Should the West African countries form a currency union?

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Abstract

This paper examines whether or not the Economic Community of West African States (ECOWAS), comprising fifteen countries, constitutes an Optimum Currency Area (OCA). The paper uses secondary data obtained from the International Financial Statistics Bulletin, covering the period 1986 to 2003. The Vector Autoregressive (VAR) modelling technique was used to investigate the optimality of the community as a currency area.

The study found that shocks to the output growth rate and inflation rates aligned symmetrically. Except for Nigeria and Sierra Leone, shocks to the real exchange rates also aligned symmetrically across countries. However, the degree of openness variable showed asymmetrical disturbance across countries.

This paper thus concludes that a low trade link exists among member countries of ECOWAS, traced principally to the fact that these countries' exports were competitive rather than complementary. The asymmetric disturbance of real exchange rate shocks and the low degree of openness across the countries implied that the sub region could not effectively form a successful Optimum Currency Area (OCA). Nevertheless, the sub region exhibits some potential for forming an optimum currency area in the future.

JEL F15

1 Introduction

The realities of contemporary international systems are such that no single nation-state can independently pursue its economic, cultural, strategic, military and even political objectives in isolation. The world has become interdependent and states have therefore found it not only expedient, but also imperative to enter into associations and communities with other countries.

Recent economic transformation, marked by the emergence of the European Union, the North-American Free Trade Agreement (NAFTA), Asia-Pacific Economic Cooperation (APEC), and the Association of South East, Asian Nations (ASEAN), raises a fresh challenge for Africa if it is to reverse its growing economic marginalisation, especially in the area of trade and investment. The major issue in this context is how to devise a strategy for the rapid integration of the economies in the sub-region so as to protect Africa's interest in the growing global scenario of integrated markets. While recognising the importance of the economic integration of West Africa as central to any effort aimed at transforming the sub-region, we hasten to add that such an integrated market must be protected for some period of time from the highly competitive products of other integrated markets outside Africa. Integration theory rests on the assumption that in order to succeed, an economic cooperation project should be based on liberalisation of the movement of capital goods, services and labour within the integrating region and selective closure to the rest of the world, especially in areas where the potential for production growth exists in the sub-region.

There has been a great deal of interest in the formation of a currency union since the countries of the European Union (EU) decided to introduce a single currency for Europe. Very few authors have, however, found that some countries are not good candidates for monetary union; this rests on the premise that economic integration has to do with member states having a common goal in terms of economic, financial and exchange rate policies. A currency union is usually defined as an area throughout which a single currency circulates. Most of the research has examined the suitability of the European countries for such a union, where this issue is of particular immediacy (Poloz, 1990; Bayoumi & Eichengreen, 1994; Funke, 1997).

The European Union (EU) is still expanding, Asia is growing around Japan to form a large economic entity, and the North American Free Trade Agreement (NAFTA) is increasing in size. The implication of this emerging trend is a continued and increasing domination of the world trade markets. The African Caribbean Pacific's (ACP) share of trade in the European Union (EU) dropped by 50 percent in 1996 (The Courier, 1997). As the focus is now placed on standardising rules, particularly under the World Trade Organization (WTO), there is a need for urgent intensification of efforts by African countries to integrate economically so as to avoid marginalisation in the global economy. There is a need for integration aided by sound macroeconomic policies with clear-cut ideas about the economy. It is also worth noting that the liberalisation of intra-area trade is essential for the success of economic development based on a strategy of import-substitution, which is the major focus of ECOWAS member states.

For countries to form an effective Optimum Currency Area (OCA), Mundell (1961) suggests that the correlation of shocks is one criterion for a country deciding to join a currency union. He argues that countries facing positively correlated economic shocks will be better suited for a currency union because it allows the use of union-wide policies to correct imbalances. Exchange rates within the region are an effective instrument of short-run adjustments, so that adjustment of the relative prices of goods produced within the area is attainable. Domestic prices should not be fully flexible, so that prices do not adjust immediately to exchange rate shocks.

This paper examines the correlation of macroeconomic shocks across the ECOWAS countries to determine if they are positively correlated. If they are, the entire region would be able to use a common monetary policy to respond to economic shocks within the region (Mundell, 1961; Mc Kinnon, 1963). While section two of this paper discusses a survey of related literature, section three discusses the empirical methodology and results analysis, and section four the implications for policy, followed by the conclusion.

