International Journal of Economics and Finance; Vol. 5, No. 9; 2013
ISSN 1916-971X E-ISSN 1916-9728
Published by Canadian Center of Science and Education

Does Philips Relations Really Exist in Nigeria? Empirical Evidence

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Received: May 21, 2013 Accepted: July 29, 2013 Online Published: August 26, 2013

doi:10.5539/ijef.v5n9p123 URL: http://dx.doi.org/10.5539/ijef.v5n9p123

Abstract

The paper examines the existence and the stability of Phillips relations for Nigeria, using time series data from 1970 to 2010. Graphical, Augmented Dickey Fuller and Philip Peron unit root tests were employed to check for stationarity. ARDL and DOLS general to specific approaches to cointegration have been used to explore the Philips relations and ECM to understand short run dynamics. The estimates shows that relation between the change in inflation rate and the unemployment rate is theoretically negative in the short run—a low unemployment rate leads to an increase in the inflation rate and therefore an acceleration of the price level-however, the relation became non existence in the long run with positive relationship between inflation and unemployment signifying stagflation. Meanwhile, recursive residual, CUSUM and CUSUMsq tests confirm a stable Philips relation.

Keywords: Phillips Curve, dynamic model, ADF, cointegration, DOLS, Nigeria

1. Introduction

Fifty four years ago, A. W Phillips plotted nominal wage inflation against unemployment in the United Kingdom, and remarked on their tight and stable negative relation over the previous century. Twenty-five years after Phillips's paper, Robert Lucas and Thomas Sargent set the simultaneously high inflation and unemployment - evident across practically all developed economies – against a Phillips curve backdrop and decried the econometric failure on a grand scale. This followed a sequence of papers during the 1970s that had both supported and called into question the econometric and theoretical basis of the Phillips curve and hence its usefulness for public policy purposes (Lipsey, 1960; Solow, 1970; Onder, 2004 and Faridul et al, 2011).

The possibility of a trade off offers policymakers a tool to deal with macroeconomic disequilibrium. However, the failure to explain economic crises of the 1970s had cast serious doubts about the validity of the relation. While Phelps (1967), Friedman (1968), Lucas (1976) and Okun (1975) argued against the hypothesis, Onder (2004), Kustepeli (2005), Furuoka (2007), Tang and Lean (2007), Schreiber and Wolters (2007), Dammak and Boujelbene (2009) lent support to a stable non linear relation. Others found an unstable relation between unemployment and inflation (Lucas, 1972, 1973, 1976); Okun (1975); Turner (1997); Atkeson and Ohanian (2001); Niskanen (2002); Demers (2003) and Reichel (2004).

Akerlof et al. (1996, 2000), Karanassou et al. (2005), and Holden (2004) discuss models in which long-run trade-off between output and inflation can exist if the inflation rates are low. Karanassou et al. (2003) provides support to a long-run inflation-unemployment trade-off for some EU countries; and Franz (2005) for German. Thus whether or not a long-run inflation-unemployment trade-off exists should be left to empirical tests using appropriate tools. This may help clarify some of the mysteries underlining the relationship between inflation and unemployment (Mankiw, 2001).

Much of the existing literatures have been examined within the context of developed countries. According to Faridul et al, sound macroeconomic policy is considered critical for pursuing economic growth and this is more relevant for African countries which are more vulnerable to major shocks. The objective of this study is therefore to analyse both the existence and stability of Philips relation in Nigeria. Since we are not aware of any study purporting to or that has explored these issues for Nigeria using annual data from 1970 to 2010 the research thus fills a gap in knowledge and thus contributes to the literature.

The rest of study is organized as follows. Literature review is discussed in Section II. Section III describes the methodology. Findings are discussed in section IV. Conclusions and policy implication are drawn in Part V.

2. Literature Review

The high rate of both inflation and unemployment experienced by many countries in the 1970s brought about concerted attacks on Philips curve as Friedman (1968) argues that this relationship was only a short run phenomenon. In the long run according to Friedman, workers and employers takes inflation into account result in employment contracts that increase pay at rates near anticipated inflation. This implies that over the long run, there is no trade-off between inflation and unemployment. Niskannen (2002) points out that the Philips curve in its original form suffers misspecification and that the positive slope of the long run Philips relation may be due to lack of indexed tax code. Gali et al, (2005) and Rudd and Whelan (2005) use GMM approached but failed to find strong Philips relation. Reichel (2004) applied co integration method to the industrialised economies but found trade-off only for US and Japan.

