

ISSN: 2415-0304 (Print)
ISSN: 2522-2465 (Online)

Indexing/Abstracting



EMPIRICAL
ECONOMIC
REVIEW | EER

Viability of a Stable West African Monetary Union

Author: ¹Abdullahi Zakari Yahaya
^{2C} Louis Sevitenyi Nkwatoh

Affiliation: ¹Economics Department, Usmanu Danfodiyo University, Sokoto, Nigeria
^{2C} Economics Department, Yobe State University, Yobe, Nigeria

Email: ¹yahya.zakari@udusok.edu.ng
^{2C} sevinkwatoh@gmail.com

Published by
Department of Economics



School of Business
and Economics

University of
Management and
Technology
Lahore, Pakistan

Submission: March 07, 2019

Acceptance: June 19, 2020

Article Information:

To cite this document

Yahaya, A. Z., & Nkwatoh, L. S. (2020). Viability of a stable west african monetary union. *Empirical Economic Review*, 3(1), 1-18.

This manuscript has been published under the terms of Creative Commons Attribution 4.0 International License (CC-BY). EER under this license lets others distribute, remix, tweak, and build upon the work it publishes, even commercially, as long as the authors of the original work are credited for the original creation and the Contributions are distributed under the same license as original.



The online version of this manuscript is available at
<https://ojs.umt.edu.pk/index.php/eer/article/view/434>

DOI:10.29145/eer/31/030101

Additional Information

For Subscriptions Email: editorasst.eer@umt.edu.pk

For further information, please visit

<http://ojs/index.php/eer/home>

Viability of a Stable West African Monetary Union

Abdullahi Zakari Yahaya¹
Louis Sevitenyi Nkwatoh^{2C}

Abstract

There is apparently non-synchronization of business cycles in the Economic Community of West African States (ECOWAS). This may likely threaten the effectiveness of the monetary union. This study investigated the viability of a stable West African monetary union in the ECOWAS region. The study used the Ghosh-Wolf output loss function after de-trending the annual growth rates of real GDP from 1975 to 2015, using Baxter-King filter approach. The results indicate that smaller economies in the region (Cape Verde, Gambia, Sierra Leone and Mali) will compromise the stability of the union because their cost of pursuing a common stabilization policy will be very high, while larger economies (Nigeria and Ghana) will incur relatively low cost compared to the other groups. Also, the output losses of WAEMU economies fall within a particular range and are relatively lower compared to that of smaller economies in the region probably because they pursue a common stabilization policy. The implication of these findings is that the stability of the envisaged West African monetary union is likely to be compromised since smaller economies in the region will be worse-off than larger economies. Thus, in order not to compromise the stability, smaller economies should not be admitted at the initial stage of the union until they satisfy all the criteria.

Keywords: ECOWAS, Ghosh-Wolf output loss function monetary union, optimal currency area, stability.

JEL Classifications: E52, F33, F36, C12, C32

¹ Economics Department, Usmanu Danfodiyo University, Sokoto, Nigeria.
Email: yahya.zakari@udusok.edu.ng

^{2C} Economics Department, Yobe State University, Yobe, Nigeria.
Email: sevinkwatoh@gmail.com



1. Introduction

The stability of a monetary union is incumbent on a set of macroeconomic convergence criteria (otherwise known as entry requirements) that must ensure an optimal policy for member countries. Correlation and synchronization of macroeconomic shocks necessitate a robust monetary union which safeguards other member countries from individual harmful shocks (Jenkins & Thomas, 1996) and enhances fiscal discipline (Cham, 2009).

The stability of the union accentuated in the New Optimum Currency Area (NOCA) theory focuses on synchronicity of business cycles of intending member countries. Business cycles according to Krugman (1993) create a good precondition for policy integration as well as the creation of a currency area. Fielding and Shields (2001) and Njoroge, Opolot, Abuka and Appa-Okello (2011) argued that policy coordination and harmonization are observable if business cycles are similar, and when shocks are symmetric among member countries. Implicitly, stability is guaranteed if the synchronicity of business cycles of member countries portends ample benefits for the entire union.

The synchronicity of business cycles as a requisite condition for a stable monetary union is predicated on the coexistence of weaker and stronger economies in a monetary union. This view articulated within the premise of the neo-classical growth theory emphasizes that weaker economies (low income) in a given sample will eventually catch-up with stronger economies (high-income) since weaker economies have every tendency to replicate production methods, technologies, institutions and economic activities of stronger economies (Fuente, 2000; Jenkins & Thomas, 1996; Rassekh & Thompson, 1993). Hence, countries with non-synchronous business cycles may disturb the monetary union, and can, therefore threaten the union's stability. This postulation is reinforced by Mink, Janp and Jakob (2007) who exemplified in their study that the instability in the Euro zone is due partly to the diverse national business cycles of Euro member countries.

