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Article

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Inflation Persistence in the West African Commonwealth Countries

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Abstract

The study examined the persistence of inflation in the West African Commonwealth Countries (WACCs). The methods used include the simple average method, the conventional unit-root test, the first coefficient of the autoregressive method, and the mean of the sum of the significant coefficient of the autoregressive method. The results of all the methods of estimations reveal the existence of high inflation persistence in all the countries and the panel with the exception of the simple average method that shows no inflation persistence in the Gambia. Meanwhile, the conventional unit-root test indicates that in Sierra Leone, inflation persistence is high while the rest of the countries and the panel required further analysis using other methods. This research was able to examine the inflation persistence in WACCs and establish its existence empirically. The research makes some recommendations on the basis of the findings of the study.

Key words

Autoregression, commonwealth, inflation persistence, West African Commonwealth Countries

JEL Codes: E30, E31

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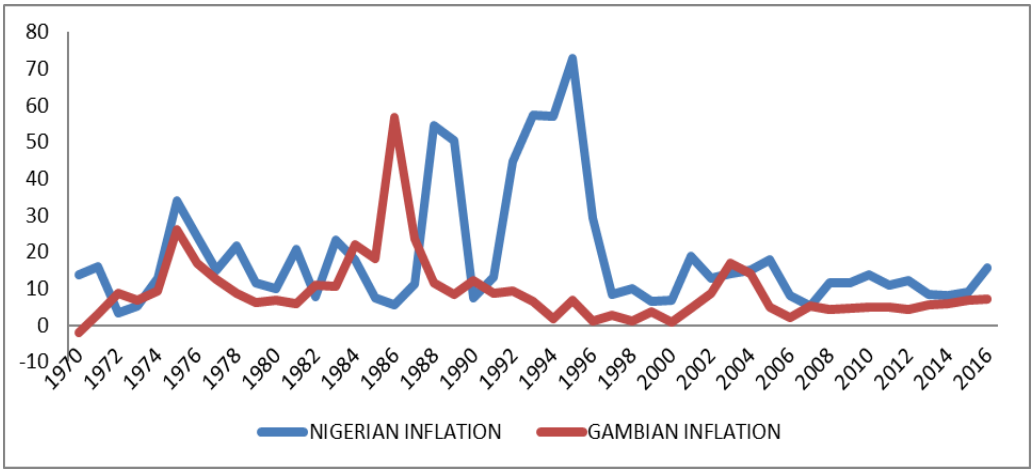
1. Introduction

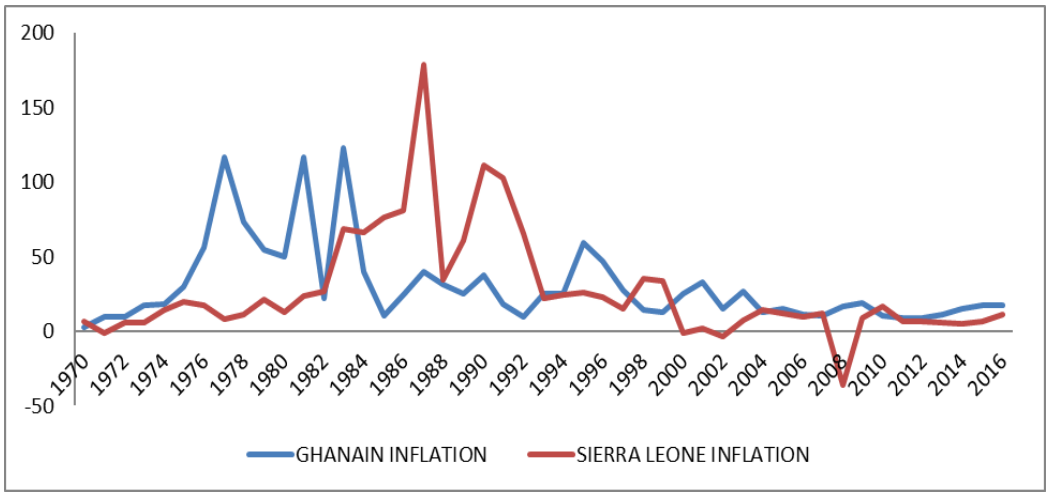
Sustainable price stability is the most priority among the macroeconomic objectives of many nations. This is because economic growth, as well as a high level of economic development attainment, is not possible without it. Prices instability has been considered to have high adverse effects on economic development attainments (Sek *et al.*, 2015). Prices, when risen hardly comedown, reduce or falling, if the rate of inflation reduces it does not mean prices are decreasing, but rather they mean the rate, at which prices are increasing, reduces. In relation to this, Fuhrer (2011) maintain that on expectational base, prices of goods and services are purely and continuously forward-looking. Continuing persistence of high inflation rate, if not check, at most times brings majorly, the economic activities, in any country, to a halt. West African Commonwealth Countries (WACCs) have been witnessing and experiencing very high persistent inflation rate even though developing countries are advised to make and maintain their rate of inflation (in terms of consumer price index) single-digit for the purpose of registering meaningful progress regarding economic development attainment. Phiri (2012) and Anwar and Islam (2011) are among the studies that advised the retainment of single-digit inflation rate for developing economies.



