THE FEASIBILITY OF MONETARY UNION IN WEST AFRICAN MONETARY ZONE (WAMZ)

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ABSTRACT

The paper examined feasibility of proposed WAMZ based on Generalized Purchasing Power Parity (G-PPP) theory. The unit root test shows exchange rates are integrated of order one I(1). Co-integration and error correction test showed there is long run relationship among exchange rate of WAMZ member states and speed of adjustment differs among member countries. Liberia was not converging to equilibrium, generalized purchasing power parity (G-PPP) holds for WAMZ member states. No country has met all primary convergence criteria, though they have shown signs of commitment in improving their performance. For a successful and sustainable monetary integration thus: WAMZ members will require more policy coordination and exchange rate synchronization among members' countries. Practical steps be taken to ensure realization of the single market comes live and all kinds of restrictions on free movement of goods and productive factors be eradicated altogether.
Keywords: Monetary Union, Feasibility, Convergence Criteria, Generalized Purchasing Power Parity theory, ECOWAS.
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INTRODUCTION

The twentieth century is characterized by aggressive waves of globalization which has negatively affected the economy of small and developing countries of African region. Especially West African sub region, with poor or virtually no manufacturing base and usually depends on primary products export as the mainstay of their economy. This scenario had left them more vulnerable now compared to last century. Hence, the need to developed mitigating strategies

to insulate their economy against the adverse effect of globalization, to ensure their survival and voice heard in global discourse. Monetary integration is adjudged by proponent as a cradle for accelerated economic growth and development among integrating economies of member states. Perhaps do to advantages attributed to currency union thus; by boosting investment and trades flows; intra regional trade transaction cost are significantly reduce; efficient domestic and regional resource allocation enhanced; shift in national production possibility frontiers; senoirage gains are enhance; improvement in productivity through factor mobility; pooling of external reserves lead to increase in resource savings; enhancement in fiscal discipline; enlargement of market size; firm reengineering resulting from mergers and acquisition; expanding money and capital markets from competition will brings financial deepening and macroeconomic policies coordination will be enhanced. Factor mobility across borders, coordination and harmonization of monetary and fiscal policies would enhance rapid economic growth and greater welfare for integrating economies.

There is an ongoing effort aims at monetary integration among West African states, usually referred to as West African Monetary Zone (WAMZ). The launch of single currency was slated for January 1, 2003, but was postponed to July 1, 2005 due to Member States' inability to meet all the four primary convergence criteria simultaneously and on sustainable basis. The launch was further postponed to December 1, 2009, and again to January 1, 2015. The new date for the launch of the single currency is now proposed to be in 2020. Due to the inability of member states to meet primary criteria for monetary union, the Economic Community of West African States (ECOWAS) has resolved to reduce macroeconomic convergence criteria to six, from the initial 11 in order to hasten actualization of the single currency project by 2020.

At the 37th meeting of the technical committee of the WAMZ, acting director of the Multilateral Surveillance within the ECOWAS Commission, Dr. Nelson Magbagbeola, who gave an update on the program announced that the requirements have now been scaled down to six, which include three primary and three secondary conditions. He said the new primary criteria demand that every member state's budget deficit; including grants on commitment basis should not be more than 3% of Gross Domestic Product (GDP) while the average annual inflation should be single digit with a long term goal of not more than 5% by 2019, as well as gross reserves of not less than 3 months of imports. The secondary criteria include the following: the public debt to GDP ratio should not exceed 70% while central bank financing of budget deficit should not be more than 10% of previous year's tax revenue and nominal exchange rate variation should be within band +/-10% (EIN NEWS, 21st July, 2014).

The feasibility of monetary union in a particle region revolves around three main approaches thus: firstly, the asymmetry shock measurement which entails the measurement of shock hitting integrating members are sufficiently homogenous to allows for a common monetary policy fit for all members, this is inspired by Optimal currency area (OCA) theory propounded by Mundell (1961). The second approach involves the comparison of macroeconomics performance of monetary union members and non integrating countries by comparing the growth rate, intra-regional trade and business cycle synchronization of members and non member country. And the third approach measure how intending monetary union members countries convergence criteria are convergent to the set target, it basically involves monitoring the macroeconomics indicators set as criteria for integration. This paper will employed generalized purchasing power parity (G-PPP) and the performance of convergence

criteria in analyzing the feasibility of monetary union in West African sub region. Contribution of this study is twofold; first, on the methodology front, the first application of G-PPP on monetary union in this region, and second, owing to the importance of exchange rate in monetary union agreement, and also it value is as a realization of real working of the economy, hence it adoption to determine the sub-region suitable for monetary union.

A lot of effort has been expanded on this lofty project with little or no progress at the moment. This paper aim at appraising the suitability or otherwise of monetary union by taking ex post analysis and assesses member states performance towards achieving convergence criteria which will eventually lead to the formation of currency union among WAMZ member states.

The paper is organized as follows: Section II provides a brief literature review, section III presents detailed methodology employed while in section IV we present and discuss empirical results and finally section V gives conclusion and policy recommendation.

