

# Is WAMZ an Optimum Currency Area?

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**Abstract:** This study empirically investigates the existence of symmetry and asymmetry in West African Monetary Zone (WAMZ) using Wald F-test. Data obtained from World Development Indicators from 1970-2017 were employed for this study. The study was carried out under pooled and country-specific study. Purposive sampling technique was employed to select countries for country-specific study. The result showed that symmetry exists in pooled study, and both symmetry and asymmetry exist in WAMZ. The result implies that WAMZ is entirely not an optimum currency Area (OCA). WAMZ is a quasi-OCA. Thus, WAMZ authorities should accelerate functional economic system that would absorb shock and a system that would strengthen productivity and capacity of WAMZ to gain market share in order to forestall Eco-currency from value volatility.

**Keywords:** Symmetric and Asymmetric, Shock, ECOWAS, WAMZ and OCA

## I. INTRODUCTION

The works of De Grauwe and Vanhaverbeke (1993) and Harvey and Cushing (2015) are two important literature that this study builds on to address the issues of whether WAMZ is an optimum currency area. This issue had been previously taken-up by Harvey and Cushing (2015), the point of departure is on instrument employed in this study; Wald-F test while SVAR was employed hitherto. Before we delve into this discourse, it is imperative to appropriately situate ECOWAS/WAMZ economic integration by extending the debate on symmetry and asymmetry in relations to whether WAMZ is a common currency area? The issue of economic integration is an important subject that has received robust attention following the Maastricht treaty that birthed European Union in 1999. The prototype of economic and monetary arrangement in European Union is such that involves the use and application of single currency called Euro. Economic and Monetary Union (EMU) in Europe has been a model for countries desiring to foster common currency union.

The May, 1975 Economic Community of West African States (ECOWAS) through its 1987 Monetary Cooperation Programme (EMCP) initiated common currency for the region. The EMCP highlighted strategic concern on the imperativeness of regional single currency called Eco currency and in “July 1991 ECOWAS ratified a treaty that re-enforced its single currency ambition (Harvey & Cushing, 2015). In 2014, member nations agreed that by 2020 ECOWAS could administer its single currency however under modified gradualist approach (Fwangkwai, 2014). As clearly denoted, the adoption of Eco currency by ECOWAS is designed to accelerate regional economic integration which in

turn will foster regional trade and implementation of common tariff for the region. West African Monetary Zone (WAMZ) plays strategic role to the actualization of generalist macroeconomic environment that would permit the adoption of Eco currency. Basically, West African Monetary Zone (WAMZ) of 2000 includes Gambia, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone. Another economic zone in the ECOWAS is the West Africa Economic and Monetary Union (WAEMU) of 1994. WAEMU since 1978 had initiated CFA monetary system, *ceteris paribus*, is that by January 2020 or so; WAEMU would collapse its CFA monetary system and enter into a broader currency union called Eco.

### A. Background to the Study

Historically, the debates on symmetry and asymmetry are traceable to the contributions of European Commission (1990) and Krugman (1993). These debates provide sufficient ground to ascertain whether countries are suitable for common currency and conversely whether the countries are an Optimum Currency Area (OCA). European Commission (1990) simply found that symmetry exist in trade integration within Europe hence EMU does exist in EU.

On the other hand, Krugman (1993) sees presence of shock asymmetry as perfect representation of the diverse economic characteristic amongst countries; possessing variants economic, social and technological difference. Krugman’s view on trade integration implies that there are possibility changes in economic outlook. These structural changes will affect the nature and degree of specialization in various economies within a region. One of the structural characteristic is the divergent modes of production. It presents a fundamental challenge to the value chain integration process that could affect country-specific productivity behaviour and hence bring about asymmetric shock within the global trade interaction system. Krugman position clearly connects and relates with the theories of international economies such as Smithsonian comparative advantage and Ricardian absolute advantage thoughts. From simply economics, Smithsonian economic principle explicates the rationale that deepens the imperativeness of specialization accruable to countries in an unrestricted global trade system. Succinctly, Krugman believes *ceteris paribus* asymmetry economic relationship could exist which thus portends that Economic and Monetary Union (EMU) is obviously not permissible. Hence, the ongoing debates between Krugman (1993) and European Commission (1990).