Source: World Development Indicators, 2019.

Figure 1. Nigerian and Gambian Inflation Rate 1970 – 2016

Figure 1 and Figure 2 highlighted the trend of inflation of Nigeria and Gambia as well as Ghana and Sierra Leone respectively, that are termed as WACCs, for the period 1970 – 2016 and in most of the periods the rates are double-digit as against what was advised.



Source: World Development Indicators, 2019.

Figure 2. Ghanaian and Sierra Leone Inflation Rate 1970 – 2016

In Africa in particular, and most developing economies in general, having a high rate of inflation is common in most times, but studies on inflation persistence are considered very few. Coleman (2010) asserted that little attempt was made to study inflation in Sub-Saharan Africa (SSA), even though, high and persistent inflation rates are likely to have strong adverse consequences on the welfare of their citizens. This study intends to examine the persistence of inflation in WACCs for the period 1970 – 2016 an annual data of 47 years. The rest of this study consist of; section two where related literature is reviewed, section three presents the methods used in the study while section four presents the results and discussions of findings of the research and finally, section five presents the research's conclusion.

2. Literature review

Fuhrer (2011) defined the persistence of inflation as a resistance of its rates to change its direction of speed downward after reaching a specific frequency that is considered high unless external-force intervene. Whereas, Cogley *et al.* (2010) perceived inflation persistence as when current inflation is being affected or influenced by the shocks of the past or previous inflation rates. Several theories attempted to explain the major causes of inflation and its persistence. Increase in money supply beyond an economy's requirement is the major cause of inflation and its persistence, as argued by monetarist theory. In fact, to them, fluctuations of the money supply can provide a substantial explanation of the shocks in macroeconomic fundamentals. On the other hand, a Keynesian strand of thought believed that the existence of excess aggregate demand over aggregate supply as the cause. Whereas, expectation theory maintained that people expectations, built based on experience, fuel the flame of inflation and result in its persistence. Gamber *et al.* (2016) pointed out that inflation persistence needs to be checked for ensuring the substantial improvement of any society. This is because the worse consequence of inflation persistence is deterioration of the welfare of the society.

There are few studies regarding inflation persistence in developing countries despite the existence of a high inflation rate in those countries. A number of the studies in this regards are conducted, based on the experience and data of the developed nations due to its significance of checking the effectiveness of their respective stabilization policies, especially, monetary policy. Moreover, even base on the experience of developed countries, similar studies in the same area provide inconsistent results and findings, for example, Pivetta and Reis (2007) have conflicting results with that of Noriega and Ramos-Francia (2009) or even the results reported by Cogley *et al.* (2010).

