Inflation differential in the West African Monetary Zone (WAMZ) area:Implications for unionization

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Inflation Differential in the West African MonetaryZone Area: Implications for Unionization

By

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Abstract

This paper examines the determinants of inflation differentials in a panel of West African Monetary Zone (WAMZ) states vis-à-vis its set benchmark for macroeconomic convergence since 2000 to date. Using a stylized 5-country model of WAMZ area, the differences in national inflation is analyzed in light of country specific shocks or differences in the monetary transmission mechanisms. The main results show macroeconomic (price) stabilization around a desired target was not attained. Over the sample period, the un-weighted average regional inflation rates were most often above a single digit target and vary widely among the countries. The major monetary policy instruments determinants of inflationary divergence are the pursuit of distorted interest rates, exchange rates overvaluation and expansionary monetary policies, which penalized credit and accentuated output supply/demand gaps.

1. Introduction

One of the preconditions for the commencement of WAMZ and introduction of the common currency (to be known as the Eco) in these countries is the need to sustain low inflation nationally. It is the general expectation that these countries routing for a common currency, must pursue *ex ante* independent monetary policies not only capable of narrowing the inflation differentials, but also foster convergence around a single digit.

The observation, since the commencement of WAMZ in 2000 is that this primary condition has been the most difficult to fulfill. Not only has there been

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persistent divergence in inflation among these countries, the prospect for attaining its convergence has also been weak thereby deeming commencement prospect also. If progress is to be made towards convergence, there is therefore the need to understand what generates the inflation differentials among these countries. In particular, there is the need to ascertain the role of nominal exchange rates volatility (appreciation/depreciation), under independent floating exchange rate regime as well as the independent monetary policy stance in generating inflationary spiral in these countries. The objective of this study therefore is to ascertain the determinants or factors giving rise to these differences in the light of historical differences in independent monetary policy pursuits.

The rest of the paper presents a brief review of related literature in part 2. Part 3 reviews the theoretical and analytical models. Part 4 presents the results while Part 5 the concluding remarks and policy implications.

2. Related Literatures

Various New Keynesian models have been used to analyze the inflation differentials in the especially in the euro area. One of such models for the euro area economies is put forward by Hofmann and Remsperger (2005). Their empirical analysis of inflation differentials is carried out by panel generalized method of moments over the period 1999Q1-2004Q2. Their results suggest that the observed inflation differentials are mainly influenced by differences in cyclical positions and fluctuations of the effective exchange rate combined with a rather high level of inflation persistence, while the proxies of price level convergence does not come out significantly. Hofmann and Remsperger (2005) also find that the degree of inflation persistence depend on the past monetary policy regime and expectations. Their results indicate that countries with a history of low and stable inflation rates exhibit zero persistence, while the persistence is rather high otherwise. Given this

finding, the authors conclude that the monetary policy of the Euro system geared at delivering and maintaining low and stable inflation rates in the euro area should reduce inflation persistence in the future.

Analogously to the aforementioned study, Angeloni and Ehrmann (2007) propose a stylised 12-country model of the euro area represented by aggregate demand and aggregate supply equations and use it to analyze the inflation and output differentials observed across the euro area over the period 1998Q1-2003Q2. Angeloni and Ehrmann (2007) point out that the main source of differentials in the early years of the euro area have been aggregate demand or potential output shocks, followed by domestic cost-push disturbances, while euro exchange rate shocks come only third. Moreover, the authors emphasize that inflation persistence have played a central role in amplifying and perpetuating inflation differentials within the monetary union. They claim that for plausible parameter values even small changes in persistence can produce dramatic changes in the inflation differentials. The paper also concludes that a tight control of average area-wide inflation around a target tends to reduce the differentials.

The long-run determinants of inflation differentials in the euro area are examined by Altissimo *et al.* (2005). In first part of their study, the authors analyze evidence on the statistical features of observed dispersion in headline inflation rates as well as changes in the components of the consumer price indexes in the euro area. Their findings suggest that most of the dispersion in European inflation occurs in the services category of the EU's harmonized consumer prices. In the second part of the study, the authors build a dynamic factor model to investigate the sources of dispersion in sector-based measures of dispersion in, on the one hand, a common component driven by common factors, and on the other hand, an idiosyncratic component.