In line with WAMZ’s vision to adopt Eco, it is therefore proper to empirically determine which of the debates clearly

explains economic events in WAMZ. The conclusion therefrom would attest whether WAMZ is an optimum currency area or not.

### B. Statement of the Problem

In 2019, out of 15 member countries of ECOWAS only Togo had achieved, and non-WAMZ member countries had achieved the entire macroeconomic convergence criteria set for the adoption of Eco currency. The motivating question therefore becomes is WAMZ an optimum currency area? This question is addressed on the basis of the outcome of symmetry and asymmetry of the region.

### C. Research Objectives

This paper seeks to;

- Determine the extent of symmetry and asymmetry in WAMZ in pooled study and country-specific study.

### D. Research Hypothesis

- Symmetry exists in WAMZ.

## II. LITERATURE REVIEW

### 1. Theoretical Framework

Optimum Currency Area (OCA) theory explains set conditions that define regions as fit for economic and monetary union. These conditions are decomposed into ex ante OCA and ex post OCA. The ex ante includes Mundell (1961) factor mobility, McKinnon (1963) degree of openness, Ingram (1973) financial integration etc. Conversely, ex post OCA theory includes Frankel and Rose (1977), Mundell (1971) etc focused on symmetry of trade integration and business cycle synchronization on the possibilities of long run convergence. The arguments on symmetry and asymmetry are traceable to the ex post OCA theory. Ex post Optimum Currency Area (OCA): Frankel and Rose (1997) hold that shock similarity is possible in an environment with synchronized business cycle and trade correlation, and thus countries within a shock similarity environment are good candidate of EMU because they will achieve convergence in the long-run *ceteris paribus*. What is the Economic Implication of shock similarity and symmetry? It revolves around the application of common monetary policy to address regional disturbances. In other words, the state of shock; symmetry, or asymmetry therefore explains entirely the possibility of an EMU which requires the application of common monetary policy and policy coordination. Hence symmetry within a region in turn determines that the countries are optimum currency area. It is so important that scholars think that because common monetary policy and common central banking system is orchestrated within the union to drive economic activities there is the need for countries desiring EMU to determine the state of symmetry and asymmetry.

### 2. Empirical Literature

The motivating empirical literature is the study conducted by Harvey and Cushing (2015) which focused primarily on WAMZ. The study is divided into introduction; evolution of the West Africa Economic and Monetary Union and West African Monetary Zone; empirical literature; methodology; data analysis employed annual data from 1980 to 2005 (IFS, DOTS) and monthly data from February 1987 to April 2011. The paper titled “Is West African Monetary Zone (WAMZ) a common currency area? Harvey and Cushing (2015) going-forward found that there is the impossibilities of WAMZ EMU. This position is empirically based on structural VAR model developed from Geweke, 1982. The study also explained that WAMZ does not possess shock similarity which is an incentive for EMU. They conclude that WAMZ is not a good candidate based on the modified Clarida and Gali (1994) Mundell-Fleming-Dornbusch model.

Viera and Viera (2011) assessed the endogeneity of OCA conditions in EMU. Frankel and Rose (1997) hypothesis was applied. The study employed panel data estimation method. The study found that OCA hypothesis does not hold for some countries. Hence the application of EMU cannot be achieved for several countries. Drastichova (2011) assessed convergence in the EU using the OCA index from 1999-2009. The study utilized panel regression. They observed that external shocks have influence on convergence and development of OCA index. Sideris (2009) evaluated whether six Central and Eastern European countries are fit for OCA. The study employed theory of generalized purchasing power parity to capture the effect of long run real exchange rate of a group with respect to a base currency. The study used Cointegration analysis and observed that the countries under investigation form an OCA. Chey (2008) study addressed the feasibility of an East Asian currency union. The study found that even though East Asia may be to some extent a feasible candidate for a currency union from an economic perspective, the region’s political situation is unfavourable for the creation of one. Warin et al (2008) assessed Frankel and Rose (1997) findings. They studied FDI flow, to test the e-OCA model of Mundell (1973). The study test result used gravity model for EU-15. The result guaranteed that economic convergence ensured by belonging to the common currency area stimulates FDI flows. Tyrowicz (2007) in a study to verify the empirical application of OCA theory for the EMU, the study used a fixed effect panel data analysis employed a sample of bilateral trade data from Eurostat from 1993-2005. The empirical gravity equation, suggest the possibilities of trade diversion effect due to introducing a common currency area. The study found that SS evidence for common currency dummy and F and R<sup>2</sup> of the model increased showing a better fit. Ricci (2007) in his OCA study proposed two-country monetary model of trade with nominal rigidities which permits for a wide-ranging concern of the monetary and real arguments. The study showed that the effect of openness is ambiguous converse to the arguments that more open economies are better candidates for a currency area. The study adapted