ECOWAS countries are committed to forming a wider and stable monetary union between West African Monetary Zone (WAMZ - Gambia, Ghana, Guinea, Nigeria, Liberia and Sierra

Leone) and the West African Economic Monetary Union (WAEMU- Benin, Burkina Faso, Côte D'Ivoire, Mali, Niger, Senegal and Togo) by 2020. Yet, the business cycles across the entire region remain weak and non-synchronous as opined by the Central Bank Governor of Nigeria cited in Uche (2016). Moreover, ECOWAS economies neither grow nor recess at the same time, which underscores the non-synchronicity of their business cycles. USAID Report (2012) shows that, Ghana's real GDP growth was expected to hit double-digits in 2011 and 2012; Nigeria's real GDP growth rates were expected to be approximately 6–8 percent between 2009 and 2012. In like manner, Burkina Faso and Sierra Leone accelerated their growth rates in 2010 and 2011. While, the political crisis in Côte d'Ivoire contracted its real GDP by 7 percent in 2011, Cape Verde's economy was intensely effected by the global financial crisis.

A major implication of the non-synchronicity of ECOWAS business cycles is that the policy conflicts emanating from the diverse economic structures of member countries may likely threaten the stability of the envisaged monetary union. For instance, larger economies like Nigeria, Ghana etc., can decide to thwart policy objectives of the entire union to meet their domestic targets. Thus, the objective of this study is to investigate the viability, of a stable West African monetary union.

2. Empirical and Theoretical Review

2.1. Theoretical Issues

According to the traditional optimum currency area (TOCA) theory, similarity in shocks is a requisite for setting up a monetary union because the cost of forfeiting monetary autonomy becomes lesser when the shocks among candidate economies are identical. Conversely, the new optimum currency area (NOCA) theory which is more forward looking considers that the requisite condition emphasized in the TOCA is strengthened and attainable only after the monetary union is formed. The NOCA theory is an extension of the TOCA theory, introduced by Frankel and Rose (1998) states that, member countries with higher trade volume are more integrated within monetary union if their business cycles are synchronous. Lending credence to Frankel and Rose's conjecture, De Grauwe

(1997) submits that the national business cycles of Euro members became more synchronized with higher trade integration. This argument buttresses an earlier submission advanced by Krugman (1993) that increased economic integration leads to higher information flow and specialization, which in turn leads to regional concentration of industrial activities. By implication, more benefits are derived from a monetary union when members become integrated.

Inferences on monetary union stability have been exemplified in the real convergence hypothesis approach, which considers, diffusion of technology, capital-labour mobility and globalization as key requirements to further strengthen a monetary union. The focal point of the convergence hypothesis resides on the tendency for developing economies to outpace developed economies. Because in the process of growth, both economies attain similar growth patterns that guarantee the stability of macroeconomic variables. Thus, similarities in the level of development ensure that the benefits of regional economic integration are realized more evenly among the member countries (McCarthy, 2002).

A crucial assumption of the neoclassical growth model is that if all economies attain similar steady state of labour productivity, then the only difference across countries lies in their initial capital stock which makes capital deficient economies to accelerate growth because they are away from their steady state. Consequently, poor economies would eventually “catch-up” with rich economies (Jenkins & Thomas, 1996; Rassekh & Thompson, 1993). Reason being that, there will be a flow of capital from rich to poorer economies which will enable them to accelerate growth than rich economies (Solow, 1956; Rassekh & Thompson, 1993; Kim, 1998). In the same process, technology and low wages will be moved from more advanced economies to less advanced economies that will allow the latter to outpace the former. This implies that, less advanced economies that were initially more technologically-backwards tend to “catch-up” faster with advanced economies if they were to embrace new technology (Abramovitz, 1986). Nindi (2012) inferred from Ohlin’s model that countries producing

homogenous goods, using the similar technology and facing price competition would end up with equalization in their factor prices. Consequently, weaker economies have an excellent opportunity to catch-up with rich ones by adopting and adapting modern technology (Dowrick & DeLong, 2003).

According to the Heckscher-Ohlin Factor Price Equalisation theorem, movement of factors across a region will force factor prices to converge, thereby causing poor economies to catch-up with rich ones (Kwok & Lai, 2009). Sachs and Warner (1995) argue that globalization has indeed promoted growth and integration only for countries that allow free goods and capital mobility.

A synopsis of the Heckscher-Ohlin-Samuelson (HOS) model, illustrates that trade between trading regions will cause factor prices of these regions to converge even in the absence of perfect factor mobility. Kim (1998) and Bajona and Kehoe (2010) note that free trade in commodities causes the relative prices of commodities for trading partners to equalize, which in turn causes factor prices and national incomes to equalize.

Thus, transfer of technology, capital-labour mobility and globalization can guarantee the stability of a monetary union since it will leverage weaker economies to catch up with stronger economies after a union is formed.