Altissimo *et al.* (2005) conclude that their outcomes are in contrast with the supposition that real exchange rate is primarily driven by regionally asymmetric productivity shocks in the traded sector. Indeed, they point instead to relative variations in productivity in the non-traded sector as the main cause of price and inflation differentials, with shocks to productivity in the traded sector being largely absorbed by movements in the terms of trade in the regional economies.

Honohan and Lane (2003) estimate the panel data model to assess the driving factors of inflation differentials in the euro area over the period 1999-2001. More specifically, they examine the relative influence of the country's external exposure, the cyclical position, the fiscal policy, and the price level convergence. Their results suggest that all aforementioned variables belong to vital determinants of inflation differentials in the euro area.

Horvath and Koprnicka (2008) examine the determinants of inflation differentials in a panel of the new European Union member states vis-à-vis the euro area in 1997-2007. Their main results are that exchange rate appreciation and higher price level in the new EU members is associated with narrower inflation differential vis-à-vis the euro area, while fiscal deficit and positive output gap seem to contribute to higher inflation differential. Nevertheless, the effect of price convergence on inflation differentials is found to be dominating in these countries. Their study shows that a country with price level 20% below the euro area average is likely to exhibit inflation nearly one percentage point above the euro area. They therefore concluded that real convergence factors rather than cyclical variation are more important for inflation developments in the new EU members, as compared to the euro area.

3. The Theoretical and Analytical Framework

The model adopted for this study draws from various New Keynesian models that have been used to analyze the inflation differentials in the euro area (i.e. the degree of non-convergence of prices {Hofmann and Remsperger (2005), Angeloni and Ehrmann (2007), Altissimo *et al.* (2005), and Honohan and Lane (2003)}. In particular the empirical methodology specified for this study draws from Honohan and Lane (2003) and Horvath and Koprnicka (2008) who focus their attention to finding the relationship between inflation differentials and the role of exchange rate channel, output gap, fiscal policy, and the countries' relative price level in a panel of euro area countries using annual data over 1999-2001. Honohan and Lane (2003) postulated a fairly general specification for inflation differentials as:

$$\pi_{it} - \pi_t^E = \beta(z_{it} - z_t^E) + \delta([P_{it-1} - P_{it-1}^*] - [P_{t-1}^E - P_{t-1}^{E*}]) + \varepsilon_{it} \quad \cdots \quad (Eq.1)$$

Where π_{it} and π_t^E are the annual national and euro zone inflation rates, respectively; z_{it} and z_t^E denote national and euro area variables that exercise short-term influence on the inflation rate; P_{it} and P_i^E denote the national and euro area price levels, P_{it}^* and P_t^{E*} represent the national and euro zone long-run equilibrium price levels. In order to account for long run convergence, in the face of tight trade and institutional linkages, Honohan and Lane (2003) assume a common long-run national and euro area price level, simplifying Eq. 1 as:

$$\pi_{it} - \pi_t^E = \beta(z_{it} - z_t^E) + \delta(P_{it-1} - P_{t-1}^E) + \varepsilon_{it} \cdots \quad \cdots \quad \cdots \quad \cdots \quad (Eq.2)$$

Horvath and Koprnicka (2008) noted that it is easy to realize that a combination of euro area variables results in a time dummy, and as such re-wrote Eq. 2 as:

$$\pi_{it} = \phi_t + \beta z_{it} + \delta P_{it-1} + \varepsilon_{it} \cdots \quad \cdots \quad \cdots \quad \cdots \quad (Eq.3)$$

Where they define the z in line with Honohan and Lane (2003) as:

$$z = [\Delta NEER_{it-1}, GAP_{it}, FISC_{it}] \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad (Eq.4)$$

Where $\Delta NEER_{it-1}$ is the lagged change of nominal effective exchange rate; GAP_{it} denotes the output gap, $FISC_{it}$ represent the fiscal deficit and P_{it} is the lagged price level. Horvath and Koprnicka (2008) estimated the following empirical specification:

$$\pi_{it} = \phi_t + \beta_1 \Delta NEER_{it-1} + \beta_2 GAP_{it} + \beta_3 FISC_{it} + \delta P_{it-1} + \varepsilon_{it} \quad \cdots \quad (Eq.5)$$