Dornbusch, Fischer, and Samuelson (1977) and Blanchard and Kiyotaki (1987) a two-country two-good Ricardian trade model. De Grauwe and Mongelli (2005) studied endogeneity of optimum areas: what brings countries sharing a single currency closer together. They found that prices changes are homogenously related across euro area countries. Also, they contended that Euro has deepened risk-sharing with low overall financial market integration, expectation of symmetry of shocks. Thus claimed various levels of endogeneity occur in OCA. The study adopted statistical and graphical analysis in studying euro areas. Horvath and Kucerova (2005) adopted OLS regression and GMM methods for 20 developed countries to establish the link between dynamism of real exchange rate and OCA criteria. The study found that OCA criteria such as financial development and economic size affect the volatility of real exchange rates. Babetskii (2004) studied EU enlargement and endogeneity of some OCA criteria: evidence from the CEECs, supported Kenen (2001) argument that the impact of trade integration on shock asymmetry depends on the type of shock. The study adopted bi-variate structural VAR proposed by Blanchard and Quah (1989). Belke and Kaas (2004) examined exchange rate movement and employment growth: OCA assessment of the CEE economies. The study found that exchange rate volatility lowers employment growth. Thus, elimination of exchange rate volatility can be used in place for removing employment protection legislation.

Ma and Tsang (2002) investigated whether China and Hong Kong constitute an OCA under the framework “one country, two systems”. They applied VAR, the study showed a negative relationship i.e. OCA could not be effectively be operational in China and Hong Kong. Ling (2001) employed structural VAR adapted Bayoumi and Eichengreen (1993, 1994) a model proposed by Blanchard and Quah (1989). The study implies that there is an existence of potentiality for monetary integration in East Asian economies built from the symmetry of trend. Bayoumi and Eichengreen (1998) found that 1) countries with more variable exchange rate produces larger asymmetric shocks, more stable rates suffer the greatest decline in the transaction value of domestic currency when their exchange rate vary 2) small size and trade dependencies reduce exchange rate variability 3) asymmetric shocks increase exchange rate variability by magnifying exchange market pressure.

Frankel and Rose (1997) developed an endogeneity model for OCA. The study chose data for thirty years for twenty industrialized countries. The result found that countries with closer trade links tend to have more tightly correlated business cycle. The study adopted panel regression and correlation method. Furthermore, Ricci (1997) explained that the net benefits that a country expects from participating in a currency union increase with the correlation of real shocks between countries; the degree of international labour mobility; the degree of adjustment provided by a fiscal tool; the difference between the inflationary bias of the domestic authority and the inflationary bias of the authority of the

currency union; the variability of domestic monetary shocks; and the extent of deadweight and efficiency gain deriving from the adoption of a single currency. De Grauwe and Vanhaverbecke (1993) considered international correlation of business cycle and applied standard deviation method. The study found the prevalence of asymmetric shock at regional level within a country than at the national level within the EU.

### III. METHODOLOGY

Model Specification

$$RGDP = f(FDI, ODA, IBRD, POP) \quad (1)$$

$$TRD = f(FDI, ODA, IBRD, POP) \quad (2)$$

$$MLT = f(FDI, ODA, IBRD, POP) \quad (3)$$

$$TRB = f(FDI, ODA, IBRD, POP) \quad (4)$$

Where RGDP= Real gross domestic product, TRD= trade % of GDP, MLT=Multilateral Trade, TRB=trade robustness (openness). FDI=foreign direct investment, ODA = official development assistance, IBRD= international Bank for reconstruction and development loans. POP=Population

$$Y_{it} = FDI_{it} + ODA_{it} + IBRD_{it} + POP_{it} + \mu_{it} \quad (5)$$

From equation 5 data sourced from World Bank from 1970 to 2017 for WAMZ countries were collected on hypothesized variables. The study employed Wald F-test both in Stepwise Least Squares (pooled study) and NARDL (country-specific) to verify the existence of symmetry and asymmetry in WAMZ taking into focus the impact of external resource inflows into WAMZ on the corresponding impact on WAMZ macroeconomic performance. We built our study from Harvey and Cushing (2015) claim on the impossibility of WAMZ to adopt Eco currency.