2.2. Empirical Literature Review

A more plausible approach that analyzes the stability of a monetary union and does not rely on any inference is the use of the output-profit loss function. The output function is a genetic optimization algorithm adapted from Ghosh and Wolf (1994) which requires the use of the VAR estimates when analysing the degree of shock symmetry among monetary union members. Cheung and Yuen (2005) and Sato and Zhang (2006) are the first to use this approach in the case of China alongside (Ellyne & Veller, 2011) for SSA.

Cheung and Yuen (2005) used the output loss estimates to evaluate the cost of adopting a common currency in Asia. Using seasonally adjusted per capita GDP of China, Japan, and Korea from 1993 to 2001, they concluded that the different policy targets of each

country would make the Asian zone unstable. Contrarily, Sato and Zhang (2006) employed the Kalman filter approach on GDP per capita from 1985 to 2003. Their findings showed that the Asian Zone would be relatively stable if they surrender their monetary autonomy. Replicating the aforementioned methodology, Veller and Veller and Ellyne (2011) minimized the total output loss for the entire Sub Saharan Africa to ascertain the viability of a common currency for the entire region. Her findings suggest that the three regional currency areas would be better off than when a common currency is adopted for the entire Sub Saharan Africa.

Fiscal cooperation can guarantee a stable monetary union as well as the harmonization of fiscal and monetary policies of member countries. Bovenberg, Kremers and Masson (1991) submitted that conflicts between national fiscal authorities and the European Central Bank arise because macroeconomic instruments often adjust to stabilize governments' debts in the Euro zone. Piffanelli (2001) established that some form of fiscal coordination is required for equilibria in which monetary policy alone is unable to secure price stability. He affirmed his position by using a standard general equilibrium model representing a monetary union with two countries featuring monopolistic competition and price rigidity. Tabellini (1986) arrived at the same results after formulating a differential game on government debt stabilization between the fiscal and monetary authorities in a closed economy. Beetsma and Bovenberg (1995) also showed that fiscal and monetary coordination in a currency union reduces inflation, taxes and public spending, which in turn increases the welfare of union members.

Beetsma and Giuliodori (2010) explored the effect of monetary and fiscal policy conflicts on macroeconomic outcomes in a monetary union. They concluded that the cost–benefit tradeoff of unification differs substantially between developed and less-developed countries, hence, the scope of the unification may be dominated by seigniorage revenues.

3. Methodology

Two steps are employed in this study: 1. De-trending the GDP growth rate using Baxter-King (BK-1999) filter approach and 2.

Employing the Ghosh-Wolf (1994) output loss function. The BK filter is used to isolate trend components from the annual growth rate of real GDP series. First, a range of duration is chosen based on economic theory and prior assumptions about the duration of business cycles. For instance, suppose that the business cycle lasts somewhere between 1.5 and 8, then the lower band is set at 1.5 years and the upper band at 8 years. In doing so, the low frequency is removed and the high frequency of the cyclical components are filtered (Eviews Help Menu, Version 9.5). Secondly, the BK filter provides three sub-component of data series. These are time trend, cycles around trend and random movement:

$$y_t = \tau_t + c_t + \varepsilon_t \quad (1)$$

Where τ_t is the time trend; c_t is the cyclical component and, ε_t is the irregular component (Baxter & King, 1999).

From the equation above, a finite symmetric moving average is applied to extract the cyclical components from the time series and a new time series y_t^* is generated.

$$y_t^* = \sum_{k=-K}^K \beta_k y_{t-k} \quad (2)$$

Where K , is the maximum lag length and β_k is a constant or weights that add to zero.

In calculating the output loss, the study employed the (Ghosh & Wolf, 1994) model which shows the cost of each individual country when it relinquishes monetary policy autonomy to adopt a common currency. According to Sato and Zhang (2005), it is a highly simplified model that enables one to empirically assess the cost of forming a currency union.

A critical assumption is that nominal wages are rigid to establish the benefits of an autonomous monetary policy. Prior to the adoption of a common currency, member countries use their sovereign policies to control economic activities and maintain full employment under the assumption of wage rigidity. But a monetary union uses a common policy to avert a union's shock which is in function of individual countries' shocks. Since the monetary union's

shock is not unique to all member countries, the common policy may not likely cause individual countries to achieve full employment (Cheung & Yuen, 2005). Hence, this will induce a cost (output cost) of joining a monetary union. In analysing the output loss function of a currency union, (Ghosh & Wolf, 1994) assumed that nominal wage of each country is rigidly downwards.

