# THE ECONOMIC COMMUNITY OF WEST AFRICAN STATES

# IS THERE A CASE FOR A COMMON CURRENCY?

BY

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Mentor

Reader

Reader

DEDICATION

To the Holy Virgin Mary : Queen of Heaven and Earth.

To my mother: Amy Sene

To my father: Diene Diagne

To my brother:Aloys Waly Diagne

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ABSTRACT

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The Economic Community of West African States: A study of the viability of a common currency.

Dissertation directed by Derrick P. Reagle, PhD

The Community of West African States was founded in 1975 in Abuja Nigeria. The objective was to create a free trade zone in the sub-region, and facilitate economic integration among members. The ultimate goal is political integration in the continent by 2030. Following the example of the European Union, they seek to adopt a common currency for the 15 countries that comprise ECOWAS.

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# Economic Community of West African States (ECOWAS) Is There a Case for a Common Currency?

## CHAPTER I

### Introduction

The West African Monetary Union has been in existence for over forty years. It is comprised of the following countries: Benin, Burkina Faso, Cote D'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo. To fully appreciate the essence of the WAMU, a background on its colonial past is essential.

Up until the middle of the nineteenth century, the French Franc was the official currency in the French colonies. As time went on, France found it necessary to adapt its lending and market policies to the needs of its colonies. The colonial administration therefore, put in place institutions that could issue currency, accept deposits and make loans to the natives.

The task was entrusted to private banks such as the Bank of Algeria, the Bank of Indochina, and in West Africa, the West African Bank. As commercial and domestic transactions between the colonies and the metropolis increased, these banks came under tight regulation by the French government.

After World War II, mechanisms that would allow for parity between the currency in the colonies and the Bank of France were put in place.

The beginning of the CFA Zone

The CFA zone was created on September 9, 1939. With the declaration of war, came the inconvertibility of the French Franc, and the beginning of restrictions on transactions. These restrictions however, did not apply to the French colonies.

The CFA Franc made its debut on December 25, 1945 with a fixed parity of 1.7 CFA francs to 1 French Franc. In 1948, the parity went to 2CFA francs for 1French Franc.

In 1960, the exchange rate got to 50CFA francs for 1 French franc, and remained unchanged until the devaluation of the CFA franc on January 11, 1994. Only then did the parity become 100CFA francs for 1French franc. The Central Bank for the CFA zone was created in 1959.

The Central Bank of West African States or Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO), maintained an account with the French Treasury where it deposited sixty percent of its reserves. The French Treasury in turn, guaranteed the CFA Franc to this day. With the common currency in Europe, the CFA is now pegged to the euro.

The West African Monetary Union (WAMU) was created in 1962, and became an Economic and Monetary Union in 1994. The treaty establishing the Economic Community of West African States was signed on May 28, 1975 in Lagos Nigeria. The objectives of the Community were to create a free trade zone among members, to promote cooperation

and development in all areas of economic activities, with full political integration as an ultimate goal.

Of the sixteen states that make up Ecowas, eight are members of the West African Economic and Monetary Union (WAEMU), and already share a common currency the CFA. The remaining seven countries, namely Nigeria, Ghana, The Gambia, Liberia, Sierra Leone and The Cap Verde Islands, have each its own currency and its own central bank. The Gambia is currently considering joining the CFA zone.

Ecowas members are pushing for full monetary integration by 2004. The West African Monetary Zone and UMEOA will merge into one central bank. The common currency the Ecoi will be the currency in use in the sub-region. Convergence criteria and other wrinkles to iron will be explored in later chapters.

The purpose of this paper is to analyze the costs and benefits of joining a common currency area for Ecowas members outside the CFA zone.

The benefits of a monetary union are evaluated in terms of lower transaction costs that come with the adoption of a single currency, shared risk, and increased symmetry in supply shocks. The costs include the loss of autonomy in monetary policy and exchange rate adjustment possibilities.

I will examine the links between the countries that currently make up the UMEOA (The West African Economic and Monetary Union), which uses the CFA as a common currency, and the WAMZ to see if the continuous use of the CFA can be justified on the ground of optimality.

The question is do their commercial links, similarities in exogenous shocks to output and the price level justify remaining in the CFA zone, or would they be better off outside the CFA zone?

A priori, there is no reason to believe that there are more similarities between CFA zone members than between CFA zone members and other countries in the sub-region, or in the continent for that matter.

According to the theory of optimal currency area introduced by Mundell (American Economic Review, vol. 51, issue 4 September of 1961), a common currency as opposed to floating exchange rates makes sense only to the extent that members of the common currency area are subject to the same shocks to output, the price level, terms of trade, exchange rates, the money supply etc.

The cost of membership will depend on the degree to which shocks to output and the price level are correlated across countries, and the long run impact of these shocks on the economy as a whole.

The countries comprising Ecowas are regularly subject to different shocks ranging form severe droughts, wars and other calamities, but also

to oil price shocks, since the largest economy in the union Nigeria, is an oil exporting country.

The Economic community of West African States was created on May 28, 1975 in Lagos Nigeria. It is comprised of 16 member nations, namely: Benin, Burkina Faso, Cote D'Ivoire, Ghana, Guinea, Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Gambia, Togo, Cape Verde Islands, and Mauritania.

Among the objectives of the regional organization was the creation of a Free Trade Zone among states, with full mobility of the resources, both human and natural. The ultimate goal is to achieve full political integration in the short to medium run in the sub-region, and in the continent by the year 2030.

In the chapters ahead, I will evaluate the organization's progress and set backs with respect to the ratification of certain treaties, such as those on the free movement of labor, the adoption of one common tariff, NEPAD etc.

As the community (Ecowas) seeks to secure its own currency, a legitimate question is can the adoption of a common currency be justified on the basis of structural similarities among the members?

I will explore and identify macroeconomic shocks to the Nigerian economy, and compare them to those of the rest of the members. The focus will be on shocks to aggregate output growth, and to aggregate

changes in the CPI. The importance of hitting inflation or output targets will be left to the policy maker, in this case, a common central bank.

# CHAPTER II

## The Model

In the following analysis I will leave Liberia and Sierra Leone out of the study for lack of data on those countries. This study will follow the methods used by Hutchison and Bergman (1997), Devarajan and Rodrik (June 1991), Fielding and Shields (October 1999).

Michael M. Hutchison and U. Michael Bergman used a VAR to analyze the reluctance of Nordic countries to join the EMU. They used two dependent variables: The change in output growth and the change in the price level, and the change in oil prices as an exogenous shock.

Dani Rodrik and Shantayana Devarajan used a loss function to analyze the gains and losses associated with membership in the CFA zone. Their study compared the benefits of low inflation that comes with a peg to a major currency, in this case the defunct French franc, to the loss in output as a result of inflexible exchange rates.

David Fielding and Kalvinder Shields used a structural VAR to analyze the two CFA zones in Africa, namely the West African zone and the Central African zone. They used three dependent variables, which were the change in money demand, the change in the price level, and the change in output growth, to explore the necessity or the lack thereof of two different zones for the same currency, and considered the question of optimality.

In my study I used a reduced form VAR with two dependent variables: The percentage change in output growth and the the percentage change in the price level, to investigate the viability of a common currency for ECOWAS. Using the theory of optimal currency area introduced by Robert Mundel (1961), I considered three exogenous shocks that were the shock to the foreign exchange rate, shocks to the world price of oil and shocks to the world interest rate.

I will estimate a reduced form VAR for 12 member nations, with Nigeria as the reference. Data for the remaining four members could not be found. The VAR will comprise two variables, the change in aggregate output growth, and the change in the aggregate price level.

The first step in this analysis will consist of estimating the magnitude of the innovation or macroeconomic shock for Nigeria. I will calculate the coefficients of correlation among the parameters of the focus country Nigeria, and I will compare them to those of the other eleven countries.

By way of variance decomposition, I will evaluate a variance covariance matrix for twelve countries. Every country will be identified by the first and last letter of its name.

The first equation of the model which consists of the change in the log output is to be simultaneously estimated with the change in the consumer price index as follows:

$\Delta Y_t = \beta_1 \Delta Y_{t-1} + \beta_2 \Delta P_{t-1} + \beta_3 \Delta M_{t-1} + \beta_4 \Delta K_{t-1} + u_{1t}$ 1.1

$\Delta P_t = \mu_1 \Delta Y_{t-1} + : \mu_2 \Delta P_{t-1} + \mu_3 \Delta M_{t-1} + \mu_4 \Delta K_{t-1} + u_{2t}$ 2.2

Equation 1.1 and 2.2 show $\Delta Y_t$ and $\Delta P_t$ as the change in log output, and the change in the log consumer price index.

$\Delta M_{t-1}$ is the percentage change in the log of the money supply, $\Delta K_{t-1}$ is the percentage change in the world price of oil, and $u_t$ is a white noise with mean zero and a covariance matrix$\sum$.

The hypothesis I will be testing is $\beta_4 = \mu_4 = 0$.

Writing the VAR in its matrix form we obtain:

$\Delta X_t = \beta_1 \Delta X_{t-1} + \beta_2 \Delta K_{t-1} + \beta_3 \Delta M_{t-1} + ut.$

$\Delta X_t = \left[\Delta Y_t, \Delta P_t\right]$

$(I - AL)) X_t = B(L)\, ut$ where AL is a matrix of lagged polynomials.

$\Delta X_t = (I - AL)^{-1} B(L)\, ut$

$\Delta X_t$ is comprised of the change in the log output for Nigeria $\Delta Y_t^{ng}$, the change in the log of the price level $\Delta P_t^{ng}$, and the change in log output and the change in the log of the price level for the rest of Ecowas members, $\Delta Y_t^j$, $\Delta P_t^j$ j= Benin, Bissau, Burkina, Cape Verde, Cote D'ivoire, Gambia, Ghana, Guinea, Mali, Niger, Senegal, Togo, and Mauritania.

Let $e_t$ be the innovation vector of $u_t$, and the matrix $(I-AL)^{-1}$ is nonsingular, then the innovation $e_t$ and the structural shock $u_t$ are related as

$e_t = S u_t$ where $S = (I-AL)^{-1} B(L)$, is nonsingular and lower triangular.

$u_j=S^{-1}e_j$, j= Benin, Bissau, Burkina, Cape Verde, Cote D'ivoire,Gambia, Ghana, Guinea, Mali, Niger, Senegal, Togo.

Lag length determination:

Due to the limited number of observations and the fact that the data used for this study is annual, I used one lag.

Procedure

I will first estimate the $\Delta Y_t$ equation for all twelve countries. I will repeat the same process for the $\Delta P_t$ equation. I will evaluate a variance covariance matrix and calculate the correlation between output, the change in the price of oil, and the change in the price level for all countries.

To measure the structural similarities between the economies of Ecowas, and to measure the effect of an exogenous macroeconomic shock on each individual country.

I will decompose the structural shock $u_t$ into a common shock $u_c$ and a country specific shock $u_s$. The innovation vector can therefore be written as:

$e=u_c\alpha+u_s$ where $u_c$ has unit variance, the vector $\alpha$ represents the weight assigned to individual components, and $u_s$ is a vector of country specific shocks. Covu=$\Sigma$ and cove=$\Delta$

$\Delta=\sigma_c^2\alpha\alpha'+\Sigma$.

To analyze the results for the correlation matrix illustrating the shocks to the price level, I will:

Consider the symmetry or lack there of, of shocks to the price level among the UMEOA members, namely (Benin, Burkina Faso, Ivory Coast, Mali, Niger, Senegal and Togo).

The currency in use within UMEOA is the CFA Franc which as I mentioned earlier was pegged to the French franc, and now to the euro.

Examine the coefficients of correlation for output growth and inflation between the UMEOA countries and Ghana, the Gambia, Mauritania, Cape Verde, Bissau and Guinea.

Compare coefficients of correlation between Nigeria and the two groups.

Compare the correlation between a change in the price of crude oil with a change in the price level in Nigeria on the one hand, and with the previously mentioned two groups on the other hand. I will follow the same procedure for the correlation matrix for output growth.

Table 1.1 shows the correlation matrix for the price level within UMEOA. The coefficients of correlation vary between 32% and 94%. The coefficients are relatively high, and this should be expected since we are dealing with a common currency, the CFA. Some countries' price level however, is more correlated than others within UMEOA.

Togo for instance has a coefficient of correlation of 79% with Senegal, the highest recorded with any country whether within ECOWAS or UMEOA. These results may not be conclusive, because we have not look

at shocks to the price level and shocks to output yet. They however, signal potential necessary rearrangements of the CFA zone.

Table 1.1

Correlation Matrix for the price level UMEOA Countries

| | BJ | BF | CI | ML | NE | SN | TG |
|---|---|---|---|---|---|---|---|
| BJ | 1 | | | | | | |
| BF | 0.68* | 1 | | | | | |
| CI | 0.94* | 0.70* | 1 | | | | |
| ML | 0.77* | 0.80* | 0.79* | 1 | | | |
| NE | 0.83* | 0.73* | 0.83* | 0.80* | 1 | | |
| SN | 0.65* | 0.67* | 0.57* | 0.48 | 0.53* | 1 | |
| TG | 0.66* | 0.35 | 0.48 | 0.32 | 0.32 | 0.79* | 1 |

*Significant

Critical value at the 5% level is 0.497

Table 1.2 shows the coefficients of correlation for output growth within UMEOA. They vary between 0.2% and 90%. Again, when we consider each country's similarities with the other members of the group, Togo is more similar to Senegal and Mali in the structure of its economy, and to no other member of UMEOA.