Ahmad and Staveley-O'Carrol (2017) investigated the existence and level of the persistence of inflation using a dynamic stochastic general equilibrium (DSGE) model for 135 countries comprise both developed and developing countries. They reported a result of low persistence of inflation in developed countries and those countries with the low inflation rate. High persistence of inflation has been reported in developing countries and those countries with a high inflation rate. Amano (2007) analyzed the effectiveness of monetary policy when inflation persistence is uncertain. The result reveals that the strategy that is being adopted during the implementation of monetary policy in such periods is usually underestimating the degree of inflation persistence, which generally limits the effectiveness of the policy. In the same vein, Antonakakis,

Cunado, Gil-Alana and Gupta (2016) used online price index and official price index to examine the persistence of inflation in the US, the UK, South Africa, Japan, Germany, China, Brazil and Argentina. The result shows that the degree of inflation persistence is smaller in the US, the UK, China, Brazil, and Argentina when online price indexes are used which, to them, is more accurate than the official CPI usage.

In their effort to investigate the existence of changes in the US inflation persistence, Cogley, Primeceri and Sargent (2010) applied VAR to measure inflation persistence in short-term and medium-term. The results show that the persistence of inflation is higher during the great inflation period, but it reduced during the Volcker period of disinflation. This finding is in accord with the results of research conducted by Noriega and Ramos-Francia (2009), though it is contrary to the findings of Pivetta and Reis (2007). Coleman (2010) investigated the existence of inflation persistence in 12 West African French-speaking countries (WAFC) using a fractional integrated method on food and non-food inflation. The result reveals the presence of inflation persistence in both food and non-food inflation in Cote d'Ivoire, Chad, and Niger. While, in Burkina Faso, Chad, Cote d'Ivoire, Gabon, Niger and Senegal, the existence of long memory of persistence of inflation in the non-food sector was recorded. Inconclusive results were reported in the food sector of the Central African Republic and Togo.

Furthermore, Giannellis and Koukouritakis (2013) studied inflation persistence in some Latin American countries such as Venezuela, Uruguay, Mexico, and Brazil in relation to exchange rates of the respective countries. The result reveals that inflation was persistent in a period of high currency depreciation experienced by the nations compared to the period of slower local currency depreciation. Levin and Piger (2004) assessed the inflation persistence of 12 industrial economies, using four price indices – CPI, the core CPI-exclude food and energy, price deflator of GDP and personal consumption price deflator, for a period 1984 – 2003. For each of the US, the UK, Switzerland, New Zealand, Japan, Italy, Germany, France, Canada, and Austria. After taking care of breaks, the results show that there exists relatively low inflation persistence in these countries. Therefore, industrial economies have no features of high persistent inflation countries.

Nevertheless, Zhang (2011) highlighted that inflationary expectations play a significant role towards high persistent inflation in China. In a study conducted for a period, 1979 – 2009, the use of monetary policy to avert inflationary expectations has been helpful in terms of breaking the high inflation persistence in China. In a similar study, Zhang and Clovis (2010) analyzed the existence of changes in inflation persistence in China. The results confirmed a significant reduction in the persistence of inflation towards the late 1990s in the country. This was attributed to the usage of a change in the systematic monetary policy of the country. Fraccalviri, Rasada and Sironi (2014) studies inflation persistence through the dynamics of inflation and unemployment relationships in the US and Japan, using VAR and VECM for a period 1980 Q1 to 2013 Q2. The dynamic analysis shows that during the period of study, inflation persistence has nothing to do with an inflation-unemployment trade-off in the long-run of the US and the short-run of Japan. Whereas, Gamber, Liebner and Smith (2016) analyzed the changes in the persistence of inflation in the US for the period 1949 – 2014, using a reduced form approach, with inflation persistence as an autoregressive process. The result shows some significant changes in the inflation persistence of the US during the period of study.

Alexova (2012) investigated the inflation persistence of the new registered European Union countries of the last decade such as; Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia and Romania, with the major focus on the determinants of inflation for the period 1996–2011. The study employed a structured vector error correction model as the econometric tool of analysis. The study reported that cost-push inflation, in the long-run, constituted the source of the persistence of inflation in Bulgaria, Czech Republic, Hungary, Poland, and Slovakia. Whereas, demand-side factors are the cause, in Estonia, Lithuania, Latvia, Slovenia, and Romania. Hajjat and Barnhorst (2013) examined the inflation persistence for a group of seven Islamic economies and its relation to money supply and economic growth, for the period 1980–2009. The study discovered that there is a link between money supply and inflation persistence in the countries during the period of study.