Let a country's output at time t be given as follows:

$$Q_t = e^{\theta_t} l_t^\alpha \quad (3)$$

Where θ_t is a productivity shock, l_t is labour employed in period t , and $0 < \alpha < 1$ is the labour share. The real wage is equal to the marginal product of labour. Since the nominal wage rate w_t , is downward sticky and depends on previous year's information, $t-1$, it implies that:

$$\log(w_t) = \log(E_{t-1}P_t) + \log(\alpha) + E_{t-1}\theta_t + (\alpha - 1) \log(\bar{l}) \quad (4)$$

Where, P_t is the price level, and E_{t-1} is the expectation operator based on previous years information $t-1$. \bar{l} is the equilibrium employment level. Thus, simulating the above two equations Gosh and Wolf arrived at the final expected output loss function as:

$$L_t = [1 - \exp(\varepsilon_t - \varepsilon_t^0) \alpha / (1 - \alpha)] \quad (5)$$

Where ε_t denotes the productivity stock to individual countries, ε_t^0 is union's shock, α is labour share and $\varepsilon_t < \varepsilon_t^0$.

To ensure that the result is robust, two alternative shocks ε_t to individual economies will be evaluated in the model - shock generated from BK filter will be captured as GDP-weighted average of individual country's shocks. Lastly, the value of the labour share parameter α is between the range 0.3 and 0.7 as defined by Gosh and Wolf, and adopted by (Cheung & Yuen, 2005; Sato & Zhang, 2006; Maboreke, 2011).

Annual data for real GDP growth rates from 1975 to 2015 for 14 ECOWAS countries: Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo were extracted from World Development Indicators (WDI). Liberia was excluded from the study due to paucity of data.

4. Results and Discussions

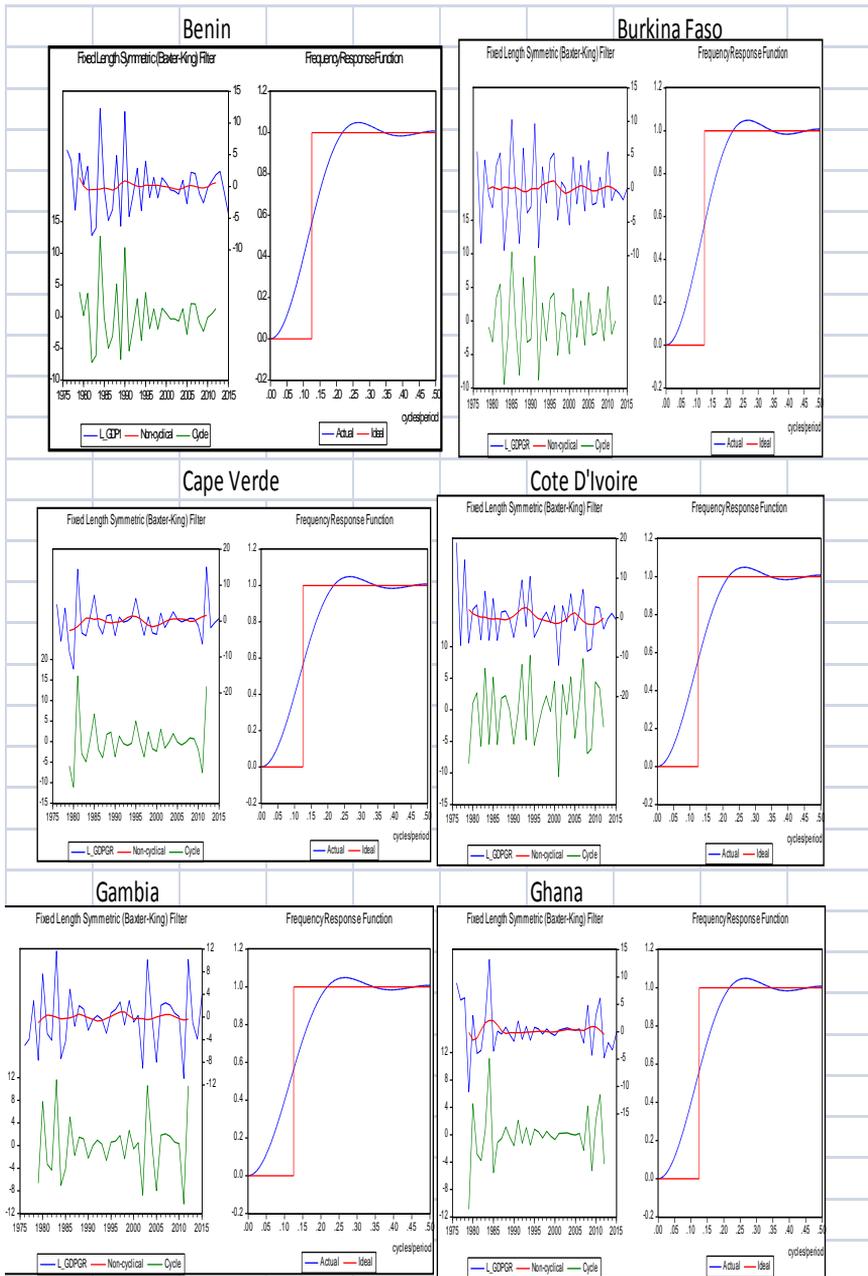
The NOCA theory stresses on the importance of the benefits of a monetary union even though the shocks may originate from heterogenous sources for each country. Cheung and Yuen (2005) argue that a common stabilization policy is effective in tackling and fine-tuning economic activities only when shocks are asymmetric, and national business cycles synchronize.

