

Dynamic Impact of Money Supply on Inflation: Evidence from ECOWAS Member States

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Abstract: According to the monetarists, inflation is essentially a monetary phenomenon in the sense that a continuous rise in the general price level is due to the rate of expansion in money supply far in excess of the money actually demanded by economic units. But the link between changes in money supply and inflation is not instantaneous. This study, therefore, assessed this dynamic linkage between money supply and inflation in ECOWAS member states; West African Monetary Zone (WAMZ) and West African Economic Monetary Union (WAEMU) for the period 1980-2012. The stationary properties of the series are explored both at univariate and panel sense using KPSS and ADF; IPS and LLC. The results revealed that money supply and inflation are stationary at the level for individual countries and at panel sense. The random effect model for ECOWAS member states shows that the impact of money supply on inflation is effective in the current and first period. While the impact is effective in the first period for WAMZ, WAEMU experiences the impact in current period. The finding also reveals that there are significant specific-country effects on the variables. This implies that the objective of macroeconomic convergence is yet to be achieved. The paper, therefore recommends that inflation should be used as an operational guide in evaluating the effectiveness of monetary policy and also a strong monetary cooperation programme among ECOWAS member states should be evolved.

Keywords: Money Supply, Inflation, ECOWAS, WAMZ and WAEMU.

I. Introduction

Macroeconomic convergence under the ECOWAS monetary Cooperation programme has been a core issue. In addition to facilitating policy coordination, it affords the opportunity of ensuring macroeconomic stability, thereby, guaranteeing the purchasing power of the common currency being envisaged. Hence, in order to achieve this macroeconomic convergence within the sub-region, certain indicators have been adopted which require Member countries to comply with prescribed benchmarks in addressing their fiscal, monetary and exchange rate imbalances in order to achieve the environment congenial for a successful monetary integration. These indicators include price stability, prudent fiscal policies, restrictive budget deficit financing and maintenance of adequate gross foreign reserves. The key monetary indicators among the convergence criteria relate to the maintenance of inflation below five percent, among others (WAMA, 2009).

Inflation is a serious disturbing issue in every economy, whether developed or developing. It has been observed that over the years, prices of goods and services have been remarkably unstable. The problem assumes different magnitudes and forms in different countries and regions round the globe. An economy that is highly inflation laden does not motivate business, and therefore discourages investment. This phenomenon has attracted both substantial theoretical and empirical effort. But what is it that drives inflation?

Yahaya (2000) and Akinbobola (2012), argue that three major explanations of inflation include fiscal, monetary and balance of payments aspects. While in the monetary aspect, inflation is considered to be due to an increase in money supply, in the fiscal aspect, budget deficits are the fundamental cause of inflation in countries with prolonged high inflation. However, the fiscal aspect is closely linked to monetary explanations of inflation since government deficits are often financed by money creation in developing countries. In the balance of payments aspect, emphasis is placed on the exchange rate. Simply, the collapse of exchange rate brings about inflation either through higher import prices and increase in inflationary expectations, which are often accommodated, or through an accelerated wage indexation mechanism,

However, the most widely accepted school of thought on inflation is that it is a monetary phenomenon and, therefore, the reduction of inflation is largely the purview of monetary policy, particularly in the initial stages of disinflation. This school of thought, based on the quantity theory of money, posits that inflation is determined solely by the change in the relative supply of money and goods. Against this background disinflation policy in many countries is framed with the objective of constraining monetary growth to be in line with the expansion in nominal income (Kwon, McFarlane and Robinson, 2006).

The role of money is fundamental in every economy. This role has been vividly described by the quantity theory of money represented by Fisher's Equation of Exchange and the New Quantity Theory of Money as ascribed to a variant of the Chicago School tradition. According to Shepherd and Duck (1978), there is substantial and growing evidence that one of the necessary conditions for economic and financial stability is that the expansions of the money stock be adequately controlled. This has to be so because in the view of Laidler (1971), changes in the money stock influence economic activities after a time lag. This has led a number of economists, including Friedman (1968), to argue that the most sensible monetary policy involves the central bank's ensuring that the money stock be expanded annually in conformity with the economy's growth rate. Thus, given this strategic role of money, it is imperative to control its behaviour. But a look at the data shows that money supply growth has been expanding briskly in ECOWAS sub-region.