In his contribution, Kar (2010) investigated the superiority of using unobserved component model (UCMs) as a measure of inflation persistence, - specifically, to measure core inflation, - over the structured vector autoregression (SVAR) method. The study maintained that the UCMs is superior to SVAR in terms of wholesale price index (WPI) inflation forecasts. Also, Kozamernik and Zumer (2011) attempted to study inflation persistence in Slovenia with an emphasis on the sources of the disinflationary process of the country. The study discovered inflation to be highly persistent and maintained that changes in interest rate through inflation targeting after the year 2000, fall in oil price and expectations on inflation are the major sources of disinflation in the country.

Similarly, Phiri (2017) analyzed inflation persistence within the period of inflation target (IT) of South Africa, using quarterly data from 2003–2014. The study used a three-regime threshold autoregressive (TAR) model based on Hansen (2000). The study discovered that the IT of 3–6 percent set by South African Reserve Bank (SARB) is in the high persistent inflation

range. Therefore, the study recommends IT to be redesigned by SARB to accommodate higher inflation rates or the IT to be abandoned completely. In their contribution to inflation persistence, Lolic and Sori (2014) conducted their study in Croatia. They attempted to measure the effect of inflation expectation and the possibility of an asymmetric effect in the inflation generating process in the country. The study employed smooth transition regression (STR), and the results reveal that high expectations, significantly, intensify inflation and its expectation. The review reveals that the majority of the studies on inflation persistence are conducted in developed nations, even though the majority of them have a low inflation rate. While studies on inflation persistence, in developing nations, are lacking even though the majority of them are experiencing a high rate of inflation.

3. Methodology of research

Source of Data: Consumer price index (CPI) is used as a proxy for inflation in this study, and it was sourced from world development indicators (WDI). It is in logarithm form.

Econometric Techniques: Several methods of estimating inflation persistence exist as presented by Fuhrer (2011). This study utilized the following econometrics techniques:

The simple average method: Checking the average inflation rate for some years if it is single-digit or double-digit. Single-digit average inflation rate signifies low inflation persistence, while double-digit average inflation rate implies high inflation persistence. Though, this method is weak in checking inflation persistence, especially, when a country faced several periods of deflation, and it is based on a statistical measure of central tendency, not econometric technique. Among the studies that recommend the retainment of single-digit inflation rate by developing economies for registering meaningful economic progress include Phiri (2012), Risso and Sanchez-Carrera (2009) and Danlami *et al.* (2018).

The conventional unit root test: This involves testing the level of stationary of the data. An existence of unit root in the inflation series shows that it is persistence while non-existence of unit root required further analysis. One of the set back of this method is that even if the series is stationary, one cannot rule out that the series is not persistence, further analysis is required. A number of methods for testing unit root exist; Augmented Dickey-Fuller (ADF) developed by Dickey and Fuller (1979, 1981) or even Phillips Peron (PP) test proposed by Phillips and Perron (1988). Some studies have used the conventional unit root test, include Cuestas and Harrison (2010).

The first coefficient of the autoregressive method: This method involves regressing current inflation on its previous (one) year lag value. It requires the first coefficient of the autoregressive method to be significant and above 40 percent (0.4) in value for the inflation rate to be persistent. The mean of the sum of the significant coefficient of the autoregressive method: For inflation rate to be persistence this method required summing and averaging the significant coefficients of the autoregressive after a specific lag length selected and having an average above 40/n percent signifies persistence of inflation rate. Where 'n' is the serial or counted number of the significant coefficients, this implies that the current inflation series is regressed on the previous series (more than one-year lag values). The advantage of this method over the usage of the first coefficient AR method is that it encapsulated the entire significant coefficient that accounts for the effect of the previous shocks on the present inflation. For more detailed and other techniques see (Fuhrer, 2011; Phiri, 2012; Altissimo *et al*, 2009; Coleman, 2010).