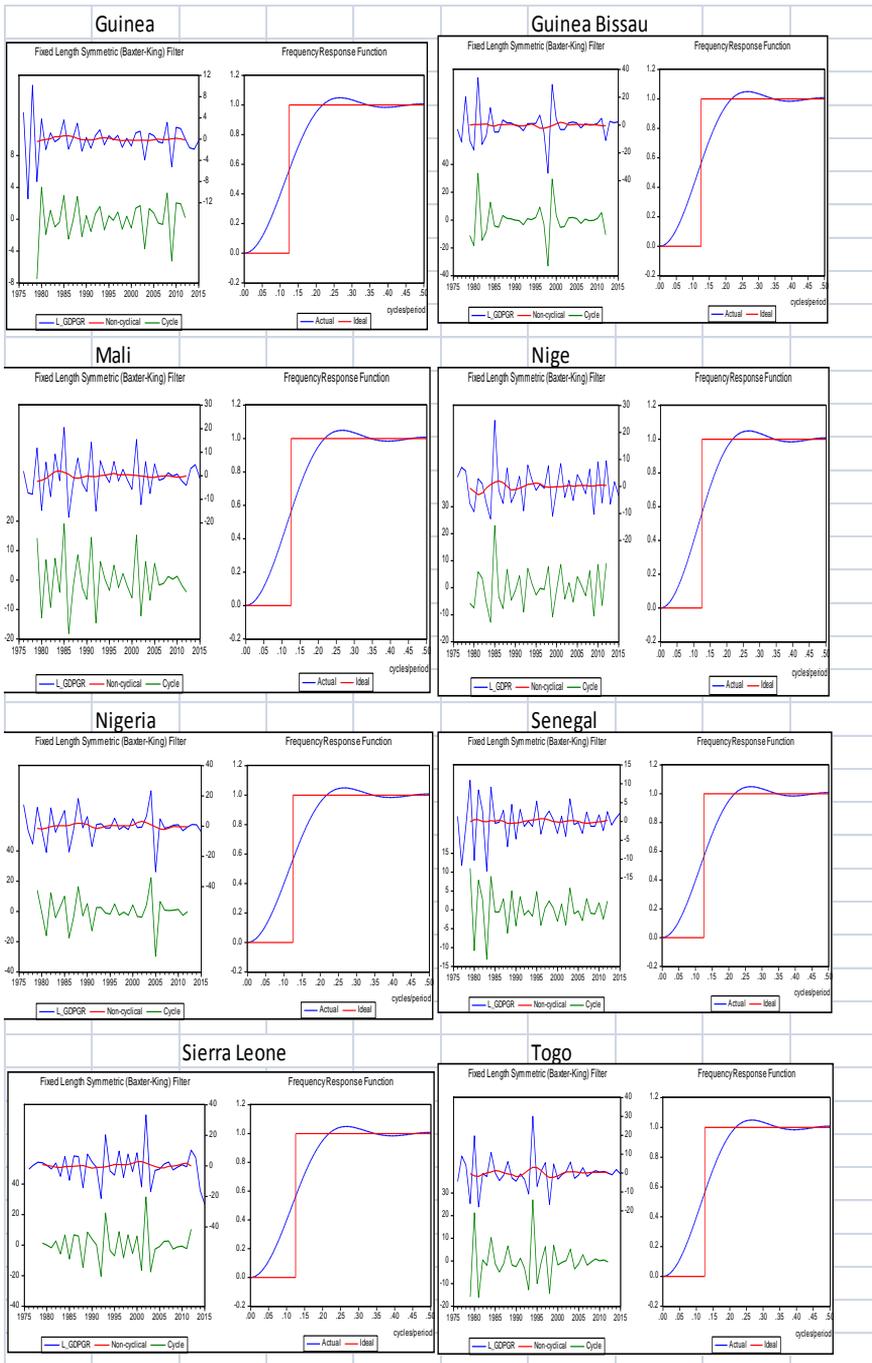
Therefore, the analysis of business cycles to know whether a currency union will be beneficial to ECOWAS economies is important. For national real business cycles (RBC) to synchronize, there must be a correlation between trend (permanent) and cyclical (transitory) components of real GDP growth.