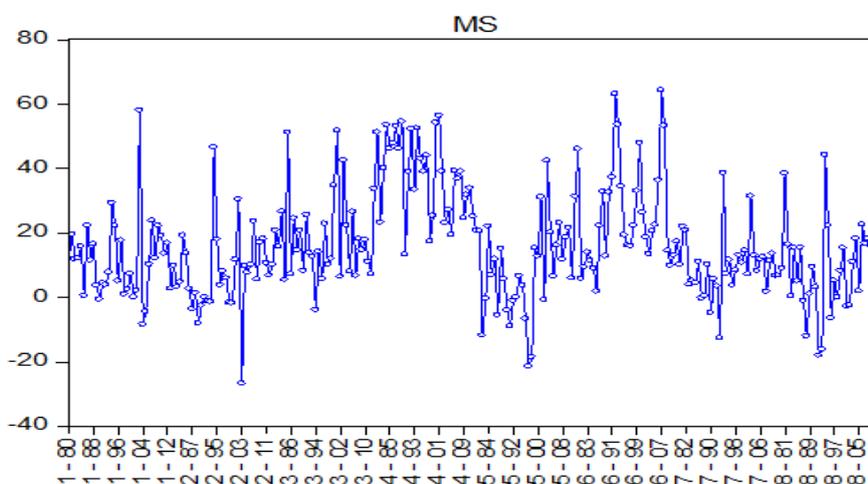


Figure 1.1: the movement of money supply growth for selected eight ECOWAS countries for the period 1980 – 2012.

Source: The authors' contribution based on data from the Global economy.

On the other hand, the effect of high inflation on the economy is generally considered to be predominantly harmful. Inflation causes serious discomfort to consumers, investors, producers and the government. As observed by Yahaya (2000), inflation led to the abandonment of the German currency in the 1920s, a national strike in France in 1973 and to a national riot in Egypt in 1977. Also, almost all free market economies have experienced some degree of protest against inflation.

As observed by Orubu (2009), the achievement of price stability has always been one of the fundamental objectives of macroeconomic policy in both developed and less developed countries. Since the major aim of any sound economic policy is price stability, price and the money stock are thought to be positively related, it is important that the money stock be controlled. This relationship has been made more precise by the quantity theory of money which asserts that the general price level is determined by the money stock. Inflation is therefore a major challenge for every central bank and the government to adopt appropriate monetary policy frame work to ensure price stability. The rate at which inflation is increasing and affecting budget implementation at all tiers of government as well as business activities in developing economies has become a serious concern. It is against this background that the researchers attempt to analyze the extent to which money supply affects inflation in ECOWAS, WAMZ and WAEMU.

Stylized fact of ECOWAS Sub-region: This section presents a historical overview of recent macroeconomic developments in respect of money supply growth and inflation in ECOWAS. The exposition on these variables, which are the key variable in the quantity theory model, provides the basis for further analyses aimed at ascertaining the consequences of excessive expansion in broad money supply on inflation.

Growth in Money Supply: Table 2.1 shows the broad money supply growth in ECOWAS countries between 2008 and 2012. The table indicates that monetary policy has generally been expansionary in certain countries, especially in the WAMZ countries. In the WAEMU zone, the highest expansion of 17.8 was recorded in 2010 which declined subsequently to 10.54 percent in 2011 and then again to 14.22 percent in 2012. Notwithstanding this performance, Burkina Faso, Cote d'Ivoire and Niger, have recoded instances of higher growth rates above the zonal average in 2010. WAMZ countries generally record high liquidity growth rates. The growth rate

decelerated in almost all the WAMZ and WAEMU countries in 2008 with Gambia, Ghana and Nigeria recording 7.27 percent, 25.14 percent and 17.42 percent respectively.