Theoretical Framework: The primary justification for checking the effects of the lag value of inflation on its current values is expectation theory (Fuhrer, 2011). Therefore, this research will best be understood using the expectation theory of inflation, which was developed on the basis of the dynamics of inflation. It is built based on commodities with markup pricing system (Hagger, 1977). Work on expectations was first sighted in the work of Hicks (1946), who analyzed the concept in relation to the dynamic and stability of the general equilibrium with regards to expectations in prices changes. To him, the stability or dynamics of the general equilibrium is entirely attributed to how expectations changes resulted from a shock that causes the disequilibrium. He used the concept of elasticity of expectations to simplify his analysis, which, simply, shows that the percentage change in the expected value of a variable in relation to the percentage change in its actual value. Applying this concept to inflation and price changes, taking P_e as the expected price in the future while P as the actual price in the future, Hicks' elasticity of expectation $\in_{Pe}$ is presented in Equation 1.

$$\in_{Pe} = \frac{\partial P_e / P_e}{\partial P / P} \quad (1)$$

If $\in_{Pe}$ = 1 increase in current price leads to the same proportion increase in prices in the future. If the current price increase by five percent, the future price is expected to increase by five percent in the future. If $\in_{Pe}$ >1 a small change in price presently will lead to a greater percentage of increase in future prices (higher expectations).

Many scholars further developed the concept of expectation theory of inflation, and this leads to the emergence of classifying the theory into adaptive expectations and rational expectations. Rational expectations believed that if variables behave in a proper way by being affected only by the variables presumed and explained by economic theory (Sargent & Wallace, 1973). The concept of the adaptive expectations theory of inflation suggested and pointed out that expectations are not directly observable. Therefore, expectations in term of inflation are linked to the past values of the variable (Frisch, 1983). The central idea behind this is that inflation that will be experienced in the future depends on current and past inflation just like the current inflation which is also being influenced by the previous inflation rates (Hagger, 1977). Their simple model is presented in Equation 2.

$$P^e = P^e_{t-1} + \alpha(P_{t-1} - P^e_{t-1}) \quad (2)$$

where P^e is expected inflation, P^e_{t-1} is previous expected inflation, P_{t-1} is previous years actual inflation and α is constant lying between zero and one. The expected inflation is equivalent to previous expected inflation added to the forecast error, which is the proportion of the difference between the previous actual and forecasted inflation. The central idea behind the theory is that current inflation is being influenced by the expectation of the people which can be represented by the previous inflation, and express in Equation 3.

$$INFL_{i,t} = \emptyset_{i,0} + \sum_{k=1}^{n} \emptyset_k INFL_{i,t-k} + \varepsilon_{i,t} \quad (3)$$

where *INFL* is log of inflation, *i* is the cross section or country (*i*=1, 2, 3, 4), *t* is time period (*t*=1, 2, 3, ... 47), *k* is lag length (to be determined by any criteria (AIC, SC, HQ, etc.), ε is the error term or random variable with its usual properties $\varepsilon_{i,t} = (V_t + \mu_{i,t})$, $V_t \sim iid(0, \delta_t^2)$ and $\mu_{i,t} \sim iid(0, \delta_\mu^2)$, therefore var $\varepsilon_{i,t} = (\delta^2_{t\ t} + \delta^2_u)$,. Note that the subscript "*i*" in the Equation is only applicable to the panel estimation (cross-section), there is no cross section in the time series estimations.

Method of Estimation: From Equation *i*, it can be understood that inflation persistence in purely autoregressive process, and therefore, this research makes use of autoregressive method (unit root test, AR first coefficient method, and AR-Average Significant Coefficient-ASC methods), as the estimation method and the simple average method is also used for confirmation purpose.

4. Results and discussions of findings

This section deals with the findings of the study started with the descriptive statistics of the variable, which is presented in table 1. The variable is in logarithm form; Ghana has the highest average log of inflation, which is approximately 3.19, followed by Sierra Leone 2.94. Nigeria 2.68, and the lowest average is that of Gambia 1.99. The average inflation rate for the panel is 2.65.