However, Karanassou et al, consistently provide further support for long run inflation-unemployment trade-off. For instance, their work in 2003 for some EU countries provides further support for long run inflation-unemployment trade-off. Karanassou, et al (2008) also analyses the relation between US inflation and unemployment from the perspective of 'frictional growth'. In particular, they focus on the interaction between money growth and nominal frictions and conclude that monetary policy has not only persistent, but permanent real effects, giving rise to a long-run inflation-unemployment tradeoff. Karanassou, et al (2010) employ the chain reaction theory (CRT) approach within the new Phillips curve to provide a synthesis of the traditional structural macroeconometric models and the (structural) vector autoregressions. Karanassou, et al again show that frictional growth, i.e. the interplay between lags and growth, generates an inflation-unemployment trade-off in the long run. They therefore suggest that a holistic framework, such as the chain reaction theory (CRT), should be used to jointly explain the evolution of inflation and unemployment.

DiNardo and Moore (1999) used a panel of OECD countries with ordinary Least Square (OLS) and Generalised Least Square (GLS) methods and found the Philips relation. These finding are corroborated by the work of Malinov and Sommers (1997) and Turner and Seghezzea (1999), where they both employed Seemingly Unrelated Estimation method. Eliasson (2001) specified linear Phillips curve for Sweden, Australia, and the United States and checked for parameters stability. They did not find the Phillips curve for Australia and Sweden, but found one for the US. Unlike Islam et al. (2003) who revisit the US Philips relation using 1950-99 data but did not find a strong relation.

Lipsey (1960) found an inverse relation for Britain for 1914-18, but not after the War. Turner (1997) argues that structural break since the 1970s in Britain may have caused the instability of the Phillips curve. He emphasizes more on the stability, than its existence. Atkeson and Ohanian (2001) also support Turner. Hansen and Pancs (2001) found inverse relation between the series for Lativa. Bhanthumnavin (2002) finds the Phillips curve for Thailand, but only in the post 1997 Asian flu. Graham and Snower (2002) demonstrate a stable Phillips curve for Chile. They argue that the trade off in long run is due to inter-relation between money growth and rise in nominal wages. Using Stock-Watson procedure, Furuoka (2007) found relation between inflation and unemployment for Malaysia, which was later confirmed by Tang and Lean (2007). Schreiber and Wolters (2007) applied VAR cointegration approach and found a long run relation for German.

Cruz-Rodriguez (2008) found Phillips curve for Dominican Republic. However, the link with output gap is found positive, which may be due to world oil prices and exchange rate shocks. Del Boca et al. (2008) found Phillips curve for Italy for 1861-1998. The paper captures the effects of structural changes and asymmetries on the estimates of the trade-off relation and found that a trade-off exists only during low inflation and stable aggregate supply. Russell and Banerjee (2008) investigate vertical Phillips curve assuming non-stationarity in the series. They find positive relation between inflation and unemployment rate in short run for the United States. Paul (2009) argues that droughts, oil shocks and liberalization-policy of the early 1990s may be the reason for the absence of a Phillips curve in India. After adjusting for the shocks he finds the Phillips curve suggesting a short-run trade-off between inflation and industrial output for India. Recently, Faridul et al (2011) estimates a Philips curve for North Cyprus using ARDL bounds testing and Dynamic Ordinary Least Squares (DOLS) approaches. Their results also confirm trade-off between inflation and unemployment.

Focusing on regimes of inflation and unemployment and using the statistical technique of fuzzy clustering, Ormerod et al, (2013) explored for the United States, the United Kingdom and Germany between 1871 and 2009. They reported that the factors which govern the inflation/unemployment trade-off are so multi-dimensional that it is hard to identify periods of short-run Phillips curves which can be assigned to particular historical periods with any degree of accuracy or predictability. They therefore identify for each country three distinct regimes in inflation/unemployment space and found that similarities exist across countries in both the regimes and the timings of the transitions between regimes. Further, even within a given regime, the results from the cluster analysis reveal persistent fluctuations in the degree of attachment to that regime of inflation/unemployment observations over time. Their implies that, first, the inflation/unemployment relationship or Phillips curve experiences from time to time major shifts. Second, that it is also inherently unstable even in the short run. They however conclude that, the typical rates of inflation and unemployment experienced in the regimes are substantially different.