Table 2.1: Ecowas Countries: Broad Money Supply Growth

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---------------|--------------|--------------|--------------|--------------|--------------|
| WAEMU | 9.99 | 17.11 | 17.83 | 10.54 | 14.22 |
| Burkina-Faso | 12.28 | 22.25 | 19.31 | 13.68 | 16.91 |
| Cote D Ivore | 5.67 | 17.16 | 18.24 | 10.68 | 6.85 |
| Niger | 11.94 | 18.69 | 21.62 | 5.97 | 31.42 |
| Senegal | 1.83 | 11.38 | 13.69 | 6.77 | 6.79 |
| Togo | 18.22 | 16.05 | 16.27 | 15.59 | 9.11 |
| WAMZ | 36.9 | 18.04 | 19.91 | 19.44 | 16.61 |
| Gambia | 18.16 | 14.83 | 17.84 | 11.2 | 7.27 |
| Ghana | 39.18 | 24.74 | 31.92 | 33.99 | 25.14 |
| Nigeria | 53.36 | 14.54 | 9.97 | 13.14 | 17.42 |
| ECOWAS | 23.45 | 17.58 | 18.87 | 14.99 | 15.42 |

Sources: The Global Economy

Inflation: The table (see below) shows that inflation has been relatively lower in WAEMU countries generally, compared to that of the WAMZ countries. The average inflation recorded in the WAEMU was 0.96 percent compared to 9.8 percent in the WAMZ in 2010. However, inflationary pressures accelerated in 2011 in WAEMU, averaging about 3.52 percent, while it decelerated in WAMZ with an average of 8.1 percent. The inflationary pressures in the non-UEMOA countries have partly been attributed to expansionary monetary and fiscal policies in certain countries. In addition to these difficulties the economies in West Africa are vulnerable to external shocks.

Table 3.2: Inflation Rates In Ecowas Countries

| | 2008 | 2009 | 2010 | 2011 | 2012 |
|---------------|--------------|-------------|-------------|-------------|-------------|
| WAEMU | 8.56 | 1.28 | 0.96 | 3.52 | 1.92 |
| Burkina-Faso | 10.7 | 2.6 | -0.8 | 2.8 | 3.8 |
| Cote D' Ivore | 6.3 | 1 | 1.7 | 4.9 | 1.3 |
| Niger | 11.3 | 0.6 | 0.8 | 2.9 | 0.5 |
| Senegal | 5.8 | -1.1 | 1.3 | 3.4 | 1.4 |
| Togo | 8.7 | 3.3 | 1.8 | 3.6 | 2.6 |
| WAMZ | 10.87 | 11.8 | 9.8 | 8.1 | 8.6 |
| Gambia | 4.5 | 4.6 | 5 | 4.8 | 4.3 |
| Ghana | 16.5 | 19.3 | 10.7 | 8.7 | 9.2 |
| Nigeria | 11.6 | 11.5 | 13.7 | 10.8 | 12.2 |
| ECOWAS | 9.43 | 5.23 | 4.28 | 5.24 | 4.41 |

Sources: The Global Economy

Money Supply-Inflation Nexus in ECOWAS

Figure 2.1 shows the movement of money supply growth and inflation in each of the ECOWAS member countries. The graph shows that money supply growth and inflation has been fluctuating over time.