They noted that the time dummies (ϕ_t) in Eq. 5 capture the common movements in inflation, so that the regression explains the inflation differentials in terms of idiosyncratic national movements. Horvath and Koprnicka (2008) expectations of the coefficient on effective exchange rate β_1 is negative, as exchange rate appreciation is expected to decrease inflation rate. On the other hand, β_2 is expected to be positive, as higher output gap results in more inflationary environment. β_3 is likely to be negative, as fiscal surplus reduces aggregate demand and therefore contributes to lower inflation. The sign of δ is expected to be negative as lower price level is likely to be associated with higher inflation rate. They further posit that for obvious reasons, output gap and fiscal balance can be endogenous to inflation and therefore estimated Eq. 5 by the generalized method of moments (GMM), where endogenous variables were instrumented by lagged values.

Empirical Models

The empirical models to be estimated rely very strongly on the theoretical foundations of these New Keynesian models. With regard to aggregate price stabilization around a preset target or benchmark, I adopt Horvath and Koprnicka (2008), i.e. Eq. 3:

$$\pi_{it} = \phi_t + \beta z_{it} + \delta P_{it-1} + \varepsilon_{it} \cdots \quad \cdots \quad \cdots \quad \cdots \quad (Eq.3)$$

but with significant modifications. Whereas they define the vector z of Eq. 3 as:

$z = [\Delta NEER_{it-1}, GAP_{it}, FISC_{it}]$ where $\Delta NEER_{it-1}$ is the lagged change of nominal

effective exchange rate; GAP_{it} denotes the output gap, $FISC_{it}$ represent the fiscal deficit and P_{it} is the lagged price level, I redefine the vector z as:

$z = [\Delta NER_{it-1}, y_{it}, M_2, CP_{it}, CG_{it}, i_{it}]$ where ΔNER_{it-1} is the lagged change in nominal exchange rate of the national currencies to the US \$, their dominant reserve currency; y_{it} denotes the real output while M_2 is money supply, which is an important component of independent monetary policy targets of WAMZ countries, in the light of pursuits of multiple objectives of macroeconomic stabilization policy; CP_{it} and CG_{it} represents banking sector credit to private and government sectors respectively, to capture the loose stand of monetary policy with regard to government borrowing and the extent of bias it implies for private sector credit; and finally, i_{it} denotes the overall interest rate policy stance of the monetary authorities, represented in this model by the monetary policy rate or minimum rediscount rates. This gives us the following empirical specification:

$$\pi_{it} = \phi_t + \beta_1 \Delta NER_{it-1} + \beta_2 y_{it} + \beta_3 CP_{it} + \beta_4 CG_{it} + \beta_5 M_2 + \beta_6 i_{it} + \delta P_{it-1} + \varepsilon_{it} \quad \cdots \quad (Eq6)$$

Whereby π_{it} is the net inflation differential of each participating country from optimal targets; ϕ_t represents cross-sectional fixed effects constants of independent movements in inflation differentials within the panel; βs are regression coefficients of the included explanatory variables, δ the regression coefficient of past trends in aggregate price level.

The expectation of the coefficient of nominal exchange rate β_1 is negative, as exchange rate appreciation is expected to decrease inflation rate. On the other hand, β_2 is expected to be positive, as higher output gap results in more inflationary environment. β_3 is likely to be negative, as expansion in credit to the private sector is expected to lead to output expansion (a positive shock) and therefore contributes to lower inflation. β_4 is

