the estimations can be made. This means that restrictions have to be placed on certain variables, thus, some being endogenous while others being exogenous (Gujarati, 2008). As a result, researchers working with such models have to always assume that some of the predetermined variables are present only in some equations. This does not allow the data to speak for itself. Sims (1980) argued that if there is true simultaneity among a set of variables, they should

all be treated on an equal footing and that there should not be any subjective a priori distinction. According to Gujarati (2008), the reduced form of VARs is always identified.

Therefore, VARs considers all variables to be endogenous; it does not need any restrictions to be placed on any variable for identification as in simultaneous equations. Thus, instead of researchers using their discretion to determine which variable is to be treated as exogenous, which might be inappropriate, VAR allows the data to interpret itself. Although restrictions, including exogeneity of some of the variables may be imposed on VAR models based on statistical procedures and economic theory.

Ordinary Least Squares (OLS) can be used to estimate each of the equations in a VAR separately to produce identical and efficient results since each regression contains the same number of lagged endogenous variables (Brooks, 2014).

Making the variable to depend not just on its history but also on other lagged variables makes VARs more flexible than univariate AR models. Therefore, VAR models are able to capture more features of the data.

Chris Brooks in his book argued that VARs are often better than 'traditional structural' models when it comes to generating forecasts. This could be due to the restriction's requirements by the structural models (Brooks, 2014). VAR models are also good when using for forecasting since it contains several series simultaneously and extends to include data from the history of other variables in the series (Verbeek, 2004).

However, VARs have other challenges including the difficulty in interpreting the several parameters. Nevertheless, this challenge is overcome using impulse response function and variance decomposition, which will be used in this particular analysis.

Another problem with VARs is the problem that arises due to the stationarity of the variables in the VAR model. If VAR is to be used for hypothesis testing, it is required that all variables be stationary. But others argue that differencing variables to obtain stationarity will cause useful information on the data to be lost when using it to establish the long-run relationship among variables (Gujarati, 2005; Verbeek, 2004). Therefore, differencing variables to make them stationary will lead to the loss of information on any long-run relationship between the variables. Gospodinov et. al (2016) also explained that impulse response estimators obtained from the level specifications are robust. However, the relationship between co-integration and error correction models as explained by Engle & Granger (1987) is always used to overcome this problem. Co-integration is when the linear combination of two or more non-stationary time series variables produces a stationary series at levels. Whenever co-integration is identified, a restricted VAR model called the vector error correction model (VECM) is normally applied (Gujarati, 2005).

Impulse Response Functions are used in this particular study to establish the similarity of response to external price shocks affecting the WAMZ countries. According to Verbeek (2004), the IRF is mostly used in VAR to trace out the impact of shocks for several periods in the future. The IRFs provide information to analyze the dynamic behavior of a variable due to a random shock or innovation on other variables. It shows the time path whereby the variables return to equilibrium after affected by a shock (Greene, 2008).

The Variance decomposition is also used here to identify the relative contribution of foreign shocks to price and output variations in the various WAMZ countries. This is to examine whether the foreign price shocks cause similar variations to prices and outputs among the WAMZ economies or not. According to Brooks (2014), the IRF and the VD give similar responses.

4.4 Data description

Data to be used in this research is secondary data from the United Nations Conference on Trade and Development (UNCTAD) database. The research uses annual real GDP at the current US dollar price and Consumer Price Index (CPI) at 2010 constant prices from 1980 to 2018 for all the countries except the EU. Data on CPI for the EU is replaced with annual inflation measured by changes in consumer prices from the WDI database. The period of the data for the research is chosen to ensure data availability of the variables for all the countries considered, notwithstanding, a time period of 38 years is statistically large enough for the study. The study aims to determine how GDP growth and prices in the WAMZ countries respond to external price shocks from China, the US, and the EU. The premise of this methodology is that for a monetary union to be stable all the members must have a similar response to shocks.

This study uses real GDP as a measure of the growth of economic activities in the various countries since GDP growth records the percentage change of economic activities relative to a reference year prices. According to Mankiw (2009) GDP is often considered the best measure of how well the economy is performing. According to economic theory and according to Blanchard and Quah (1989), real GDP growth is affected by supply-side factors. This study adopts any shock to real GDP growth as supply shock (shock on output growth), as adopted by Blanchard and Quah (1989), Fields and shields (1999), Abdoulie (2013), and Cushing and Harvey (2015).

The most commonly used measure of the level of prices is the consumer price index (CPI). This research considers CPI due to its comprehensiveness in capturing a better view of price changes in the economy. The CPI is able to measure the prices of the goods and services bought by consumers within the economy. Since the WAMZ countries are net importing countries, the CPI

will reflect how foreign price changes are translated into the domestic economy. This study will use any shock of price to represent price shock/ inflation shock

The European countries have been the major trading partners of the African continent, partly because of the colonial relations and the economic strength of the European Union. The United States of America and China are the biggest economies in the world in terms of GDP. The choice of these foreign economies is due to their economic size and trade relations with the countries in ECOWAS. It is expected that if the WAMZ countries experience similar external price and output shocks from these giant economies, a single currency will beneficial.

4.5 Empirical model

This research is using Impulse Response Functions to determine how symmetrical the WAMZ countries respond to price shocks from China, the EU, and the US. The adoption of the Eco by the WAMZ will require them to have symmetric response to shocks since a common monetary policy will be issued by the West African Central Bank (WACB) to bring stability in the wake of shocks.

The model of the VAR setup is in line with the Aggregate Demand (AD) and Aggregate Supply (AS) framework as explain by Mankiw (2009). This setup has been used by Blanchard and Quah (1989), Bayoumi and Echengreen (1994), and Omotor and Niringiye (2011). The classical economic theory is of the view that in the long-run nominal variables affect only nominal factors and not real factors. Real factors like output and employment are determined by real factors like growth in the labour force, capital accumulation, and technological progress while nominal factors like prices do not have any long-run impact on real output and unemployment, hence the neutrality of money (money is a veil). To the classical, prices are completely flexible while the output is constant in the long-run; implying that the long-run AS curve is vertical at full employment of

capital, labour, and technology. Prices are completely flexible in the long run but not in the short run due to sticky prices. A positive supply shock (shock to technology, capital accumulation, labour supply) shifts the AS curve to the right leading to a permanent increase in output and a fall in prices. But AD shocks like an increase in domestic prices due to expansionary monetary policy increases output in the short run due to sticky prices but in the long run, wages and prices adjust to ensure that the effect of the monetary policy only changes prices and wages but not output (Omotor & Niringiye, 2011; Mankiw, 2009). It is, therefore, assumed that in the long run price shocks do not affect output growth.

The model for this research also incorporates the open-economy analysis. Due to globalization and the increase in international trade, foreign economies can influence economic happenings in other countries. This research integrates foreign prices to the usual bivariate AD/AS VAR setup to determine how the various WAMZ countries respond to foreign price shocks. The decision of whether to adopt a common currency or not is determined by the symmetry or asymmetry of the countries' response to foreign shocks. Idiosyncratic response to shocks is a sign that countries should not adopt a common currency (Chuku, 2012).

In a monetary union, since various countries cannot use exchange rate depreciation to restore the fall in output and employment to the external price shock, it is expected that a common monetary policy will be used to bring about stability; to improve output production and employment. However, if the countries in the monetary union are facing different responses from the foreign price shock; some affected negatively while others are affected positively or not affected at all, a common monetary policy will not be ideal for the whole monetary area. For example, if the WAMZ adopts the ECO, and they are faced with a price fall in China which affects Ghana and Gambia the same way by reducing exports and increasing imports, while Nigeria and Sierra Leone

are not affected by this change in prices in China, an expansionary monetary policy that will be used by the WACB to bring about stability for Ghana and Gambia will at the same time lead to unintended inflation in Nigeria and Sierra Leone.

Including the external price shock to the model is appropriate since the WAMZ countries are predominantly primary export-oriented. Countries in a monetary union need to have symmetric responses to foreign shocks. Therefore, rather than the conventional bivariate VAR models which have been used largely in several studies to determine the appropriateness of OCAs, this model is a three-variable VAR with k lags as follows in a structural form.

$$\pi Y_t = \alpha + \sum_{i=1}^{k} \beta_i\, Y_{t-i} + \varepsilon_t \qquad (1)$$

$$Y_t = \pi^{-1}\alpha + \sum_{i=1}^{k} \pi^{-1}\beta_i\, Y_{t-i} + \pi^{-1}\varepsilon_t \qquad (2)$$

Where π is a 3×3 matrix of contemporaneous coefficients among the endogenous variables, α is 3×1 a vector of constants, β_i is a 3×3 matrix of structural coefficients, ε_t is a vector of orthogonal structural shocks which are white noise terms and are uncorrelated. Y_t is a 3×1 vector of the variables $Y_t = [P^*, Y, P]$, representing logs of foreign price, domestic GDP, and domestic price respectively. The shocks are represented by $\epsilon_{1t}\epsilon_{2t,}\epsilon_{3t}$ as foreign price shock, domestic supply shock, and domestic price shock respectively.

The reduced form of the VAR is presented in (3) below

$$Y_t = \delta + \sum_{i=1}^{k} \theta_i Y_{t-i} + \mu_t \qquad (3)$$

Where $\pi^{-1}\alpha = \delta,\ \pi^{-1}\beta_i = \theta_i$ and $\pi^{-1}\varepsilon_t = \mu_t$

It can also be transformed into a lag operator form as

$$Y_t = \delta + \theta(L)Y_t + \mu_t \qquad (4)$$

Where L is the lag operator. We can also transform the stable system in (4) into a moving average representation using the Wold's decomposition.

$$(I - \theta(L))Y_t = \delta + \mu_t \qquad (5)$$

$$Y_t = \delta(I - \theta(L))^{-1} + (I - \theta(L))^{-1}\mu_t \qquad (6)$$

$$Y_t = \varphi + \sum_{i=0}^{\infty} \emptyset_i \mu_{t-i} \qquad (7)$$

Where $\emptyset_i$ is the impulse response at horizon i. A plot of $\emptyset_i$ gives the impulse response functions.