The correlations representing the business cycle synchronization of West Africa States are shown in figure 1. It is evident here that economies in ECOWAS are not able to maintain steady growth. The trend component of RBC of Gambia, Mali and Senegal are not significantly different from zero. Among these countries, Mali has not been able to grow because it suffered from severe security and political crisis (2012 coup d'état) linked to the attacks by armed groups in the north of the country (Malian Economic Update, 2013), which constrained economic activities in the country. There was apparent growth between 1990 and 1997 in Benin, Burkina Faso, Cote d'Ivoire and and Togo, because they experienced a currency devaluation.

However, the negative and significant growth movement of Cote d'Ivoire is due to serious political and economic instability. Ghana and Niger experienced a consistent positive growth between 1980 and 1986. Nigeria experiences both positive and negative shocks. There was falling trend in 1990, rising trend between 2000 and 2005 and again falling between 2006 to 2009 because of global financial crisis.

Figure 1: Baxter-King Filters of GDP Growth Rates for ECOWAS Countries





Source: BK Filter using Eviews 9.5.

4.1. Stability of West African Monetary Union Using Output Loss Function

West African States must be prepared to sacrifice their monetary policy autonomy and conduct a common stabilization policy for the region, if they really want to proceed to a currency union. However, to pursue a common stabilization policy, the output variations of member economies should be similar or have symmetric shocks. It, therefore, implies that countries with very high output variations will compromise the stability of the union and at the same time; increase the cost of managing a broader monetary union.

To figure out the particular countries that might compromise the stability of the union, the output loss function introduced by (Ghosh & Wolf, 1994) is used to assess the cost of joining a currency union and pursuing a common stabilization policy. The identified supply shocks are calculated from the output loss function derived from the Baxter-King filter. Cheung and Yuen (2005); Sato and Zhang (2006) considered the weighted average GDP of each country's shocks to represent the total shock to the union, while (Cheung & Yuen, 2005) used the average GDP of each country's shocks to obtain similar results. For simplicity, the average GDP was adopted for this study in line with (Cheung & Yuen, 2005). A specific labour share parameter α ranging from 0.3 - 0.7 is assigned to each economy in line with other studies (Cheung & Yuen, 2005; Sato & Zhang, 2006).

Table 1 provides the average percentage output losses with different labour shares for ECOWAS economies based on the simple average currency union's shock. The results indicate that higher parameters of α , are associated with higher percentage output losses in case a monetary union is formed. This implies that the stability of the union will be compromised if the output losses of ECOWAS countries increase with time.

The results also show that smaller economies will incur more cost if they join the West African monetary union because they have the highest and consistent output losses for all the parameters of α . For instance, Sierra Leone (0.81, 0.28), Gambia (0.80, 0.26), Mali (0.80, 0.26) and Cape Verde (0.78, 0.25) when α is 0.7 and 0.3 respectively. The implication of this finding is that these countries

will compromise the envisaged common stabilization policy of the entire region. With the exception of Mali, the output losses of WAEMU sub-set economies are consistently higher and fall within the same range i.e., (0.73 to 0.77, $\alpha = 0.7$), (0.6 to 0.64, $\alpha = 0.6$), (0.45 to 0.47, $\alpha = 0.5$), (0.31 to 0.34, $\alpha = 0.4$), and (0.21 to 0.24, $\alpha = 0.3$) respectively. This justifies the fact that countries in a monetary union display similar patterns as already established from business cycle analysis. Again, this may be due to the common stabilization policy currently being pursued by all WAEMU countries. Of all the ECOWAS countries, only Nigeria and Ghana have relatively low output losses, consistent for all α parameters. Therefore, based on this analytical technique, only these two countries may be considered as prospective candidates for a monetary union because the cost of losing their monetary autonomy will be lesser.

However, the output losses for ECOWAS countries are relatively higher compared to a group of Asian countries using the same technique and Baxter-King filter. Considering three Asian countries (China, Japan and Korea) for example, Cheung and Yuen (2005) had established that the output losses for Korea are 1.315 ($\alpha = 0.7$) and 0.249 ($\alpha = 0.3$) respectively making it a poor candidate for a currency union with Japan and China. On the other hand, China and Japan had relatively low output losses. For instance, the values of China range from 0.03 ($\alpha = 0.3$), three times smaller than that of Ghana and Nigeria to 0.318 ($\alpha = 0.7$), two times smaller than Ghana and Nigeria. The values of Japan range from 0.059 ($\alpha = 0.3$), approximately 6 times smaller than that of Ghana and Nigeria to 0.164 ($\alpha = 0.7$), four times smaller than that of Ghana and Nigeria. These values suggest that even Ghana and Nigeria with relatively low output losses compared to other ECOWAS countries are still not yet good candidates for a monetary union.