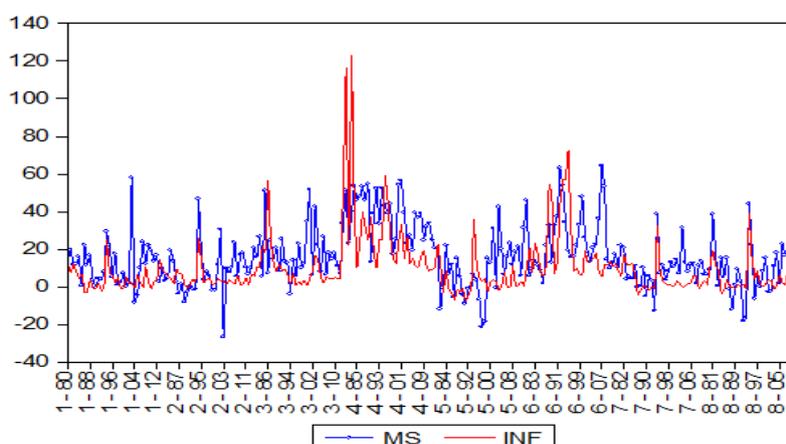


Figure 1.1: the movement of money supply growth and inflation for selected eight ECOWAS member countries for the period 1980 – 2012.

Source: The authors' contribution based on data from the Global economy.

II. Review Of Literature

Inflation has been widely described as an economic situation where increase in money supply is faster than the new production of new goods and services in the same economy. Inflation is going on when one needs more and more money to buy some representative bundle of goods and services, or a sustained fall in the purchasing power of money. Inflation emerges in the economy on account of the increase in the money income of certain sectors of the economy without any corresponding increase in their productivity, giving rise to an increase in the aggregate demand for goods and services which cannot be met at the current prices by the total available supply of goods and services in the economy.

The nexus between money supply and inflation is a very common debate in the economic literature. Considerable empirical and theoretical studies have been carried out on money supply and its inflationary effect in developed and developing economies.

At international level, such studies include Chhibber, Cottani, Firuzabadi, and Walton (1998) that employed a highly disaggregated econometric model for Zimbabwe. They found that monetary growth, foreign prices, exchange and interest rates, unit labour cost, and real output are the key determinants of inflation in that country. In a study for the African Economic Research Consortium (AERC), Kilindo (1997) investigated the links among fiscal operations, money supply and inflation in Tanzania. The findings reveal a strong relationship among the three, he recommends the adoption of a restrictive monetary policy in which the supply of money must be constrained to grow steadily at the rate of growth of real output.

In another study for AERC, Barungi (1997) examined the determinants of inflation in Uganda. The study analysed the relative importance of monetary, cost-push and supply related causes of inflation. He concluded that inflation in Uganda was persistently a monetary phenomenon. Also, Laryea and Sumaila (2001) look into the determinants of inflation in Tanzania and the study established that in the short-run, output and monetary factors are the main determinants of inflation in Tanzania. They also pointed out that in the long-run; parallel exchange rate also influences inflation. In their conclusion, they emphasized that; inflationary situation in Tanzania is basically a monetary phenomenon.

Many studies in Nigeria have looked at the links between money supply and inflation. While some economists found negative relationships, most of economists found positive relationships. Ajisafe (1996) used an error-correction model (ECM) to examine the cause of inflation in Nigeria. He reported that money supply, real gross domestic product, previous level of inflation and exchange rate cause inflation in Nigeria. Ajisafe's study was preoccupied with the monetary factors that could cause inflation, at the expense of fiscal factors. But fiscal factors cannot be ignored in a country like Nigeria where deficit spending has become a more or less permanent feature of the budgetary process (Folorunso and Abiola, 2000). Odiba, Apeh and Daniel (2013) adopted econometric method of multiple regression analysis to examine the relationship between inflation and selected explanatory variables (money supply, budget deficit, import and population), with a time series data from 1986 to 2009. The study found that money supply and aggregate demand had significant impact on price level in Nigeria.

Akinbobola (2012) studied the dynamics of money supply, exchange rate and inflation in Nigeria. The paper explored the co integration and Vector Error Correction Mechanism (VECM) to finding out if long run relationship exists between monetary growth, exchange rate and inflation for the period 1986-2008. The study discovered that exchange rate is more relevant in price determination in Nigeria than monetary expansion and real output production. Real exchange is found to have negative and significant effect on inflation rate. It also revealed that money supply has negative effect on the price level, a case which raises question about the usual theoretical linkage between money supply and price (i.e., money should have positive and significant effect on price level in the long run) though the short run analysis revealed that only money supply has significant effect on the price level.