Table 1. Descriptive Statistics of Inflation of the Various Countries and the Panel

	NIG_INFL	GHA_INFL	GAM_INFL	SLN_INFL	Panel
Mean	2.68	3.19	1.99	2.94	2.65
Median	2.55	3.15	1.94	2.83	2.56
Maximum	4.29	4.81	4.04	5.19	5.19
Minimum	1.24	2.17	0.09	0.74	-0.17
Std. Dev.	0.73	0.73	0.80	1.00	0.94
Skewness	0.51	0.60	-0.19	0.27	0.07
Kurtosis	2.62	2.56	3.65	2.50	3.38
Jarque-Bera	2.09	2.84	1.00	0.93	1.27
Probability	0.35	0.24	0.61	0.63	0.53
Sum	112.47	133.81	83.50	123.49	484.15
Sum Sq. Dev.	21.94	21.70	26.13	41.23	161.01
Observations	42	42	42	42	183

Source: Authors' computation using Eviews 9.

The Simple Average Method

Table 2 presents the results of the average of the raw inflation rate for each country and the panel. The results indicate the existence of high persistent inflation rate in all the countries and the panel, having double-digit average inflation rate except the Gambia with single-digit (9.18 percent) though on the border nearly double-digit. Using this method, Gambia is considered to have a low persistent inflation rate while the rest and the panel having a high persistent inflation rate. Ghana has the highest average of approximately 30.26 percent, followed by Sierra Leone, with an average inflation rate of 27.26 percent, Nigeria 18.59 percent, and the panel is 21.32 percent.

Table 2. The Average of the Raw Inflation Rates of WACCs

	NIG_INF	GHA_INF	GAM_INF	SLN_INF	INF_Panel
Mean	**18.59**	**30.26**	**9.18**	**27.26**	**21.32**
Median	12.88	19.25	6.82	14.42	12.52
Maximum	72.84	122.87	56.56	178.70	178.70
Minimum	3.46	3.03	-1.99	-35.84	-35.84
Std. Dev.	16.06	27.95	9.25	36.47	25.92
Observations	47	47	47	47	188

Source: Authors' computation using Eviews 9.

The Conventional Unit Root Test

The results of unit root tests are presented in Table 3 and Table 4 for time series and panel, respectively. The results reveal that inflation in Sierra Leone is highly persistent, given that it is not stationary at level but rather at first difference. The results of the rest of the countries and panel show that the variable is stationary at level and therefore required further checking and investigation for inflation persistence.

Table 3. Phillips Peron Unit Root Test

	Philips Peron test at Level		Philips Peron test at 1st Diff.	
Country	T Statistics	Probability	T Statistics	Probability
Nigeria	-3.67	0.01*	--	--
Ghana	-4.02	0.00*	--	--
The Gambia	-3.30	0.02*	--	--
Sierra Leone	-2.16	0.22	-7.37	0.00*

Source: Authors' computation using Eviews 9. Note * signifies stationary at level.

Table 4. Panel Unit Root Tests

Method	Statistics	Probability
Levin, Lin, and Chu	-4.04	0.00*
Im, Pesaran, and Shin	-3.82	0.00*
ADF-Fisher	30.54	0.00*
PP-Fisher Chi-square	32.10	0.00*

Source: Authors' computation using Eviews 9. Note * signifies stationary at level.

The Autoregressive Methods

Autoregression involves estimations using AR and Panel AR for time series and panel, respectively. It could be using the first coefficient method or using the average of the sum of the significant coefficient. Therefore, it requires the use of lag selection criteria to choose an optimal lag. Table 5 presents the lag selection criteria for the panel. All the criteria for lag selection (AIC, BC, HQ and the rest) unanimously chosen the second lag (2 lags) as the best lag for the Panel AR estimation.