The structure of the Ivorian economy for instance, is similar to none of the other members in UMEOA. This is what one would expect given the

fact that the Ivory Coast is the world number one producer of cacao, and ranks third in the production of coffee. Until recently, it was also the destination of many migrant workers in the sub-region. Therefore, mobility of human resources has been a reality for some time. The results are not much different with the rest of ECOWAS.

It is however apparent that as low as they may be, UMEOA members have higher coefficients between themselves, than between them and the non UMEOA members, that constitutes the West African Monetary Zone(WAMZ). What we know is these similarities can only be attributed to endogeneity, or the Rose effect.

The countries that make up UMEOA were glued together by the French colonial system, which operated like a monopsony. It was the only buyer of their primary commodities, and the currency in use was the CFA pegged to the French franc.

The theory of optimal currency area which was introduced in 1961 could not have been the basis for putting these countries together.

Table 2.1 shows the matrix correlation for the price level within ECOWAS. The coefficients of correlation between Nigeria and the rest of Ecowas vary between 18% and 81% in absolute value. The highest coefficient, 81% is with the Faso, a member of UMEOA. The highest coefficient that Burkina has with any member of UMEOA is 80%, Mali.

Correlation between changes in the price of oil and changes in the price level range between 32% for Mauritania, 29% for Nigeria and for Ghana. For all other countries within ECOWAS, the coefficients are much lower.

As for table 2.2, it illustrates the coefficients of correlation for output growth within ECOWAS. They vary between 0 %( Benin-Mauritania), and 90 %( Senegal-Mali).

Table 1.2
Correlation Matrix for output growth UMEOA

| | BJ | BF | CI | ML | NE | SN | TG |
|---|---|---|---|---|---|---|---|
| BJ | 1 | | | | | | |
| BF | 0.71* | 1 | | | | | |
| CI | -0.11 | -0.03 | 1 | | | | |
| ML | 0.66* | 0.66* | 0.15 | 1 | | | |
| NE | 0.57* | 0.57* | 0.04 | 0.50* | 1 | | |
| SN | 0.64* | 0.64* | -0.13 | 0.90* | 0.54* | 1 | |
| TG | 0.32 | 0.43 | 0.02 | 0.74* | 0.48 | 0.82* | 1 |

*Significant

Critical value at the 5% level is 0.497

Table 2.1

Correlation matrix for the price level ECOWAS

| | B J | B F | CV | C I | GM | GH | GN | GW | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B J | 1 | | | | | | | | | | | | | |
| B F | 0.68* | 1 | | | | | | | | | | | | |
| CV | 0 | 0.25 | 1 | | | | | | | | | | | |
| C I | 0.94* | 0.70* | 0.027 | 1 | | | | | | | | | | |
| GM | -0.18 | -0.29 | -0.03 | -0.06 | 1 | | | | | | | | | |
| GH | 0.32 | 0.54* | 0.22 | 0.22 | -0.30 | 1 | | | | | | | | |
| GN | -0.21 | -0.36 | -0.32 | -0.27 | -0.03 | -0.4 | 1 | | | | | | | |
| GW | 0.19 | 0.32 | 0.27 | 0.12 | -0.29 | 0.55* | -0.34 | 1 | | | | | | |
| ML | 0.77* | 0.80* | 0.31 | 0.79* | -0.26 | 0.29 | -0.28 | 0.10 | 1 | | | | | |
| NE | 0.83* | 0.73* | 0.07 | 0.83* | -0.32 | 0.4 | -0.49 | 0.19 | 0.8* | 1 | | | | |
| NG | 0.60* | 0.81* | 0.18 | 0.56* | -0.29 | 0.78 | -0.34 | 0.53* | 0.56* | 0.61* | 1 | | | |
| SN | 0.65* | 0.67* | 0.57* | 0.57* | -0.07 | 0.19 | -0.38 | 0.09 | 0.48 | 0.53* | 0.49 | 1 | | |
| TG | 0.66* | 0.35 | 0.48 | 0.48 | -0.07 | 0.16 | -0.09 | 0.19 | 0.32 | 0.32 | 0.32 | 0.79* | 1 | |
| MR | -0.03 | -0.01 | -0.18 | -0.18 | -0.18 | 0.33 | 0.33 | 0.16 | -0.39 | -0.05 | 0.25 | 0.15 | 0.15 | 1 |

*Significant

Critical value at 5% level is 0.497

Table 2.2
Correlation matrix for output growth ECOWAS

| | B J | B F | CV | C I | GM | GH | GN | GW | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B J | 1 | | | | | | | | | | | | | |
| B F | 0.71* | 1 | | | | | | | | | | | | |
| CV | 0.18 | 0.42 | 1 | | | | | | | | | | | |
| C I | -0.11 | -0.03 | -0.16 | 1 | | | | | | | | | | |
| GM | 0.06 | 0.034 | -0.26 | 0.13 | 1 | | | | | | | | | |
| GH | 0.46 | 0.50* | 0.48 | -0.03 | -0.39 | 1 | | | | | | | | |
| GN | -0.064 | -0.10 | -0.25 | 0.07 | 0.67* | -0.3 | 1 | | | | | | | |
| GW | -0.02 | 0.10 | -0.17 | 0.79* | 0.13 | -0.23 | 0.14 | 1 | | | | | | |
| ML | 0.66* | 0.35 | 0.38 | 0.15 | 0.15 | 0.56* | 0.09 | -0.06 | 1 | | | | | |
| NE | 0.57* | 0.41 | 0.15 | 0.04 | -0.04 | 0.36 | -0.26 | 0.30 | 0.50 | 1 | | | | |
| NG | -0.19 | -0.04 | 0.16 | 0.15 | 0.48 | -0.06 | 0.69* | 0.20 | 0.19 | 0.11 | 1 | | | |
| SN | 0.64* | 0.47 | 0.51* | -0.13 | 0.14 | 0.52* | -0.02 | -0.20 | 0.90* | 0.54* | 0.17 | 1 | | |
| TG | 0.32 | 0.43 | 0.64* | 0.02 | 0.11 | 0.57 | 0.12 | 0.12 | 0.74* | 0.48 | 0.48 | 0.82* | 1 | |
| MR | 0 | 0.24 | 0.76* | -0.05 | -0.07 | 0.43 | 0.01 | -0.02 | 0.36 | -0.24 | 0.41 | 0.42 | 0.65* | 1 |

*Significant

Critical value at the 5% level is 0.497

In table 3.1 I have summarized the coefficients of correlation for shocks to output growth among ECOWAS members.

The coefficients that Nigeria has with the other members vary

between 0.05 and 0.48 in absolute value. These preliminary results suggest uneven development in the sub-region, which is to blame partly for the slow ratification of many treaties on trade liberalization. The coefficients may improve as a result of more integration, and free movement of labor and natural resources, as suggested by the rose effect. The coefficients of correlation between Nigeria and the rest of the members are negative for Benin, Faso, Cape Verde, Ghana, Mali, and Niger. They are below 20% for the remaining members.

Table 3.1
Correlation matrix for shocks to output growth ECOWAS

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B J | 1 | | | | | | | | | | | |
| B F | 0.69* | 1 | | | | | | | | | | |
| CV | -0.06 | 0.27 | 1 | | | | | | | | | |
| C I | 0.09 | 0.07 | -044 | 1 | | | | | | | | |
| GM | -0.17 | -0.27 | -0.09 | 0.25 | 1 | | | | | | | |
| GH | -0.05 | 0.12 | 0.10 | 0.06 | -0.06 | 1 | | | | | | |
| ML | 0.25 | 0.35 | 0.28 | -0.24 | -0.18 | 0.50* | 1 | | | | | |
| NE | 0.58* | 0.43 | 0.09 | 0.04 | -0.46 | 0.12 | 0.65* | 1 | | | | |
| NG | -0.37 | -0.48 | -0.16 | 0.12 | 0.13 | -0.10 | -0.05 | -0.24 | 1 | | | |
| SN | 0.15 | 0.21 | 0.31 | -0.03 | 0.03 | 0.47 | 0.86* | 0.52* | 0.18 | 1 | | |
| TG | 0.56* | 0.20 | -0.04 | -0.04 | -0.04 | -0.01 | 0.01 | 0.14 | 0.29 | 0.32 | 1 | |
| MR | 0.14 | 0.05 | -0.13 | -0.24 | -0.24 | 0.21 | 0.03 | 0.05 | 0.48 | 0.28 | 0.64* | 1 |

*Significant

Critical value at the 5% level is 0.497

Using OLS, I estimated the model specified in the previous pages. The source for the data was the African Development Bank, and covered the periods from 1983 to 1999 for 12 countries. I also conducted a unit root test for growth, and found the variable to be stationary, as there is no unit

root. The results are displayed in the following table. The group-t designates the t value for the panel.

Asymptotic critical values used for panel

Mean and Variance Adjusted terms used: -2.18- 0.56

N=12, T=16, maximum lag =3

Individual statistics:

| N | ADF | lags |
|---|---|---|
| 1 | -4.29 | 0 |
| 2 | -4.29 | 0 |
| 3 | -4.29 | 0 |
| 4 | -4.54 | 0 |
| 5 | -4.19 | 0 |
| 6 | -3.89 | 3 |
| 7 | -4.72 | 3 |
| 8 | -3.69 | 3 |
| 9 | -3.41 | 2 |
| 10 | -5.02 | 0 |
| 11 | -5.27 | 0 |
| 12 | -3.96 | 0 |

Group-t: -9.80

Table 3.2 Parameter estimates for Output growth.

$\Delta Y_t = \beta_1 \Delta Y_{t-1} + \beta_2 \Delta P_{t-1} + \beta_3 \Delta M_{t-1} + \beta_4 \Delta K_{t-1} + u_{1t}$ 1.1

| Variable | Parameter Estimate | t value | P Value |
|---|---|---|---|
| Intercept | -2969.12 | -0.23 | 0.8154 |
| $\Delta Y_{t-1}$ | -0.31 | -4.89 | <.0001 |
| $\Delta P_{t-1}$ | 4294.63 | 3.44 | 0.0007 |
| $\Delta M_{t-1}$ | -0.12 | -0.93 | 0.3513 |
| $\Delta K_{t-1}$ | 693.89 | 0.34 | 0.7378 |
| $R^2$ | | | .16 |
| Adj $R^2$ | | | .13 |
| n | | | 192 |

The above table shows the SAS output for the output growth equation.

For the growth equation, we have an R-squared of 0.1576, and an adjusted R-squared of 0.1384.The null hypothesis cannot be rejected, a shock to the price of oil has no impact on output growth.

The parameter estimate for the price level shows that one percentage increase in the price level leads to an increase in output by 4292.63 dollars. This is consistent with the law of supply. As for money growth, we note that one percentage increase in the money supply leads to a decrease in output by 12 percentage points.

The parameter estimate for oil indicates that one percentage increase in the world price of oil will increase output by nearly 694 dollars. The major economy in the group is Nigeria, an oil exporting country.

For the change in the price level equation, the regression results are summarized in table 3.3. We have an R-squared of 0.30 and an Adjusted R squared of 0.28.

The Ho $\beta_4=0$ that I sought to test cannot be rejected for the growth model. In other words, a shock to the price of oil seems to have no impact on output growth, but does impact the price level. The null hypothesis can therefore be rejected, as oil is significant beyond the ten percent level of significance, and a ninety five percent confidence interval.

Considering that inflation affects output growth in the long run, a shock to the world price of oil has an indirect impact on output growth. The unit root test for inflation reveals no unit root; therefore the variable is also stationary. The final unit root test was for money growth.
The results are displayed with a group-t of -7.57, and they also suggest a stationary variable, and no unit root.

Asymptotic critical values used for panel

Mean and Variance Adjusted terms used: -2.18 0.56

N=12, T=16, maximum lag =3

Individual Statistics:

Table 3a

| N | ADF | lags |
|---|---|---|
| 1 | -4.49 | 0 |
| 2 | -4.04 | 2 |
| 3 | -3.63 | 0 |
| 4 | -4.58 | 0 |
| 5 | -3.24 | 0 |
| 6 | -2.61 | 3 |
| 7 | -4.06 | 0 |
| 8 | -4.92 | 0 |
| 9 | -2.56 | 0 |
| 10 | -4.3 | 0 |
| 11 | 11.34 | 0 |
| 12 | -2.52 | 0 |

Group-t: -10.09

Asymptotic critical values used for panel

Mean and Variance Adjusted terms used: -2.18 0.56

N=12, T=16, maximum lag =3

Individual Statistics:

Table 3b

| N | ADF | lags |
|---|---|---|
| 1 | -1.68 | 0 |
| 2 | -5.27 | 0 |
| 3 | -4.72 | 0 |
| 4 | -0.19 | 3 |
| 5 | -4.72 | 0 |
| 6 | -3.39 | 3 |
| 7 | -4.76 | 0 |
| 8 | -3.83 | 0 |
| 9 | -3.79 | 3 |
| 10 | -4.66 | 3 |
| 11 | -4.06 | 2 |
| 12 | -4.71 | 0 |

Group-t: -7.57

Table 3.3 Parameter Estimates for Changes in the price level

$\Delta P_t = \mu_1 \Delta Y_{t-1} + \mu_2 \Delta P_{t-1} + \mu_3 \Delta M_{t-1} + \mu_4 \Delta K_{t-1} + u_{2t}$ 2.2

| Variable | Parameter Estimate | t Value | P Value |
|---|---|---|---|
| Intercept | 3.68465 | 5.46 | <.0001 |
| $\Delta P_{t-1}$ | 0.28908 | 4.35 | <.0001 |
| $\Delta Y_{t-1}$ | -1.4E-06 | -0.41 | 0.6857 |
| $\Delta M_{t-1}$ | 3.43E-05 | 4.99 | <.0001 |
| $\Delta K_{t-1}$ | 0.18923 | 1.72 | 0.0868 |
| $R^2$ | | | .30 |
| Adj $R^2$ | | | .28 |
| n | | | 192 |

The response of the price level to changes in the parameter estimates is such that; one percentage increase in output will decrease the price level by 1.4 percentage points. This finding is consistent with the basic law of demand. On the other hand, one percentage increase in the money supply will increase the price level by 3.43 percentage points. The reaction of the price level to a shock to the world price of oil shows that one percentage increase in the world price of oil will increase the price level by 19 percentage points.