Olorunfemi and Adeleke (2013) estimate and test the relationship between inflation and money supply in Nigeria, using Vector Autoregressive (VAR) model. The paper also evaluates the key determinants of inflation such as money supply, real exchange rate, real interest rate, oil revenue and government expenditure, all within the period 1970-2008. The study reveals a unidirectional causality from money supply to inflation: from exchange rate to inflation: from interest rate to inflation. Their results provided supportive evidence of a positive link between money supply and inflation rate. The result for the VAR model shows that own shock raise malfunction in the first two years that came down to negative and slightly rose to flatten out. The shock in money supply had no early effect on inflation rate but later had a slight positive effect on inflation.

There is a general consensus in Literature that money supply affects inflation either positively or negatively. However, none of the reviewed Literatures provides any evidence on the lag between monetary policy actions supply and the responses of inflation. These studies have failed to address some key issues in money supply – inflation nexus. Does past monetary policy have any effect on current level of inflation? And if it does, how long does it take for this impact to vanish? These are the preoccupation of this study.

III. Methodology And Model Specification

Following the monetarists postulation that inflation is a monetary phenomenon, we developed a simple inflation function to test the dynamic impact of money supply on inflation in ECOWAS member states. We get the following equation:

$$INF_t = f(MS_t) \tag{1}$$

Suppose the impact of money supply on inflation is distributed over several time periods, and assuming an infinite distributed lag model and taking cognizance of the panel nature of our data, the inflation function in its compact form is specified as:

$$INF_{it} = \alpha_0 + \sum_{i=0}^n \beta_j MS_{it-1} + \mu_t \tag{2}$$

Expanding equation (2), we obtain the empirical model of the form:

$$INF_t = \alpha_0 + \beta_0 MS_t + \beta_1 MS_{t-1} + \beta_2 MS_{t-2} + \dots + \beta_k MS_{it} + \mu_{it} \tag{3}$$

Where

INF_{it} = the inflation rate at a time t for i^{th} country; MS_{it} = the money supply at time t for i^{th} country; β_j are the coefficients which measures the impact of a unit change in money supply on inflation at a time t .

Specifically, the coefficient β_0 is the short-run or impact multiplier, which measures the change in the mean value of inflation following a unit change in money supply in the same time period. Assuming the change in money supply is maintained at the same level thereafter, then, $(\beta_0 + \beta_1)$ gives the change in (the mean value of) inflation in the next period, $(\beta_0 + \beta_1 + \beta_2)$ in the following period, and so on. These partial sums give the interim or intermediate multipliers. Finally, after k periods we obtain:

$$\sum_{i=0}^k \beta_i = \beta_0 + \beta_1 + \beta_2 + \beta_3 + \dots + \beta_k = \beta \tag{4}$$

Equation (4) is the long-run or total, distributed-lag multiplier, provided the sum β exists. μ_{it} is the white noise that has two dimensions, one for the country and one for the time period.

For ($i = 1,2,3,\dots,8$); ($t = 1,2,3,\dots,33$) and ($j = 1,2,3,\dots,k$)

Estimation Procedure

Before carrying out the estimation of Eq. (3), the time series properties of the series in each country are investigated using Kwiatkowski, Phillips, Schmidt and Shin (KPSS) and Augmented Dickey-Fuller (ADF) test statistics to ascertain the stationarity of the variables for each of the eight countries. We also conducted a panel unit root test because of the panel nature of our data. This test is conducted using Im, Pesaran and Shin (IPS) and Levin, Lin and Chu (LLC).

After the unit root test, we applied OLS on each of the countries, disregarding the panel nature of our data. This is necessary to find out the unique characteristics of each of the eight countries in our cross-section. Three types of panel data analytic models are estimated for ECOWAS, WAMZ and WAEMU: They are: Pooled OLS (Constant Coefficients Model); the Random Effect and the Fixed Effect Models¹.