LITERATURE REVIEW

Literatures on monetary union abound, however, researched in Africa and particularly West Africa region is scanty at best. For instance, Cécile et al (2013) examines how CFA countries have successfully maintained a currency union for several decades, despite failing to meet many of optimum currency area criteria. They test sustainability hypothesis using behavioural equilibrium exchange rate (BEER) approach by comparing the convergence process of real exchange rates towards equilibrium for CFA zone countries, and a sample of other Sub-Saharan Africa (SSA) countries. They found internal and external balances have been fostered and adjustments facilitated in the CFA zone as a whole compared to the South Sahara Africa states as well as in each of its member countries. Sampawende (2010) estimates risk sharing channels among West African states from 1970 to 2004. He uses the definition of national accounts to measure the fraction of asymmetric output shocks smoothed via net factors income, net transfers and net saving. He found that compared to the OECD (Organization for Economic Cooperation and Development) estimates, the degree of risk sharing among West African countries is quite low. That net saving is the significant and stable risk sharing channel and only the contribution of public saving is significant. He concludes West African economies do not have sufficient symmetry. Fielding and Shields (2001) used structural vector autoregressive (VAR) techniques to analyze the correlation of output shocks and correlation of price shocks within the CFA monetary zone. They found price shocks are highly correlated whereas output shocks rarely co-moved. In the same vein, BénassyQuéré and Coupet (2005) and Tsangarides and Qureshi (2008) they also found significant lack of homogeneity among West African economies. On the contrary, Houssa (2008) applied dynamic structural vector model, he solved some limits of the VAR methodology and found West African countries are heterogeneous. Essein and Egbuna (2002) analyzed the growth implications of trade, spillovers and market size of neighboring economies in ECOWAS region. They found these countries benefit from neighboring economies market size and positive spillovers in the region, no evidence of growth induced by regional trade; states that trade within the region is largely informal and unrecorded and concludes that the impact of regional integration has not been greatly felt in the region and therefore calls for a deliberate effort at promoting regional trade and learning. Xavier, Paul and Pattilo (2010) developed fully fledged cost-benefit analysis of

monetary integration and applied it to currency unions actively pursued in Africa. They state that, benefits of monetary union come from a more credible monetary policy, while the costs are derived from real shock asymmetries and fiscal disparities. That the proposed EAC, ECOWAS, and SADC monetary unions bring about net benefits to some potential members, but modest net gains and sometimes net losses for others. They advocated for strengthening domestic macroeconomic frameworks provide same improvements as monetary integration, hence reducing the integration relative attractiveness. Belkacem and Imed (2002) used formal and informal criteria, to test whether Gulf Cooperation Council (GCC) is an Optimum Currency Area (OCA). They found that GCC countries are yet to fulfill necessary preliminary conditions for the establishment of Currency Union (CU). Their economies remains dominated by the oil sector, intraregional trade is very limited and, no evidence of convergence of main macroeconomic fundamentals or synchronization of their business cycles. Real exchange rates in GCC are closely related and share the same stochastic trend and hence points to the readiness of the countries of the region for currency union, though to different degrees, strong commitment by all GCC countries to fixed exchange rate arrangements and a strong political resolve to achieve economic integration. Alesina, Barro and Tenreyro (2002) emphasized the gains inherent in monetary union that by coordinating monetary and fiscal policies, the monetary union would bring a greater monetary and price stability which is the prerequisite for economic growth. Rose (2009) testing the hypothesis of currency union has no trade effect by performing a meta-analysis using twenty six recent studies on European countries. Found the EMU has increased trade inside Euro zone by at least 8% (and could be as large as 23%). Santo-Silva and Tenreyro (2010) after reviewing the literature on trade impact of currency union, they states that countries which are geographically close, speaking the same language, and share former colonial links are more likely to form a currency union. Darrat and Al-Shamsi (2005) used Cointegration method between GCC countries' real GDP, inflation rates, financial markets, monetary policies. They found these variables are co integrated. GCC countries share a common long term trend, that is, their economic activities are linked through financial markets and monetary policies. They also opine that only socio political differences preventing them to form a monetary union. In the same vein, Echchabi et al (2011) believed the GCC monetary union will bring many benefits to the GCC countries.

Nnanna (2003) stated macroeconomic performance in the WAMZ member countries has been generally disappointing. The road to economic convergence has been bumpy for all the members, not a single member has succeeded in meeting the convergence criteria on a sustained basis. Overall macroeconomic performance characterized by large swings but remained optimistic despite poor performance, that the WAMZ project is likely to succeed in the long run if authorities persevere. Enhance welfare gains will accrue to WAMZ citizens in the long run, the short term benefit of the project lies essentially on improved macroeconomic environment and operational efficiency which only peer group pressure can force on the WAMZ economy managers. Nnanna (2006) took a comparative analysis of the efforts made by African policy makers towards the achievement of economic and monetary union and appraised the challenges and prospects of achieving the objective. He opine that despite the non compliance to OCA criteria, available evidence seem to suggest that expanded trade, macroeconomic stability, sustained growth and fiscal prudence have become more entrenched in the zones where economic and monetary union arrangements have been formerly institutionalized in