Table 5. Panel AR Lag Selection

Lag	FPE	AIC	SC	HQ
0	0.98	2.82	2.84	2.82
1	0.44	2.01	2.06	2.03
2	**0.42***	**1.98***	**2.04***	**2.01***
3	0.43	1.99	2.08	2.03
4	0.43	1.99	2.10	2.03

Lag	FPE	AIC	SC	HQ
5	0.43	2.00	2.13	2.06
6	0.43	2.00	2.15	2.06
7	0.44	2.02	2.19	2.09
8	0.44	2.03	2.22	2.11

Source: Authors' computation using Eviews 9

All the criteria have unanimously chosen two lags for the panel and Nigeria. While all the criteria unanimously chose single lag for Ghana and Sierra Leone and finally, the majority of the criteria, including FPE, AIC, SC, and HQ, have chosen three lags for the Gambia. Table 6 presents the results of the estimations; the first coefficient autoregressive method results reveals that persistence of high inflation rate exists in all the countries including the panel with the values of the coefficients above 0.40 or above 40 percent. Also, the result of the mean of the significant coefficients (Average Significant Coefficients – ASC) also confirms the existence of persistence of high inflation rates in all the countries and the panel with various ASC values over and above their respective ASC marks. Note that Sierra Leone results are added to confirm what the unit root test suggested, and it conformed to the unit root test results. Also, the results show that inflation persists for two years consecutively in the Panel and the Gambia; meanwhile, it persists for one year in Nigeria, Ghana, and Sierra Leone.

Table 6. AR and Panel AR results

	Coefficient	St error	t-stat	Prob	1st coef	ASC	ASC Mark
Panel							
$INFL_{t-1}$	0.62*	0.08	8.19	0.00	0.62	0.39	0.20
$INFL_{t-2}$	0.15*	0.08	2.05	0.04			
C	0.61*	0.16	3.93	0.00			
Nigeria							
$INFL_{t-1}$	0.63*	0.15	4.25	0.00	0.63	0.63	0.40
$INFL_{t-2}$	-0.29	0.15	-1.93	0.06			
C	1.75*	0.41	4.28	0.00			
Ghana							
$INFL_{t-1}$	0.55*	0.11	4.98	0.00	0.55	0.55	0.40
C	1.43*	0.36	4.00	0.00			
The Gambia							
$INFL_{t-1}$	0.50*	0.15	3.30	0.00	0.53	0.72	0.20
$INFL_{t-2}$	0.43*	0.16	2.75	0.01			
$INFL_{t-3}$	-0.30	0.15	-2.00	0.05			
C	0.70*	0.28	2.47	0.02			
S. Leone							
$INFL_{t-1}$	0.80*	0.09	8.80	0.00	0.80	0.80	0.40
C	0.68*	0.29	2.36	0.02			

Source: Authors' computation using Eviews 9. Note * indicates significant coefficients

Postestimation Diagnostic Checks:

Various tests were conducted for the purpose of ensuring the goodness of fit of the estimations. Table 7 presents the time series postestimation checks, which shows that the estimations of the various countries are free from heteroskedasticity, no serial correlation and the errors are normally distributed, having the probabilities values greater than five percent.

Table 7. Postestimation Diagnostic Checks for the Time Series

	Z/F-statistic (Probability)of the various countries			
Test Type	Nigeria	Ghana	Gambia	Sierra Leone
Hetros(ARCH)	0.001	1.18	0.09	0.15
	(0.97)	(0.28)	(0.77)	(0.70)
Serial Cor(LM)	0.78	0.58	0.04	0.50
	(0.38)	(0.45)	(0.84)	(0.48)
Jarque-Bera	0.06	2.77	0.62	0.58
	(0.97)	(0.25	(0.73)	(0.75)
Shapiro-W test	-1.92	0.85	-0.95	0.09
	(0.97)	(0.20)	(0.83)	(0.47)

Source: Authors' computation using Eviews 9 and Stata 14. Note: the figures in parenthesis represent the probabilities

Table 8 presents the postestimation diagnostic checks of the panel estimation. It indicates the absence of the problem of cross-sectional dependence (CD), no heteroskedasticity, and the errors are normally distributed, having probabilities values greater than five percent.