In a Moving Average representation, (4) can be transformed as follows as supposed by Harvey and Cushing, 2015.

$$Y_t = \mu_t + A_1\mu_{t-1} + A_2\mu_{t-2} + \cdots \qquad (8)$$

However, the actual data generating processing for the structural form (1) is

$$Y_t = C_0\varepsilon_t + C_1\varepsilon_{t-1} + C_2\varepsilon_{t-2} + \cdots \qquad (9)$$

From (2), (3), (8), and (9) the following can be deduced

$$\pi^{-1}\varepsilon_t = \mu_t, \; C_0 = \pi^{-1}, \; C_i = (\pi - \beta_i)^{-1}$$

The relationship between the structural VAR and the reduced form VAR shows that, the structural shocks $\varepsilon_t = C_0\mu_t$ can be estimated when the matrix $C_0 = \pi^{-1}$ is identified. We, therefore,

require three long-run restrictions or identification to enable us to estimate the parameters since the structural shocks are unobservable. Therefore, since there are K^2 parameters in C, we require K^2-K(K+1)/2 restrictions to be placed on the parameters. We restrict that in the long run since the WAMZ countries are small countries, happenings there do not affect foreign prices and domestic price changes do not impact real GDP growth in the long run similar to a recursive ordering identification.

$$C_0 = \begin{bmatrix} C_{11} & C_{12} & C_{13} \\ C_{21} & C_{22} & C_{23} \\ C_{31} & C_{32} & C_{33} \end{bmatrix}$$

With the restrictions $C_{12} = C_{13} = C_{23} = 0$, C_0, is, therefore, a lower triangular matrix.

We, therefore, estimate the reduced form VAR in (3) to obtain the reduced form residuals (μ_t) and rearranging and decomposing them to recover the structural shocks (ε_t). The aim of this research is not to recover the structural shocks but rather to determine the similarity of response to shocks. The premise of the methodology is that the WAMZ countries should have a similar response to foreign price shocks.

4.6 Diagnostic test

Time series data need to be examined to ensure that the series meet the criteria to ensure the data produces efficient and consistent parameters for the estimates. In time series, a unit root test is required to ensure that the regression does not produce spurious results. The unit root test for stationarity is done using the Augmented Dickey-Fuller test, the Phillips-Peron test, and KPSS.

However, in an argument put forward by Verbeek (2004) all variables need to be stationary in a VAR if it is to be used for hypothesis testing to examine the statistical significance of parameters otherwise if the VAR is for establishing relationships, differencing will throw information on any long-run relationships between the series away. Therefore, VAR for establishing relationships can be estimated at levels Brooks (2014). Since the aim of this study is to establish the similarity of response to shocks, the VAR system will be estimated at levels.

4.7 Lag length selection criteria

One of the critical issues to consider when using VAR is the optimal lag length selection. In VAR, when too many lags are used, there will be a decrease in the degrees of freedom, and including too few lags will lead to specification errors. One way of deciding this question is by using the information criterion like the Akaike Information Criterion (AIC) or Schwarz Bayesian Information Criterion (SBIC).

Akaike Information Criterion (AIC) by Akaike (1973) and Schwarz Bayesian Information Criterion (SBIC) by Schwarz (1978) are some of the criteria used to determine the optimal lag length. The lag order chosen by the AIC will be used in this research unless it is unstable or serially correlated that we will use the SBIC.

4.8 Estimation technique

Having found that the residual terms are not correlated, each equation of the reduced form VAR is estimated separately using OLS, which yields efficient results since the lags of all the endogenous variables appear in all the equations. However, due to the many parameters usually estimated in VAR, it is usually cumbersome to interpret the parameters. The Impulse Response

Functions and the Variance decomposition are used to interpret the VAR results. The IRF traces out the effect of a shock in the error term on the dependent variable in the VAR system. The Variance decomposition permits us to determine the percentage of the variations in the variables that are determined by shocks to the various variables in the system. The impulse response functions and the variance decomposition are used to reinforce the long-run relationship between the variable. The VAR system needs to be stable before the IRF and VD are estimated. Stability requires that the eigenvalues of the dynamic matrix lie within the unit circle. Breusch-Godfrey-LM tests will be also be used for checking residual autocorrelation in the VAR models. Breusch-Godfrey- LM has a null hypothesis of no serial correlation against the alternate of autocorrelation. We accept the null hypothesis of no serial correlation when the p-values are more than 5 percent.

CHAPTER FIVE

Estimations and empirical results

5.1 Introduction

The empirical results from the estimations are discussed in this particular chapter. Results from the data manipulation are categorized according to the foreign countries. Impulse response functions and Variance decompositions are used to juxtapose the response of the WAMZ countries to external price shocks to achieve the research objective.

5.2 Descriptive data analysis

Table 9 gives the descriptive statistics of the variables used for the estimation to achieve the research objective. The results displayed by the table show that from 1980 to 2018, inflation measured by CPI was generally moderate among the WAMZ countries. The highest mean inflation was recorded by the Gambia while Sierra Leone recorded the lowest average inflation. The WAMZ countries had minimal variability in GDP growth, however, there was much uncertainty in inflation considering the differences in the standard deviations. This can be accounted for by the weak economic structures and the high fiscal indiscipline in the WAMZ countries, which makes the fluctuations in inflation very high among the WAMZ countries (Africa, 2019). High fluctuations in inflation tend to slow down GDP growth due to the difficulty for economic agents to plan, which probably accounted for the moderate growth in GDP by the WAMZ countries (Omotor & Niringiye, 2011). Ghana and Nigeria recorded the lowers average inflation and also accounted for the highest mean growth which emphasizes the effect of high and uncertain inflation on GDP growth. Sierra Leone recorded a lower average growth of 7% which could be attributed to the negative 20% growth in 2015 due to the outbreak of the Ebola virus. The higher mean GDP growth

recorded by Ghana could also be as a result of the huge leap of growth of 14% recorded in 2011 due to the discovery and production of crude oil in large quantities. Table 9 also displays that even though average inflation is higher in China and the US than in the EU, there is much certainty in inflation in China and the US than in that of the EU. The unpredictability in inflation is higher than the fluctuation in the GDP growth among the WAMZ countries. The table also shows that the WAMZ countries are similar in their inflation and GDP growth rates since the mean and standard deviations in the inflation and GDP growth are not very widespread across countries. This preliminary result suggests that the level of similarity displayed by the table shows the WAMZ countries are converging in terms of their inflation and GDP growth which makes them suitable for a single currency. The adoption of the ECO will reduce the uncertainties surrounding inflation and will improve GDP growth.

Table 9: Summary of descriptive statistics

	Inflation		GDP growth	
Country	**Mean**	**Std. deviation**	**Mean**	**Std. deviation**
Gambia	3.846572	0.8879997	6.988229	.2344374
Ghana	2.383965	2.369218	9.834875	.7229755
Guinea	3.091873	1.613241	8.467193	.4393164
Nigeria	2.720303	2.073082	11.87305	.8324164
Sierra Leone	2.338148	2.919194	7.410253	.5420011
US	4.304219	0.3185066		
EU	3.964395	2.990818		
China	4.11825	0.600904		

Source: Author's computation from Stata 15

One of the ways of assessing the level of convergence among countries is the business cycle synchronization approach, which measures the co-movement of economic activities among

countries (Amoah, 2013). The higher the co-movement of economic activities among countries, the better they are to adopt a common currency. The cross-country correlation coefficients are estimated to further establish how the business cycle and economic activities are co-moving among the WAMZ which will be used to judge if a monetary union in the WAMZ will be suitable.

Correlation of Economic activities

Table 10: Correlation of inflation among the WAMZ countries

	GAMBIA	GHANA	GUINEA	NIGERIA	SIERRA LEONE
GAMBIA	1.000				
GHANA	0.9784	1.0000			
GUINEA	0.9898	0.9777	1.0000		
NIGERIA	0.9610	0.9897	0.9610	1.0000	
SIERRA LEONE	0.9745	0.9621	0.9495	0.9584	1.0000

Source: Author's computation from Stata 15.

The cross-country correlation coefficients of inflation displayed by table 10 indicate that there is a high co-movement of prices among the WAMZ countries. The results show that the correlation of inflation among the WAMZ countries is above 90 percent for all country pairs, which contradicts the results obtained by Omotor and Niringiye (2011). The correlation of inflation between Guinea and Gambia, and between Ghana and Nigeria are the highest which are about 99 percent. The lowers correlation coefficient is the correlation between Guinea and Sierra Leone which is about 95 percent. Even though inflation among the WAMZ countries is generally high (double-digit), the positive and high correlation coefficients emphasize the efforts of these

countries to converge to adopt the ECO. The level of correlation also discloses the fact that these countries are predominantly exporters of primary oriented product and importers of industrial products, these make them prone to high price volatilities.

Table 11: Correlation of GDP growth among the WAMZ countries

	GAMBIA	*GHANA*	*GUINEA*	*NIGERIA*	*SIERRA LEONE*
GAMBIA	1.0000				
GHANA	0.7896	1.0000			
GUINEA	0.8669	0.9319	1.0000		
NIGERIA	0.3830	0.7193	0.4960	1.0000	
SIERRA LEONE	0.5743	0.8481	0.7114	0.9215	1.0000

Source: Author's computation from Stata 15.

Table 11 also displays the level of correlation of GDP growth among the WAMZ countries. There is low co-movement in the GDP growth among the WAMZ countries compared to the co-movement in their inflation rates, however, like the correlation in inflation, the correlation coefficient of GDP growth is positive for all cross-country pairs. The Gambia and Nigeria recorded the lowest correlation coefficient while Guinea and Ghana's GDP growths recorded the highest correlation coefficient. Gambia's economy depends predominantly on the exports of agricultural products whiles the others like Ghana and Nigeria depend on crude oil, Sierra Leone and Guinea also depend on mining. GDP growth in Sierra Leone is more correlated with that of Ghana and Nigeria.

The results displayed by tables 10 and 11 show that the various WAMZ economies are converging and therefore suitable for a monetary union confirming the findings of Amoah, 2013. This can be as a result of the reliance on a narrow range of export goods which are predominantly similar primary goods and the heavy reliance on the agricultural sector by all countries (Buigut and Valev, 2005). This suggests that the WAMZ countries might be prone to symmetric shocks. As the literature has explained, correlation in inflation is a very crucial criterion to be met by countries before ascending into a monetary union since it will ensure the stability in the terms of trade for each country and will not require any exchange rates adjustments among countries, even though, Frankel and Rose (1998) suggest that similarities in inflation can be achieved ex-post. Therefore, this result also indicates that when the WAMZ countries adopt the ECO there will not be any external imbalances originating from member countries which will require their bilateral exchange rate adjustments.

Notwithstanding, we must proceed to examine whether or not these countries have symmetric responses to foreign price shocks using the VAR technique imploring the impulse response functions (IRF) and the variance decomposition (VD) since having a similar response to shocks will make them better candidates for a monetary union than just the correlation of inflation and output growth (Mongelli, 2002).