This analysis is divided into two pooled analysis and country-specific analysis. In pooled study six countries of WAMZ namely Gambia the, Ghana, Guinea, Liberia, Nigeria, and Sierra Leone were employed and in country specific study through purposive sampling technique, the study adopted four countries viz Gambia the, Ghana, Nigeria, and Sierra Leone.

We selected only models that meet the conditions to perform Wald F-test in pooled and country-specific study. These conditions are non-serial correlation (Breusch-Godfrey LM test) and absence of heteroskedasticity (Breusch-Pagan-Godfrey test), and significant F-test at 5 percent level of significance (LOS). The Wald F-test takes into account the effect of positive and negative variables on the target variable. The nature of Wald F-test of coefficient restriction determines whether symmetry or asymmetry exists. In conclusion, our hypotheses are conducted at 5 percent.

*Formulation of Hypothesis*

Null Hypothesis: There is Symmetry

Alternative Hypothesis: There is Asymmetry

## IV. RESULTS PRESENTATION AND DISCUSSION

*Section I: Stepwise Least Squares*

Table 4.1: Wald F-statistic test Result (Multivariate Variables)

	Wald F-statistic (Pvalues)	Pvalues of Regression F-test	Serial Correlation	Heteroskedasticity
RGDP model	FDI= 0.1705 (0.6801) ODA =1.0328 (0.3107) IBRD= 0.4288 (0.5133)	0.041819	0.0612	0.4978
MLT model	FDI=2.592 (0.1091) IBRD=2.0172 (0.1573) ODA= 1.1557 (0.2838)	0.011	0.3670	0.6748

Source: Eviews 9

Table 4.1 is the results obtained from Wald F-test under a three external resources inflows models otherwise called multivariate system. From the stepwise least squares (pooled) regression two models were presented in table 4.1. They are namely RGDP model and MLT model. The serial correlation and heteroskedasticity test result were above 5 percent. The F-test showed that RGDP model is symmetry and MLT is symmetry. From table 4.1 the Pvalues of the F-test are given as 0.6801, 0.3107 and 0.5133 for RGDP model and 0.1091, 0.1573, and 0.2838 for MLT model. The corresponding Wald F-test values are greater than 0.05 hence we conclude that there is symmetry in WAMZ. The impact of the nature and dynamical state of external resources inflows (proxy for financial integration) into WAMZ on macroeconomic performances were examined to determine whether financial integration guarantees optimum currency area in WAMZ. The

models were suitable because there is absence of serial correlation and heteroskedasticity.

In furtherance to provide a robust evaluation on the subject matter, we developed a two-external resources inflows variable system with model variations as in the pooled study. We conducted these tests under two platforms viz; under a model incorporating for dummy variable to clearly exploit the impact of seasonal variation and structural breakpoints in the region; and under a system without adjustment for structural breakpoints (dummy variables). This adjustment is carried out in an attempt to obtain information on the pattern of symmetry and asymmetry from two dimensions viz; under structural breakpoint and without structural breakpoint to determine the effect of occurrence of changes likely to affect the stability of the results.

Table 4.2: Wald F test Result (With Dummy Variables)

Models	Wald F-statistic (Pvalues)	Pvalues of Regression F-test	Serial Correlation	Heteroskedasticity
RGDP Model	FDI=0.0580 (0.8098) ODA = 0.0890 (0.7656)	0.0013	0.2370	0.5757
MLT Model	FDI= 0.9704 (0.3259) ODA= 1.3701 (0.2433)	0.0076	0.4397	0.5210
MLT Model	FDI= 2.2320 (0.1369) IBRD= 2.5894 (0.1093)	0.021049	0.5605	0.4428
TRB Model	N/A	0.000225	0.2766	0.0000***

Source: Eviews 9

From table 4.2 and table 4.3, the F-test results showed that symmetry exist in the both two variables models i.e. with and without dummy variables. From table 4.2 and table 4.3 our F-test results are greater than 5 percent. This implies that the corresponding Wald F-test prob. values are greater than 0.05

percent. Hence, we accept null hypothesis. Null hypothesis states that symmetry exists. We could observe the second order test of the model showed that there are no serial correlation and heteroskedasticity in the system.