Africa. Itsede (2004) opine that country participating in a monetary union renounces a very important instrument of economic policy. Abandonment of monetary and exchange rate policy would forgo a host of other domestic economic management policy options. These are significant costs that could discourage a country from unionizing. Yet, given the political will to implement decisions, commitment and sincerity of purpose, the gains and opportunities that await integrating countries outweigh the perceived costs. An important issue that is relevant to the discussion of monetary unions is the conduct of fiscal policy by the integrating countries. In a monetary union, national fiscal actions or inactions could impact tremendously on other union members. This possibility is one of the nightmares of integrationists. It carries with it the risk of low inflation countries importing inflation from countries with high rates. This could make the low inflation countries to demur on decisions to advance the cause of regional integration (Itsede, 2001).

McKinnon (1963) incorporate trade factors in theory of OCA, by demonstrating the influence of openness in a currency area and opined that considerations of a country's trade behaviour are essential to determined optimality. Specifically, "move across the spectrum from closed to open economies, flexible exchange rates become both less effective as a control device for external balance and more damaging to internal price level stability". Financial credibility underscored the importance of liquidity where capital accumulation depends on confidence in the domestic currency. Citing the common currency of America's fifty states as an example, noted that small areas are more in need of a fixed exchange rate to assure that individual currencies remain liquid, particularly in cases where intra-regional trade is extensive. Kenen (1969) states that diversification should be of more concern than labour mobility. He noted that homogeneity is not always optimal since a country with a fixed currency would better withstand asymmetric shocks provided her economy is diversified and depended on more than one commodity for revenue base. Frankel and Rose (1998) introduced the notion of endogeneity. They submitted that a group of countries that does not qualify as OCA ex ante may evolve into one ex post, by virtue of adopting a common currency. Those countries with closer trade links tend to have more tightly correlated business cycles and thus, would converge towards the ideal conditions for monetary integration. This observation undermines conventional OCA theory, as it proves difficult to rule out potential common currency regions on the basis of their current shortcomings.

McKinnon (2004) revisited the issue of homogeneity and argues for intra-regional diversification as a safeguard to economic shock, particularly for specialized economies. In effect, heterogeneity offers a risk sharing arrangement within which a homogenous country with a specialized economy benefits from monetary union with countries that have a different revenue base. Thus, when one member suffers an economic shock, others are unhurt and can provide temporary assistance to the needy country. McKinnon (2004) concludes that there are only two compelling reasons for any country not to enter into monetary union with its trading partners: fragile public finances and unstable monetary model. Given that the dollar or the euro could both serve as stable monetary standards in the current international financial arrangement, the only lingering obstacles to optimal monetary integration has been reduced considerably. De Grauwe (2000) enumerated the potential benefits of adopting a common currency and restated that strong trade relations are a precondition for a successful currency union. He focused on the advantages of reducing instability and concluded that Mundell's

criteria were basically restrictive as it ignores the important prospective benefits of monetary integration that put the costs into focus. Grauwe (2000) findings laid the foundation for a more inclusive understanding of OCA's which has influenced the direction of contemporary researches. Devrajan and de Melo (1987) demonstrated that participation in the CFA Zone shielded member states from the negative impact of economic shocks that jolted the global economy during the 1970s. They note that individual and aggregate measures of the Zone's GDP growth are higher than those of other countries in Sub-Saharan Africa. Guillaumont and Plane (1988) analyzed the effects of CFA participation on policy formation in member states by controlling for the effects of exogenous influences such as resource allocations and political influences. They concluded that monetary integration in the CFA Zone benefited participating countries. Guillaume and Stasavage (2000) stated that the advantages of monetary integration were not restricted to CFA countries. They compared the Zone with other African monetary unions, and concluded that membership in other common currency areas offered comparable benefits. For instance, members of the Rand Monetary Area experienced high levels of growth and investment as well as low inflation rates in the period 1974-1993.

Hadjimicheal and Galy (1997) the CFA franc zone does not meet the conventional criteria of an optimum currency area, even after 50 years of existence. Bayoumi and Ostry (1997) opined that one of the major shortcomings of the CFA Zone lies in its insufficient homogeneity. However, they found high inflation correlations for CFA countries, uniformity in economic growth across countries could not be established, indeed, negative correlations were reported in some cases. Growth asymmetry in terms of the high specialization by member countries in the production of primary products, which makes them vulnerable to external shocks and endogeneity may not applied to West African countries.

Guillaume and Stasavage (2000) studied the conditions necessitating the creation of monetary unions and conclude that participation in monetary unions is attractive only if there are no reasonable alternatives. Monetary unions must contend with members' resistance to losing their sovereignty when met by limited prospects of economic benefits and argued that unless members are able to make exit costly, either in terms of losses in regional benefits or links with developed countries, monetary unions have little hope of long term survival. Grandes (2003) analyzed the cost and benefit of the common monetary area in South Africa; state the common monetary area including Botswana formed an optimal currency area given the existence of common long run trends in their bilateral real exchange rates. Macroeconomic efficiency gains could be augmented if these countries went all the way to develop a fully-fledged monetary union. There is evidence of similar production structures, higher output correlation and risk hedging possibilities. Besides, identified divergence in terms of trade shocks, lack of export diversification and pre-dominance of inter industrial trade patterns.