5.3 VAR Estimation

The VAR model is used to estimate for each WAMZ country, to determine how foreign price shocks affect each WAMZ countries' output growth and prices using Stata 15. The objective is to determine whether or not prices and output growth among the WAMZ countries respond similarly

to foreign price shocks. There are three VAR systems for each WAMZ country, making a total of fifteen VAR systems.

Checking to ensure that variables are stationary is necessary to overcome the problem of spurious regressions and also to produce efficient parameter estimates. However, we estimate our model in levels using natural logs of CPI and GDP instead of testing for stationarity, since our objective is not for obtaining parameter estimates for hypothesis testing but rather to establish the long-run relationships among variables which according to Gospodinov et al (2013) produces robust impulse response estimates than the VARs estimated using the first difference of variables.

5.3.1 Lag length selection

The appropriate lag length for each VAR system is chosen using the information criteria specifically the Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (BIC). Choosing too few lags will result in the misspecification of the model while choosing too many lags will lead to the loss of degrees of freedom. Even though the various information criteria might suggest different lag orders, we use the number of lags suggested by the AIC.

Table 12 displays lag lengths chosen by the various information criteria. The lower lag lengths chosen by the various information criteria are justified by the short time period (1980-2018) of the data used for the analysis and the fact that we are using annual data rather than monthly or quarterly data. A VAR system is estimated for each WAMZ country in relation to each foreign country.

Table 12: The number of lags chosen for each VAR system by the information criteria

Country	VAR	AIC	SBIC	HQIC	FPE
The Gambia	US	2	1	1	2
	EU	1	1	1	1
	China	3	1	3	3
Ghana	US	1	1	1	1
	EU	1	1	1	1
	China	4	1	4	4
Guinea	US	3	1	3	2
	EU	3	1	2	3
	China	4	2	2	4
Nigeria	US	2	1	2	2
	EU	2	1	1	2
	China	4	1	4	4
Sierra Leone	US	2	1	2	2
	EU	1	1	1	1
	China	3	3	3	3

Source: authors computation from Stata 15.

5.3.2 Model diagnosis

We then proceed to do other diagnostic tests on the VAR system to test for autocorrelation and stability of the models to prove the appropriateness of the models. Breusch-Godfrey- LM test is used to check for autocorrelation in the various VAR models. The LM test has a null hypothesis of no autocorrelation against the alternate of autocorrelation. We fail to reject the null hypothesis of no autocorrelation when the p-values are more than 5 percent.

Stability for a VAR system requires that all the Eigenvalues lie inside the unit circle. The diagnostic checks reveal that there are no autocorrelations in the residuals and that the systems are stable at the chosen lag orders. Results for the autocorrelation and the stability test are displayed in the appendix table 5 and figure 1 respectively.

5.4 VAR estimation results

After the various diagnostic tests, the VAR system is estimated for each WAMZ country with the various foreign countries applying the restrictions identified in chapter 4. The main purpose of this estimation is to determine how output growth and price in each WAMZ country respond to price shocks from the US, EU, and China, whether the responses are symmetric or not. In chapter 4 we noted three shocks; foreign price shock, domestic price, and supply shock. Since the WAMZ countries are highly integrated with these world economic giants, a shock to prices in these countries will have repercussions on the economic fortunes of the WAMZ countries. It is expected that when the price and output growth among the WAMZ countries respond symmetrically to price shocks, then the proposed monetary union will be feasible. Previous empirical studies either identified the shocks and tested for their correlation or estimated the log run parameters and test them for significance. However, this research is to test the similarities in response to foreign shocks among the WAMZ countries using IRFs and VDs.

5.4.1 Impulse Response Functions

The Impulse Response Functions are used here to determine the response of domestic prices and output growth to foreign price shocks across the WAMZ countries. A shock is symmetric if the sign, magnitude, and persistence of the responses do not vary significantly across countries, otherwise, it is considered as asymmetric, thus, it helps us do a better analysis of the response to foreign price shocks (Adu et al., 2018). Using the Cholesky type restriction on the contemporaneous shocks helps us to draw a better interpretation, therefore with this restriction, the WAMZ countries' price and output shocks do not affect foreign prices and domestic price shocks do not also affect domestic output in the long run. The response to a one standard deviation shock to a foreign price which spans for 7 periods is shown with the blue thick line whiles the corresponding upper and lower bands representing 95 percent confidence intervals are displayed in the red dashed lines, the black dashed horizontal line through the zero represent a state of equilibrium (when the effect of shock disappears). The IRF tables are shown in the appendix for clearer analysis. A smaller magnitude and a higher speed of adjustment will make the proposed ECOWAS monetary union feasible.

Below is the discussion of how the WAMZ economics respond to foreign price shocks.

5.4.1.1 US Price shocks

The United States is the world's largest economy in terms of GDP and has been a major trade partner of the sub-region for several decades, therefore, any economic shock in the US is expected to have a global impact especially on developing countries who largely depend on them for industrial goods. Therefore, it is expected that price changes in the US will have a ripple effect on

ECOWAS which will require an appropriate economic adjustment mechanism to combat the repercussions.

Figure 2: Response of WAMZ countries' prices to US price shocks
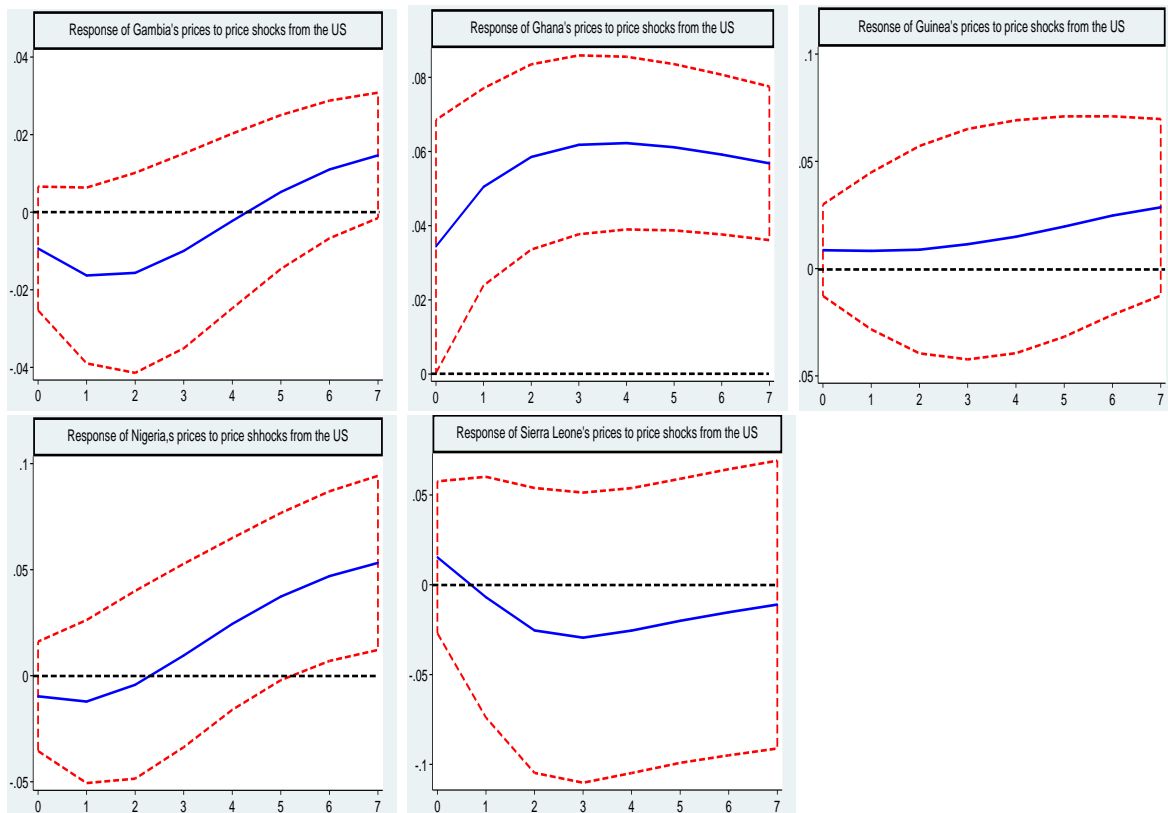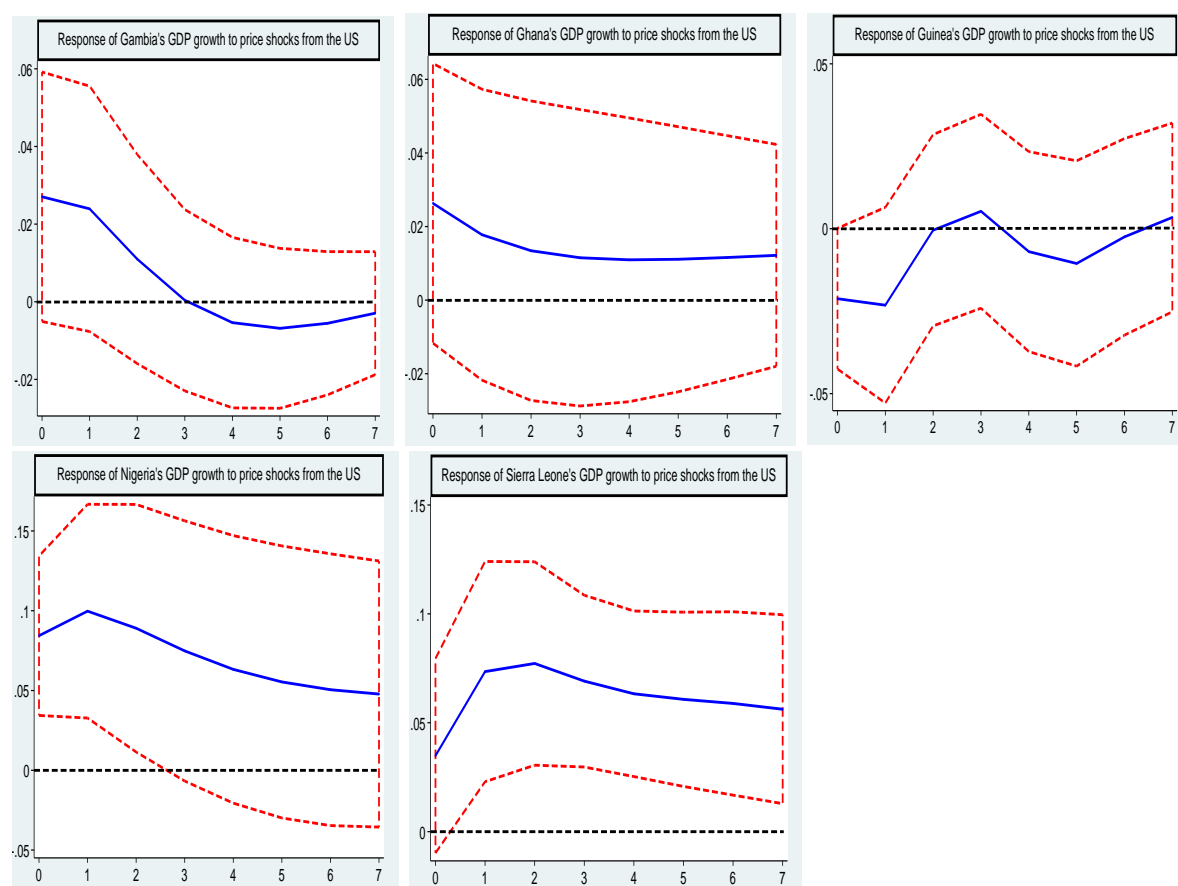