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likely to be positive, as expansion in credit to government is expected to lead to expansion in aggregate demand and therefore contributes to higher inflation. β_5 is likely to be positive, as expansion in aggregate money supply is expected to lead to expansion in aggregate demand and therefore contributes to higher inflation. β_6 is likely to be negative, as lower interest rates is expected to lead to output expansion (a positive shock) and therefore contributes to lower inflation. The sign of δ is expected to be negative as lower price level is likely to be associated with higher inflation rate.
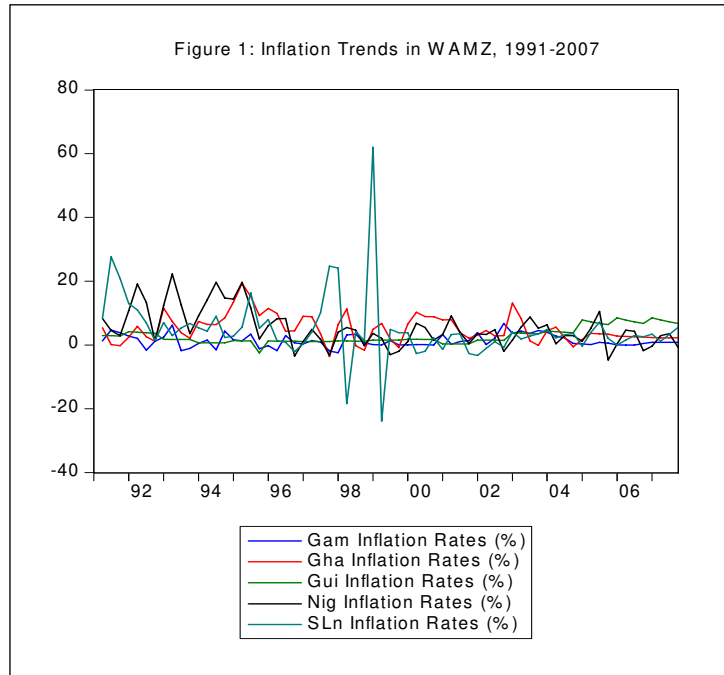
4. Empirical Results

Table 1 presents the Equation 6 regression results of the determinants of inflation differential of WAMZ countries from the less than 10 per cent target set for the commencement of WAMZ. The adjusted R^2 value, which measures the overall goodness of fit of the regression, show that independent monetary policy stance variables could only account for about 45 per cent of inflation divergence from set targets. It can be inferred that efforts at macroeconomic

Table 1: Regression Results of Determinants of Inflation Differential among WAMZ Countries					
Dep. Variable: Inflation Differential: π_{it}					
Method: Pooled EGLS (Cross-section SUR)					
Sample (adjusted): 1991Q3 2007Q4					
Included observations: 66 after adjustments					
Cross-sections included: 5					
Total pool (balanced) observations: 330					
Linear estimation after one-step weighting matrix					
Variables		Coefficient		Statistics	
Name	Symbol	Name	Value	t-Stat.	Prob.
Constant		ϕ_i	-2.07	-1.2	0.23
Nom.ER App/Dep.	$\Delta NER_{it\text{-}1}$	β_1	0.021	1.6	0.11
Real Output Shock	y_{it}	β_2			
Credit to Pr. Sect.	$Cp_{it}(\text{-}1)$	β_3	-0.000012	-3.7	0.00
Credit to Govt.	$CG_{it}(\text{-}2)$	β_4	-0.000001	-0.8	0.43
Money Supply:	$M_2(\text{-}1)$	β_5	0.00001	4.3	0.00
Monetary Policy Rate	$Log\ i_{it}$	β_6	2.25	4.0	0.00
Lagged Aggr. Price (CPI)	$P_{it\text{-}1}$	δ	-0.011	-2.5	0.01
Fixed Effects (Cross)					
_GAM--C			-1.40		
_GHA--C			0.90		
_GUI--C			-2.40		
_NIG--C			2.71		
_SLN--C			0.19		
Weighted Statistics					
R-squared		0.47	Mean dependent var		0.96
Adjusted R-squared		0.45	S.D. dependent var		1.29
S.E. of regression		0.97	Sum squared resid		298.4
F-statistic		28.41	Durbin-Watson stat		1.47
Prob(F-statistic)		0.00			
Source: Estimated using Eviews 6.1					

(price) stabilization around a desired target was not attained. Over the sample period, the un-weighted average regional inflation rates were most often above a single digit

target and vary widely among the countries. The summary of the descriptive statistics associated with the inflationary pattern displayed in Figure 1 is as shown in Table 2. This table shows that except for Gambia, all the WAMZ countries have had astonishing records of double

Figure 1: Inflation Trends in WAMZ, 1991-2007

digit inflation. The country that recorded the minimum inflation rate during the study period is Gambia at an average of 5.6 per cent while Sierra Leone recorded the maximum average inflation rate of 29.3. The table also shows that for more than half the period under review, both Gambia and Guinea recorded single digit inflation with the median