IV. Estimation And Discussion Of Results

Unit root test results (time series and panel)

In the first step of our empirical analysis, it is crucial to ascertain the integrational properties of the data series, both in a univariate and a panel sense. To investigate the unit root properties for money supply and inflation we apply the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) and Augmented Dickey-Fuller (ADF) test statistics. These results are shown in the following tales.

The KPSS Asymptotic critical values at 1%; 5% and 10% level of significance are 0.73900; 0.46300 and 0.34700 respectively while the ADF critical values at the different level of significance are -3.653730; -2.957110 and -2.617434. The KPSS and ADF tests show that Money supply and inflation are both $I(0)$ for all the eight countries.

In the next step, we set out to establish the order of integration of the variables in a panel sense. The results based on the IPS and LLC tests together with the critical values are reported in Table 4.2 above. Our

¹ The pooled OLS (POLS) model is appropriate on the event that there is neither significant country nor significant temporal effects. The Random Effect model (REM) is appropriate if there is significant country effect or significant temporal effect and the error term is uncorrelated with the explanatory variables. The Fixed Effect model (FEM) becomes appropriate in the event that the error term is correlated with explanatory variables.

results are as follows. For the money supply variable, the calculated test statistic turns out to be 7.46 and 7.44 with associated probability values of 0.0000 each, while the calculated test statistic for inflation is 5.77 and 6.67 with probability values of 0.0000 each. The low p-value suggests that the joint unit root null hypothesis for money supply and inflation is rejected. Hence, the results show that both series are stationary at level.

Individual country OLS Results

The results are shown on table 4.3 in the appendix. The lag length was selected using the Schwarz and Akaike information criteria. The results show individual OLS estimates for each of the eight countries. In the current period (MS_0), the coefficient of money supply growth is positive (0.19, 0.36 and 0.38) and statistically significant at the 5 percent level for Cote D' Ivore, Senegal and Togo. In Burkina-Faso, Gambia, Ghana and Niger, the current value of money supply growth also has positive (0.10, 0.05, 0.24 and 0.02) but statistically significant impact on inflation. Meanwhile, Nigeria has a negative, but statistically insignificant coefficient (-0.09) at the 5 percent level. In the first period (MS_1), the impact of money supply on inflation is positive (0.38 and 0.48) and statistically significant for Gambia and Ghana. The impact of Money supply on inflation is positive (0.03, 0.07, 0.05, 0.54) but statistically insignificant for Burkina-Faso, Cote D' Ivore, Niger and Nigeria. However, Senegal and Togo have negative (-0.14 and -0.11) and statistically insignificant at the 5 percent level.

Growth in money supply in the second period has positive (0.07, 0.19, and 0.13) but insignificant impact on inflation for Burkina-Faso, Gambia and Ghana. Meanwhile, the effect is negative (-0.04, -0.001, -0.03, -0.12 and -0.07) and statistically insignificant in Cote D' Ivore, Niger, Nigeria, Senegal and Togo. The OLS results show that while money supply has impact on inflation in some countries (Cote D' Ivore, Senegal, Togo, Gambia and Ghana), no evidence of impact is seen in some other countries (Burkina – Faso, Niger, and Nigeria).

Panel Regression Results (Pooled OLS, Random Effect and Fixed Effect Models)

In table 4.4 in the appendix, we present the estimates of three different models for ECOWAS, WAMZ and WAEMU. Preliminary test² suggests that there are significant country and temporal effects in the data; hence the assumption of heterogeneity in data is not relaxed.

The REM results show that money supply in the current (MS_0) and first (MS_1) periods has positive (0.19 and 0.21) and statistically significant for ECOWAS at 5 percent level. The REM outcome for WAMZ shows that money supply in the first period (MS_1) has positive (0.37) and significant impact on inflation, while the impact is positive (0.17) and statistically significant for WAEMU in the current period (MS_0).