Source: Authors computation from Stata 15

Figure 2 displays the dynamics of how prices in the various WAMZ economies respond to price shocks from the US. It is seen that a one standard deviation shock to US prices will have different responses from the various WAMZ countries from period 1 until period 7. The magnitude of the response to the shocks and the speed of adjustment to the shocks vary significantly across the WAMZ countries. US price shocks as shown in the graphs have a persistent long-run positive price response in the Gambia, Ghana, Guinea, and Nigeria. This confirms the finding of Abdoulie (2013) that foreign price shocks have a positive price response among the WAMZ. Prices in Gambia and

Nigeria have fairly a symmetric response to US prices both in the short and long runs. Even though these countries experience positive price response to a US price shock, the magnitude and the speed of adjustment among the countries are largely asymmetric, making them unfit for a monetary union. The magnitude of a US price shock is large in Ghana and Nigeria than on Sierra Leone, the Gambia, and Guinea confirming Abdoulie (2013) who found that US price shocks have a significantly positive impact on prices in Nigeria and the Gambia which confirms our results.

Figure 3: Response of WAMZ countries' GDP growth to US price shocks

Source: Authors compilation from Stata 15

Figure 3 shows that GDP growths in Ghana, Guinea, and Nigeria respond positively to US price shocks from the first period which persists even after the 7th period, contrary to Abdoulie (2013).

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However, the magnitude of the impact of price shocks from the US is high on the GDP growths in Nigeria and Sierra Leone than on prices in Ghana. The graphs also display that US price shocks do not have any significant response from GDP growths in the Gambia and Guinea in the 7th period even though both countries have asymmetric responses to the shock from the 1st to the 3rd period. The response of both prices and output in Ghana and Nigeria to US price shocks are symmetric in the long run even though at different magnitudes. The magnitude of the shocks on the various WAMZ countries varies across the countries with divergent speeds of adjustments.

Foreign price shocks from the US have idiosyncratic responses from the WAMZ countries' prices and GDP growths. Even though GDP growths among the WAMZ countries respond symmetrically to US price shocks than that of the responses by their prices, the level of dissimilarities in the responses reveals that the WAMZ countries cannot use a single monetary policy to restore equilibrium for all member countries in the wake of shocks from the US, which implies each country should maintain independent national currencies.

5.4.1.2 EU Price shocks

The responses of the WAMZ countries' prices to price shocks from the European Union as displayed in figure 4 have been symmetric across countries except for Ghana's. The Gambia, Guinea, and Nigeria have their prices responding negatively to price shocks in the EU contrary to their responses to US price shocks. However, the size of the impact of the shock is higher in the Gambia than the other countries. The similar response of Guinea and Nigeria to EU price shocks confirms Adu et al (2018) that Guinea, Ghana, and Nigeria respond similarly to oil price shocks. The response of prices in Ghana is asymmetric to the rest of the other countries, thus prices in Ghana respond rather positively to EU price shocks. Even though prices among the WAMZ

exhibits symmetric response to EU price shocks, the persistence of the shock even after the 7th period shows that the speed of adjustment is low which will pose a challenge to a monetary union. In contrast, Abdoulie (2013) results indicate that domestic prices respond positively to foreign price shocks. The WAMZ countries respond more symmetrically to price shocks from the EU than price shocks from the US.

**Figure 4: Response of WAMZ countries' prices to EU price shocks**
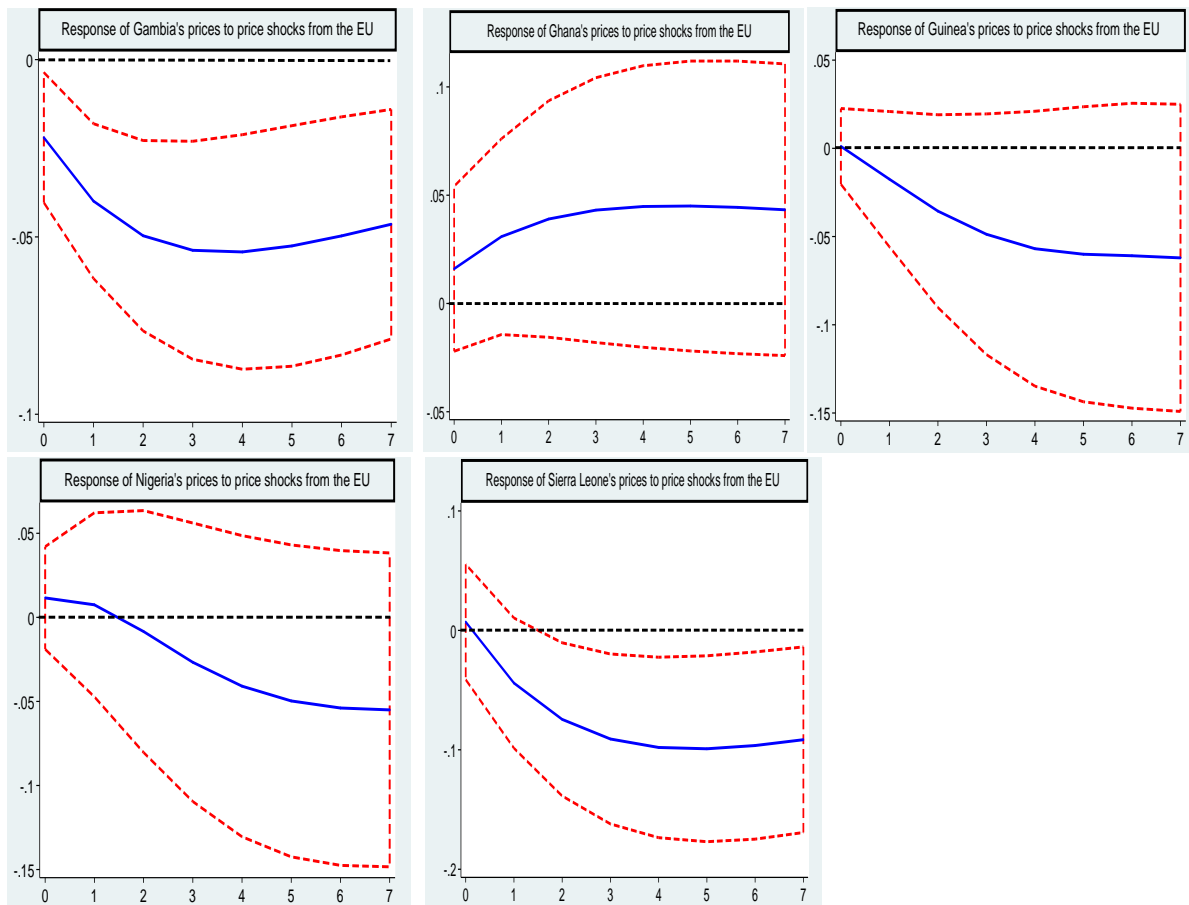
Source: Authors compilation from Stata 15

From figure 5, output growth in the Gambia and Guinea respond negatively to price shocks from the EU unlike Ghana, Nigeria, and Sierra Leone's which respond positively to EU price shocks. Even though Ghana, Nigeria, and Sierra Leone's GDP growths seem to have symmetric response

to EU price shocks, the magnitude of the shock on Nigeria is more than that on Ghana and Sierra Leone. The response of prices in the Gambia to EU price shocks even though positive in the first period, the high speed of adjustment causes the impact of the shock to dissipate in the 5th period.

Figure 5: Response of WAMZ countries' GDP growth to EU price shocks
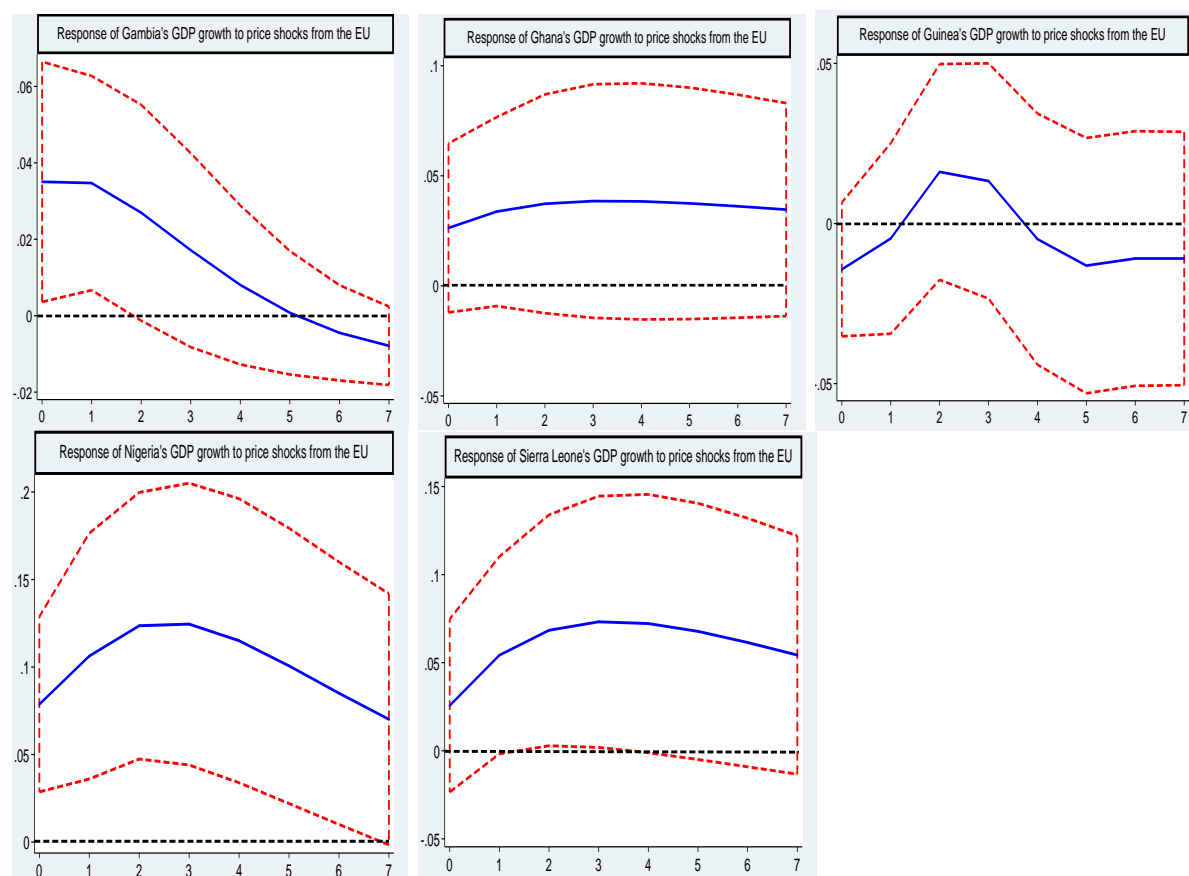
Source: Authors computation from Stata 15