Table 3.4

Correlation matrix for shocks to the price level ECOWAS

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B J | 1 | | | | | | | | | | | |
| B F | 0.60* | 1 | | | | | | | | | | |
| CV | -0.22 | 0.03 | 1 | | | | | | | | | |
| C I | 0.56* | 0.2 | -0.21 | 1 | | | | | | | | |
| GM | -0.15 | -0.21 | 0 | -0.01 | 1 | | | | | | | |
| GH | 0.02 | 0.51* | -0.02 | 0.22 | -0.12 | 1 | | | | | | |
| ML | 0.78* | 0.75* | 0.23 | 0.56* | -0.2 | 0.27 | 1 | | | | | |
| NE | 0.92* | 0.58* | -0.16 | 0.56* | -0.21 | 0.24 | 0.75* | 1 | | | | |
| NG | 0.23 | 0.71* | 0.06 | 0.2 | -0.20 | 0.83* | 0.41 | 0.40 | 1 | | | |
| SN | 0.57* | 0.61* | -0.08 | 0.12 | -0.14 | 0.03 | 0.43 | 0.46 | 0.23 | 1 | | |
| TG | 0.58* | 0.42 | -0.18 | 0.12 | -0.15 | -0.18 | 0.36 | 0.42 | -0.03 | 0.92* | 1 | |
| MR | -0.12 | 0.05 | -0.69 | 0.10 | -0.23 | 0.16 | -0.40 | -0.02 | 0.15 | 0.13 | 0.06 | 1 |

*Significant

Critical value at 5% level is 0.497

In table 3.4, the correlation coefficients for shocks to the price level among Ecowas members suggest a rather low level of symmetry.

The test of significance reveals that some countries would benefit more outside the CFA zone than within it. For instance, shocks to the price level for the Ivory Coast are correlated with those of Niger and Mali, and with no other member of UMEOA.

Among UMEOA members, the coefficients are much higher, and they vary between 0.12 and 0.92. This result again, should not surprise us as these countries already use the CFA as a common currency. Other than Ghana and the Faso, the coefficients of correlation between Nigeria and the remaining Ecowas members are 71% with the Faso, 83% with Ghana. In fact, it would make more sense for Nigeria and the Faso (a UMEOA) member, to be in the same monetary union, than the Faso and Benin, two UMEOA members. These preliminary results again do not support the case for a common currency, but rather the necessity of rearrangement on the basis of similarities.

Table 4.1
Decomposition of prediction error covariance's by variable and by country output growth

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U s | 0.54 | 0.95 | 0.82 | 0.94 | 0.83 | 0.67 | 0.70 | 0.85 | 0.62 | 0.82 | 0.91 | 0.50 |
| Uinf | 0.05 | 0.02 | 0.01 | 0.04 | 0.02 | 0.02 | 0.04 | 0.04 | 0.31 | 0.05 | 0.03 | 0.40 |
| Umoney | 0.32 | 0.03 | 0.07 | 0.01 | 0.09 | 0.01 | 0.22 | 0.09 | 0.03 | 0.12 | 0.04 | 0.01 |
| Uc | 0.08 | 0.0 | 0.09 | 0.01 | 0.06 | 0.3 | 0.03 | 0.01 | 0.03 | 0.0 | 0.0 | 0.10 |
| Total | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Table 4.1 illustrates the decomposition of the prediction Error Covariance. The above results are those of the fifth period.

$U_s$ designates the percentage of the prediction error for output growth, for each country, which is accounted for by its own innovation.

$U_{infl}$ designates the percentage of the prediction error for output growth which is accounted for by changes in the price level.

$U_{money}$ designates the percentage of the prediction error for output growth, which is accounted for by changes in the money supply.

$U_c$ is the percentage of the prediction error for output growth which is accounted for by changes in the price of oil. (in this case, the common shock). Oil is one commodity that every one of the members imports,

including Nigeria. Mark Ashurst of BBC World Business writes:" while selling cheap gas at home, the Nigerian government is importing more oil at a higher cost because so much fuel has been smuggled out of the country for sale in neighboring countries". This situation makes Nigeria an oil importing country, just like the rest of its fellow members in Ecowas.

Oil prices in Nigeria are subsidized to the tune of two billion dollars a year. In June of 2003, the Nigerian government raised the price of gasoline from 26 Naira per liter to 40 Naira. This price is the equivalent of twenty five cents per liter. With an external debt to the Paris Club estimated at thirty billion dollars, meeting convergence criteria is likely to be a serious challenge.

The objective is to see how every one of the twelve countries in the study is affected by the common shock. Again, the results on both table 4.1 and 4.2 show that the common shock does not affect Ecowas members with a similar magnitude. This is in accord with what we have learned from the correlation coefficients. The shock to output growth was evenly felt by Togo, Senegal and the Faso, all UMEOA members.

Table 4.2
Decomposition of prediction error co variances by variable and by country change in the price level.

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U s | 0.88 | 0.54 | 0.18 | 0.35 | 0.97 | 0.35 | 0.64 | 0.96 | 0.63 | 0.63 | 0.54 | 0.96 |
| Ugrowth | 0.02 | 0.10 | 0.20 | 0.06 | 0.02 | 0.06 | 0.20 | 0.01 | 0.04 | 0.31 | 0.35 | 0.0 |
| Umoney | 0.08 | 0.34 | 0.01 | 0.58 | 0.02 | 0.58 | 0.07 | 0.01 | 0.32 | 0.06 | 0.10 | 0.01 |
| Uc | 0.02 | 0.01 | 0.6 | 0.01 | 0.0 | 0.01 | 0.08 | 0.02 | 0.0 | 0.0 | 0.0 | 0.02 |
| total | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Table 4.2 shows the decomposition of the prediction error covariance by variable and by country change in the price level. The results show that the impact of a shock to the price of oil on the price level is not evenly felt across Ecowas. A shock to the price of oil has the same impact on Nigeria, Senegal the Gambia, and Togo. Again, this finding suggests a lack of symmetry in the exogenous shock among country members.

On the subject of common currency for ECOWAS, a recurring question has been about the exchange rate regime to adopt. Whether the currency should be pegged to the US dollar or the Euro, or should be a flexible rate, remains the subject of debate among academics and central bankers alike.

There is the widely held view that floating exchange rates insulate

domestic monetary conditions from international financial shocks, in the sense that they allow monetary independence for central banks. I decided to investigate this assumption, by using a major change in monetary policy in the United States.

I explored the effects of a shock to the fund's rate on both members of the West African Monetary Union that use the CFA, pegged to the Euro, and members of the WAMZ, namely Nigeria, Ghana, Cape Verde and the Gambia, which all have their own currencies with flexible exchange rates. How domestic interest rates react to a change in the fund's rate will, in our model, be manifested in the behavior of both output and the price level.

The regression results are summarized in the following tables:

$\Delta Y_t = \beta_1 \Delta Y_{t-1} + \beta_2 \Delta P_{t-1} + \beta_3 \Delta M_{t-1} + \beta_4 \Delta K_{t-1} + \beta_5 \Delta FX + \beta_6 \Delta int + u_1 t$ 1.1

Table 5.1

| Variable | Parameter Estimate | t Value | P Value |
|---|---|---|---|
| Intercept | 0.2956 | 1.06 | 0.2892 |
| $\Delta Y_{t-1}$ | -0.00578 | -0.08 | 0.9396 |
| $\Delta P_{t-1}$ | -4.08 | 1.4347 | 0.15 |
| $\Delta M_{t-1}$ | -0.6421 | -0.65 | 0.5163 |
| $\Delta K_{t-1}$ | -1.624 | -1.24 | 0.2182 |
| $\Delta FX$ | -1.3425 | -0.41 | 0.6837 |
| $\Delta int$ | 1.4479 | 1.31 | 0.1922 |
| $R^2$ | | | .20 |
| Adj $R^2$ | | | .14 |
| n | | | 192 |

The test of significance shows that neither an oil price shock nor a shock to foreign exchange rate has an impact on output growth. On the other hand, the price level and output both react very strongly to a major monetary policy shock from the United States. One percentage increase in the price level leads to a decrease in output by 4.08 million dollars, while one percentage increase in the money supply leads to a decrease

in output by 0.064 percentage points. The impact of a shock to the price of oil on output is such that; one percentage increase in the world price of oil increases output by 1.64 million dollars.

As for the foreign exchange rate, we see that one percentage increase in the foreign exchange rate leads to an increase in output by 1.34 million dollars. When the world interest rate increases by one percentage point, output for the community increases by 1.44 million dollars.

The increase in the world interest rate causes the price of foreign goods to increase, leading to the substitution effect. Demand for foreign goods falls, while demand for domestic goods increases. This increase in demand for domestic goods is met by local producers who increase their output; this explains why a shock to the fund's rate translates into higher output for some of the countries, such as Nigeria which is also an important US trading partner.

The impact on the price level is the same across countries, but with different magnitudes. High levels of inflation induce agents to seek safe heavens in foreign bonds and other assets, sending the domestic exchange rate down to depreciation. This depreciation in turn adjusts the balance of payments and improves output growth.

While a major monetary policy shock in the US may translate into higher output for some of the countries, for others it has a negative impact. Since the external debt is denominated in foreign currency, they have no way of predicting what their interest payments will be from one year to the next.

Table 5.2

$\Delta P_t = \mu_1 \Delta Y_{t-1} + \mu_2 \Delta P_{t-1} + \mu_3 \Delta M_{t-1} + \mu_4 \Delta K_{t-1} + \mu_5 \Delta FX + \mu_6 \Delta int + u_{2t}$ 2.2

| Variable | Parameter Estimate | t Value | P value |
|---|---|---|---|
| Intercept | 0.05698 | 4.12 | <0001 |
| $\Delta P_{t-1}$ | 0.18851 | 2.64 | 0.0090 |
| | -0.0013 | | |
| $\Delta Y_{t-1}$ | | -0.34 | 0.73 |
| $\Delta M_{t-1}$ | 0.20 | 4.14 | <.0001 |
| $\Delta K_{t-1}$ | -0.00513 | -0.08 | 0.9375 |
| ΔFX | 0.087 | 0.54 | 0.5933 |
| Δint | 0.02592 | 0.47 | 0.63 |
| $R^2$ | | | .19 |
| Adj $R^2$ | | | .16 |
| n | | | 192 |

Two new parameters, the foreign exchange rate and the world interest rate were added to the previous regression. The results show that one

percentage increase in the foreign exchange rate increases the price level by 0.09 percentage points. An increase in the world interest rate by one percentage point will also increase the price level by 0.03 percentage points. The relationship between output and the price level shows that one percentage increase in output will lead to a decrease in the price level by 0.0013 percentage points. The relation between the money supply and the price level is a direct one. One percentage increase in the money supply increases the price level by 0.20 percentage points.

It should be noted that more than one half of Ecowas members use the CFA as a currency, which is pegged to the euro. For that reason, they have no independent monetary policy. The CFA appreciates with the euro, creating all sorts of inflationary pressures and balance of trade problems.

Table 5.3
Decomposition of prediction error covariance's by variable and by country output growth

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U s | 0.39 | 0.02 | 0.22 | 0.34 | 0.47 | 0.35 | 0.23 | 0.09 | 0.06 | 0.39 | 0.23 | 0.24 |
| Uinf | 0.44 | 0.00 | 0.04 | 0.13 | 0.11 | 0.07 | 0.14 | 0.21 | 0.35 | 0.06 | 0.13 | 0.12 |
| Umoney | 0.07 | 0.20 | 0.13 | 0.00 | 0.20 | 0.47 | 0.15 | 0.23 | 0.27 | 0.44 | 0.22 | 0.47 |
| Uc | 0.03 | 0.13 | 0.28 | 0.06 | 0.00 | 0.06 | 0.00 | 0.06 | 0.00 | 0.01 | 0.00 | 0.03 |
| F X | 0.04 | 0.65 | 0.31 | 0.44 | 0.21 | 0.04 | 0.47 | 0.40 | 0.26 | 0.09 | 0.36 | 0.13 |
| i n t | 0.03 | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.00 | 0.05 | 0.00 |
| Total | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

The above table shows the response of output growth to different exogenous shocks. As previously noted, an oil price shock is equally felt by the Gambia, Mali, Niger, and Togo. All of these countries with the exception of the Gambia are members of the CFA zone.