Anyanwu (2003) used panel data from UEMOA and non-UEMOA ECOWAS countries to determine whether monetary union has brought price and output, fiscal and trade stabilization during the period 1990-2001. He found economic growth and stability was greater in the WAEMU countries than in the non WAEMU countries during the study period and reverse was the case for inflation. (Rose, 2000; Frankel and Rose, 2002; Engel and Rose, 2002) using Gravity model on trade for monetary integration. The relationship between currency integration and intraregional trade and they concluded common currency increases trade threefold. Studies examined the impact of monetary union on fiscal policies, based on the theory of credible

commitment. The consensus view is that budget discipline and strict compliance to convergence criteria must accompany any future plans of monetary union in order to ensure success. Collier (1991) advocated the theory of 'agencies of restraint' to regulate governments in African countries. Guillaume and Stasavage (2000) argue that governments can demonstrate their credibility by voluntarily restraining themselves on the issues of monetary intervention and instead, choose a fixed exchange rate regime. Oyejide (1998) stated the potential benefits of trade liberalization and integration for African countries are ingrained in theory of economies of scale. The small size of most SSA economies points to unification as a useful means of expanding markets and increasing participation in the global economy. Thus, a relaxation of trade restrictions within a given region could reduce internal transport costs, stimulate intraregional trade, and ultimately increase the growth and productivity of member states. Trade is the lynchpin to creating a common currency area, because trade integration creates the transnational political and economic infrastructure required for an effective monetary union. Intraregional trade agreements can be adopted without restricting monetary policy flexibility as against monetary union; trade unions preferably permit members to enjoy communal benefits of preferential treatment without sacrificing the benefits of monetary policy autonomy. In spite of these prospects, trade unions in Africa have shown limited capacity of enhancing economic development. Hanink and Owusu (1998) used trade intensity index to analyzed trade within ECOWAS and found trade has not been promoted among members. Oyejide (1998) found that policies to increase intraregional trade are not instrumental in solving the 'Africa growth problem'. Early trade unions in Africa, for instance ECOWAS and the Preferential Trade Area for Eastern and Southern African States (forerunner of COMESA) did not result in appreciable increases in formal intra-regional trade.

METHODOLOGY, MODEL SPECIFICATION AND DATA

Testing OCA for WAMZ: Generalized Purchasing Power Parity Approach

The paper employed Generalized Purchasing Power Parity Approach (GPPP) in assessing the feasibility for the formation of currency area developed and tested by Enders and Hurn (1994). The core idea of this approach starts from the fact that real exchange rates of potential candidates for a monetary union area are stochastic. Because the fundamental macroeconomic variables (forcing variables) that determine real exchange rates are also non stationary and follow divergent growth paths. For integrating countries to become successful currency area, they ought to experience convergence and symmetric shocks to their fundamentals. Their shocks must converge and be sufficiently interrelated to allow for the real exchange rates to have common stochastic trends. This theory advocates the real exchange rates of currency area should be co-integrated. This implied the bilateral real exchange rates of these countries should have at least one linear combination that is stationary.

The generalized purchasing power parity involves testing the existing of co-integrated vectors between the exchange rates of the currency union or testing for equilibrium relationship that exists between the bilateral real exchange rates, thus:

$RER_{12t}=\alpha + \beta_{13}RER_{13t}+\ldots + \beta_{1k}RER_{1kt}+\varepsilon_t$……………………………………………………..(1)

Where RER_{1it} is the real exchange rate between base country and country i in period t, α_0 is the constant term and β_{ij} are the co-integrating vector and represent linkages among the economies of the currency area, and $\varepsilon_t$is a white noise error term.

Co-integration test

The test for Co-integration is the necessary step in order to determine if the variables have a long run relationship; the idea of using co-integration techniques in studying non stationary time series was first introduced by Granger (1981) and advanced by (Granger and Weiss, 1983; Engle and Yoo, 1987; Engle and Granger, 1987; Johansen, 1988; and Johansen and Juselius, 1990). Co-integration theory provides a unified framework for examining the long run equilibrium relationship and short-run dynamic behavior existing between two (or more) non stationary economic time series. In order to test for co-integration, the multivariate maximum likelihood co-integration technique proposed by Johansen (1988) is employed in this paper. It fully captures the underlying time series properties of the data, it provides estimates of all of the co-integrating vectors that exist among a vector of variables, and also offers a test statistic for the number of co-integrating vectors. A further advantage of employing the Johansen technique it allows direct hypothesis testing on the coefficients entering the co-integrating vectors. This can be stated generally for unrestricted vector auto regression thus:

$$Y_t = \prod_1 Y_{t-1} + \ldots + \prod_k Y_{k+1} + \mu + e_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where; $\prod$ is an (n x n) matrix whose rank determines the number of distinct co-integrating vectors that exist among the variables in (n x 1) vector Y_t. If the rank of $\prod$ matrix is zero, each element of $\prod$ must equal zero. For co-integration to exist the rank of the $\prod$ matrix has to be greater than zero and less than n that is $0<r_n<n$, where r_n is the number of co-integrating vectors in vector Y and n is the number of variables contained in vector Y. If the rank of $\prod$ matrix, denoted as rank ($\prod$), equals one, there is a single co-integrating vector, on the hand, if 1 <rank ($\prod$) < n, there are multiple co-integrating vectors. When $0 <r_n< n$,.