Table 2: WAMZ Inflation Descriptive Statistics, 1991Q1 to 2007Q4					
	Gambia	Ghana	Guinea	Nigeria	S/Leone
Mean	5.6	23.1	12.2	25.3	29.3
Median	3.3	16.4	7.0	16.9	14.1
Maximum	29.9	102.3	38.7	123.7	588.2
Minimum	-9.2	-13.8	-9.6	-17.5	-66.3
Std. Dev.	8.3	21.1	11.2	30.2	78.6
Skewness	0.7	1.2	1.0	1.3	5.6
Kurtosis	3.2	4.9	3.0	4.6	39.6
Jarque-Bera	5.4	26.1	11.2	26.8	4083.5
Probability	0.1	0.0	0.0	0.0	0.0
Sum	378.1	1550.4	817.5	1693.5	1966.0
Sum Sq. Dev.	4518.9	29260.6	8280.8	60079.2	408136.0
Observations	67.0	67.0	67.0	67.0	67.0
Source: Estimated with Eviews 6.1 from the Regression Data					

statistics estimated at 3.3 and 7.0 per cent, respectively. These two countries can be described as the low inflation group among WAMZ while Nigeria and Ghana are the highly inflation group, with Sierra Leone joining the club after a protracted period of political crisis and instability.

The overall estimate of the fixed effects constant, ϕ_t, show significant variation in its value across the participating countries in WAMZ. Whereas, it exhibited a

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negative spread from the regional average in the case of the Gambia and Guinea, the countries with low records of inflation, it is positive for Nigeria, Ghana and Sierra Leone that have poor records of inflation control. This finding tends to confirm that there is a wide divergence among the participants with regard to the average outcomes of price stabilization efforts, with very slim hope for attaining convergence with independent monetary policy pursuits. The trends in national consumer prices

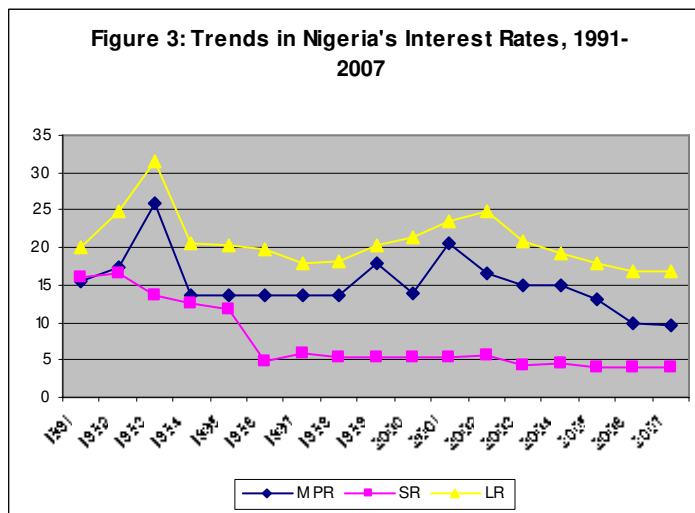Figure 2: Trends in Aggregate Consumer Price Index of WAMZ countries, 1991-2007
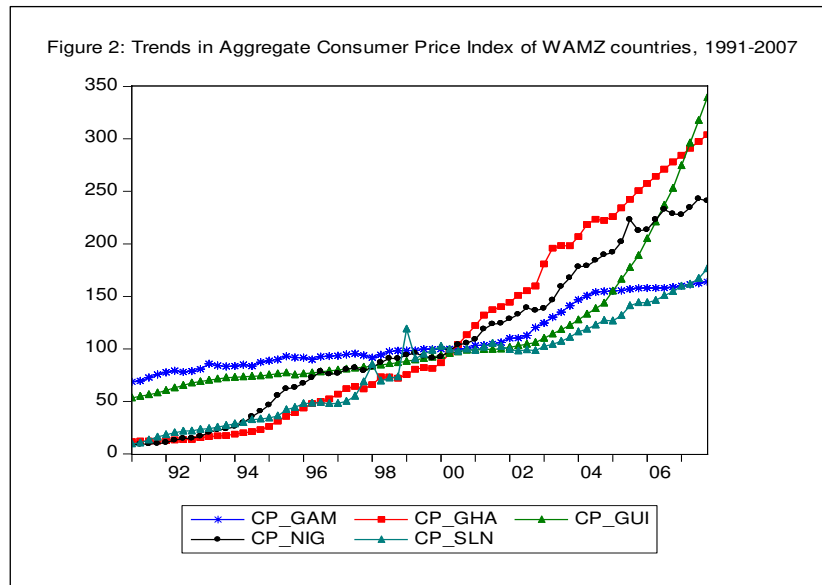
displayed in Figure 2 shows the divergent growth path of prices in these countries.