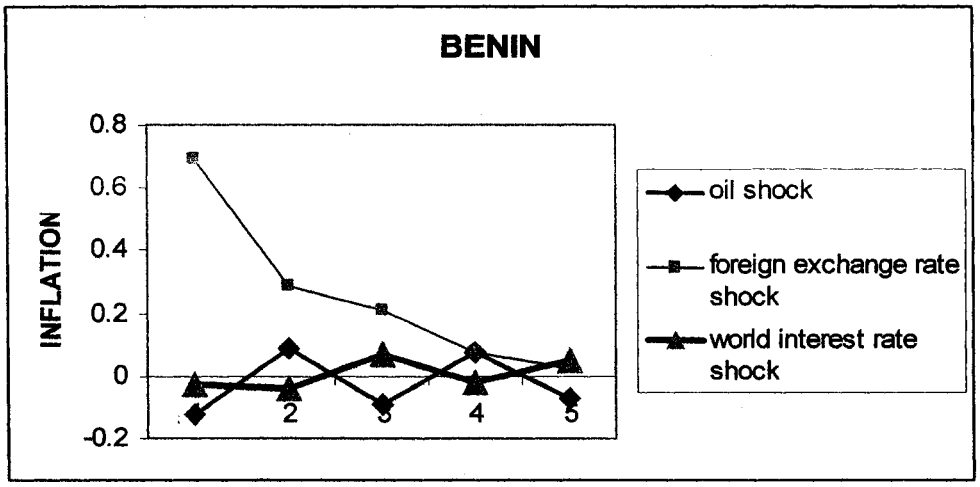
The Gambia being an enclave of Senegal, a considerable part of its commercial and monetary transactions is conducted in CFA. Moreover, the two economies are highly integrated. The vast majority of businessmen and women working in the Gambia are Senegalese who trade using the CFA more than the local currency. It may be said that unofficial dollarization does exist to some degree.

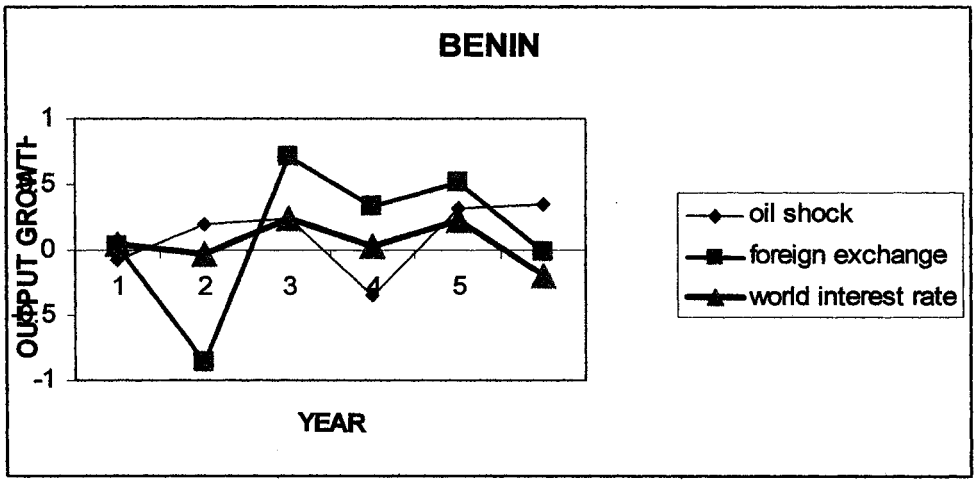
We notice a similar reaction to a shock to the world interest rate.

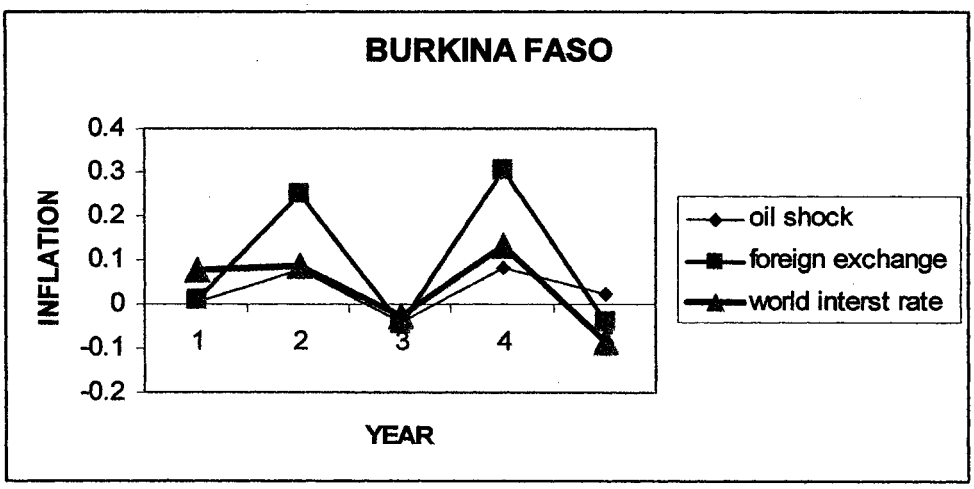
The magnitude of a shock to the world interest rate is equally felt by Burkina Faso, the Gambia, Ghana, Mali, Senegal, and Mauritania. Again, with the exception of Ghana, and the Gambia, the mentioned countries are all members of the CFA zone. It is apparent that for the Ivory Coast and Burkina Faso, despite membership to the CFA zone, output is more responsive to shocks to world interest rates. The reason for this difference may lie in the fact that other than Nigeria, the Ivory Coast is arguably the most indebted country in West Africa. Burkina Faso having borders with the Ivory Coast, its economy is subject to a great deal of influence from the latter.

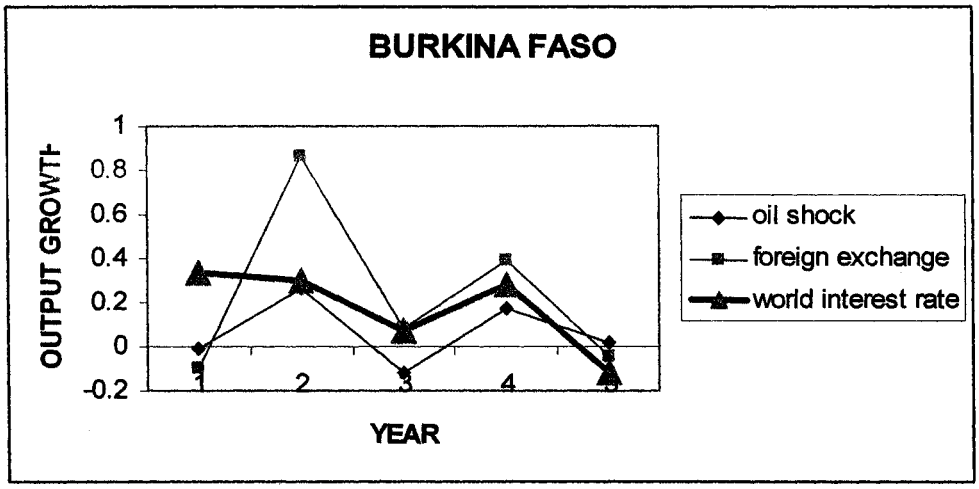
Benin and Ghana react to a shock to the foreign exchange rate with the same magnitude. They also have the lowest magnitude of the twelve countries in the study. Ghana's major export for instance is gold, for which demand may be more inelastic.

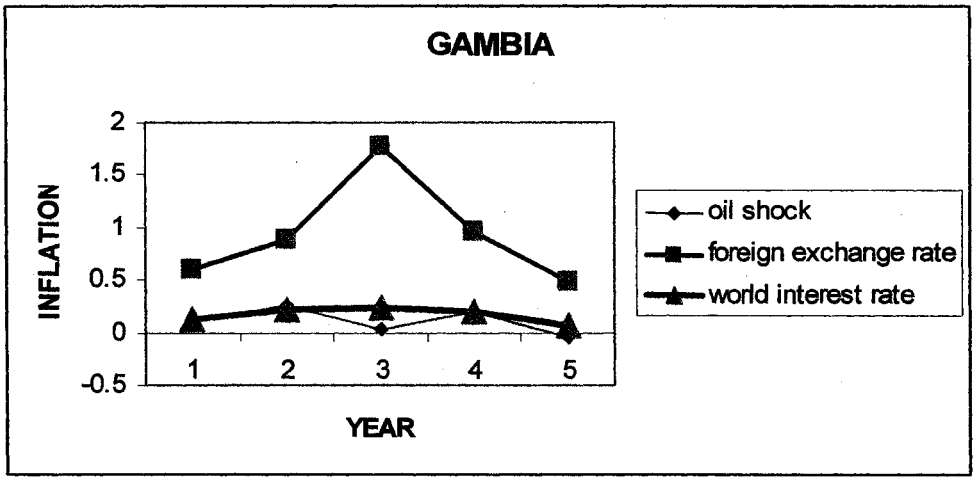
For the rest of the members, no two countries react the same way. I conducted an impulse response study to observe how shocks to oil prices, foreign exchange rates, and the world interest rate would affect the respective price levels and outputs for the countries in the study. The following pictures illustrate the results.

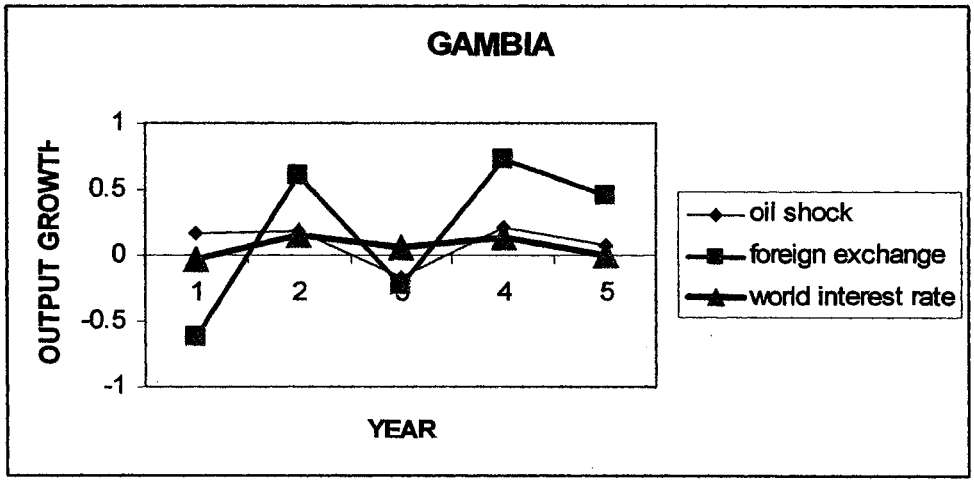

BENIN
INFLATION
0.8
0.6
0.4
0.2
0
-0.2
2
3
4
5
oil shock
foreign exchange rate shock
world interest rate shock


BENIN
OUTPUT GROWTH
1
5
0
5
-1
1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


BURKINA FASO
INFLATION
0.4
0.3
0.2
0.1
0
-0.1
-0.2
1
2
3
4
YEAR
oil shock
foreign exchange
world interst rate


BURKINA FASO
OUTPUT GROWTH
1
0.8
0.6
0.4
0.2
0
-0.2
1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


GAMBIA
INFLATION
2
1.5
1
0.5
0
-0.5
1
2
3
4
5
YEAR
oil shock
foreign exchange rate
world interest rate