2
Survey of literature

Some empirical work on the desirability of regional integration has been carried out by various authors, especially studies on monetary integration in terms of its likely effects on macroeconomic stability.

Bayoumi and Eichengreen (1994) made use of a structural vector auto-regression approach developed by Blanchard and Quah (1989) to identify aggregate supply and demand disturbances and to distinguish them from subsequent responses. These measures are used to identify groups of countries suited for monetary union. In their study, vector auto-regression identifies three sets of countries that, on the basis of their macroeconomic disturbances and responses, are plausible candidates for monetary unification, a Northern European group comprising Germany and a subset of other potential participants in EMU (Austria, Belgium, Denmark, France, the Netherlands and perhaps Switzerland); a Northeast Asian bloc (Japan, Korea, Taiwan); and a Southeast Asian area (Hong Kong, Indonesia, Malaysia, Singapore, and possibly Thailand).

Erkel-Rousse and Melitz (1995) identify five sources of shocks for the six major European countries, through the Blanchard and Quah technique, and extend the analysis from the usual correlation of shocks (their findings confirm the low correlation among European countries) to the effectiveness of domestic monetary and fiscal policy as a stabilisation device. Through the contribution that absorption shocks and relative money-velocity shocks add to the explanation of output and net exports, they infer that fiscal policy is an effective tool for all countries except Germany (suggesting that they will need to retain some fiscal independence in the EMU), and that only in Germany and United Kingdom does monetary policy have any real effect (indicating that these two countries would lose from forgoing the independence of such instrument).

Whitt (1995) examines the historical patterns of aggregate demand and supply shocks in several European Monetary System countries in order to assess the desirability of monetary union. The historical time series of shocks is identified by estimating a vector autoregressive model while imposing the restriction that demand shocks have no permanent effect on real output. He found that in most cases supply shocks are positively correlated with those of Germany, but the negative correlation of demand shocks suggests that monetary union may not be desirable.

Thiam (2002) examines the formation of a currency union of South-East Asian countries, while using a structural vector autoregression. The shocks are identified using restrictions on the long-run coefficient matrix as suggested by Blanchard and Quah (1989). The correlations of shocks for the EU and NAFTA countries are used for comparison. The South-East Asian countries are shown to have more strongly correlated shocks than the EU countries. Compared with the NAFTA countries, external shocks are more closely correlated for the ASEAN countries, but the supply and demand shocks are less correlated. Indonesia, Singapore, and Malaysia, in particular, exhibit a high degree of correlation of shocks. Other criteria for monetary union, such as intra-regional trade, openness of the economy, and similarity of monetary policy, were also examined.

The message from this review is that while several authors have carried out research on developed countries for forming optimum currency areas, research in this context in Africa is, to a large extent, scanty. The peculiarities and differences in continent, structural developments of countries will no doubt call for more studies, particularly with the focus on the West-African sub-region.

3 Empirical methodology/results

Some literature has shown that a symmetric system, in which members cooperate, leads to a monetary union (Tavlas, 1995; Whitt, 1995; Ahmed & Park, 1994; Bayoumi & Eichengreen, 1994). This study therefore takes its cue from earlier studies by using a simple VAR model to identify the fundamental demand and supply shocks that have driven output, prices, exchange rates and degree of openness of ECOWAS countries. The VAR technique avoids the imposition of potentially spurious *a priori* constraints that are employed in the specification of structural models. Secondly, as pointed out by Raynold *et al.* (1991), since few restrictions are placed on the system, variables interact. VARs are well suited for the examination of channels through which macroeconomic variables operate.

3.1 The model

This study uses the structural version of the reduced form VAR (which separates the influence of shocks from those of structure) proposed by Blanchard and Quah (1989) and Shapiro and Watson (1988) and extended to large open economies by Ahmed *et al.*, (1993), Tallman and Wang (1992), Clarida and Gali (1994) and Whitt (1995). Our model attempts to capture both real and monetary aspects of the optimum currency area literature. The model represented by a four-component vector is thus defined as:

$$V_t = [Y_t, Pt, E_t, D0_t] \text{ .... } (1)$$

Where V_t is the vector containing the four variables, Y_t is the output, Pt is the level of prices, E_t is the real exchange rate and Do_t is the degree of openness.