In Maximum likelihood Co-integration approach; we used trace and Maximum Eigen-value. Both can be use to determine the number of co-integrating vectors, they don't always indicate the same number of co-integrating vectors. The distribution of both tests statistics is non-standard. The Trace test is a joint test with null hypothesis of number of co-integrating vectors which is less than or equal to r, against alternative hypothesis that there are more than r co-integrating vectors. The Maximum Eigen-value test conduct separate tests on each Eigen-value with null hypothesis that there are r co-integrating vectors which exist against the alternative hypothesis that there exists (r + 1). However, whenever the result of the two tests shows different co-integration vectors, we go with the trace test in estimating the error correction model.

According to Granger (1981) co-integration theorem for any order one I(1) series, so long as there is long run relationship, there must be error correction model in the short run to bring series back to long run path. Equation (2) can be generalized for dynamic model (Error correction model) as follows;

Given (n+1) vector $Y_t = (Y_{1t}, Y_{2t}, \ldots, Y_{nt})$ has an error correction representation, if it can be expressed in this form;

$$\Delta Y_t = \prod_0 + \prod_1 Y_{t-1} + \prod_1 \Delta Y_{t-1} + \prod_2 \Delta Y_{t-2} + \ldots + \prod_p Y_{t-p} + e_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where; $\prod_0 =$ an (n+1) a vector of intersect terms

$\prod$ = is a matrix with elements such that one or more of the $\prod_{jk} \neq 0$

$\prod_i$ = (n x n) coefficients matrices with elements $\prod_{jt(i)}$
e_t, = an (n x n) vector with elements $e_{it.}$

We can define two n x r matrices such that $\prod$ = αβ′ where β is a matrix of co-integrating vectors and α is a matrix of error correction coefficients. The rows of β′ form the r distinct co-integrating vectors, such that, if β_i' is the ith row of β′ then $\beta'_i Y_i \sim I(0)$.

Data Descriptions

Two alternative base countries were used to constructs real exchange rate series, the base countries are Federal Republic of Nigeria. The choice of Nigeria as a base country is predicated on its economic dominance among WAMZ member economies, and could represent the dominant country in forming a successful currency union and the United States of America (USA) is selected base on its close relationship with most of these countries and its currency dominance in World trade.

The real exchange rate that is employed is defined thus:

$$RER_t = \frac{S_t P_t^*}{P_t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

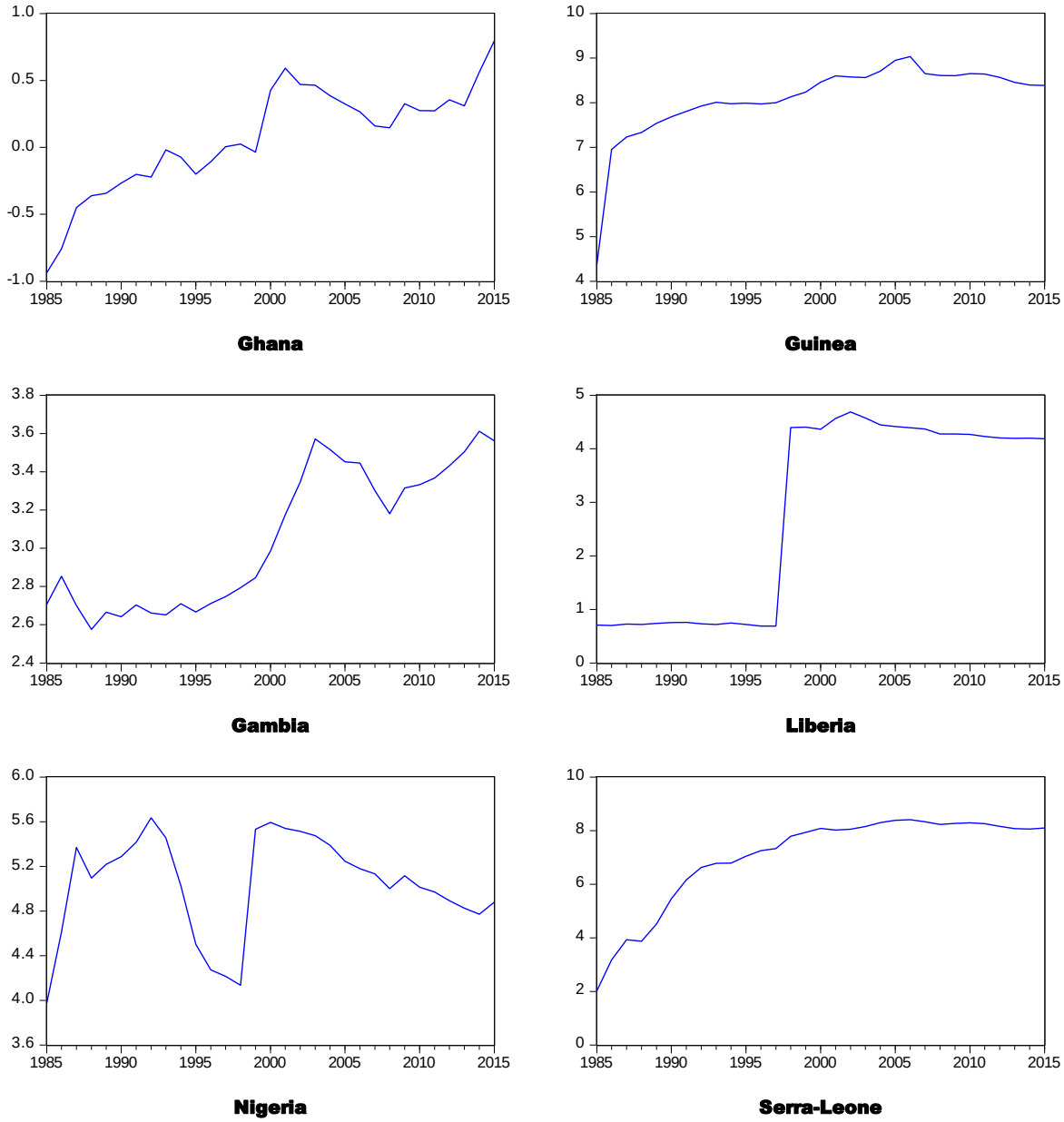
Where S_t is the nominal exchange rate expressed as the number of domestic currency units for one unit of the currency of the base country, P_t^* and P_t are the consumer price index of the base and the home country respectively.