Table 8. Postestimation Diagnostic Checks for the Panel

Test Type	Statistics/Chi-square	Probability
Breuch-Pagan LM CD test	5.24	0.49
Pesaran Scaled LM CD test	-1.32	0.19
Pesaran CD test	1.35	0.18
Breuch-Pagan Heter. Test	0.48	0.49
Jarque-Bera normality test	3.13	0.21
Shapiro-W test	1.12	0.13

Source: Authors' computation using Eviews 9 and stata 14

Discussions of Findings

Based on the results presented using the simple average method, Nigeria, Ghana, and Sierra Leone, as well as the panel are having a high rate of inflation persistence. The average inflation rates, in the mentioned countries and the panel, are double-digit and beyond the recommended threshold rate, whereas, the Gambia's average inflation rate is single-digit, and therefore, considered to have low inflation persistence base on this method. Meanwhile, the results of the PP unit root tests reveal that Sierra Leone has been confirmed to have a high persistent inflation rate. While the rest of the countries and the unit root test results of the panel indicate that further analyses are required since the unit root tests could not detect the persistency, as the series of their inflation rates are stationary at level. The result of the AR first coefficient method shows that the first coefficients in all the countries and the panel are positive, significant and at the same time above the threshold of 40 percent which indicates the existence of high inflation persistence in all the countries and the panel.

Similarly, the results of the AR average significant coefficient (ASC) reconfirmed the results obtained using the AR first coefficient method with high inflation persistence in all the countries and the panel. Based on the ASC method, the two estimated coefficients of the panel are significant, and their average (ASC) is above the cutoff mark. This indicates a high inflation persistence in the panel. Meanwhile, in Nigeria, only the first coefficient is significant, and therefore, the result of AR-ASC is the same with that of AR first coefficient method. Also, in Ghana and Sierra Leone, only one lag is selected by the criteria; therefore, like Nigeria, their AR-ASC result is the same with that of AR first coefficient method. Finally, the AR-ASC result of the Gambia is estimated based on the chosen three lags but only the first and the second coefficients are significant and thee ASC estimated is above the cutoff mark which signifies the existence of high persistence of inflation in the country. The findings of high inflation persistence, of WACCs, corresponds to the findings of Coleman (2010) on Cote d'Ivoire, Chad, and Niger as well as the findings of Ahmad and Staveley-O'Carrol (2017) on developing countries. Similarly, the findings correspond to the arguments of expectation theory.

The major implication of these findings is that the existence of high inflation persistence could be the major hindrance to economic growth and welfare improvements of WACCs. Nevertheless, the presence of high inflation persistence of one period (one year) is also a serious issue that should not be taken lightly. Having a high inflation rate in the current year just because last year's inflation was high, then automatically, this year's high inflation will make next year's inflation high, the persistence will continue in the future unless policymakers intervene and break the inflation persistence. Hence for meaningful economic growth and welfare improvements to be registered in WACCs, such inflation persistence must be checked, through long-term Inflation Targeting (IT) to target a low inflation rate for the economies to break such high inflation persistence.

5. Conclusions

The study is conducted to examine the inflation persistence in WACCs for the period 1970 – 2016. Several methods are used for that purpose. The results of the simple average method reveal that inflation is persistent in all the countries and the panel except the Gambia, which has a single-digit average inflation rate. The results of the conventional unit-root test reveal that inflation is persistence in Sierra Leone while the rest of the countries and the panel required further analysis using other methods. Also, the results of the first coefficient of the autoregressive method show that inflation is persistence in all the countries and the panel, having the value of the first coefficient of more than 0.4 or 40 percent. Meanwhile, the results of the average of the sum of the significant coefficients of the autoregressive method confirmed the existence of the inflation persistence in all the countries and the panel. The results also show that the periods of inflation persistence in the panel and Gambia are two years (having a significant first and second lag of inflation as regressors) whereas the period for

Nigeria, Ghana, and Sierra Leone is one year each (having an only significant first lag of inflation as regressor). Having ascertained the existence of high inflation persistence in WACCs, this research recommends more empirical studies to be conducted on the effect of some variables – like exchange rate, financial strength, interest rate, and even money supply – on inflation in WACCs. So that a clear view of the causative agents of inflation in WACCs can be revealed to the policymaker to take the necessary action otherwise, it will be hard to register any meaningful progress in terms of economic development with high persistent inflation rates.

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