3. Methodology

The methodology used here is based on the recently developed autoregressive distributed lag (ARDL) framework (Pesaran & Shin, 1995, 1999; Pesaran et al, 1996; Pesaran et al, 1998) which does not involve pre-testing variables, thereby obviating uncertainty. Put differently, the ARDL approach to testing for the existence of a relationship between variables in levels is applicable irrespective of whether the underlying regressors are purely 1(0), purely I(1). The statistic underlying the procedure is the Wald or F-statistic in a generalised Dickey-Fuller regression, which is used to test the significance of lagged levels of the variables in a conditional unrestricted equilibrium correction model (ECM) (Pesaran et al., 2001: 1). The estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient given the fact that: (a) it can be applied to studies that have a small sample, such as the present study; (b) it estimates the long-run and short-run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation; (c) the ARDL method can distinguish between dependent and independent variables.

Researchers have included variables such as real GDP and marginal cost of production in estimating Phillips curve. Gordon (1981) recommends using real gross national product for unemployment rate. To measure inflation consumer price index (CPI) has been used. Overall inflation rate through CPI is a better measure for inflation rate for a developing economy (Faridul et al, 2011). Open unemployment data, real gross domestic products and money supply through M2 are employed for this study. While all data are sources from the Central Bank of Nigeria statistical bulletin and annual reports and statement of accounts (2010) and National Bureau of Statistics (2010), money supply is from the World Development indicators (2010).

The study employed data from 1970-2010 and before implementing co integration technique, the variables used in the model are subjected to stationary tests using Augmented Dickey-Fuller (ADF) and Philip Perron test following equation 1. Our ADF test consists of estimating the following equation:

$$\Delta Y_t = \alpha + \beta_t + \delta Y_{t-1} + \Psi \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon_t \tag{1}$$

Where α represent the drift, t represents deterministic trend, β, δ, ψ are parameters to be estimated, m (lag length) is a lag large enough to ensure that ε_t is a white noise process; and Δ is the difference operator. In the ADF approach, we test whether $\delta = 0$

The Philips-Perron test is based on the following statistic:

$$\tilde{t}_\alpha = t_\alpha \left(\frac{\gamma_0}{f_0}\right)^{1/2} - \frac{T(f_0 - \gamma_0)(se(\hat{\alpha}))}{2 f_0^{1/2} s} \tag{2}$$

Where: $\hat{\alpha}$ estimate; $\tilde{t}_\alpha$ is the t-ratio of $\alpha; se(\hat{\alpha})$ is the coefficient standard error; T is the sample size or number of observations and s is the standard error of the test regression. In addition, γ_0 is a consistent estimate of the error variance in the standard Dickey-Fuller equation (calculated as $(T - k)s^2/T$, where k is the number of repressors). The remaining term, f_0, is an estimator of the residual spectrum at frequency zero.

In our search for a long run relation, we use cointegration approach. When variables are cointegrated, the long-run relations are estimated by cointegrating vectors focusing on the order of integration of each series. Moreover, ARDL remains valid irrespective of the order of intergration. But ARDL procedure will collapse if any variable is I(2). Johansen (1988a, 1991) derived distribution when the cointegrated system is parameterized as a vector error correction model (VECM). For a set of I(1) variables and a single cointegrating vector, Stock and Watson (1993) can be applied. The method has come to be known as the "dynamic OLS" (or GLS, as the case may be). The resulting "dynamic OLS" (respectively GLS) estimators are asymptotically equivalent to the Johansen estimator. In finite sample, these estimators perform better, relative to other asymptotically efficient estimators, when simple short-run dynamics is involved.

The DOLS procedure requires partial knowledge of the series expected to cointegrate and the orders of integration. With DOLS the problems associated with simultaneity, endogeneity and serial correlation are resolved by including leads and lags in small sample. The DOLS procedure is helpful if the series has different orders of lags (Stock-Watson, 1993). In the case of normal distribution the estimators have desirable properties as compared to Phillips and Perron (1988), Phillips and Loretan (1991) and Phillips and Moon (1999, 2001). In particular, the Engle–Granger's approach may not be satisfactory if in a multivariate case more than one cointegrating vector is present (Seddighi et al. 2000). Engle-Granger estimator suffers from a non-standard asymptotic distribution. Inferences on the parameters of the cointegrating vectors using DOLS estimator are efficient. Monte Carlo studies by Agrawal (2001) favor DOLS in estimating the long run relation. Predictive properties DOLS are better than the standard Engle-Granger (1987), Johansen (1988, 1991); Johansen-Juselius (1990) and Phillips & Hansen (1990) procedures. As such we also apply the ARDL using the unrestricted error correction method. Following Faridul *et al* (2011) our model is specify thus:

$$INF_t = \psi_0 + \sum_{i=1}^{p} \varphi_t INF_{t-1} + \sum_{t=0}^{q} \eta_t UNP_{t-1} + \varepsilon_t \tag{3}$$