The annual data covers 1985 to 2015 for nominal exchange rates and consumer price indices for WAMZ and USA were obtained from the United Nations Conference on Trade and Development (UNCTAD), we use the logarithm of the real exchange rates as stated in equation (4).

RESULT AND DISCUSSION

To determine if generalized purchasing power parity holds for WAMZ members states, the first step to is to determine whether the real exchange rate is stationary or not. While using Nigeria as the base country, the WAMZ member currency movement during the period of 1985-2015 has the following coefficients of variations: Ghana 0.09, Guinea 0.20, Gambia 0.27, Liberia 0.07, Nigeria 0.11 and Serra-Leone 0.91. Liberia has the lowest volatility rate against the Naira while Serra-Leone had highest rate of volatility against the Naira. On average, the currencies of intending currency union members are relatively stable among member countries, which is a good omen for the formation of monetary union. By using US as base country, the coefficients of variations are Ghana 0.56, Guinea 0.11, Gambia 0.12, Liberia 0.64, Nigeria 0.08, and Serra-Leone 0.26. Nigeria has the lowest fluctuation against US dollar while Liberia had highest fluctuation against US Dollar. This is not a surprised as Liberian currency moves from been at parity with US dollar to 41.8 to a Dollar in 1998. However, on average the volatility against dollar is not chaotic in this region. Figure 1, display the graphical stochastic nature of the exchange rate, a visual inspection tells us rates are not stationary. This is confirmed by unit root test result in Table 1, which shows the variables are integrated of order one I(1) except for Liberia and Gambia in Nigeria base country of nominal rate and Liberia and Sierra-Leone in real exchange rate of Nigeria base country.

Figure 1.Real Exchange Rates of WAMZ 1985-2015



Source: Authors

Table 1: Unit Root test Result

Base Country: Nigeria

Countries	**Nominal**		**Real**	
	Level	First Difference	Level	First Difference
Ghana	-2.39 (0.84)	-3.88 (0.00)	-0.89 (0.78)	-5.53 (0.00)
Guinea	-1.85(0.35)	-4.16 (0.00)	-2.86 (0.19)	-5.29 (0.00)

Gambia	-3.84(0.00)	-	-1.21(0.65)	4.25 (0.00)
Liberia	-85.25(0.00)	-	-7.11 (0.00)	-
Nigeria	-	-	-3.11(0.12)	-4.66(0.00)
Serra-Leone	-3.47(0.06)	-3.46 (0.00)	-3.91(0.03)	-
		Base Country: Nigeria		
Ghana	1.88 (0.99)	2.60(0.00)	-2.35(0.39)	-3.44(0.00)
Guinea	-1.38(0.84)	-3.81 (0.00)	-1.19 (0.89)	-4.29 (0.00)
Gambia	-2.83(0.19)	-2.98(0.00)	-2.89 (0.18)	-3.75 (0.00)
Liberia	2.39 (0.73)	-4.87 (0.00)	-1.37 (0.85)	-5.09 (0.00)
Nigeria	-2.27 0.44)	-4.244(0.00)	-1.37 (0.85)	-5.09 (0.00)
Serra-Leone	-2.77(0.22)	-5.79 (0.00)	0.03 (0.99)	-2.86 (0.00)