GAMBIA
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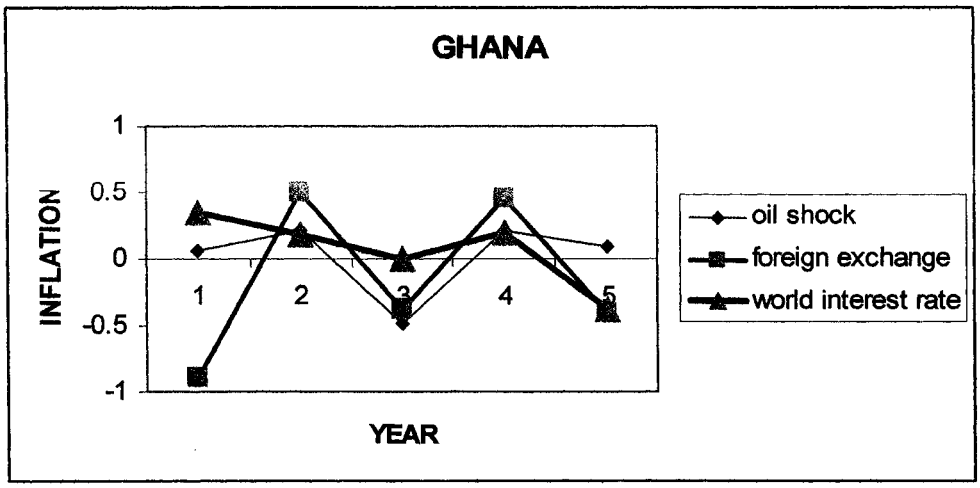
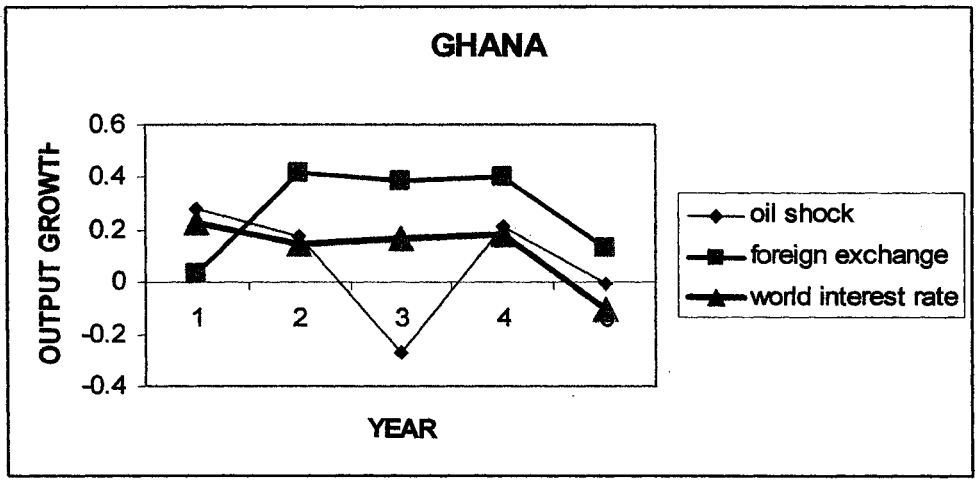
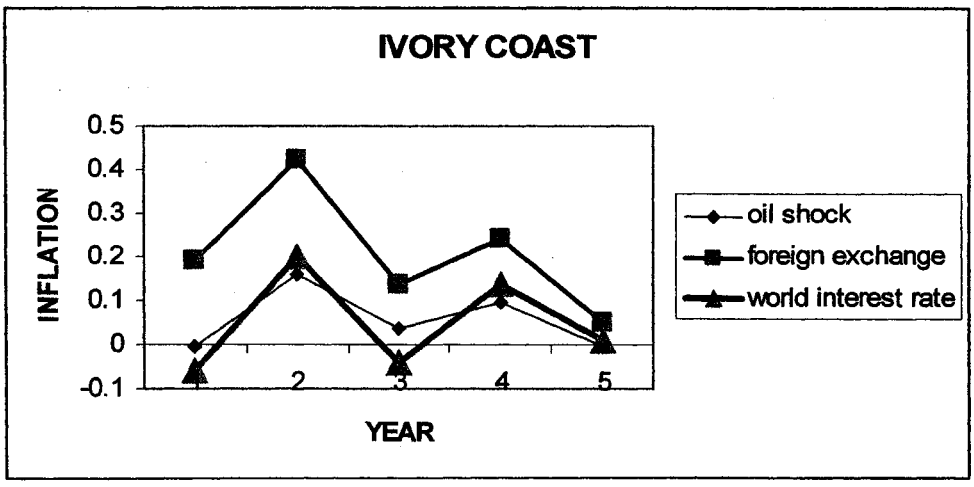
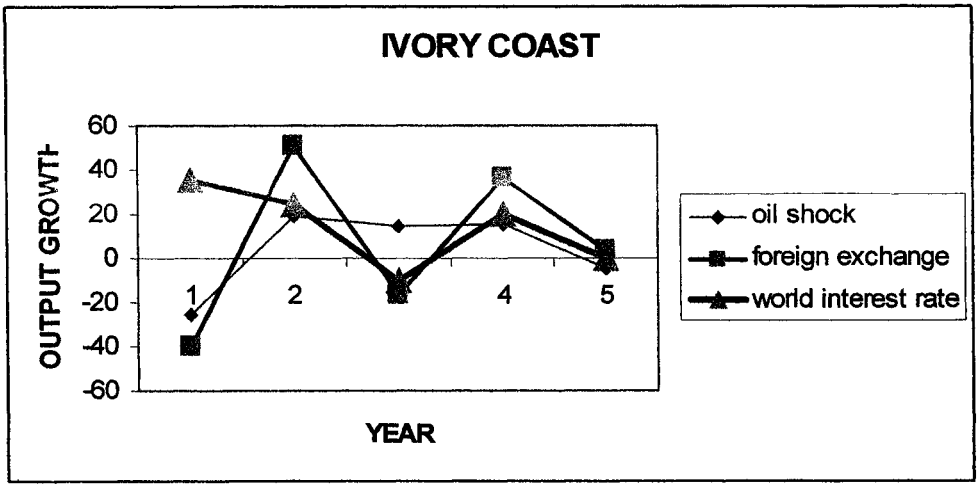
0
-0.5
-1
1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


GHANA
INFLATION
1
0.5
0
-0.5
-1
1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


GHANA
OUTPUT GROWTH
0.6
0.4
0.2
0
-0.2
-0.4
1
2
3
4
YEAR
oil shock
foreign exchange
world interest rate


IVORY COAST
INFLATION
0.5
0.4
0.3
0.2
0.1
0
-0.1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


IVORY COAST
OUTPUT GROWTH
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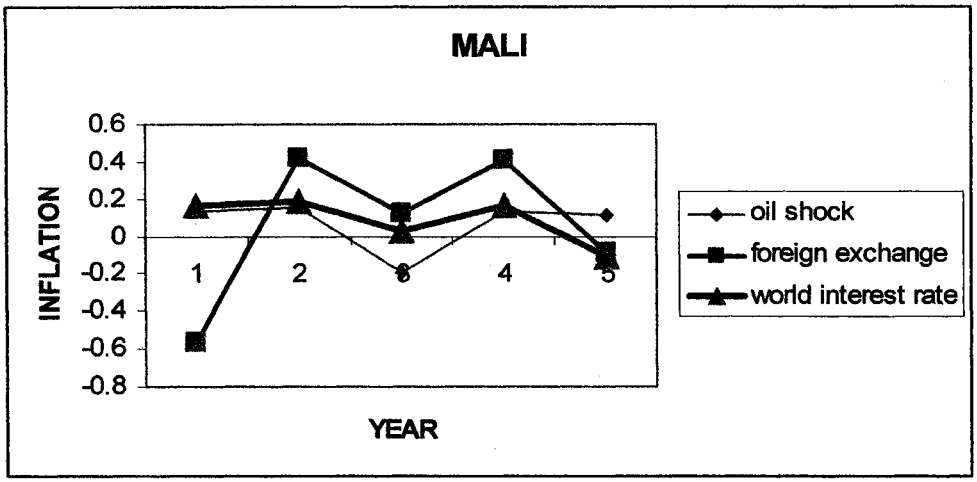
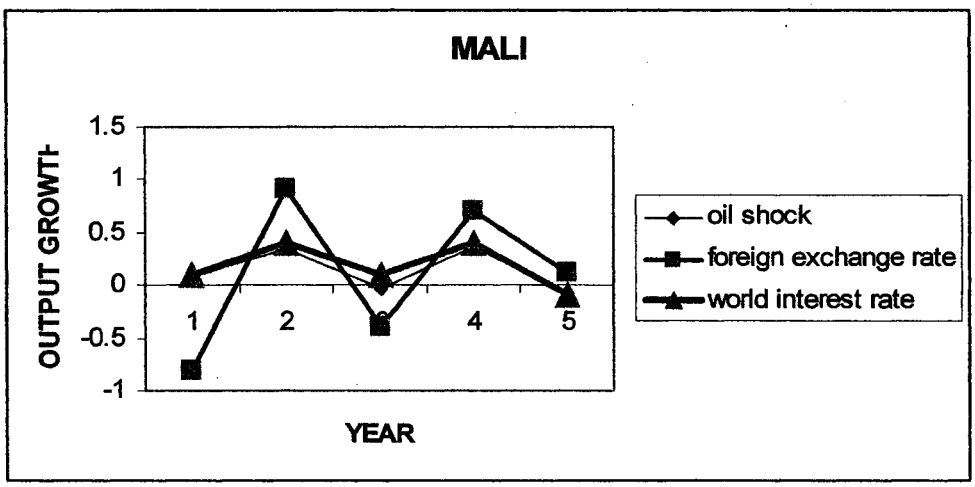
40
20
0
-20
-40
-60
1
2
4
5
YEAR
oil shock
foreign exchange
world interest rate


MALI
INFLATION
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
1
2
4
5
YEAR
oil shock
foreign exchange
world interest rate


MALI
OUTPUT GROWTH
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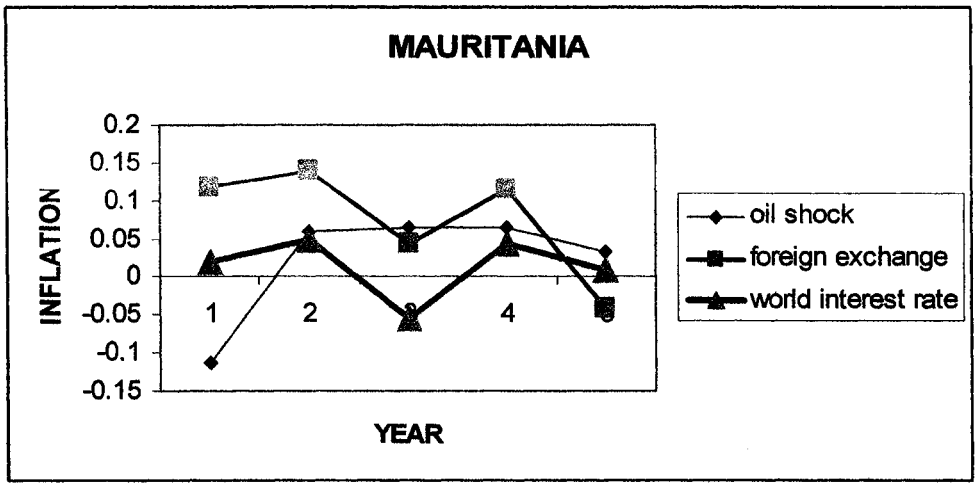
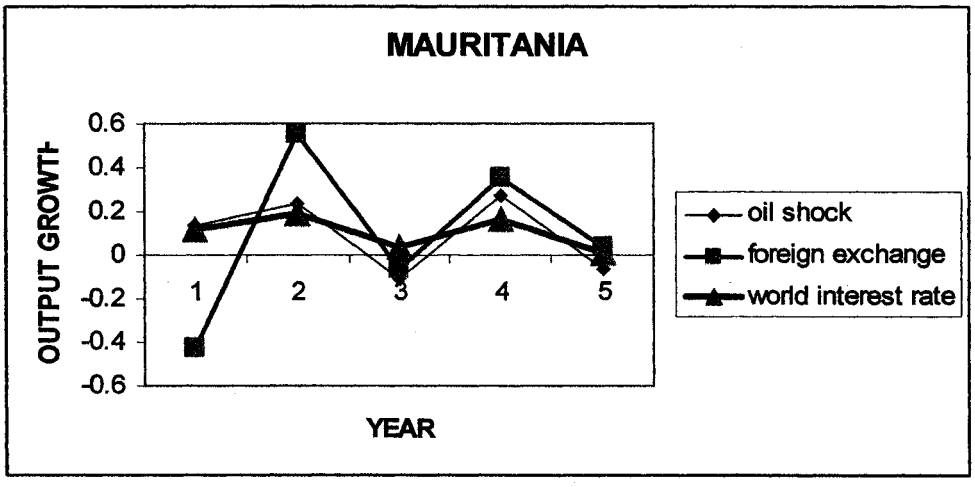
0.5
0
-0.5
-1
1
2
4
5
YEAR
oil shock
foreign exchange rate
world interest rate


MAURITANIA
INFLATION
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
1
2
4
YEAR
oil shock
foreign exchange
world interest rate


MAURITANIA
OUTPUT GROWTH
0.6
0.4
0.2
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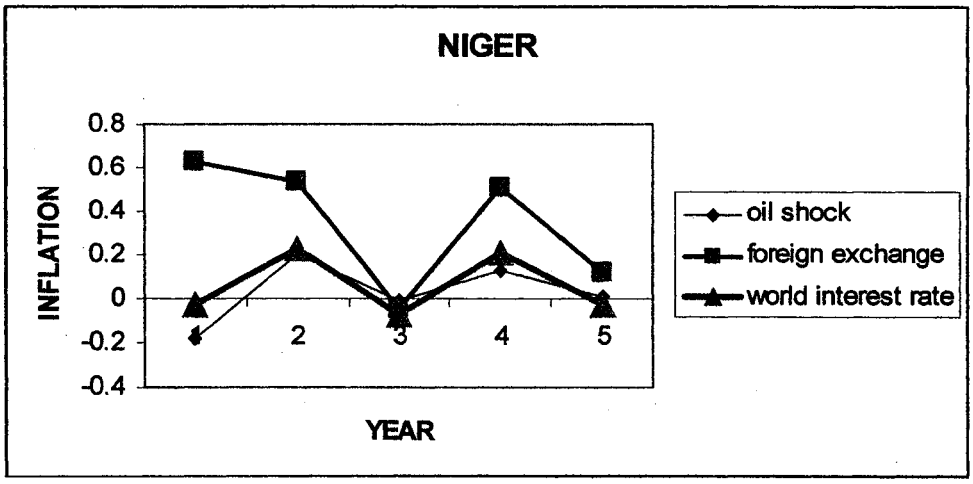
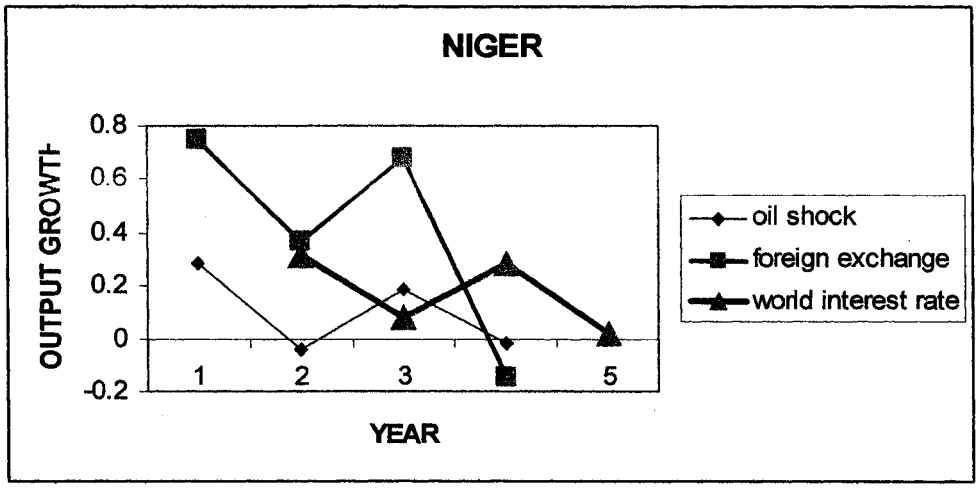
-0.4
-0.6
1
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