The regression result also shows that the major monetary policy instruments determinants of inflationary divergence are the pursuit of distorted interest rates and expansionary monetary policies, which penalized credit and accentuated output supply/demand gaps, and exchange rates overvaluation.

With regard to interest rates policy stance, the result shows that a 1% rise in interest rates generates about 2.25% rise in inflation rates. This means that high monetary policy rates translated into high lending rates in virtually all the countries within the region. Two fundamental issues belie the independent interest rate policies of WAMZ countries: firstly, is the lack of clear cut policy rules for an objective determination of optimal interest rates. The independent monetary authorities seem to set interest rates arbitrarily, neither following Taylor's rules or the Neo Keynesian framework as the pass-through mechanism to inflationary control. The experience in
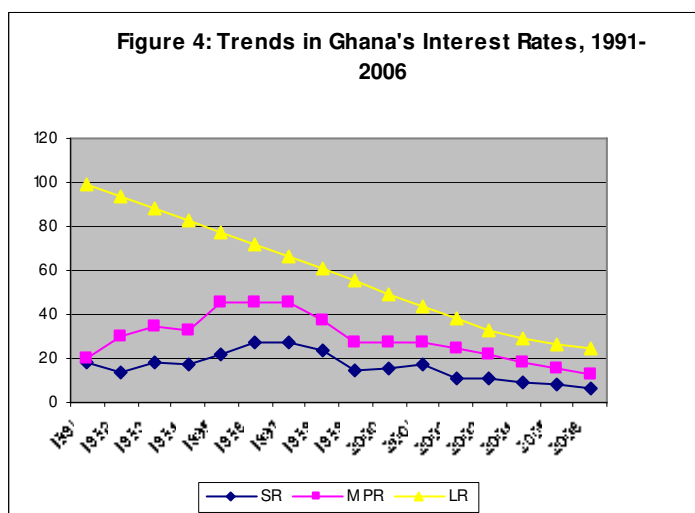
Ghana and Nigeria is that monetary authorities were more concern with the adverse implication of cheap funds for foreign exchange management. This was with a view to fostering both internal and external balance within a Mundellian framework of balancing the use of monetary policy represented by interest rate/reserve money control and fiscal policy represented by government expenditure. This attempt was a colossal failure because monetary policy rates hike meant for stemming excess national demand could not restrain fiscal borrowing via ways and means, as well as through public debt instruments.

**Figure 3: Trends in Nigeria's Interest Rates, 1991-2007**

The second is the pervasive internal economic distortion which accompanied the interest rates policy stance, especially the widened divergence between low savings rate which inhibits savings mobilization and high lending rates which resulted in credit apathy by both lenders and borrowers. Financial market operators, especially the banking system capitalized on the distortions to diversify their portfolios from lending to speculations in money markets, in the face of a wide spread margin between savings and treasury bills rates which moved in tandem with the monetary policy rates.

Figure 4: Trends in Ghana's Interest Rates, 1991-2006

Figures 3 and 4 shows that both Nigeria and Ghana kept monetary policy rates high, even when savings rates suggest lower costs of funds. However, Figure 5 tends to suggest that the Gambia aligned her monetary policy