Note: Critical value 5% with trend at level -3.574, first difference 5% -1.955, figure in parenthesis are probability Values.
Source: Authors

Table 2, Co-integration Test (Nigeria base country)

		Trace		**Maximum Eigen Value (λ_{Max})**				
H_o	**H_1**	**Stat**	**5% Critical**	**H_o**	**H_1**	**Stat**	**5% Critical**	**λ Value**
r=0	r>0	192.79	95.75	r=0	r=1	70.88	40.07	0.92
r≤1	r>1	121.90	69.81	r=1	r=2	61.6	33.87	0.88
r≤2	r>2	60.29	47.85	r=3	r=3	30.88	27.58	0.66
r≤3	r>3	29.41	29.79	r=3	r=4	17.92	21.13	0.47
r≤4	r>4	11.48	15.49	r=4	r=5	7.37	14.26	0.23
r≤5	r>5	4.11	3.84	r=5	r=6	4.10	3.84	0.14

Source: Authors

Table 2, revealed 3 co-integration vectors in the exchange rate of WAMZ countries using Nigeria as the base country.

Table 3, Co-integration Test (US base country)

		Trace		**Maximum Eigen Value (λ_{Max})**				
H_o	H_1	Stat	5% Critical	H_o	H_1	Stat	5% Critical	λValue
r=0	r>0	149.54	95.75	r=0	r=1	55.67	40.08	0.85
r≤1	r>1	93.87	69.81	r=1	r=2	34.83	33.88	0.67
r≤2	r>2	61.04	47.85	=3	r=3	29.89	27.58	0.64
r≤3	r>3	31.14	29.79	r=3	r=4	14.93	21.13	0.40
r≤4	r>4	16.20	15.49	r=4	r=5	13.69	14.26	0.37
r≤5	r>5	2.50	3.84	r=5	r=6	2.51	3.84	0.08

Source: Authors

Table 3, the trace test indicate 5 co-integrating vector while rank test indicate 3 co-integration vectors in the exchange rate of WAMZ countries using USA as the base countries, having

established existent of Cointegration in both base countries. We move on to estimate coefficient of co integrating vector β's, and associated coefficient of adjustment (speed) vectors α's.

Table 4, Co-integrating and error correction (Adjustment) Vectors

	Countries					
Parameters	**Nigeria**	**Ghana**	**Guinea**	**Gambia**	**Liberia**	**Serra-Leone**
β_{nga}	1.000	-20.579	-2.694	(1.567)	-11.138	-0.911
		(2.560)	(1.567)	(1.986)	(2.239)	(0.561)
α_{nga}	-0.080658	-0.038	-0.075	-0.009	0.039	0.116
	(-1.603)	(1.849)	(3.438)	(0.372)	(2.789)	(4.412)
β_{usa}	1.000	-17.642	-24.898	29.113	-1.4093	12.912
		(10.024)	(6.587)	(4.985)	(1.514)	(1.668)
α_{usa}	-0.269	-0.074	-0.124	-0.047	0.009	-0.224
	(-4.902)	(-1.567)	(-2.102)	(-1.051)	(0.020)	(-3.162)

Note: figure in parentheses are the t-value.
Source: Authors

The β's coefficients are long term elasticity, while α's the error correction term (adjustment coefficients) indicating speed of adjustment toward long run equilibrium. Having found long run (Cointegration) relationships, it implies generalized purchasing power parity holds for WAMZ countries and meet threshold for monetary union. This result coincided with Belkacem and Imed (2002) on Golf countries cooperation (GCC). The long run relationships for all exchange rates of WAMZ countries are significant except Sierra-Leone in Nigeria base country and all were significant in US base country. We used coefficient zero restriction Likelihood Ratio test to determine if indeed exchange rate of Liberia in Nigeria base and Serra-Leone in US base are zero, the null hypotheses were rejected at 95 percent level. This may reflect that Liberia and Sierra-Leone was least suitable candidate for monetary union in this sub-region.

Furthermore, the speed adjustment α's for Gambia and Liberia is very small indicating a slow pace of adjustment, while Gambia has expected negative sign but Liberia had positive sign, indicating none adjustment towards equilibrium but further diverging from long run equilibrium. The differences in speed of adjustment might reflect differences in economic condition of these countries which require different policy measures. Given this result, Gambia and Liberia are less homogeneous members compared to rest of WAMZ countries and they should be given special attention in West African Monetary zone constitution formulation. The success of WAMZ monetary union will require more policy coordination and harmonization of business cycle among intending member countries. Practical steps be taken to ensure realization of the single market comes live and restrictions of all kinds on free movement of good and productive factors are eradicated completely. Table 5;, shows macroeconomics indicators, the performance of members countries budget deficit/surplus as percentage of GDP have improved over the years with countries like Sierra-Leone, Guinea and Gambia all experiencing budget surplus all through the period under review, while Nigeria, Gambia and

Liberia has deficit but relatively within the target, except Gambia for few years. They have also improved in inflation performance, as it decrease year on year except Sierra-Leone with increasing rate, though above the target rate of single digit. Furthermore, only Nigeria among all member countries under reviewed had perform excellently well in central bank financing of budget deficit. Overall the performance is mix in budget deficit performance among members countries and gross external reserves for three months import bill in most countries are well above three month target.