Subjecting the Random Effect model to diagnostic test using Hausman test indicates that the error term is uncorrelated with the explanatory variables. These findings make the Random Effect Model (REM) more appropriate than the POLS and FE Models. The implication of these findings is that there is country-specific effect on the data and that each country has an intercept term different from the common intercept.

V. Conclusion And Policy Recommendations

The main goal of this paper was to assess the dynamic impact of money supply on inflation rate in ECOWAS, WAMZ and WAEMU member countries. The stationary properties of the series are also explored both at univariate and panel sense using KPSS and ADF; IPS and LLC. The results revealed that money supply and inflation are stationary at the level. The random effect model for ECOWAS member states shows that the impact of money supply on inflation is effective in the current and first period. While the impact is effective in the first period for WAMZ, WAEMU experiences the impact in current period. The finding also reveals that there are significant specific-country effects on the variables. This implies that the objective of macroeconomic convergence is yet to be achieved. The paper, therefore recommends that inflation should be used as an operational guide in evaluating the effectiveness of monetary and policy and also a strong monetary cooperation programme among ECOWAS countries be evolved.

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² This test is conducted using Braeusch-Pagan Lagrangian Multiplier (LM) test.

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Appendix

Table 4.1: Univariate unit root test - Kwiatkowski, Phillips, Schmidt and Shin (KPSS) and Augmented Dickey-Fuller (ADF)

| country | KPSS @ Level | | ADF @ level | | Order of integration |
|---------------|--------------|------------|-------------|--------------|----------------------|
| | MS | INF | MS | INF | |
| Burkina Faso | 0.158948* | 0.159499* | -6.187246* | -4.762921* | I(0) |
| Cote D'Ivoire | 0.145419* | 0.406263* | -5.447798* | -4.28864* | I(0) |
| Gambia | 0.080509* | 0.334188* | -6.934943* | -3.074856** | I(0) |
| Ghana | 0.500192** | 0.604908** | -4.712903* | -4.463049* | I(0) |
| Niger | 0.341023* | 0.113214* | -4.054420* | -4.196220* | I(0) |
| Nigeria | 0.202088* | 0.0203028* | -3.679829* | -2.777222*** | I(0) |
| Senegal | 0.149395* | 0.266305* | -6.172227* | -4.035467* | I(0) |
| Togo | 0.174469* | 0.121611* | -5.240999* | -4.078915* | I(0) |

Note: *,** and *** indicate that the series is stationary at 1%/; 5% and 10% levels of significance.

Table 4.2: Panel Unit Root Tests – Im, Pesaran and Shin (IPS) and Levin, Lu and Chin (LLC)

| Variable | IPS @ Level | | LLC @ Level | | r of ration |
|----------|-----------------------|--|-----------------------|--|-------------|
| | ECOWAS | | WAMZ | | |
| MS | 7.46202 (0.0000)* | | 7.44364 (0.0000)* | | I(0) |
| INF | 5.77159 (0.0000)* | | 6.66955 (0.0000)* | | I(0) |
| | WAMZ | | WAEMU | | |
| MS | -3.80419 (0.000)* | | -3.97224 (0.0000)* | | I(0) |
| INF | -2.71731 (0.0033)* | | -4.19148 (0.0000)* | | I(0) |
| MS | -6.49209 (0.0000)* | | -6.55549 (0.0000)* | | I(0) |
| INF | -5.19572 (0.0000)* | | 5.30403 (0.0000)* | | I(0) |