The figure also shows that Sierra Leone, Nigeria, and Ghana have their prices and GDP affected more by EU price shocks, this might suggest that these countries trade more with EU countries. The WAMZ countries, having different countries as their major trade partners make them face the divergent responses to shocks from these countries. This asymmetric response will make a common central bank unable to use a common monetary policy to restore equilibrium for all countries simultaneously. These results confirm the results obtained by Harvey and Cushing

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(2015) where they found that the WAMZ countries experience asymmetric responses to exchange rate shocks. This research found that GDP growths in Ghana, Nigeria, and Sierra Leone respond fairly symmetrically to price shocks from the US and the EU. While that of the Gambia and Guinea's follow.

5.4.1.3 China's Price shocks

China has become one of the major economic influencers globally and specifically in Africa. Africa's imports from China have increased significantly over the years and major exports of the African continent now go to China as well. Economic disturbances in China will doubtless have repercussions on the proposed ECOWAS common currency which will require a common policy approach to stabilize the various economies. The WAMZ countries export majorly primary products to China and import industrially manufactured products from China, making the WAMZ countries likely to face similar shocks and also to respond symmetrically to China's price shocks.

From the impulse response graphs displayed in figure 6, the WAMZ countries exhibit divergent responses to price shocks from China. Even though all these countries import similar industrial products from China, the figure shows that Ghana and Nigeria have symmetric long-run responses to price shocks from China while the Gambia, Guinea, and Sierra Leone have their prices responding negatively to price shocks from China. The price shocks from China have a greater impact on the prices in Nigeria and Sierra Leone than on the others even though the impacts are divergent. This result shows that if the WAMZ should at this time proceed to adopt the ECO, the West African Central Bank (WACB) will not be able to use a common monetary policy to restore equilibrium for all countries in the case of a price shock from China. Similar to the response to

price shocks from the US and contrary to that from the EU, prices in the WAMZ respond positively
to price shocks from China.

Figure 6: Response of WAMZ countries' prices to price shocks from China
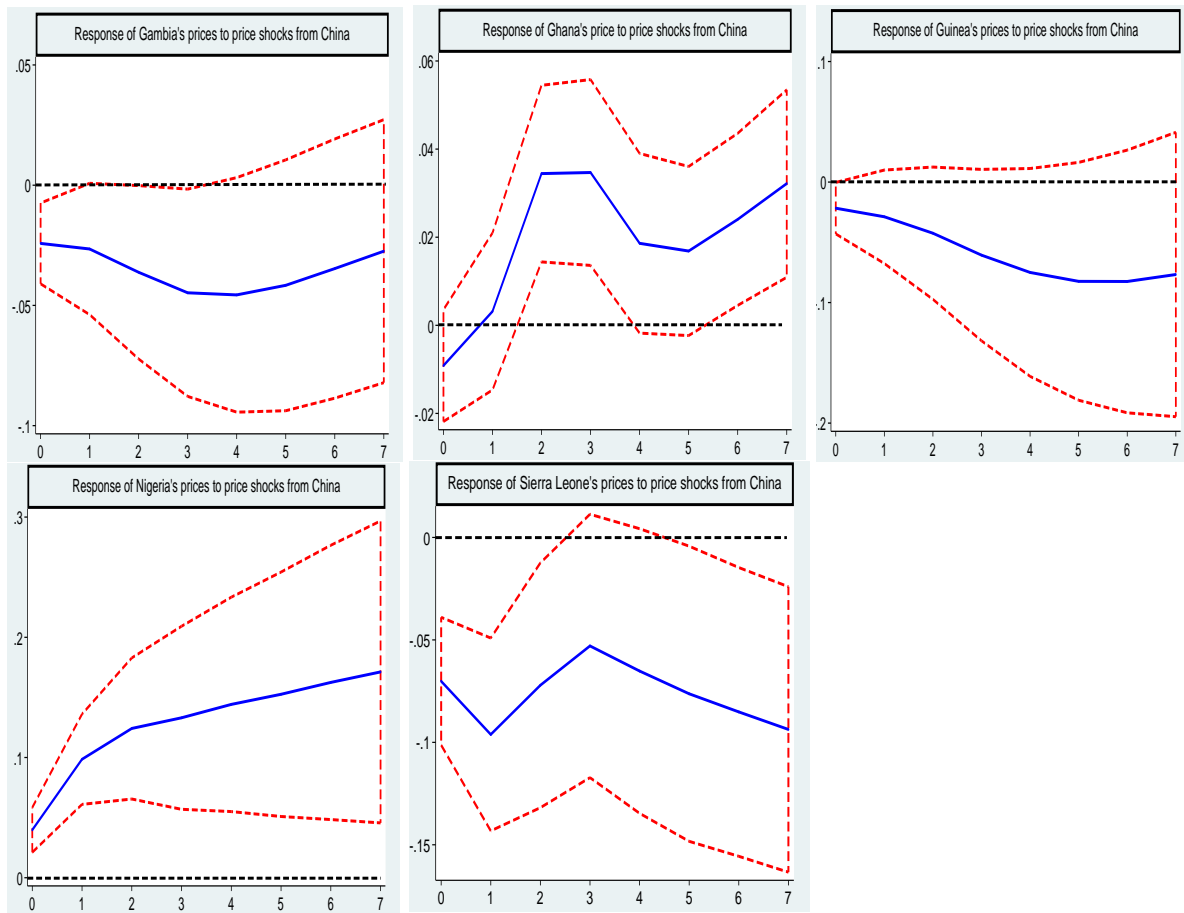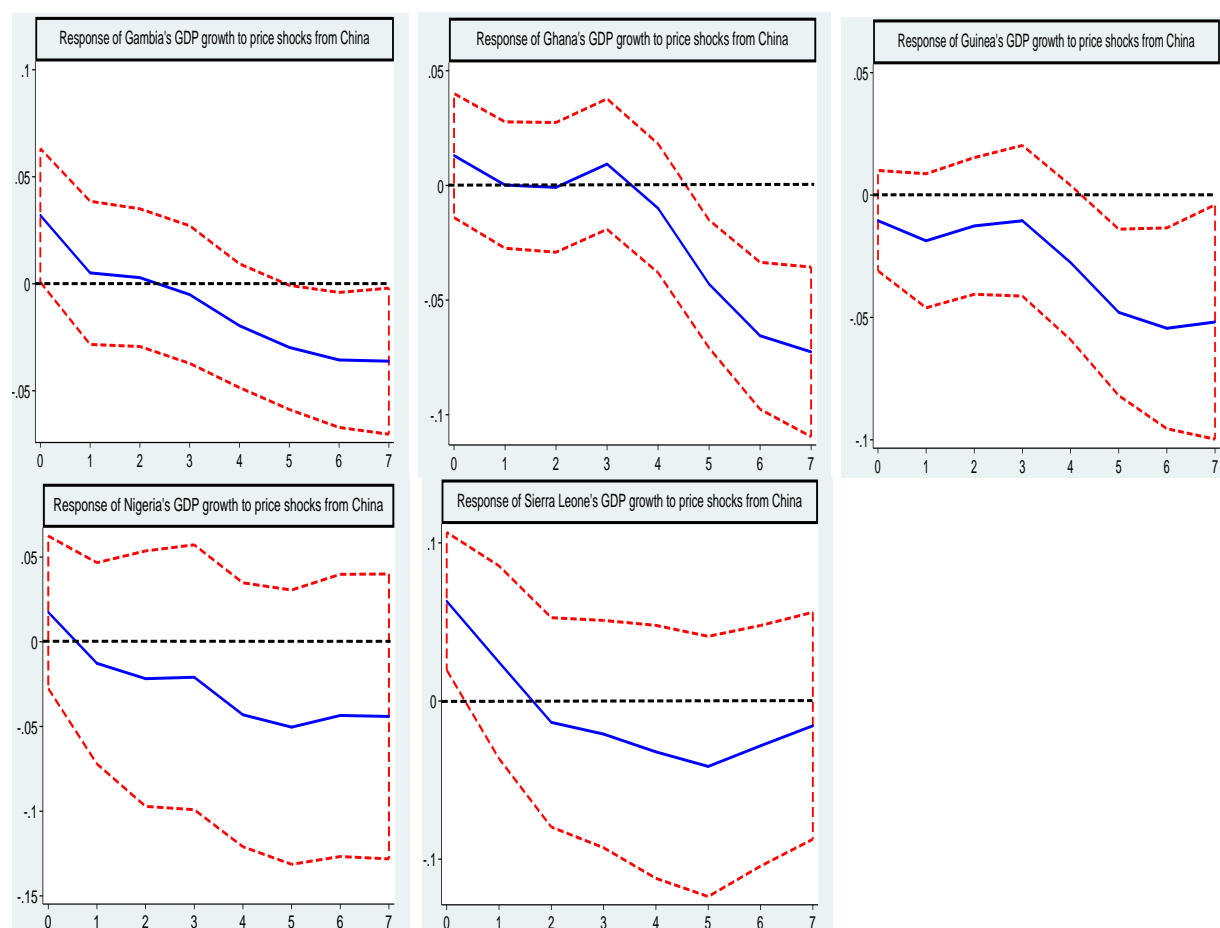

Source; Authors computation from Stata 15

WAMZ's output growth is negatively affected by price shocks from China from the 2nd period
until the 7th period. The Gambia, Nigeria, and Sierra Leone's GDP respond similarly to price
shocks while Ghana and Guinea also have their GDP responding similarly. The findings of Omotor
and Niringiye (2011) was that the volatility of output and prices follow a similar pattern among
the WAMZ countries confirming the responses of output growth to price shocks from China. The
magnitudes of the shock on Ghana and Guinea are higher than on the others. All the countries
respond positively in the first period before responding negatively after some period except for

Guinea which response negatively till the 7th period. For all countries, the shock dissipates for only Sierra Leone during the seventh period.