NIGER
INFLATION
0.8
0.6
0.4
0.2
0
-0.2
-0.4
2
3
4
5
YEAR
oil shock
foreign exchange
world interest rate


NIGER
OUTPUT GROWTH
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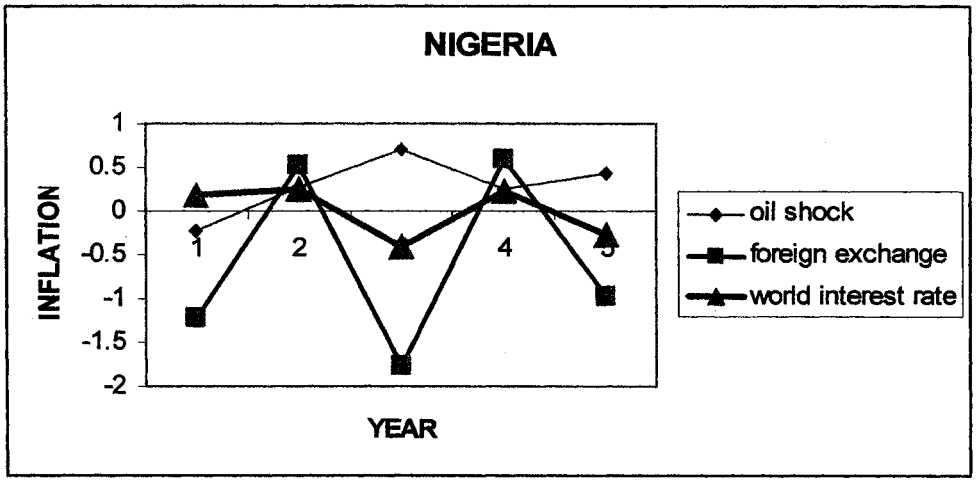
0.4
0.2
0
-0.2
1
2
3
5
YEAR
oil shock
foreign exchange
world interest rate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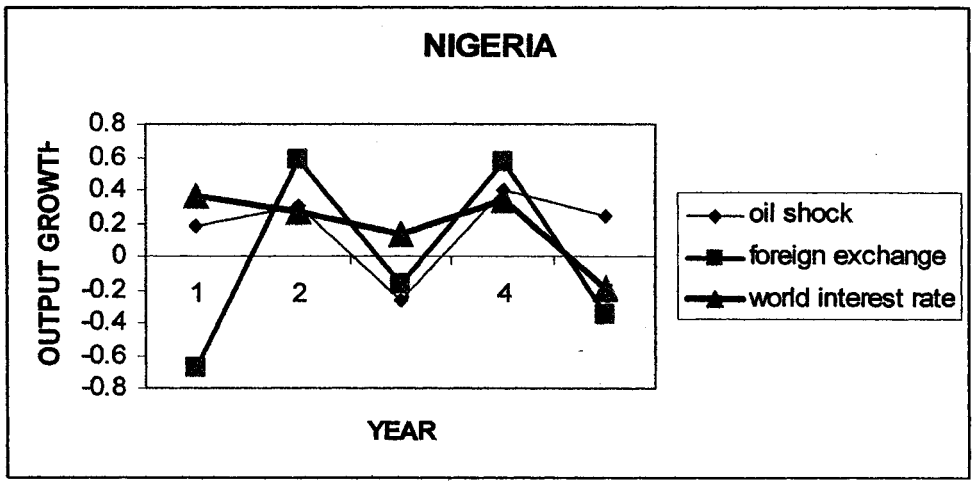
YEAR
oil shock
foreign exchange
world interest rate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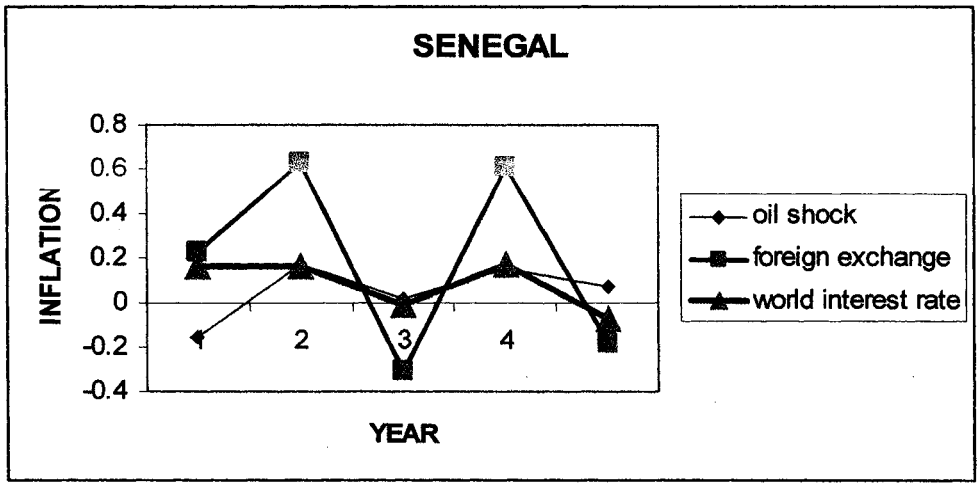
YEAR
oil shock
foreign exchange
world interest rate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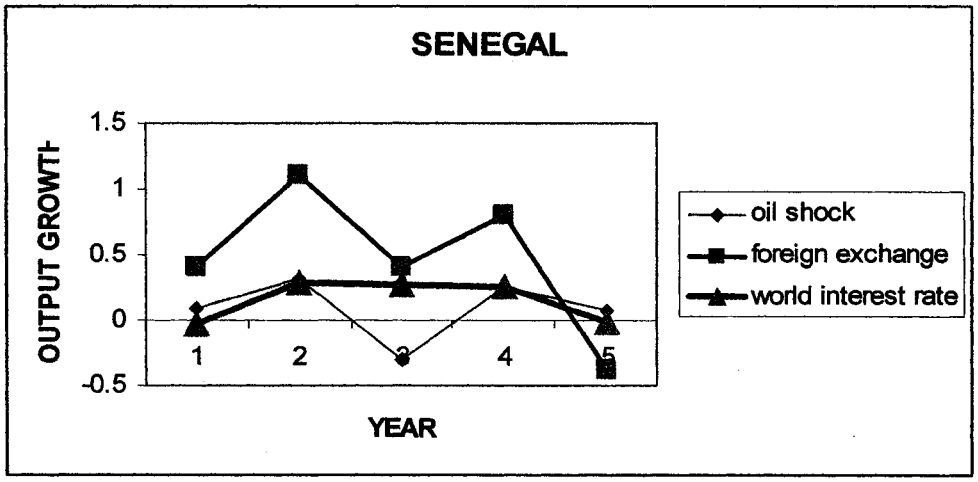
YEAR
oil shock
foreign exchange
world interest rate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OUTPUT GROWTH
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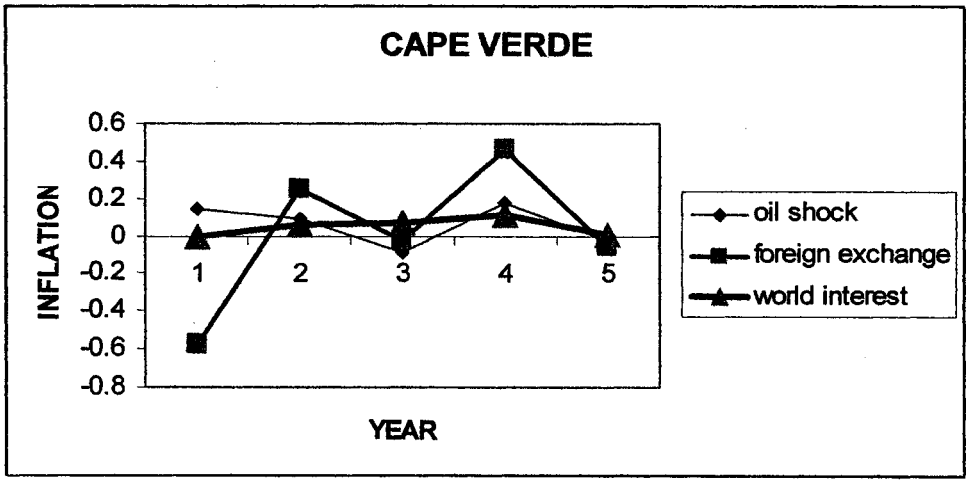
YEAR
oil shock
foreign exchange
world interest rate


CAPE VERDE
INFLATION
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-0.4
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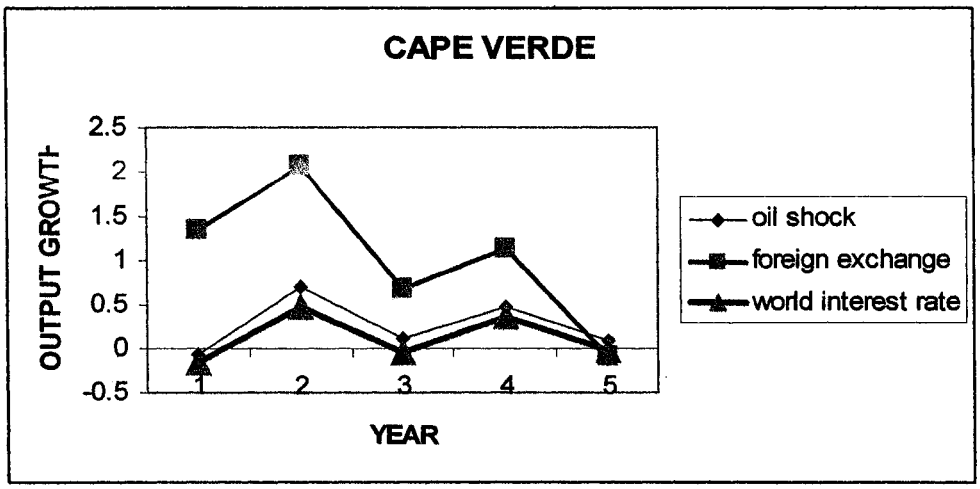
YEAR
oil shock
foreign exchange
world interest




The results for the impulse response show large swings in the price level as a result of a shock to the world interest rate. The purpose of the study is to see if different ECOWAS members respond the same way to the same exogenous shock. We discover that this is not the case. For some of the countries, namely those in the CFA zone, a major monetary policy shock causes the price level to rise less than for those in the WAMZ.

For instance, for Benin, Burkina Faso, Gambia, Ivory Coast, Mauritania, Niger, Togo, Senegal and Mali, the response of the price level to a one percent shock to monetary policy in the United States varies between 0.1% and 1.3%. A much higher response is observed for Nigeria 1.8%, Ghana 2.4% and Cape Verde 2.5%. The finding is consistent with the benefits of membership to the CFA zone that has always enjoyed low inflation.

Based on this finding, we can conclude that the choice of a peg

versus float in ECOWAS depends on the choice between inflation and output growth. Nigeria, the largest economy in the Community has a floating exchange rate, and so do Ghana and Cape Verde. The flexible rate however, does not insulate them from the monetary shock emanating from the United States. What matters more than the regime is whether or not these are small (cannot affect world trade) or big countries. While the shocks create large swings on the price level, they are of different magnitudes, suggesting asymmetry.

The persistence of the shock and how long it lingers depends to a large extent, on how fast the monetary authorities in their respective countries react to it.

The effects of an oil shock are less remarkable. While we observe large swings on the price level of countries such as: Niger, Ivory Coast and Burkina Faso where the shock tends to linger, and at times explosive, it levels out for the rest of the members.

The foreign exchange rate shocks on the price level are negligible. Other than Niger, Burkina Faso and the Ivory Coast, the impact of a foreign exchange rate shock on the price level rapidly disappears. It is safe to say, based on our observations, that a major monetary policy shock in the United States has more impact on these developing countries, than does

a foreign exchange rate shock.

Table 5.4
Decomposition of prediction error co variances by variable and by country change in the price level.

| | B J | B F | CV | C I | GM | GH | ML | NE | NG | SN | TG | MR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U s | 0.65 | 0.03 | 0.20 | 0.13 | 0.16 | 0.36 | 0.17 | 0.59 | 0.36 | 0.25 | 0.27 | 0.09 |
| Ugrowth | 0.01 | 0.00 | 0.02 | 0.01 | 0.34 | 0.01 | 0.28 | 0.01 | 0.01 | 0.11 | 0.19 | 0.12 |
| Umoney | 0.26 | 0.20 | 0.18 | 0.01 | 0.27 | 0.46 | 0.17 | 0.13 | 0.34 | 0.48 | 0.17 | 0.62 |
| Uc | 0.02 | 0.13 | 0.33 | 0.06 | 0.00 | 0.07 | 0.00 | 0.03 | 0.00 | 0.07 | 0.06 | 0.04 |
| F X | 0.05 | 0.63 | 0.24 | 0.70 | 0.22 | 0.00 | 0.36 | 0.23 | 0.22 | 0.09 | 0.35 | 0.14 |
| i n t | 0.01 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.11 | 0.00 |
| Total | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

The decomposition of the prediction error covariance in the price level reveals more asymmetry when we consider more than one exogenous shock. For instance, a shock to the price of oil when combined with a shock to the world interest rate and a shock to the foreign exchange rate, would affect Senegal and Ghana with the same magnitude. The Gambia, Mali, and Nigeria would be impacted similarly. In the process of analyzing these results, it is quite apparent that a country like the Gambia would be much better off by joining the CFA zone.