Table 4.3: Summary of OLS results for individual country

| country | MS ₀ | MS ₁ | MS ₂ | MS ₃ | MS ₄ | R ² | AC | SER |
|--------------|--------------------------|--------------------------|--------------------|--------------------------|------------------|----------------|------|-------|
| Burkina Faso | 0.095 (1.146) | 0.027 (0.320) | 0.069 (0.823) | -0.050 (-0.604) | - | 0.08 | 1.96 | 5.524 |
| CIV | 0.191 (2.946)* | 0.072 (1.116) | -0.039 (-0.608) | -0.025 (-0.16) | - | 0.30 | 1.57 | 4.550 |
| Gambia | 0.049 (0.327) | 0.380 (2.469)* | 0.188 (1.203) | 0.102 (0.670) | - | 0.25 | 0.95 | 10.04 |
| Ghana | 0.238 (1.423) | 0.476 (2.768)* | 0.127 (0.763) | 0.361 (2.246)* | 0.096 (0.581) | 0.44 | 1.76 | 10.51 |
| Niger | 0.018 (0.166) | 0.053 (0.470) | -0.001 (-0.012) | -0.167 (-1.543) | - | 0.09 | 1.62 | 8.037 |

| | | | | | | | | |
|---------|--------------------------|--------------------|--------------------|--------------------|--------------------|------|------|-------|
| Nigeria | -0.094 (-0.335) | 0.536 (1.513) | -0.028 (-0.083) | 0.165 (0.648) | - | 0.20 | 0.79 | 18.18 |
| Senegal | 0.357 (2.854)* | -0.141 (-1.115) | -0.115 (-0.941) | 0.012 (0.176) | 0.012 (0.105) | 0.32 | 1.14 | 6.10 |
| Togo | 0.384 (3.961)* | -0.107 (-1.076) | -0.071 (0.684) | -0.142 (-1.534) | -0.138 (-1.530) | 0.50 | 1.55 | 6.15 |

*Coefficients significant at the 5 percent level are in bold.

Table 4.4: Summary of panel regression outcomes for ECOWAS, WAMZ and WAEMU (Dependent variable: inflation 1980 – 2012)

| | ECOWAS | | | WAMZ | | | WAEMU | | |
|---------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | POLS | REM | FEM | POLS | REM | FEM | POLS | REM | FEM |
| MS ₀ | 0.20 (4.06)* | 0.19 (4.06)* | 0.15 (2.88)* | 0.06 (0.58) | 0.26 (1.97) | 0.06 (0.58) | 0.18 (4.36)* | 0.17 (4.14)* | 0.18 (4.37)* |
| MS ₁ | 0.21 (4.26)* | 0.21 (4.28)* | 0.17 (3.25)* | 0.37 (3.51)* | 0.37 (2.76)* | 0.37 (3.51)* | -0.01 (-0.25) | -0.01 (-0.14) | -0.01 (-0.22) |
| MS ₂ | 0.09 (1.91) | 0.09 (1.88) | 0.05 (0.99) | 0.10 (0.96) | -- | 0.10 (0.96) | -0.04 (-1.09) | -0.02 (-0.59) | -0.04 (-1.07) |
| MS ₃ | 0.09 (1.76) | 0.08 (1.74) | 0.07 (0.90) | 0.13 (1.30) | -- | 0.13 (1.30) | -0.08 (-2.09) | -0.09 (-2.21) | -0.08 (-2.07) |
| MS ₄ | 0.04 (0.82) | 0.03 (0.74) | -0.02 (-0.37) | 0.02 (0.26) | -- | 0.02 (0.26) | -0.07 (-1.69) | --- | -0.07 (-1.66) |
| R ² | 0.39 | 0.34 | 0.44 | 0.31 | 0.17 | 0.31 | 0.17 | 0.13 | 0.17 |
| AC | 1.07 | 1.09 | 1.17 | 0.94 | 1.30 | 0.94 | 1.66 | 1.61 | 1.66 |
| SER | 10.27 | 10.20 | 10.02 | 13.44 | 19.34 | 13.44 | 6.22 | 6.26 | 6.26 |
| No. of Countries | 8 | 8 | 8 | 3 | 3 | 3 | 5 | 5 | 5 |
| No. of observations | 232 | 232 | 232 | 87 | 96 | 87 | 145 | 150 | 145 |

*Coefficients significant at the 5 percent level are in bold.