Figure 7: Response of WAMZ countries' GDP growth to price shocks from China

Source: Authors computation from Stata 15.

The impulse response graphs show that the WAMZ countries have asymmetric response (divergent magnitude and speed of adjustments) to price shocks from their major trade partners which is an indication that there is no real convergence among the WAMZ countries and that a common monetary policy will not be able to bring stability to all countries in the wake of foreign price shocks.

5.4.2 Variance Decomposition

Variance decomposition is used to evaluate the dynamic interactions and causal relationships among the variables in the VAR system. It is used to show the percentage of the changes in the domestic output and prices that are induced by foreign price shocks. We, therefore, use it to further establish the findings from the impulse response functions. Since the different causes in variabilities among the countries could be as a result of underlying differences in the transmission process of policy responses among the WAMZ countries, differences in the cause of variabilities could be an obstacle to the proposed monetary union. The variance decomposition is calculated for 7 years forecast horizons. Overall, price changes from these foreign countries cause idiosyncratic variations to output growth and price changes among the WAMZ countries.

5.4.2.1 Variance decomposition by US price shocks

Table 13 shows that the proportion of variation to output growth and prices attributed to US price shocks varies across the WAMZ countries. It can be observed that US price shocks explain a greater proportion of the variation in output growth in Nigeria and Sierra Leone. However, price shocks from the US do not have similar effects on the prices and output growth of the various WAMZ countries which will require countries to adopt a country-specific approach to respond to shocks from the US. About 23 percent of the variation in GDP growth in the seventh period for Nigeria can be accounted for by US price shocks while the same shocks account for only 7 percent for the Gambia and 2 percent for Ghana in the same period. However, a greater proportion of the price fluctuations in Ghana is accounted for by US price changes than the others. An average of 30 percent of the variation of price in Ghana is accounted for by US price changes but it only accounts for about 2 percent of the price changes in Guinea.

This, therefore, suggests that the WAMZ economies are fundamentally different and not suitable for the use of a common currency.

Table 13: Variance decomposition due to price shocks from the US

Step	Variation in GDP growth due to price shocks from the US							Variation in prices due to price shocks from the US						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Gambia	7.1	8.6	8.3	7.7	7.4	7.3	7.3	3.5	5.6	6	5.6	5.1	5.1	5.8
Ghana	4.7	3.5	2.8	2.5	2.3	2.3	2.3	9.8	19.6	28.9	36.8	43	48	52
Guinea	10	10.4	8.4	6.6	5.5	5	4	1.7	1.1	.8	.9	1.1	1.4	2.2
Nigeria	25.7	30	30.2	29.2	28.1	27.3	23	1.5	1.5	1.1	1.2	3	6.6	11.4
Sierra Leone	6.1	18.9	29.1	34.9	37.8	39.4	40.3	1.4	.6	1.1	1.6	1.8	1.7	1.6

Source: authors computation from Stata 15

5.4.2.2 Variance decomposition by EU price shocks

Prices changes in the EU accounts for price changes and output growth among the WAMZ countries at different proportions. Table 14 shows that about 30 percent of the GDP variations in Gambia and Nigeria can be attributed to EU price shocks while it accounts for 10 percent for Ghana and Guinea's. EU price shocks also account for greater price fluctuations in the Gambia and Sierra Leone than in Ghana and Nigeria. The WAMZ countries again are responding differently to price shocks from the EU, explaining a greater price and output variations in the Gambia and only a small proportion in Ghana. Similarly, Adu et al (2018) using global oil prices

as foreign shocks concluded that external sector shocks have idiosyncratic effects on Real Effective Exchange Rates (REER) among the WAMZ countries.

Table 14: Variance decomposition due to price shocks from the EU

Step	Variance in GDP due to price shocks from the EU							Variance in prices due to price shocks from the EU						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Gambia	12	16	19	20	20	20	20	14	27	37	44	50	53	56
Ghana	4.6	6.7	8.5	10	11	12	13	1.8	4.2	6.2	8	9.3	10	11
Guinea	4.9	2.6	4.2	4.2	3.5	3.7	3.6	0	2.1	5.3	8.1	10.5	12.3	13.6
Nigeria	22.8	31.6	38.8	43.6	46.3	47.5	47.8	1.5	.6	.5	1.1	2.2	3.4	4.5
Sierra Leone	2.7	7.5	11.9	15.3	17.8	19.6	20.8	0.21	4.4	11.2	17.6	22.8	26.9	30.3

Source: Author's computation from Stata 15

5.4.2.3 Variance decomposition by China price shocks

Table 15 indicates that price shocks in China account for the output fluctuations in Gambia, Ghana, and Guinea than in Nigeria and Sierra Leone. Generally, price shocks from China cause a greater proportion of the fluctuation in prices across the WAMZ economies, counting for about 30 percent on average. Price shocks in China account for greater fluctuation in prices in the WAMZ than price shocks from the US and EU.

Investments in Africa by China have grown steadily over the years, which requires further analysis to be done with regards to Africa's trade relations with China to establish how a single currency in ECOWAS would be affected by China's price shocks. This has revealed that price changes in China effectively affect prices and outputs in ECOWAS. Price shocks in China can explain a

greater proportion of the output and price variations in Gambia, Guinea, and Nigeria than the US price shocks can explain. Price shocks from China explain about 24, 43,21,80, and 45 percent of the price variations in Gambia, Ghana, Guinea, Nigeria, and Sierra Leone in the 7th period respectively compared to the US price which could only account for only about 6, 52, 2, 11, and 1 percent for Gambia, Ghana, Guinea, Nigeria, and Sierra Leone in the 7th period respectively. This result highlights the realignment of ECOWAS trade intensity with its new trade partner (China).

Table 15: Variance decomposition due to price shocks from China

	Variance in GDP due to price shocks from China							Variance in prices due to price shocks from China						
Step	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Gambia	11	8	7.4	7.3	9.3	13	18	20	16	17	21	23	24	24
Ghana	2.5	1.8	1.6	2	2.5	13.1	30.3	5.5	2.7	23.3	34.7	37.3	39.5	43.2
Guinea	2.7	6	7.3	7.2	11.7	22.3	29.5	10.4	8.7	10.3	13.5	16.7	19.3	21
Nigeria	1.6	1.2	1.6	2.2	4.7	7.5	9.1	39.9	60	64.1	68.2	74.1	78	80.5
Sierra Leone	20.2	11.5	9.3	8.2	7.7	8.4	8.4	42.5	50.1	45.6	42.9	42.2	43.6	45

Source: Authors computation from Stata 15

5.5 Summary of analysis

The aim of this chapter has been to juxtapose the responses of the WAMZ countries' prices and GDP growths to price shocks from the US, EU, and China.

The preliminary results from the correlation of inflation and GDP growth rates among the WAMZ countries show strong support for a monetary union among the WAMZ countries. The correlation

coefficients for both inflation and GDP are above 90 and 70 percent respectively, which implies the WAMZ countries are converging, thus, supporting the use of a common currency. Similarities in inflation and growth structures imply there would not be any external imbalances from member countries that would require the use of bilateral exchange adjustments to restore equilibrium. Thus, supporting the use of a common currency.

However, the use of the IRF and the VD to further establish the dynamics of the WAMZ countries' response reveal that the WAMZ countries have idiosyncratic responses to foreign price shocks. Due to dissimilarities in the composition of various commodities produced and exported by the WAMZ countries, the shocks have been dissimilar resulting in heterogeneous responses to the shocks. The various countries have different foreign countries as their major trading partners which makes them respond asymmetrically to price shocks from different countries. Price shocks from China cause the greatest price fluctuation in the WAMZ countries and the WAMZ countries' GDPs respond more symmetrically to price shocks from China than from the US and EU even though price shocks from China causes the smallest fluctuation in GDP growth among the WAMZ countries.

The study further establishes that prices in the WAMZ have a more symmetric response to EU price shocks than price shocks from the US and China. The response of GDP growth to the US and China's price shocks follow a similar pattern than their response to EU's price shocks though at very different magnitudes. Similar to the results of Abdoulie (2013) except price shocks from the EU, price shocks from the US and China both have positive impacts on prices among the WAMZ countries. Synonymous with his findings, foreign price shocks from China have negative impacts on GDP growths in the WAMZ however, price shocks form the US and EU have positive impacts contrary to his findings.

Individual country responses reveal that while prices in Ghana respond more to price shocks from the US and China, GDP growth responds more to price shocks from the EU and China. Similarly, prices in Nigeria also respond more to price shocks from the US and China, however, GDP growth in Nigeria respond more to price shocks from the EU and the US but not China. Also, prices in the Gambia, Guinea, and Sierra Leone respond more to price shocks from the EU and China than from the US while their GDP growths respond differently to different countries' price shocks. Whereas GDP growth in the Gambia response more to price shocks from the US and China, GDP in Guinea responds more to price shocks from the EU and China while the GDP growth in Sierra Leone responds more to price shocks from the US and the EU.

The findings from this chapter, therefore, reveal that the WAMZ countries face different responses to shocks from a common source which means a common monetary policy will not be ideal to optimally restore equilibrium to all countries in the wake of foreign price shocks. For example, while an expansionary monetary policy will be required by the Gambia, Guinea, and Sierra Leone to respond appropriately to the effect of price shocks from China on their GDP growth, Ghana and Nigeria will at the same time require a contractionary monetary policy to respond appropriately to the same shock. This means it is not good to have a common currency and a common monetary policy among the WAMZ, thus each country should maintain an independent currency and an independent monetary policy until further convergence is attained.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter summarizes the results obtained from the methodological procedure to answer the research questions to achieve the study objective. It also gives the conclusion on the results obtained and end the research with recommendations.

6.2 Conclusion

The objectives of this study have been to determine the impact of foreign price shocks on the WAMZ countries' prices and output growth, thus, whether they have a symmetric response to external price shocks or not, and also to determine if adopting a common currency among the ECOWAS countries will be feasible and sustainable.

An assessment of the performance of the ECOWAS countries with respect to meeting the convergence criteria show that none of the WAMZ countries met all the MCC as at 2018, only four WAEMU countries met all the MCC in 2018. They have failed to consistently and simultaneously meet the macroeconomic convergence criteria to be able to enable them to adopt the ECO. Most of the WAMZ countries are still recording double-digit inflations whiles others are recording high budget deficits. This shows that the ECOWAS countries are not ready for the ECO. The assessment also shows that intra-ECOWAS trade is below 12% which is not good enough for the ECOWAS countries to adopt a common currency since they will not benefit from the gains from reduced transaction cost and access to lager markets that are associated with Monetary

unions. The adoption of the ECO with this level of intra-ECOWAS trade will mean negative net benefits.