We expect the coefficient of UNP to be negative and significant for the existence of Philips curve. Generally the short and the long run models follow thus:

$$\Delta \inf = a_0 - b_1 \inf_{t-1} + c_1 un_{t-1} + d_2 y_{t-1} + d_3 m2 +$$
$$\sum_{i=1}^{p} e_i \Delta \inf_{t-1} + \sum_{i=1}^{p} f_i \Delta un_{t-1} + \sum_{i=1}^{p} g_i \Delta y_{t-1} + \sum_{i=1}^{p} h_i \Delta m2_{t-1} + \varepsilon_t \ldots\ldots\ldots(4)$$

In Equation-4, 1 g refers to a constant and 2 g to the long run parameter. The number of lags is denoted by *p; k* refers to lag length of the leads terms. The e refers to the error term. The selection of lags and leads is based on AIC.

In traditional approaches to cointegration, structural break in time series can be checked by Chow test. In ARDL, the CUSUM and CUSUMsq tests provide diagnosis for such information. For example, in Fig I and II, if the blue lines cross the red lines then structural break is likely. Based on the results obtained of this study, such outcome is unlikely. Also ARDL bounds test approach applies notwithstanding ambiguity in the order of integration7. This issue is relevant because in the presence of structural break in the data generating process, the traditional approaches may not capture cointegrating relation. This can potentially affect the outcome of the unit root test and the predictive powers (Leybourne and Newbold 2003; Perron, 1989, 1997)8. The ARDL approach is implemented by the following unrestricted error correction method (UECM) form (See Pesaran et al. 2001)):

$$\Delta \inf = a_0 + \sum_{i=1}^{p} e_i \Delta \inf_{t-1} + \sum_{i=1}^{p} f_i \Delta un_{t-1} + \sum_{i=1}^{p} g_i \Delta y_{t-1} + \sum_{i=1}^{p} h_i \Delta m2_{t-1} + jECM_{t-1} + \varepsilon_t \ldots(5)$$

The ARDL model calculates (p+1)k number of regressions based an appropriate number of lags. The p indicates the number of lags in ARDL bounds testing and k is the number of actors in the model. In selecting lags, the minimum of AIC and SBC is used. The model has been subjected to sensitivity analysis to tests for serial correlation, functional form, normality, White heteroscedisticity, model specification and ARCH. CUSUM and CUSUMsq check for the stability of long and short run parameters.

4. Results and Discussions

4.1 The Unit Root Test

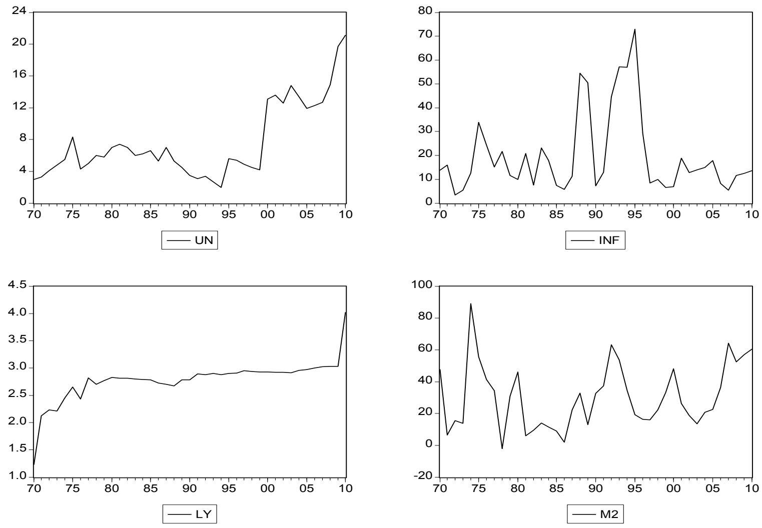


Figure 1. The initial clue about the likely nature of the time series under study

INF and M2 appear to fluctuate around a constant mean while both UN and LY appear to and upward trend over the period of study, suggesting perhaps that their mean have been changing. Therefore we can deduce that INF and M2 are stationary while UN and LY are not.