A shock to the world interest rate would equally affect Burkina

Faso, the Ivory Coast, the Gambia, Ghana, Mali, Niger, and Mauritania. Again the Gambia is standing almost alone among CFA zone members.

When it comes to foreign exchange rates, no two members of ECOWAS feel the shock with the same intensity. The countries that feel more turbulence in their price levels are: Ivory Coast (70%), Burkina Faso (63%), Mali (36%) and Togo (35%). This comes as no surprise because the Ivory Coast is the world number one exporter of cacao, Mali is the main producer of cotton in the African continent, Togo's number one export is cacao, coffee, and cotton, while Burkina Faso exports mainly cotton and ground nuts.

I will use the impulse response function, in order to observe the response of output to one impulse or a shock to oil prices, foreign exchange rates, and the world interest rate. The following pictures will illustrate the behavior of output for every individual Ecowas member. The analysis of the impulse response function for output growth indicates the significance of a shock to the world interest rate. The effect on output growth varies depending on whether a country is in the CFA zone or in the WAMZ. Those countries that are in the CFA zone, all respond to a one percent monetary policy shock in the United States with a negative change in output growth. For Nigeria, Ghana and the Gambia, all nonmembers of the CFA zone, there is a positive change in output

growth.

The test of significance illustrated on the table that follows indicates that, the response of the price level to a major monetary policy shock in the United is significant.

On the other hand, the response of output growth to the very shock is not significant and varied across countries. The lack of significance on the part of output growth is due to the fact that more than half of ECOWAS members have a hard peg on the euro.

Nigeria, as an oil exporter has close commercial ties with the United States. A major monetary policy shock in the U.S, which would have its impact on the local interest rates and the price level, would force agents to seek safe heavens in foreign bonds and assets. The naira would depreciate, while domestic interest rates decline, encouraging investment and economic growth. Even though patterns of the response are different among ECOWAS members, this analysis is also valid for Ghana and the other countries in the WAMZ.

While emphasis is put on the expansionary aspect of the shock for some countries, we must not forget the effects on the external debt of ECOWAS, estimated at seventy billion U.S dollars.

ECOWAS members are heavily in debt. The debt is denominated in foreign currency, and servicing it has created all sorts of constraints on governments' ability to invest and grow output. On the other hand, since

most of the countries that make up ECOWAS can no longer borrow at home or abroad, their only way of financing their deficits is through central bank borrowing, which is inflationary. Therefore, the gains made in output growth are undermined by the costs of servicing the debt. Debt relief as an important priority of NEPAD is still being negotiated, and its impact on alleviating poverty and hunger is not immediate.

I analyzed the impact of both a shock to the foreign exchange rate and a major monetary policy shock in the United States on the CfA zone and separately on the countries outside the CFA zone. The reaction of output is explained by the exchange rate regime that allows countries outside the CFA zone to enjoy a flexible monetary policy.

Output reaction outside the CFA zone
Analysis of Variance.
Table 6.3
Group F Test

| Source | Sum of Squares | Mean Square | F value | P Value |
|---|---|---|---|---|
| Model | 0.32770 | 0.03641 | 1.40 | 0.2068 |
| Error | 1.69105 | 0.02603 | | |
| Corrected Total | 2.01875 | 0.02602 | | |

Price Level reaction outside the CFA zone

Group F Test

Table 6.4

| Source | Sum of Squares | Mean Square | F value | P Value |
|---|---|---|---|---|
| Model | 1.44 | 0.4488 | 10.62 | <0.0001 |
| Error | 0.9856 | 0.01518 | | |
| Corrected Total | 2.4344 | | | |

Parameter Estimates outside the CFA zone

Table 6.5

| | Price Level | | | Output | | |
|---|---|---|---|---|---|---|
| Variable | Parameter estimate | t value | P Value | Parameter estimate | T value | P Value |
| Intercept | 0.0239 | 1.03 | 0.3079 | 0.087 | 2.88 | 0.0056 |
| $)Y_t$ | -0.202 | -2.26 | 0.0271 | -0.1463 | -1.25 | 0.2171 |
| $)P_t$ | 0.168 | 1.75 | 0.085 | 0.043 | 0.34 | 0.7320 |
| $)M_t$ | 0.629 | 6.93 | <.0001 | -0.1329 | -1.12 | 0.2680 |
| $)K_t$ | 0.0858 | 1.01 | 0.3176 | -0.0012 | -0.01 | 0.9913 |
| )FX | -0.5297 | -2.34 | 0.022 | -0.1628 | -0.55 | 0.5848 |
| $)i_{INT}$ | 0.0090 | 0.08 | 0.935 | 0.3256 | 2.25 | 0.0280 |

For the price level, we observe that a shock to the foreign exchange rate

is significant, but a shock to the world interest rate. We also notice that oil is significant. We draw a major difference between the CFA zone and the West African Monetary Zone (WAMZ), where the latter does not enjoy the shield provided the CFA zone by the hard peg on the euro.

Output reaction within the CFA zone
Group F Test
Table 7.1

| Source | Sum of Squares | Mean Square | F value | P value |
|---|---|---|---|---|
| Model | 1.025 | 1.025 | 3.72 | 0.0003 |
| Error | 3.0062 | 2.7580 | | |
| Corrected Total | 4.0318 | | | |

Table 7.2
Parameter Estimates within the CFA zone

| | Price Level | | | Output | | |
|---|---|---|---|---|---|---|
| Variable | Parameter estimate | t value | P Value | Parameter estimate | T value | P Value |
| Intercept | 3.7285 | 4.39 | <.0001 | 2238.715 | 0.12 | 0.9031 |
| $)Y_t$ | -3.8179 | -0.11 | 0.9147 | -0.2989 | -3.89 | 0.0002 |
| $)P_t$ | 0.2235 | 2.53 | 0.0127 | 5316.966 | 2.79 | 0.0063 |
| $)M_t$ | 0.0000 | 1.18 | 0.2403 | -0.00352 | -0.02 | 0.9853 |
| $)K_t$ | 0.054 | 0.35 | 0.7300 | -314.561 | -0.09 | 0.9269 |
| )FX | -0.020 | -0.15 | 0.8830 | -3944.875 | -1.29 | 0.1991 |
| $)i_{INT}$ | 0.7013 | 0.88 | 0.3785 | 47294 | 2.76 | 0.0068 |

Within the CFA zone, the reaction of output growth to a shock to the foreign exchange rate is not significant, while a shock to the world interest rate is. This lack of response is due to the fact that UMEOA members do not have the flexibility in exchange rates that would allow for devaluation of the currency.

Price level reaction within the CFA zone

Group F Test

| Source | Sum of Squares | Mean Square | F value | P value |
|---|---|---|---|---|
| Model | 5636.585 | 433.5835 | 1.87 | 0.057 |
| Error | 6432.36 | 59.012 | | |
| Corrected Total | 7533.896 | | | |

The reaction of the price level to a shock to the foreign exchange rate is not significant, while a shock to the world interest rate is. As I mentioned previously, CFA zone members have always enjoyed low inflation because of the shield provided by the French franc then, and now by the euro.

## CHAPTER III

### Macroeconomic environment and Convergence Criteria

The plan for monetary integration in West Africa is to follow in two steps. The West African monetary zone (WAMZ) was created in the year 2000, and comprises Nigeria, Ghana, Sierra Leone, Gambia, Guinea and Liberia. The WAMZ is to merge with UMEOA, and the two monetary unions are to form the West African Central Bank (WACB) and a single currency the ecoi.

By integrating the economies in West Africa, monetary integration will lead to the creation of a single regional market with 215 million people and a GDP of more than 100 billion US dollars.

Ecowas external debt is estimated at 70 billion US dollars. While real GDP growth has steadily declined.

Throughout the 1990's decade, debt servicing as a percentage of exports has been increasing, and the terms of trade have suffered considerable deterioration. Inflation has been brought down from 13.3% in 1990, to 7.0% in 1999.

Unemployment numbers, which are rarely published, are among the highest in the world, going as high as 48% in some countries. A jobless rate of this magnitude is a serious threat to political and social stability,

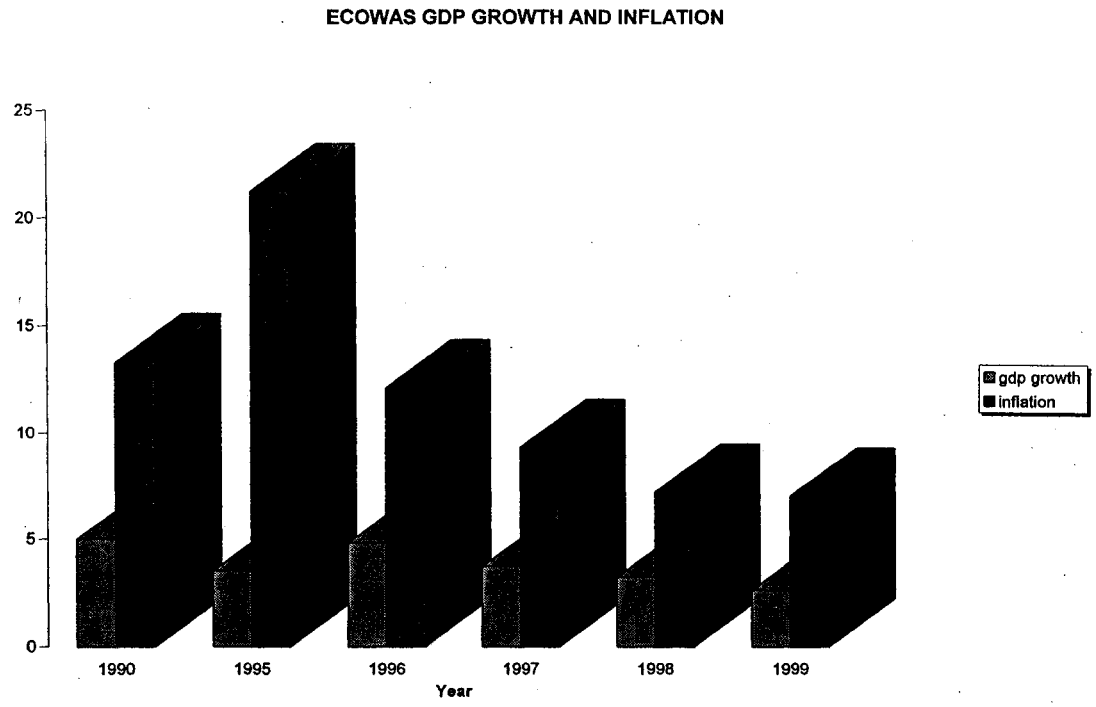
which can be blamed for most of the troubles in the sub-region.

On the other hand, the loss in tax revenues associated with the high level of unemployment can only worsen government current account deficits. As for Foreign Domestic Investment, while it has been trickling in, its share of 2.8% of Ecowas GDP needs to improve.

In a continent plague by armed conflicts and massive corruption, attracting foreign investors is no small task. While the continent has enough resources to develop, bad governance and lack of transparency have been and remain a major hurdle.

African governments, burdened by heavy debt servicing, have been unable to invest on education, health care, and social programs. As a result, the Human Development Index (literacy rate, life expectancy, etc.) remain among the lowest in the world.

Figure 1



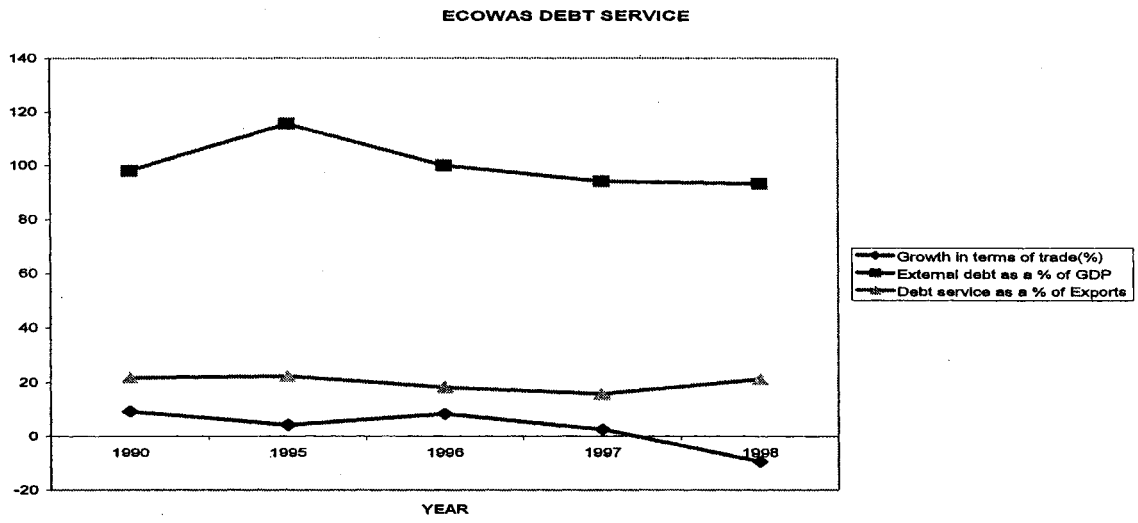

Source: ECOWAS SECRETARIAT and ADB

Productivity in the agriculture sector, which accounts for about 70% of GDP, remains low. The AIDS epidemics coupled with armed conflicts have had a devastating effect on the regional economy. The lack of adequate infrastructures in telecommunications, roads and railways has added complications to the flow of commerce. Industrial production is constantly disrupted by electric power failures and worker strikes.