Equation (1) is an identity that would be estimated using the VAR technique. The impulse response functions (IRFs) and the variance decompositions (VDCs) are based on the moving average representations of the VAR model and reflect short-run dynamic relationships between variables. While the VDCs show the percentage of the forecast error variance for each variable that may be attributed to its own innovations and to fluctuations in other variables in the system, the IRFs indicate the direction and size of the effect of a one standard deviation shock to one variable on other system variables over time. Since model variables are converted to first difference prior estimation of the model, the VDCs and IRFs reported here indicate the effects of a shock to the changes in real output, real exchange rates, inflation rate and the degree of openness. More importantly, the variables are ordered in a particular fashion, and in this way, some structure is imposed in computation of the VDCs and IRFs. The preferred ordering in this paper is Dot, Et, Pt and Yt. The Dot first, because it is an exogenous variable which affects the domestic variable. Taking the West African countries as a unit and in view of the homogeneity of their structure, that is, they are all primary producers and tend to rely more on imported finished items, then they are subjected to variations in the international market. Liberalising the exchange rate also affects the level of prices within the domestic economy and subsequent productivity within the economy.

3.2 Data sources/measurement

The choice of data focuses the analysis more closely on the tradable goods sector of the economy, which would be the most directly affected if exchange rates were pegged irrevocably.

The paper makes use of quarterly data for two reasons; one, to allow timing of historical shocks more precisely than with annual data and second, a desire to minimise problems with temporal aggregation (see Christiano & Eichenbaum, 1987). Quarterly data from 1986 – 2003 were sourced for all members of the ECOWAS. Data were sourced mostly from the International Financial Statistics Bulletin and ECOWAS Statistical Bulletin. The choice of 1986 to 2003 is based on the premise that, if not all, many of the member countries were going through economic reforms, which focused primarily on foreign exchange liberalisation.

Data for the other countries (4) were unavailable in the IFS Bulletin. This could be adduced to the fact that for many years, these countries went through civil war and collating data became a problem. Countries in this category are Liberia, Guinea, Gambia and Cape Verde Island. The exception of these countries from this analysis is, however, relatively insignificant considering their economic strength and, as they could be categorised as slow reformers, they will follow the pace of fast reformers within the ECOWAS. We adopted the popular measure of the degree of openness in literature, that is, the ratio of trade (exports + imports) to GDP, following Ramirez (2000), Cigno, *et al.* (2002) among others. Our real exchange rate was calculated as:

$$\mathrm{E}t = \frac{\mathrm{NERn} \times \mathrm{CPI(US)}}{\mathrm{CPIn}}$$

Where;

NER = Nominal exchange rate defined as number of units of domestic currency per unit of the foreign currency.
CPI = Consumer price index
n = ECOWAS countries

The data were subjected to the Augmented Dickey Fuller (ADF) test so as to establish their univariate time series behaviour in order to determine the basic unit of observation. The implication of this test is to determine whether the subsequent estimation should use the level, first or second difference of each time series. Except for each country's growth rate that was stationary at second difference, all other variables were stationary at first difference. Thus, the evidence suggests that first differencing is sufficient, or that these macro variables do not have two unit roots. Consequent to these tests, therefore, measure of inflation rate, real exchange rate and degree of openness were in level while the growth rate as rates of change.

We first estimate the correlations for our variables (that is, GDP growth rate, real exchange rate, inflation rate and degree of openness) for all the countries and thereafter the impulse response functions and the variance decomposition.

3.3 Results

Our correlation coefficient (see appendix) shows that the output growth rates for all the countries are very significantly correlated. Except for Nigeria and Sierra Leone, the real exchange rates for all the ECOWAS countries are all significantly correlated at 5 per cent (Kendall & Stuart, 1973). This suggests that all other countries' currencies are symmetrically aligned. This result is, however, strengthened by the correlations of francophone countries' real exchange rate, which shows a high level of correlation. This could, however, be adduced to the use of the same currency, that is, CFA franc. Nigeria and Sierra Leone's real exchange rate is significantly correlated at 5 per cent. Ghana's real exchange rate, however, did not symmetrically align with other Anglophone member states' real exchange rate.