Using data from 1980 to 2018, the results from the correlation of inflation and GDP growth showed that the WAMZ countries have their business cycle synchronizing which is a good foundation for a monetary union. However, this can be a result of the primary export-oriented nature of these economies, which does not really mean they have real convergence and for that matter symmetric response to shocks. This result follows Omotor and Niringiye (2011) who found that inflation and output growth among the WAMZ countries are weakly symmetric which Chuku (2012) suggested it could be a result of the countries' reliance on similar primary export products.

Further studies to determine whether or not the WAMZ countries have similar responses to foreign price shocks using IRFs and VDs reveal that the WAMZ economics are heterogeneous and have asymmetric responses to common external price shocks. Contrary to the findings of Omotor and Niringiye (2011) who found the volatility of output and prices to be following a similar pattern of fluctuation among the WAMZ countries and Chuku (2012) who also found the WAMZ external shocks to be relatively symmetric, this research found that the WAMZ countries respond asymmetrically when faced by price shocks from the same foreign country, which indicates the concentration of trade between each WAMZ country and the foreign countries. The WAMZ countries produce different products and have different countries as their major trade partners, therefore, they respond differently to shocks from different countries. For example, the result from the IRF and VD show that GDP growth in Gambia and Guinea are not affected by US price shocks, however, they are affected more by price shocks from China than price shocks from the EU. Ghana and Nigeria have similar long-run responses to foreign price shocks from these countries except the response of their prices to EU price shocks which is asymmetric. This result confirms the work

of Amoah (2013) who suggested that Ghana and Nigeria's economies are correlated and that they can proceed with the adoption of the ECO.

The study further shows that the magnitude of the impact and the speed with which the WAMZ countries respond to the shocks are significantly different. While all the counties in the WAMZ have their GDPs responding negatively to price shocks from China from the 3rd period, prices respond asymmetrically to US price shocks, with prices in Ghana and Nigeria responding positively while the rest respond negatively. However, Gambia and Guinea respond similarly to these foreign price shocks in the long-run even though at different magnitudes.

Additionally, the research found that while GDP growths in Ghana, Nigeria, and Sierra Leone follow a fairly similar pattern of response to foreign price shocks, prices in the Gambia and Guinea also follow quite a similar pattern of response though at different magnitudes.

This asymmetric response to external price shocks will not favor the adoption of a single currency issued by a single central bank which will set a common monetary policy for all countries, since a common monetary policy will not be optimal to address the impact of shocks on all countries simultaneously. Adu et al (2018) stated that given the differences in economic size, trade, and consumption patterns among developing countries, it is not feasible for the WAMZ to have an exact similar response to shocks. Nonetheless, the achievement of convergence in sound macroeconomic indicators will ensure similarly response to shocks which is crucial for the stability of the WAMZ.

The variance decomposition reveals that among the foreign countries considered, price shocks from China explain a greater proportion of the volatility in prices among the WAMZ countries than prices shocks from the US and EU. Price shocks from China explains about 43, 80 and 45

percent of the price variations in Ghana, Nigeria, and Sierra Leone in the 7th period compared to US price shocks explaining 11, 4.5 and 30 percent respectively for the same period.

Answering the research questions, the study reports that the WAMZ countries do not respond similarly to external price shock and therefore do not have the real convergence to adopt a common currency even if they meet the MCC. Since the WAMZ countries respond differently to common foreign shocks, a common monetary policy will not be able to bring stability to all countries in the wake of foreign price shocks.

As the literature has provided, the cost of forming a monetary union will low if the incipient countries respond symmetrically to shocks. This study, therefore, concludes with Abdoulie (2013), Harvey and Cushing (2015), Amoah (2015), and Adu, Litsios & Baimbridge (2018) that the WAMZ countries and for that matter, ECOWAS does not have the real convergence to proceed with the Eco. A common monetary policy will have divergent impacts on all countries when using it to counter an adverse effect of a foreign price shock, making an ECOWAS monetary union unsustainable. Intra-regional trade should be increased among the ECOWAS countries to ensure that trade with these foreign countries is reduced, to reduce the impact of shocks from foreign countries, and make them respond homogeneously to shocks. Since the WAMZ countries are responding asymmetrically to shocks from the countries they trade about 50 percent with, adopting the ECO will have dire consequences on the economies in the sub-regional.

6.3 Recommendations

Even though ECOWAS has been in pursuance of this common currency for decades now and has also suffered several postponements, the evidence from this study and the challenges in the

Eurozone should caution and guide the ECOWAS single currency policy. This study recommends that:

Leaders of the ECOWAS member countries should commit themselves to attain the set macroeconomic convergence criteria since the political will of the member countries are crucial to the achievement of these economic indicators. The attainment of the macroeconomic convergence should not be compromised to fast-track the adoption of the ECO.

ECOWAS member states should work towards the promotion of intra-regional trade which is still very minimal (11%) in the region. The major gains from a monetary union are the elimination of transaction costs and access to a larger market. Intra-regional trade can be improved by the removal of tariff and non-tariff barriers and also the extension of transport services across the region.

The level of structural transformation has been very low causing the huge trade with non-ECOWAS countries. The manufacturing sector has not been developed in West Africa therefore, efforts should be made to diversify each country's economy to be able to develop the manufacturing sector to provide jobs and also make the sub-region less dependent on imported manufactured products. This can be done by the transformation of the raw materials into semi-processed and processed products before exportation and also by increasing investment in the manufacturing sectors.

Finally, the adoption of the ECO should be approached gradually to ensure that member countries converge in real economic terms before proceeding. The experience of the Eurozone shows that the Euro was not adopted in just one day but it took a period of about 50 years, therefore ECOWAS should approach the adoption of the ECO gradually.

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APPENDIX

Table 1: ECOWAS Basic indicators, 2018

	Population (thousands)	Land area (km2 thousands)	Population density (people per km2)	Gross domestic product ($ millions)	Gross domestic product per capita ($)
Benin	11,486	115	100	27,546	2,398
Burkina Faso	19,752	274	72	1,966	6.1
Cabo Verde	553	4	137	4,029	7,282
Côte d'Ivoire	24,906	322	77	106,783	4,287
Gambia	2,164	11	191	5,993	2,770
Ghana	29,464	239	124	145,768	4,947
Guinea	13,053	246	53	30,278	2,320
Guinea Bissau	1,907	36	53	3,391	1,778
Liberia	4,854	111	44	6,440	1,327
Mali	19,108	1,240	15	44,329	2,320
Niger	22,311	1,267	18	23,549	1,055
Nigeria	195,875	924	212	1,169,148	5,969
Senegal	16,294	197	83	59,987	3,681
Sierra Leone	7,720	72	107	12,251	1,587
Togo	7,991	57	141	13,902	1,740
West Africa	377,437	5,115	74	1,692,228	4,483
Africa	1,286,206	30,049	43	6,764,685	5,259

Source: Regional economic outlook, 2019

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Table 2: Impulse response to shocks from the US

	Response of real GDP to US price shocks								Response of prices to US price shocks							
Step	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Gambia	.03	.03	.01	.0	-.01	-.01	-.01	0	-.01	-.02	-.02	-.01	0	.01	.01	.02
Ghana	.03	.02	.01	.01	.01	.01	.01	.01	.03	.05	.06	.06	.06	.06	.06	.05
Guinea	-.02	-.02	0	.01	-.01	-.01	0	0	.01	.01	.01	.01	.02	.02	.02	.03
Nigeria	.08	.1	.09	.07	.06	.06	.05	.05	-.01	-.01	0	.01	.02	.04	.05	.05
Sierra Leone	.03	.07	.08	.07	.06	.06	.06	.06	.02	-.01	-.03	-.03	-.03	-.02	-.02	-.01

Source: Author's computation from Stata 15

Table 3: Impulse response to shocks from the EU

	Response of real GDP to EU price shocks								Response of prices to EU price shocks							
Step	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Gambia	.04	.03	.03	.02	.01	0	-.01	-.01	-.02	-.04	-.05	-.05	-.05	-.04	-.04	-.04
Ghana	.03	.03	.04	.04	.05	.04	.04	.03	.02	.03	.04	.04	.04	.05	.04	.04
Guinea	-.02	0	.02	.01	0	-.01	-.01	-.01	0	-.02	-.04	-.05	-.06	-.06	-.06	-.06
Nigeria	.08	.11	.12	.12	.12	.1	.09	.07	.01	.01	-.01	-.03	-.04	-.05	-.05	-.06
Sierra Leone	.03	.05	.07	.07	.07	.07	.06	.05	.01	-.04	-.07	-.09	-.1	-.1	-.1	-.1

Source: Author's computation from Stata 15

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Table 4: Impulse response to shocks from China

		Response of real GDP to China price shocks								Response of prices to China price shocks							
Step	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
Gambia	.03	0	.01	-.01	-.02	-.03	-.04	-.04	-.02	-.03	-.04	-.05	-.05	-.04	-.03	-.03
Ghana	.01	0	0	.01	-.01	-.04	-.07	-.07	-.01	0	.03	.03	.02	.02	.02	.03
Guinea	-.01	-.02	-.01	-.01	-.03	-.05	-.05	-.05	-.02	-.03	-.04	-.06	-.07	-.08	-.08	-.08
Nigeria	.02	-.01	-.02	-.02	-.04	-.05	-.04	-.04	.04	.1	.12	.13	.14	.15	.16	.17
Sierra Leone	.06	.02	-.01	-.02	-.03	-.04	-.03	-.02	-.07	-.1	-.07	-.05	-.07	-.08	-.09	-.09