Table 5, Convergence Criteria

		Primary criteria		
Year	Budget Deficit/ Surplus/GDP ≤4%	Inflation Rate Single percentage digit	Budget Deficit financing ≤10%	Gross External Reserve (Months of Import) ≥3
2001	-3.20	16.50	0.00	8.90
2002	-3.90	12.20	0.00	6.20
2003	-2.00	23.80	37.60	4.90
2004	-1.20	10.00	0.00	11.60
2005	11.60	11.60	0.00	11.00
2006	-0.60	8.50	0.00	17.30
2007	-0.60	6.60	0.00	14.80
2008	-0.20	15.10	0.00	17.20
2009	-3.30	14.00	0.00	16.60
2010	-5.00	11.80	0.00	7.90
2011	-2.60	10.30	0.00	6.40
		Country: Ghana		
2001	13.20	21.30	0.00	1.40
2002	8.30	15.20	12.10	2.70
2003	7.50	23.60	0.00	5.00
2004	8.10	11.80	27.70	4.60
2005	6.90	13.90	0.00	4.00
2006	7.00	10.90	0.00	3.70

2007	9.50	12.80	0.00	3.90
2008	10.60	18.10	38.70	2.20
2009	7.00	16.00	0.00	4.40

Continuation of Table 5

2010	8.30	8.60	0.00	4.80
2011	3.00	8.60	8.80	3.20
		Country: Guinea		
2001	5.20	1.10	9.90	4.40
2002	8.00	6.10	27.10	3.70
2003	10.50	14.80	16.10	1.80
2004	5.90	27.60	23.10	1.10
2005	0.80	29.70	-0.40	0.90
2006	1.80	39.10	81.60	0.60
2007	0.50	12.90	-1.10	0.40
2008	1.70	13.50	16.60	0.60
2009	6.80	7.90	40.10	2.20
2010	14.40	20.80	82.90	1.90
2011	3.80	19.00	-17.40	4.30
		Country: Gambia		
2001	-10.00	8.10	-	8.20
2002	-9.10	13.00	-	5.20
2003	-7.60	17.60	-	4.60
2004	-8.60	8.00	-	5.00
2005	-7.40	4.90	-	5.20
2006	-2.70	0.40	-	6.40
2007	-1.00	6.00	-	4.40
2008	-3.30	6.80	-	4.40
2009	-8.60	2.70	-	4.70
2010	-8.20	5.80	-	6.80
20011	-11.40	4.40	-	6.10

Continuation of Table 5

2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-12.20	11.70	0.00	-
2008	2.69	9.40	0.00	2.06
2009	2.03	9.70	0.00	3.62
2010	-6.36	6.61	0.00	4.32
20011	0.23	11.45	0.00	3.33
		Country: Sierra-Leone		
2001	16.54	3.43	0.00	2.40
2002	11.70	-3.08	0.00	2.70
2003	9.96	11.29	24.26	1.70
2004	8.64	14.39	0.00	3.82
2005	9.57	13.10	0.00	4.02
2006	8.55	8.26	13.27	4.15
2007	4.97	12.15	0.00	5.30
2008	7.92	13.20	0.30	4.30
2009	10.35	12.20	21.23	6.18
2010	14.02	17.84	66.69	5.40
20011	13.99	16.79	1.13	2.44

Source: WAMI

CONCLUSION AND RECOMMENDATION

Most regions within the African continent, has been nursing financial integration and monetary union ambition. The West African States have earlier agreed on a roadmap to establish a common currency known as the “Eco” by 2020. The Eco is to pave way for the West African Monetary Zone (WAMZ), which was supposed to have been launched in 2015 with creation of a Central Bank and shared currency for the six WAMZ states. The paper examines feasibility of proposed West African Monetary Zone, using tests based on Generalized Purchasing Power Parity (G-PPP) theory. Backed by Unit root test, co-integration and error correction model and assessed primary convergence criteria for formation of West Africa Monetary Zone (WAMZ). The exchange rates were not stationary at level and became stationary at first difference. There is long run relationship among exchange rate of WAMZ member states and the speed of adjustment differs among member countries. However, Liberia

is not converging to equilibrium, generalized purchasing power parity (G-PPP) holds for WAMZ member states; our finding is consistent with Belkacem and Imed (2002) on Golf countries cooperation (GCC). At the moment, no country has met all primary convergence criteria, though they have shown signs of commitment in improving their performance. Though they did not fulfilled the ex-ante criteria for monetary union at present, they might fulfill the ex post criteria after monetary union. For a successful and sustainable monetary integration WAMZ members will requires more policy coordination and harmonization of their business cycle. Practical steps should be taken to ensure realization of the single market comes live and restrictions of all kinds on free movement of goods and productive factors are eradicated altogether.

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