The degree of openness variable shows significant and high correlations for the Francophone ECOWAS countries. This suggests a considerable inter-trade link within the CFA franc zone, but on the other hand, insignificant correlations exist between the Francophone and the Anglophone countries. Except for Nigeria, which shows a significant correlation with Cote d'Ivoire, Togo, Mali, and Senegal, other Anglophone countries, Ghana and Sierra Leone are not significantly correlated with the Francophone countries. Nigeria's correlation could be adduced to its large oil trade. The degree of openness correlation suggests a considerable inter-trade link within the CFA franc zone, but the contrary exists for the ECOWAS sub-region. The correlation of Anglophone countries is highly insignificant and suggests a low level of inter-trade.

The correlation coefficient of inflation rate suggests that many of the ECOWAS countries pursue varying monetary policies. However, the result of correlation of inflation rate for Anglophone countries suggests that they (Nigeria, Ghana, and Sierra Leone) have been pursuing fairly similar monetary policies. Except for Mauritania and Guinea Bissau, the other Francophone countries also exhibit some level of significant correlation. This development is, however, not unprecedented. Guinea Bissau, though, it has as its currency CFA franc, it is a former Portuguese colonised country, but unlike other CFA franc countries colonised by the French, this has hampered the growth of the economy. Mauritania's major reason for pulling out of ECOWAS could be reflected from the result of the inflation rate correlation, which shows a highly insignificant level of correlation with other CFA franc zone countries. An immediate result of monetary integration is the loss of monetary policy as a policy instrument. The adjustment to a single monetary policy for a region is easier if the countries in the region have been pursuing relatively similar monetary policies (Thiam, 2002).

Table 1

Pooled ECOWAS impulse response to one standard deviation innovations

Period	Response of g_t			
	g_t	P_t	Rer_t	Do_t
1	0.0036	0.000	0.000	0.000
3	0.009	–0.001	–0.002	–0.006
6	0.001	0.001	–0.004	–0.001
10	0.004	0.001	–0.005	–0.002
	Response of P_t			
1	0.009	0.024	0.000	0.000
3	0.006	–0.005	–0.002	0.002
6	0.002	–0.001	–0.001	–0.001
10	0.001	0.001	–0.002	–0.002

	Response of Rer_t			
1	3.583	–0.090	5.908	0.000
3	–1.635	–0.799	5.323	–1.133
6	–5.977	–0.657	6.151	2.475
10	–6.491	–1.775	8.544	3.681
	Response of DO_t			
1	0.054	–0.026	0.104	0.064
3	–0.023	–0.046	0.101	0.042
6	–0.098	–0.032	0.118	0.069
10	–0.121	–0.040	0.162	0.079

Table 2
Variance decomposition of pooled ECOWAS member states

Period	Variance decomposition of g_t			
	g_t	P_t	Rer_t	Do_t
1	100.00	0.00	0.00	0.00
3	95.04	0.74	0.32	3.89
6	91.75	0.86	2.73	4.65
10	87.60	0.89	6.81	4.69
	Variance decomposition of P_t			
	g_t	P_t	Rer_t	Do_t
1	13.22	86.77	0.00	0.00
3	18.56	79.01	0.10	2.31
6	22.33	75.04	0.35	2.27
10	22.45	73.94	1.34	2.26
	Variance decomposition of Rer_t			
	g_t	P_t	Rer_t	Do_t
1	26.89	0.02	73.09	0.00
3	20.88	1.50	75.32	2.29
6	35.99	0.81	59.66	3.54
10	34.65	1.48	56.42	7.45
	Variance decomposition of DO_t			
	g_t	P_t	Rer_t	Do_t
1	16.25	3.62	57.99	22.13
3	11.60	9.96	61.57	16.86
6	22.73	6.87	54.64	15.76
10	26.86	4.92	53.36	14.86

3.4 Impulse response/variance decomposition function

From the above results, it could be deduced that openness in ECOWAS countries plays a small role in its contribution to growth. In fact, a shock on the degree of openness will impact negatively on growth in the long run. This could be adduced to the fact that many, if not all these countries, are not involved in productive/ manufacturing activities for exports. Many rely on primary natural resources for exports. In the long run, however, an increase in the level of inflation will impact positively on growth.