Source: Author's computation from Stata 15

Figure 1: Stability graphs for VAR models

Gambia-China
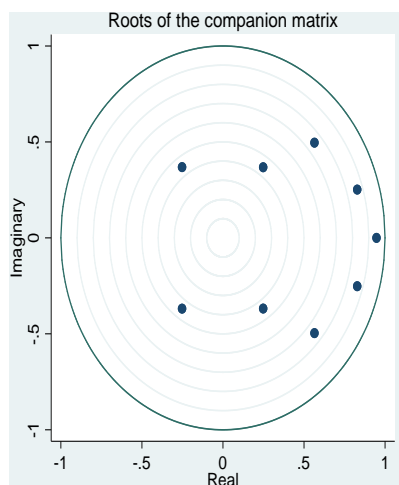
Gambia-EU
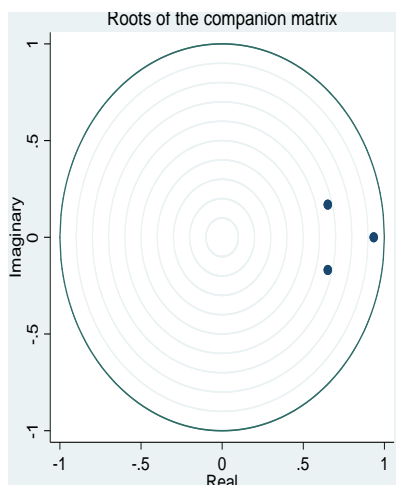
Gambia-US
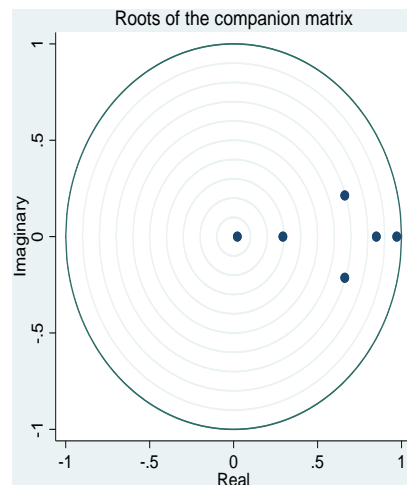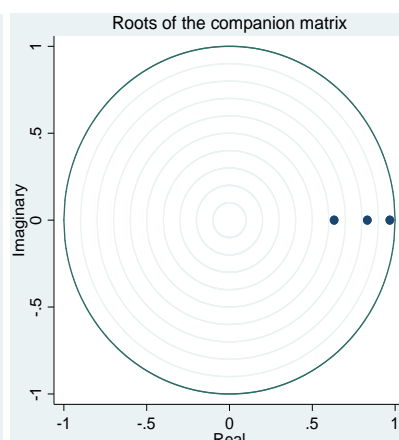

Ghana-China
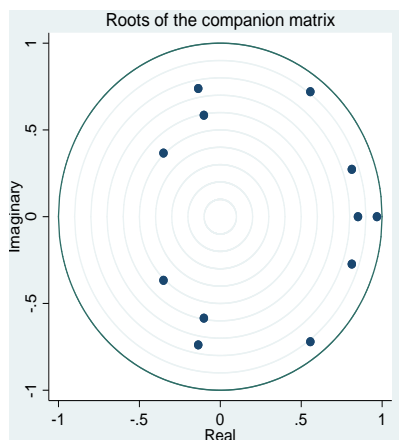
Ghana- EU
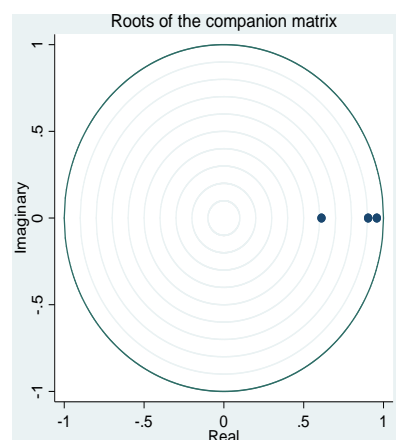
Ghana-US

Guinea-US
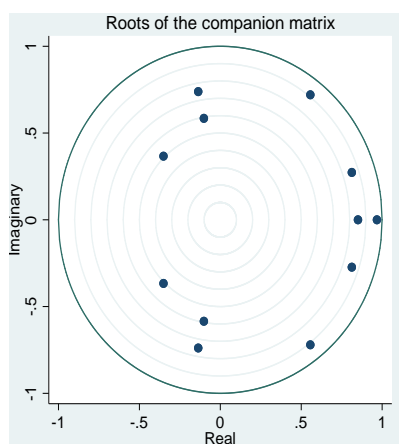
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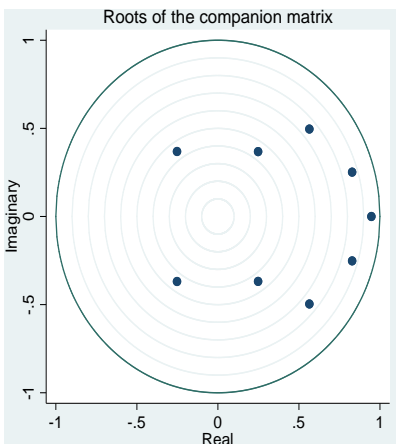
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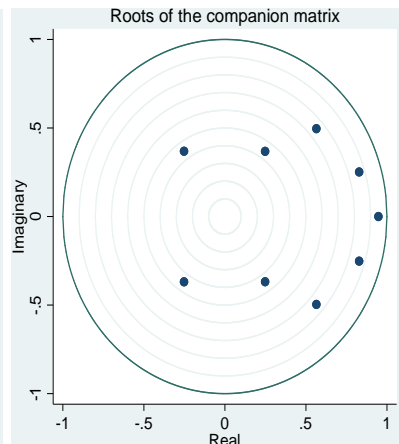
Nigeria-US
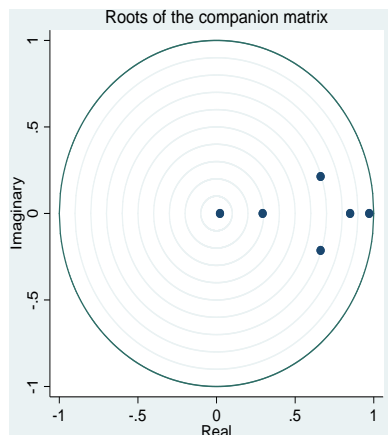
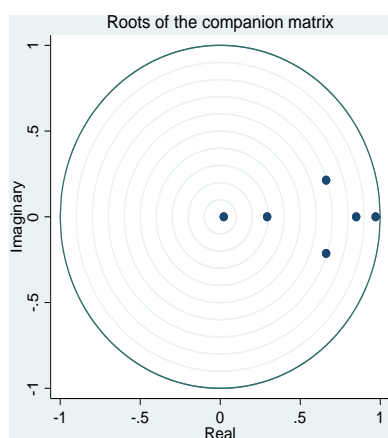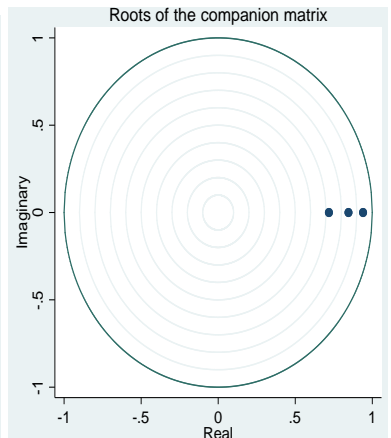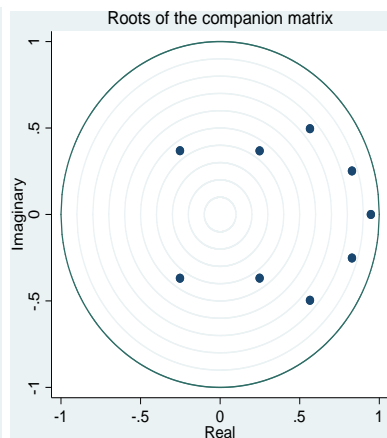**Nigeria- EU**
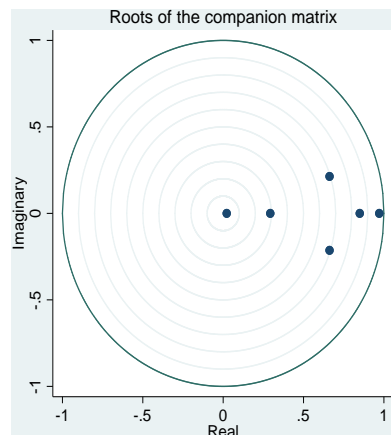
Nigeria-China
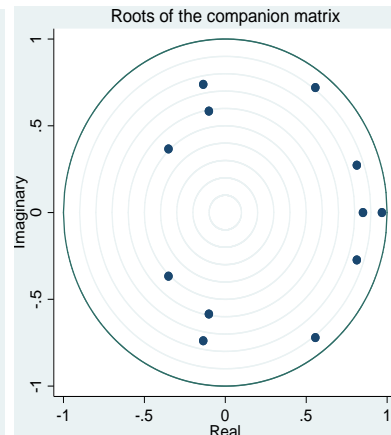
Sierra Leone – EU

Sierra Leone-US

Sierra Leone-China

Source: Author's computation from Stata 15

Table 5: Lagrange-multiplier tests for stability for the various VAR models

Gambia-US

Lag	Chi2	df	Prob>chi2
1	8.7248	9	0.46306
2	5.4486	9	0.79359

Ghana-China

Lag	Chi2	df	Prob>Chi2
1	12.4883	9	0.18716
2	9.9282	9	0.35633

Gambia-EU

Lag	Chi2	df	Prob>Chi2
1	12.8248	9	0.17069
2	5.0162	9	0.83289

Guinea- US

Lag	Chi2	df	Prob>Chi2
1	7.5621	9	0.57881
2	8.7352	9	0.46206

Gambia-China

Lag	Chi2	df	Prob>Chi2
1	12.4883	9	0.18716
2	9.9282	9	0.35633

Guinea-EU

Lag	Chi2	df	Prob>Chi2
1	6.4282	9	0.69641
2	18.7273	9	0.02761

Ghana-US

Lag	Chi2	df	Prob>Chi2
1	8.7248	9	0.46306
2	5.4486	9	0.79359

Guinea-China

Lag	Chi2	df	Prob>Chi2
1	13.0461	9	0.16053
2	5.6872	9	0.77077

Ghana-EU

Lag	Chi2	df	Prob>Chi2
1	8.2332	9	0.51082
2	2.1955	9	0.98798

Sierra Leone-China

Lag	Chi2	df	Prob>Chi2
1	7.0919	9	12.1955
2	12.1955	9	0.20251

Nigeria-EU

Lag	Chi2	df	Prob>chi2
1	6.7797	9	0.66004
2	10.1471	9	0.33871

Nigeria-China

Lag	Chi2	df	Prob>Chi2
1	13.2092	9	0.15337
2	5.9303	9	0.74688

Nigeria-US

Lag	Chi	df	Prob>Chi2
1	10.4790	9	0.31312
2	13.6552	9	0.13513

Sierra Leone-US

Lag	Chi2	df	Prob>Chi2
1	7.3973	9	0.59583
2	4.7158	9	0.85835

Sierra Leone-EU

Lag	Chi2	Df	Prob>Chi2
1	17.2082	9	0.04555
2	8.7996	9	0.45597