Furthermore, Ghosh and Wolf (1994) discovered that the losses in terms of the foregone macroeconomic stabilization policies for CFA countries are significantly higher than the corresponding costs for the US, European countries and even the G-7 countries. Sato and Zhang (2006) found that the output losses for smaller economies like Hong Kong and Taiwan compared to China are higher. There is a consistency in the above findings, justifying the fact that smaller economies in a monetary union will incur higher

costs if they pursue a common stabilization policy. Hence, the stability of the envisaged ECOWAS monetary union will be undermined if member countries proceed as a group because the overall costs will seriously out-weigh the potential benefits.

Table 1: Average Output Losses of ECOWAS Countries

	Average Shock (%)				
	$\alpha = 0.7$	$\alpha = 0.6$	$\alpha = 0.5$	$\alpha = 0.4$	$\alpha = 0.3$
Benin	0.76	0.60	0.46	0.34	0.23
Burkina Faso	0.73	0.57	0.43	0.31	0.21
Cape Verde	0.78	0.63	0.48	0.35	0.25
Cote d'Ivoire	0.77	0.61	0.47	0.34	0.24
Gambia	0.80	0.64	0.49	0.36	0.26
Ghana	0.61	0.46	0.33	0.24	0.16
Guinea	0.77	0.61	0.47	0.34	0.24
Guinea Bissau	0.75	0.59	0.45	0.33	0.23
Mali	0.80	0.64	0.50	0.37	0.26
Niger	0.76	0.60	0.46	0.34	0.23
Nigeria	0.64	0.48	0.35	0.25	0.17
Senegal	0.73	0.57	0.43	0.32	0.22
Sierra Leone	0.81	0.65	0.51	0.39	0.28
Togo	0.77	0.61	0.47	0.34	0.24

Source: Author's computation derived from Baxter-King Filter

5. Conclusions

ECOWAS countries are committed to forming a broader monetary union between WAMZ and WAEMU by the year 2020, yet business cycles across the entire region have remained weak and non-synchronous which may likely threaten the stability of the envisaged union. This study investigated the viability of a stable monetary union in the ECOWAS region. The study used the Golsh-Welsh Output Loss Function after de-trending the annual growth rates of the real GDP series from 1975 to 2015, using Baxter-King filter approach.

The results indicate that smaller economies in the region (Cape Verde, Gambia, Sierra Leone and Mali) will compromise the stability of the union because their cost of pursuing a common stabilization policy will be very high, while larger economies (Nigeria and Ghana) will incur relatively low cost compared to the other groups. Also, the output losses of WAEMU economies fall within a particular range and are relatively lower compared to that of smaller economies in the region probably because they pursue a common stabilization policy. The implication of these findings is

that the stability of the envisaged ECOWAS monetary union is likely to be compromised, since smaller economies in the region will be worse-off than larger economies. Thus, smaller economies in the ECOWAS region should not be admitted into the monetary union for now, since they will compromise the union's stability. This recommendation signals to ECOWAS that the stability of the Euro zone was compromised because of admittance of unstable economies into the European monetary union that failed to meet the optimum currency area criteria.

References

- Abramovitz, M. (1986). Catching up, forging ahead, and falling behind. *The Journal of Economic History*, 46(2), 385-406.
- Bajona, C., & Kehoe, T. (2010). Trade, growth, and convergence in a dynamic Heckscher-Ohlin Model. *Review of Economic Dynamics, Elsevier for the Society for Economic Dynamics*, 13(3), 487-513.
- Baxter, M., & King, R. G. (1999). Measuring business cycles: approximate band-pass filters for economic time series. *The Review of Economics and Statistics*, 81(4), 575-593.
- Beetsma, R., & Giuliodori, M. (2010). The macroeconomic costs and benefits of the EMU and other monetary unions: An overview of recent research. *Journal of Economic Literature*, 48(3), 603-641.
- Bovenberg, A. L., Kremers, J. J., & Masson, P. R. (1991). Economic and monetary union in Europe and constraints on national budgetary policies. *Staff Papers*, 38(2), 374-398.
- Cham, T. (2009). Is WAMZ an optimum currency area (OCA)?. *Journal of Economic and Monetary Integration*, 9(2), 99-113.
- Cheung, Y., & Yuen, J. (2005). The suitability of a greater China currency union. *Pacific Economic Review*, 10(1), 83-103.
- De Grauwe, P. (Ed.). (1997). *The Economics of Monetary Integration*. Oxford, United Kingdom: Oxford University Press.