While a depreciation in the real exchange rate works to reduce the inflation level in ECOWAS economies, the more open these economies are, the higher the level of inflation, except for the later quarters, that is, in the long run.

The response of real exchange rate to growth shocks is negative. Except for the first quarter, relationship is negative. That is, a depreciation of the real exchange rate leads to improved output growth. The response of the real exchange rate to inflationary shock is, however, inversely related. A reduction in the level of inflation will lead to an appreciation of the real exchange rate. The response of the degree of openness to inflationary shocks is such that a reduction in the level of inflation will encourage openness. Policies that will reduce the level of inflation and an appreciation of the real exchange rate should be followed to increase output growth in the ECOWAS economies. Countries should be compelled to initially reduce their level of inflation before harmonisation of sectoral policies. The degree of openness in these economies does not impact positively on growth. This could, however, be adduced to the low level of industrial/manufacturing output in these economies. Virtually all ECOWAS countries depend primarily on imports of manufactured goods from outside the ECOWAS sub-region. It is noted, however, that a reduction in the level of inflation will encourage the degree of openness. Likewise, the real exchange rate, that is an appreciation of the real exchange rate, will encourage the degree of openness of these countries.

4 Policy implications/ concluding remarks

The implications of the above results for policy are analysed bearing in mind the basis of this empirical investigation: that countries that are subject to similar patterns of shocks, that is substantial positive correlations, are presumably good candidates for monetary union.

From the pooled ECOWAS result of variance decomposition we can deduce that the output growth rate of ECOWAS countries align, that is, have the same pattern of disturbance. Inflation rates also show a substantial positive correlation, implying that the ECOWAS countries have similar patterns of inflationary disturbance. The real exchange rate variable, though it shows some level of positive correlation, is not as high as the variables analysed earlier. This signifies that policies that will affect the real exchange rates of these economies will have an impact on the rate of output growth of ECOWAS economies in the event of monetary integration of these economies. In this case, the real exchange rate variable is very important for ECOWAS monetary unification bid. The degree of openness variable shows an asymmetric nature of disturbance in the pooled ECOWAS result. This implies that the real exchange rate variable is the determining variable for the rate of inter-trade link and not the degree of openness of these economies. This result also shows that the level of trade within the region is highly insignificant, which is a signal to the low level of industrial output of these economies and also a pointer to the fact that virtually all the countries have the same structure of export, that is primary products, and this reduces the inter-trade link among the countries.

Frankel and Rose (1996) assert that countries involved in trade link are potential members of an optimum currency area (OCA), since international trade patterns and international business cycle correlations are endogenous. They found that countries with close international trade links would potentially benefit greatly from a common currency and are more likely to be members of an OCA. Thus from the VAR analysis we can absolutely affirm that ECOWAS sub-region cannot form a successful optimum currency area. However, since this criterion is just one of several criteria for a successful optimum currency area, then other criteria need be assessed. This is not to say that policies that will encourage diversification of these economies need not be intensified, but on the other hand, based on the performance of other macroeconomic variables, the ECOWAS subregion can form an Optimum Currency Area (OCA).

The European Economic and Monetary Union (EMU) example is a very useful case study for the ECOWAS to follow. Certain stringent criteria were put in place that countries involved must meet to be a member of the currency union that was launched in January 1999. The convergence criteria adapted by ECOWAS is a good step in the right direction for achieving harmonisation of the macroeconomic variables of countries in the union. The VAR analysis of pooled ECOWAS variables shows that other macroeconomic variables, except the degree of openness, exhibit symmetric shocks, and therefore can form an Optimum Currency Area (OCA) if certain factors discussed above are put in place.

It should be noted that since we live in a world of imperfect markets, different exchange rate regimes may have distinct and non-neutral effects on the evolution of the real side of the economy. This implies that there will be two-way linkages joining the macroeconomy of these countries, that is, international trade linkage and the exchange rate regime. These two-way interactions will give rise to endogenous forces, which may induce both transitory disequilibria and permanent mutations in the macro-economic structure, both in the functioning of the exchange rate regime and in the evolution of regional integration. There are many other factors which could experience significant endogenous changes beyond our tested ones given exogenous variables. It is logical to expect that different coordination schemes will have distinct, non–neutral and not necessarily transitory effects on key elements, such as factor mobility, the degree of autonomy of policies, policy preferences, credibility and price dynamics. Changes in these factors might, in turn, trigger permanent changes in the macroeconomic and trade structures and, via investment decisions, in comparative advantages and productivity growth.