Table 4.3: Wald F test Result by Equation (Without Dummy Variables)

Models	Wald F-statistic (Pvalues)	Pvalues of Regression F-test	Serial Correlation	Heteroskedasticity
RGDP	FDI=0.7515 ( 0.3870) IBRD= 0.0890 (0.7656)	0.034	0.3503	0.4078
TRD	FDI=1.5844 (0.2100) IBRD= 0.8889 (0.3472) ODA= 1.70619 (0.1934)	0.0022	0.8679	0.0685
MLT	FDI= 0.2402 (0.6246) ODA= 0.8001 (0.3722) IBRD= 0.4829 (0.4879)	0.007	0.7905	0.0677
TRB	FDI= 0.0077 (0.9302) IBRD= 0.01911 (0.8902) ODA= 0.1568 (0.6925)	0.038	0.2383	0.6373

Source: Eviews 9

## 2. Non-linear ARDL (Country-Specific analysis)

In this section, we conducted Wald F-test using NARDL estimator. We examined the impact of external resources inflows into WAMZ on selected macroeconomic performance indicators such as RGDP, trade, and multilateral trade. Thus,

we only conducted Wald F-test for countries that met post-diagnostic test in NARDL environment. Secondly, in this section we considered only one variable in each model i.e. RGDP as a function of FDI and RGDP as a function of ODA intermittently.

Table 4.4: Wald Fstatistic in NARDL Framework (Without Dummy)

Equations	Country	Wald Fstatistic	P-value at 5 percent
RGDP (ODA) model	Gambia	31.21	0.0113
TRD (FDI) model	Ghana	0.0724	0.7896
TRD (FDI) model	Nigeria	7.4949	0.0110
TRD (FDI) model	Sierra Leone	0.61423	0.4382
TRD (ODA) model	Ghana	17.74	0.0012
TRD (ODA) model	Sierra Leone	1.687	0.2069
MLT (FDI) model	Gambia	2.6619	0.1136
MLT (FDI) model	Nigeria	0.5483	0.4654
MLT (ODA) model	Gambia	2.935	0.1375
MLT (ODA) model	Nigeria	3.215	0.0861

Source: Eviews 9

The Pvalues of Wald F-test showed that RGDP (ODA) in Gambia, Trade (FDI) in Nigeria, and Trade (ODA) in Ghana are asymmetry. This is because their corresponding Pvalues is less than 5 percent. While, Trade (FDI) in Ghana, Trade (FDI) in Sierra Leone, Trade (ODA) in Sierra Leone, MLT (FDI) in Gambia and Nigeria, and MLT (ODA) in Gambia and Nigeria are symmetry. They are symmetry corresponding Pvalues is more than 5 percent.

## V. IMPLICATIONS OF THE FINDINGS

We empirically observed that financial integration of WAMZ generates symmetry and asymmetry in WAMZ. This mixed findings implies that both European Commission (1990) and Krugman (1993) postulations holds in WAMZ. The summary

of the findings implies that (i) WAMZ is entirely do not meet the conditions for OCA (ii) Common Central Bank for WAMZ in dealing with economic events might require extra-independent efforts of member countries (iii) Krugman 's specialization argument do not hold in WAMZ. The minimal presence of asymmetry in WAMZ implies that specialization in WAMZ is at minimal level.

## VI. CONCLUSION AND RECOMMENDATION

From the findings we conclude that WAMZ is a special case of OCA/EMU. Hence, Harvey and Cushing (2015) findings might not appropriately explain the suitability of OCA/EMU in WAMZ. Thus, the presence of symmetry and asymmetry in WAMZ clearly portend that WAMZ would require more than

common central bank to tinker with economic policies to deal with unwarranted disturbances that could affect Eco in the long run. Thus, we recommend that in addition to common central bank, WAMZ should leverage on their respective Central Banks to deal with shocks and also Eco currency should be used as reserve and trade currency rather than the Dollar.

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