- Dowrick, S., & DeLong, B. (2003). Globalisation and convergence. In M. D. Bordo., A. M. Taylor., & J. G. Williamson (Ed). *Globalization in Historical Perspective* (pp. 191-226). Chicago, United States of America: University of Chicago Press.
- Fielding, D., & Shields, K. (2001). Modelling macroeconomic shocks in the CFA Franc zone. *Journal of Development Economics*, 66(1), 199-223.
- Frankel, J., & Rose, A. (1998). The endogeneity of the optimum currency area criteria. *The Economic Journal*, 108(449), 1009-1025.
- Fuente, A. (2000, January). Convergence across countries and regions: Theory and empirics. Paper presented at *European Investment Bank Conference on Economics and Finance: Regional development policy and convergence in the EU* Retrieved from <http://digital.csic.es/bitstream/10261-1973/1/44700.pdf>
- Ghosh, A. R., & Wolf, H. C. (1994). *How many monies? A genetic approach to finding optimum currency areas* (NBER Working Paper No. 4805). Retrieved from the National Bureau of Economic Research website: <http://www.nber.org/papers/w4805>.
- Jenkins, C., & Thomas, L. (1996). *Is southern Africa ready for regional monetary integration? Centre for the study of African Economics* (CSAE Working Paper No. WPS 197-03). Retrieved from: <https://www.csae.ox.ac.uk/materials/papers/csae-wps-1997-03.pdf>
- Kim, S. (1998). Economic integration and convergence: U.S., 1840-1987. *Journal of Economic History*, 58(3), 659-683.
- Krugman, P. (1993). The Hub Effect: Or, Threeness in Interregional Trade. In W. J. Ethier., E. Helpman., & J. P. Neary (Ed.) *Theory, Policy and Dynamics in International Trade* (pp.29-36).Cambridge, United Kingdom: Cambridge University Press.

- Kwok, Y., & Lai, C. (2009). *Factor price equalization and economic integration in China*. Retrieved from <http://www.rcie-cn.org/conferences/2009/papers/kwok.pdf>
- Maboreke, J. (2011). *Optimum Currency Areas in Africa: A Genetic Optimisation Approach* (Master's Thesis, University of Cape Town). Retrieved from: https://open.uct.ac.za/bitstream/handle/11427/11270/thesis_com_2011_maboreke_j.pdf?sequence=1
- Malian Economic Update. (2013). *The Malian economy holds steady in the face of crisis*. Retrieved from: <http://www.worldbank.org/en/news/feature/2013/03/14/the-malian-economy-holds-steady-in-the-face-of-crisis>
- Mccarthy, C. (2002). *Macroeconomic convergence in SADC: A policy perspective for the central banks of the integration arrangement*. Retrieved from: <http://www.sarpn.org/documents/d0000559/P512-Macroeconomic-SADC.pdf>.
- Mink, M., Jan, P. A. M. J., & Jakob, H. (2007). *Measuring synchronicity and co-movement of business cycles with an application to the euro area* (CESifo Working Paper No. 2112). Retrieved from SSRN website: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1020557
- Nindi, A. G. (2012). *The feasibility of monetary integration within the SADC Region*. (Unpublished PhD Thesis, Rhodes University). Retrieved from: <https://core.ac.uk/download/pdf/11985769.pdf>
- Njoroge, L. K., Opolot, J., Abuka, C., & Apaa-Okello, J. (2011). Nature and extent of shocks in COMESA: Implications for a monetary union. *Interdisciplinary Journal of Research in Business*, 1(3), 23-46.
- Piffanelli, S. (2001). *The price stability in a monetary union* (DESA Discussion Paper No. 18). Retrieved from: <http://www.un.org/esa/esa01dp18.pdf>.
- Rassekh, F., & Thompson, H. (1993). Factor price equalization: Theory and evidence. *Journal of Economic Integration*, 8(1), 1-32.

- Sato, K., & Zhang, Z. (2006). Real output co-movements in East Asia: Any evidence for a monetary union?. *World Economy*, 29(12), 1671-1689.
- Sachs, J., & Warner, M. (1995). *Economic convergence and economic policies* (NBER Working Paper No. 5039). Retrieved from National Bureau of Economic Research website <https://www.nber.org/papers/w5039.pdf>
- Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65-94.
- Tabellini, G. (1986). Money, Debt and deficits in a dynamic game. *Journal of Economic Dynamics and Control*, 10(4), 427-442.
- Uche, G. (2016, June). *ECOWAS and challenges of implementing single currency system*. Retrieved from: <http://www.thetidenewsonline.com/2015/06/24/ecowas-and-challenges-of-implementing-single-currency-system>
- USAID Report (2012). *Economic trends report: West Africa*. Retrieved from: https://eads.usaid.gov/esdb/analysis/econ_trends/2011/west_africa.cfm
- Veller, C., & Ellyne, M. (2011). *What is the SARB's inflation targeting policy, and is it appropriate?* (MPRA Paper No. 42134). Retrieved from Munich Personal RePEc Archive website: https://mpra.ub.uni-muenchen.de/42134/-1/MPRA_paper_42134.pdf

To cite this article:

Yahaya, A. Z., & Nkwatoh, L. S. (2020). Viability of a stable west african monetary union. *Empirical Economic Review*, 3(1), 1-18. doi: 10.29145/eer/31/030101



Received: March 19, 2019

Last Revised: March 05, 2020

Accepted: June 19, 2020