The asymmetry observed in the degree of openness is, in fact, a serious obstacle to an effective and a successful ECOWAS monetary union as at present. A thorough coordination of macroeconomic policies and price dynamics will contribute positively to ensure macroeconomic stability and ultimately help industrial growth of these economies.

The evolution of the real exchange rate is critical in determining the success or failure of ECOWAS (OCA). This is evident in our result, as this variable determines the observable forecast errors of the degree of openness even more than its own innovations. This means that ECOWAS needs put in place an effective monitoring of each country's nominal prices and the nominal bilateral exchange rates; that is, we must take into account the process of domestic pricing. All the ECOWAS economies, except Benin, have experienced long periods of high inflation. As a consequence, for this trend to be reversed, structural bottlenecks, mobilisation of domestic savings to boost investments, improving production techniques, diversification of these economies, and thorough policy coordination would be advisable, to mention but a few.

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Appendix

Appendix 1

CORRELAT ON OF GDP GROWTH OF ECOWAS COUNTR ES

	BEN N	N GER	N GER A	SENEGAL	S/LEONE	TOGO	MAUR - TAN A	MAL	GHANA	COTE D' VO RE	BURK NA FASO	G/B SSAU
BEN N	1.0000											
N GER	0.8627	1.0000	1.0000									
N GER A	0.9799	0.7709	0.9615									
SENEGAL	0.9887	0.8800	0.9561	1.0000								
S/LEONE	0.9728	0.8099	0.9551	0.9679	1.0000							
TOGO	0.9770	0.8650	0.9557	0.9665	0.9255	1.0000						
MAUR TAN A	0.9598	0.8141	0.9806	0.9689	0.9812	0.9123	1.0000					
MAL	0.9977	0.8688	0.9618	0.9888	0.9677	0.9836	0.9614	1.0000				
GHANA	0.9838	0.8746	0.9551	0.9662	0.9596	0.9831	0.9432	0.9874	1.0000			
COTE D' VO RE	0.9861	0.8939	0.9593	0.9711	0.9379	0.9782	0.9172	0.9864	0.9792	1.0000	1.0000	
BURK NA FASO	0.9674	0.8551	0.9338	0.9467	0.9399	0.9758	0.9310	0.9764	0.9890	0.9634	0.9072	
G/B SSAU	0.9707	0.8550		0.9765	0.9801	0.9149	0.9752	0.9641	0.9394	0.9391	1.0000	1.0000

Appendix 2

CORRELAT ONS OF REAL EXCHANGE RATE OF ECOWAS COUNTR ES

	BEN N	N GER	N GER A	SENEGAL	S/LEONE	TOGO	MAUR - TAN A	MAL	GHANA	COTE D' VO RE	BURK NA FASO	G/B SSAU
BEN N	1.0000											
N GER	0.9189*	1.0000										
N GER A	–0.4084	–0.4083	1.0000									
SENEGAL	–0.9406*	0.9895*	–0.4541	1.0000								
S/LEONE	–0.0347	–0.1496	0.0661	–0.1137	1.0000							
TOGO	0.9658*	0.9830*	–0.3969	0.9810*	–0.0959	1.0000						
MAUR TAN A	0.8230*	0.9046*	–0.3519	0.9256*	–0.0962	0.8712*	1.0000					
MAL	0.9468*	0.9726*	–0.5528	0.9758*	–0.0936	0.9747*	0.8724*	1.0000				
GHANA	0.5616*	0.7157*	–0.0384	0.6291*	–0.4805	0.6970*	0.5248*	0.6343*	1.0000			
COTE D' VO RE	0.9886*	0.9526*	–0.4687	0.9728*	0.0094	0.9799*	0.8591*	0.9747*	0.5622*	1.0000	1.0000	
BURK NA FASO	0.9555*	0.9851*	–0.4762	0.9959*	–0.1017	0.9844*	0.9014*	0.9834*	0.6281*	0.9834*	0.5713*	
G/B SSAU	0.4030*	0.6490*	–0.1631	0.5746*	–0.5853	0.5750*	0.4520*	0.5457*	0.7553*	0.4653*	1.0000	1.0000

*Significant at the 5 percent level.