Figure 5: Trends in the Gambia Interest Rates, 1991-2007
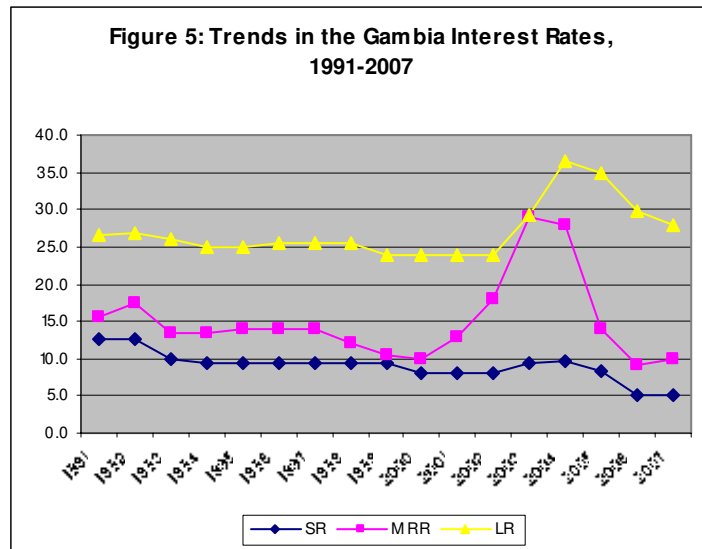
rates to savings rates which eliminated speculations.

The coefficient of the change in nominal exchange rate variable is not significant, contrary to the expectation that devaluations drive the inflationary pressures of these countries. It is however positively signed implying that it could potentially be a cause of inflation. This result is expected, since the currencies of these countries are non-traded but pegged to a basket of currencies dominated by the US Dollar ($). The availability of the US Dollar quantitatively becomes the issue, while the effects of devaluation translate to imported inflation on a narrow basket of imported consumer and capital goods. The experience, in most of the countries is that consumers resorted to local alternatives, while the significant efforts at foreign exchange controls through restrictive tariffs and quantitative controls accrued as rents to protected industries and traders. This finding re-enforces the assertion that devaluation as an instrument of demand management approach to macroeconomic stabilization is rather ineffective to cope with economies that suffer from deep structural maladjustments.

The coefficient of the past trends in national aggregate prices on inflationary convergence is significant and rightly signed. The result showed that a 100% decline in aggregate price level would reduce the inflation gap by about 1.1%. This natural

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growth path suggests that indeed inflation is not a monetary phenomenon and that macroeconomic losses which emanated from inadequate stabilization would be far greater than the noise generated from subscription to a convergence stance rooted in common monetary and exchange rates stance. Also, credit to private sector exhibited the expected right and significant but inelastic relationship to inflation while credit to government variable turned out to be insignificant. This also confirms that it may not be very correct to blame fiscal indiscipline reflected in public sector borrowing from the banking system for spiraling inflation as the monetary authorities of these countries had often claimed.

5.   *Summary and Implications for Unionization Efforts*
This paper examines the determinants of inflation differentials in a panel of West African Monetary Zone (WAMZ) states vis-à-vis its set benchmark for macroeconomic convergence since 2000 to date. Using a stylized 5-country model of WAMZ area, the differences in national inflation is analyzed in light of country specific shocks or differences in the monetary transmission mechanisms. The main results show that macroeconomic (price) stabilization around a desired target was not attained. Over the sample period, the un-weighted average regional inflation rates were most often above a single digit target and vary widely among the countries.   The major monetary policy instruments determinants of inflationary divergence are the pursuit of distorted interest rates, exchange rates overvaluation and expansionary monetary policies, which penalized credit and accentuated output supply/demand gaps.

The immediate implication of these findings is that there is very slim prospect for the attainment of price convergence by WAMZ countries in the foreseeable future. In particular, the divergent path of interest rates policies among the countries, with no clear cut policy rules and the didactic approach to exchange rates determination all points to this conclusion.   This is reinforced by the pervasive internal economic

distortion which accompanied the interest rates policy stance, especially the widened divergence between low savings rate which inhibits savings mobilization and high lending rates which resulted in credit apathy by both lenders and borrowers.

The finding that nominal exchange rate devaluation has relatively insignificant effect on inflation differential also implies that unwarranted emphasis was placed by these countries on exchange rate management. Although some independent national studies suggest that it could be an important determinant of domestic inflation, it has not been effective as an instrument of demand management approach to price stabilization. This further suggests that these countries could be better off surrendering the inferior price stabilization approach to a supra-national monetary authority that compels compliance to a regional monetary and inflation targets.

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