Many of the Ecowas countries still function under an antiquated tax collection system, and many of the economic activities in the informal sector are not accounted for. Unfriendly tax policies have kept investors

out of the region, and corruption makes it almost impossible to properly collect taxes from those firms already operating in the region. The high population growth rate of 2.7%, combined with a low rate of economic growth is cause for concern. Despite efforts to enroll some of the countries in the IMF's HIPC (Highly Indebted Poor Countries) initiative, and debt forgiveness, poverty still persists.

Figure 2

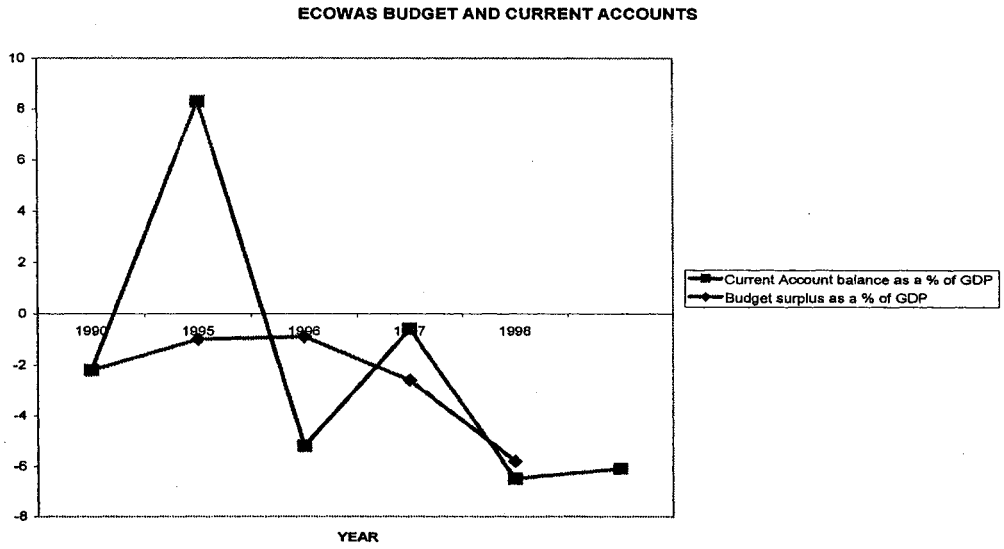



Source: ECOWAS SECRETARIAT and ADB

CONVERGENCE CRITERIA

The four chosen criteria to which member states must adhere to are likely to be among the greatest challenges to meet. They are as follows:

Figure 3




Source: ECOWAS SECRETARIAT and ADB

1) ratio of budget deficit (excluding grants)to GDP should be below 4%;

2) the rate of inflation must be less or equal 5%;

3) central bank financing of budget deficit cannot exceed 10% of previous year's tax revenues;

4) Gross external reserves should represent at least six A set of secondary criteria was also put in place in order to sustain the primary criteria and make it easy to hit the convergence targets. They were selected to include:

- prohibition of new domestic arrears and liquidation of all existing

ones;

- tax revenue/GDP ratio must at least be equal to 20%;
- wage bill/tax revenue ratio must be no more than 35%;
- real exchange rate stability;
- countries must maintain positive real interest rates;
- Public capital expenditure/tax revenue ratio must equal or greater than 20%.

## CHAPTER IV

### The New Partnership for Africa's Development (NEPAD)

NEPAD is the latest PANAFRICAN organization added to the list of many regional, sub-regional, and continental organizations.

Before being phased out and replaced with the African Union, the Organization of African Unity(OAU), mandated five heads of states(Algeria,Egypt,Nigeria,Senegal,and South Africa),to design an integrated socio-economic development framework for Africa.

The NEPAD like many of its predecessors has many ambitious ideas, and some very noble goals. Among those goals are:

The eradication of poverty;

To place Africa on a path of sustainable growth;

Etc. To achieve these goals, the organization has set some priorities that include:

1) peace and security;

2) democracy and good, political, economic and corporate governance;

3) Capacity building.

There is no doubt these conditions may not be sufficient, but are

necessary for an environment that is conducive to economic growth and prosperity. The one new thing that seems to be added to the list is good governance.

Achievement of these projects and many others in the continent is contingent upon the good will of partners none of which is in Africa. Whether these projects are financed by the world bank or others international organizations, the facts remains that should they choose not to participate, none of these projects would see light of day.

I think it is very dangerous for NEPAD to be planning its operations based on would be borrowed funds. Much has been said about mobilizing African savings to finance NEPAD, while waiting for private investors to pour in additional funds.

If Africans have savings at all, those savings are certainly not for the most part, in Africa. The Africans who keep their money in Africa are usually the simple working unsophisticated people, whose savings are usually very meager. There are at least two reasons why Africans do not keep their money at home;

1) High inflation and lack of faith in the local currency;

2) Lack of faith in their governments and elected officials.

While the political elite call upon international firms to come and invest in Africa, they all have their savings outside Africa. It is hard to explain to a foreign investor how someone who has worked for government for twenty or thirty years does not have any more than two or three thousand dollars in a savings account or in a bank at home.

Good governance is part of NEPAD's pillars. There is a so-called watch dog organization for those who would step out of the good governance line. Suffice it to say that this organism is ineffective because quite a number of the heads of states would not sign the treaty that would allow these sorts of auditors to look into what they are doing.

As of this date, only sixteen countries out of more than fifty have signed the agreement that would give inspector access to their governing and business practices. How do we hold an unelected official accountable and make him adhere to good governance? And the answer is we cannot.

Very few of African leaders have ever practiced democracy, let alone good governance. If African leaders want to look credible to the rest of the world, they should send those leaders who came into office through the back door to their countries, where they must organize fair and transparent elections before they can have a seat at the table.

In all likelihood, foreign investors will not be coming to Africa any time soon. The political environment is not stable, and corruption is rampant. The lack of good work ethics is a hindrance to capacity building, and this would not change even if Africa had the most sophisticated machinery.

In the most industrialized countries, investors would not put their money in harms ways by investing in poorly run firms, let alone across the Atlantic into some terribly run countries. Asking private investors to come to Africa now is simply not understanding how international financial markets operate.

NEPAD or at least the idea has many supporters and that is the good news. The bad news is most of these supporters are politicians and other governments. The support that NEPAD wants is that of private investors, whether domestic or foreign. Job creation must be among the top priorities of NEPAD, and real job growth can come only from the private sector.

In my view, all the priorities can be reduced to a single one; fight corruption with all your might and your souls. In the African continent, there are many redundant organizations, none of which can be said to be quite successful. The reason is a lack of political will in implementing

the treaties they sign.

Among the priorities, we also have Market access. While this is not under the control of Africans, serious negotiations must be undertaken with the World Trade Organization. Market access is just as important if not more important than Foreign Domestic Investment.

In many African countries, agricultural output has improved a great deal in recent years, especially in cotton, corn, bananas and cacao. For the highly perishable goods, it is important that farmers have immediate access to foreign markets.

A considerable part of farmers or local fishermen's output does perish because of a lack of storage facilities. The problem of market access can however be partly solved by improving roads, railways and waterways within the continent.

It is rather amazing that in the vast majority of African countries, there is no such think as business law. In other words, there are no laws that guarantee protection of private property. Strong recommendations with regard to this matter were made by the World Bank in the past. Amid this situation, Africans are still working hard at attracting private investors. In my judgment, this is simply putting the cart before the cows.

# CHAPTER V

## Conclusion

In the study, I considered two dependent variables: output growth and inflation. I first run the regression with a change in the world price of oil as an exogenous shock. I subsequently added two parameters, namely a shock to the foreign exchange rate and a shock to the Federal Reserve's Fund's rate.

For output growth neither an oil shock nor a shock to the foreign exchange rate was significant. The response to the world interest rate was however significant.

The regression results for the price level reveal that both an oil shock and a shock to the world interest rate were significant, but there was no response to a shock to the foreign exchange rate.

To test the viability of a common currency within ECOWAS, I used three different methods to test for symmetry in shocks to output growth, the price level and the money supply. The three tests comprised: shocks to output growth and the price level, variance decomposition, and an impulse response function. All three tests lead to the conclusion that there is no symmetry in the different shocks.

The coefficients of correlation for shocks to output growth within

ECOWAS are significant between Benin, Burkina Faso, Niger, Togo, Mali, Ghana, Senegal and Mauritania. Except for Ghana, all the above named countries already share the same currency: The CFA.

The results are not much different for the coefficient for the price level. Nigeria is the major economy in ECOWAS. We notice in table 3.4 that none of the coefficients between this oil producing country and its fellow members is significant.

The variance decomposition illustrated in table 5.4 shows that the price level for the Gambia, Mali, Nigeria respond the same way to an oil shock, while the rest of the countries each responds differently. As for the foreign exchange rate, no two countries respond the same way. The CFA zone members respond the same way to a shock to the world interest rate. The rest of the countries, with the exception of Ghana and the Gambia, have a reaction which is different from that of the members of UMEOA.

On table 5.3, we observe that output growth for Nigeria, Togo and the Gambia respond the same way to a shock to the world price of oil. Output in the CFA zone responds the same way to a shock to the world rate of interest, and no two countries within ECOWAS respond the same way to a shock to the foreign exchange rate.

The analysis of variance for ECOWAS as shown in table 6.1, show the price level to be non responsive to any of the three shocks. Output growth is responsive to both a shock to the foreign exchange rate and the world interest rate.

For countries outside the CFA zone, a shock to the foreign exchange rate was significant for output growth, but a shock to the world interest rate was not. I observed the opposite with regard to the price level where a shock to the foreign exchange rate was not significant, while a shock to the world interest rate was.

Within the CFA zone, exogenous shocks to output growth were significant, while shocks to the price level were not. The impulse response analysis reveals differences in response, but does confirm the previous findings. Shocks on output growth tend to level out, while shocks to the price level have a tendency to linger for some countries, and explosive for others.

A common currency for the West African sub-region or for Africa as a whole may be desirable. For ECOWAS to be an optimal currency area, trade links between the member countries must improve far beyond their current level. Only 17% of ECOWAS exports went to other members of the organization in 2002. Almost thirty years after its creation, this record is less

than impressive.

Trade liberalization and the adoption of a common external tariff have been in progress. The main problem remains with industrial goods where there is a lot of resistance to liberalize. It is impossible to effectively operate in a common currency zone without the free movement of labor. The few members who have signed the agreement on the free movement of labor have failed to put in place mechanism that would allow citizens of ECOWAS to travel freely in the sub-region. Corruption and harassment across borders make the trip for many persons prohibitive. Among the major projects of ECOWAS were the construction of major roads and railroads across the sub-region, to facilitate commerce. The idea is a good one and the vision is correct, but roads in West Africa are worst today than they were in 1975 when ECOWAS was created.

The Community of West African States will have a common currency, but its time has not come yet. Under the current macroeconomic and political climate, creating a common currency is likely not to produce the desired results. ECOWAS is not an optimal currency area, but with a lot of political will, could be made into one.

## CHAPTER VI

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**Education:** State University of New York College at Old Westbury.
Bachelor of Science in Management. (Dec 1988)

City University of New York, Queens College
Master of Art in Economics (June 1998)

Fordham University, Bronx NY.
PhD in Economics (May 2004)

**Work Experience:**

**9/02 to date** **Fordham University, Bronx, NY**

- **Teaching Associate**
- Teaching International Economics,
- Macroeconomics, Microeconomics
- And Applied Calculus

**Manhattan College, Riverdale, NY**

- **Adjunct Professor**
- Teaching Macroeconomics, Microeconomics
- And Statistics

**09/99 to 5/02** **St. John's University, Jamaica, NY**

- **Adjunct Professor**
- Teaching Micro and Macroeconomic theory.

**08/98 to 12/98** **State University of New York Farmingdale & Old Westbury**

- **Adjunct Professor**
- Taught Micro and Macroeconomic theory.

**06/94 to 08/98** **Global Technologies International Systems, Inc**
Jamaica, New York.

- **Manager**
- Coordinated sales and marketing strategies
- Supervised operations and wrote Requests for Proposals (RFP)
- Negotiated Government and corporate contracts
- Managed Sales projections and forecast.

**04/90 to 06/94** **Nationwide Insurance Company**
Lake Success, New York.

- **Claims adjuster commercial large loss**
- Investigated and evaluated claims
- Inspected property and made recommendations to underwriting
- Wrote estimates on fire, water and property damage
- Handled subrogation and court arbitrations
- Investigated GL and made recommendations to the legal department.

**10/89 to 04/90** **First National Bank of Chicago (First Card)**
Uniondale, New York.

- **Credit Card adjuster**
- Verified Credit limits and charges
- Answered customer inquiries on credit and charge backs
- Mediated disputes between Merchants and customers
- Handled charge backs and adjusted finance charges.

**04/89 to 08/89** **Liberty Mutual Insurance Company**
New York City, New York.

- **Claims Adjuster**
- Handled Auto Cases
- Public liability and property
- Investigated and Adjusted BI cases
- Analyzed medical reports to evaluate extent of treatment and injuries
- Priced cases and negotiated with attorneys.

**References:** Available upon request.
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