* The statistic 0.5 Ln [(1 + r)/(1 – r)] is distributed approximately, normally with a mean of 0.5 Ln [(1 + p)/(1 – p)] and a variance of 1/(N – 3) (See Kendall and Stuart, 1973; pp 292-293) where r is the estimated correlation coefficient, p is the null value of the correlation coefficient, and N is the number of observations.

Appendix 3

CORRELAT ONS OF DEGREE OF OPENNESS OF ECOWAS COUNTR ES

	BEN N	N GER	N GER A	SENEGAL	S/LEONE	TOGO	MAUR - TAN A	MAL	GHANA	COTE D' VO RE	BURK NA FASO	G/B SSAU
BEN N	1.0000											
N GER	0.6634	1.0000										
N GER A	–0.3777	–0.4546	1.0000									
SENEGAL	0.6161	0.8991	–0.4984	1.0000								
S/LEONE	–0.6441	–0.6320	0.2898	–0.6093	1.0000							
TOGO	0.0240	0.5139	–0.5985	0.4367	–0.2062	1.0000						
MAUR TAN A	0.5785	0.7489	–0.0106	0.5912	–0.6713	0.2131	1.0000					
MAL	0.8449	0.8307	–0.2394	0.7552	–0.7063	0.2322	0.7478	1.0000				
GHANA	0.7584	0.3503	0.0057	0.3379	–0.6167	–0.3079	0.6479	0.5593	1.0000			
COTE D' VO RE	0.7312	0.8938	–0.5047	0.9168	–0.5877	0.4352	0.5567	0.8187	0.3188	1.0000	1.0000	
BURK NA FASO	0.4811	0.1523	0.3556	0.0400	–0.2492	–0.4241	0.3745	0.4524	0.4741	0.1043	–0.6438	
G/B SSAU	–0.3413	0.0633	–0.3009	0.1577	0.2203	0.4936	–0.3649	–0.2496	–0.5546	0.1260	1.0000	1.0000

Appendix 4

CORRELAT ONS OF NFLAT ON RATE OF ECOWAS COUNTR ES

	BEN N	N GER	N GER A	SENEGAL	S/LEONE	TOGO	MAUR - TAN A	MAL	GHANA	COTE D' VO RE	BURK NA FASO	G/B SSAU
BEN N	1.0000											
N GER	0.2853	1.0000										
N GER A	0.0481	0.2760	1.0000									
SENEGAL	0.5258*	0.5774*	–0.0322	1.0000								
S/LEONE	–0.0058	0.2003	0.6168*	–0.1937	1.0000							
TOGO	0.5967*	0.5160*	0.1794	0.5004*	0.0109	1.0000						
MAUR TAN A	–0.0531	0.0816	0.3845	–0.0664*	0.4467*	–0.0824	1.0000					
MAL	0.3929	0.4791*	–0.0890	0.6830	–0.2656	0.3767	–0.1510	1.0000				
GHANA	0.2944	0.0080	0.4317*	–0.2243	0.4331*	0.1418	0.2851	–0.0921	1.0000			
COTE D' VO RE	0.4300*	0.6197*	0.5255*	0.3291	0.4260*	0.6557*	0.2954	0.2095	0.3478	1.0000	1.0000	
BURK NA FASO	0.3517	0.7714*	0.1582	0.5764*	0.0014	0.6157*	0.0045	0.6205*	–0.0378	0.5218*	–0.1548	
G/B SSAU	–0.1666	–0.2437	0.3475	–0.2640	0.2895	–0.0813	0.2256	–0.1936	0.1340	0.1589	1.0000	1.0000

* Significant at the 5 percent level.

Endnote

1 ECOWAS is made up of fifteen West African states with eight Francophone coutries, Burkina-Faso, Cote d'Ivoire, Guinea, Mali, Niger, Republic of Benin, Senegal, and Togo, five English-speaking states of Gambia, Ghana, Liberia, Nigeria, and Sierra-Leone and former Portuguese colonies, Cape Verde Island and Guinea-Bissau.