Table 1. Unit root test—ADF and PP

Var	ADF Sta	C.V 5%	Order	PP Sta	C.V 5%	Order
INF	-3.1360 -6.3668	-3.5266 -3.5330	I(1)	-2.9520 -12.635	-3.5266 -3.5297	**I(1)**
UN	-1.0730 -6.5303	-3.5266 -3.5297	I(1)	-0.0038 -6.5329	-2.9369 -3.5297	**1(1)**
LY	-5.2728 -5.6979	-3.5266 -3.5297	**I(0)**	-5.2725 -5.6305	-3.5266 -3.5297	**I(0)**
M2	-3.8711 -7.7348	-3.5266 -3.5297	**I(0)**	-3.9671 -9.7711	-3.5266 -3.5297	**I(0)**

Source: Computed by the authors. Note: tests include intercept only.

Using the ADF and Philip Perron unit root tests, Table 1 confirm that while INF and UN are stationary at first difference; LY and M2 are stationary at level. This confirm that the variables in our study are integrated of both I(1) and I(0) which necessitate the adoption of ARDL model. However, the informal and formal unit root tests contradict each other. We now test for the significance of our model.

Table 2. Co integration test: bound test

Model For Estimation	F-Statistics	Lag	Outcome
F_{INF}(INF)	4.374149**	2	Co integration
Critical Bounds	Lower		Upper
1%	3.66		5.26
5%	2.73		3.92
10%	2.31		3.35

Note: The lag selection is based on AIC.

4.2 ARDL General to Specific Dynamic Ordinary Least Square (DOLS)

From the robustness perspective, the Dynamic Ordinary Least Square result below shows that the coefficient of the ECM contains information about whether the past values of variables affect the current values of the variables under study.

ΔINF = 0.7878194483*UN (-1) - 1.66209896*ΔUN (-1) -0.3559895048*ECM (-1)

0.0836	*0.2773*	*0.0075*	*Prob*
0.442657	*1.506691*	*0.125614*	*S.E*
1.779752	*1.779752*	*-2.833985*	*t.Stat*

$R^2 = 0.193394$

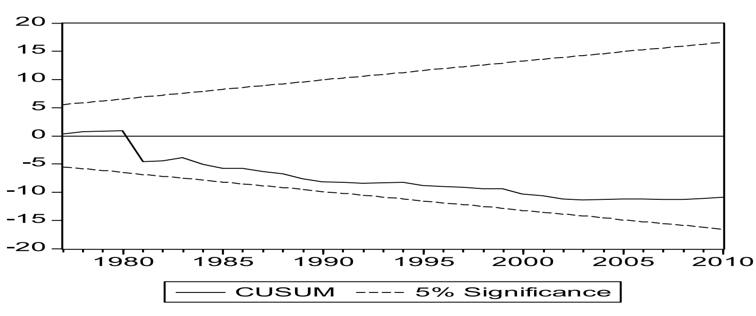
The absolute value of the coefficient of the error-correction term implies that about 35.6 percent of the disequilibrium in the Philips relations model is offset by short-run adjustment within a year. In this case, full adjustments are achieved, and take twelve months to complete the cycles. Thus, to maintain long run equilibrium between inflation and unemployment in Nigeria, it is important to reduce the existing disequilibrium over time.

As expected, the relation between the change in inflation rate and the unemployment rate from the specific analysis is negative in the short run—a low unemployment rate leads to an increase in the inflation rate and therefore an acceleration of the price level, hence the existence of Phillips curve. The specific result shows that a percentage increase in unemployment reduces inflation by 1.66 percent. However, the relation became positive in the long run since the coefficient of the first lag unemployment suggests that a percentage increase in unemployment increases inflation rate by 0.79 percent. More so the negative and significant coefficient of the first lag of INF (-0.3559895048) confirms a true long run relationship of the bound test result.

This negative short run relationship in Nigeria therefore supports the basic tenet of Philips curve of inverse relationship between unemployment and inflation rate. However, the long run result shows positive relationship between inflation and money supply and also economic growth. This inconsistent relationship is not expected since they are not in tandem with the theory. This can be as a result of continuous changes in the composition of the labour force consequent upon the demographic changes and random economic shocks such as currency devaluation, unanticipated increase in crude oil prices and various other policy inconsistencies in Nigeria.

These contradictory results might be as a result of the high level of natural rate of unemployment in Nigeria. Meanwhile, the recursive residual, the CUSUM and CUSUMsq tests suggest stability of the parameters.

4.3 Stability Test



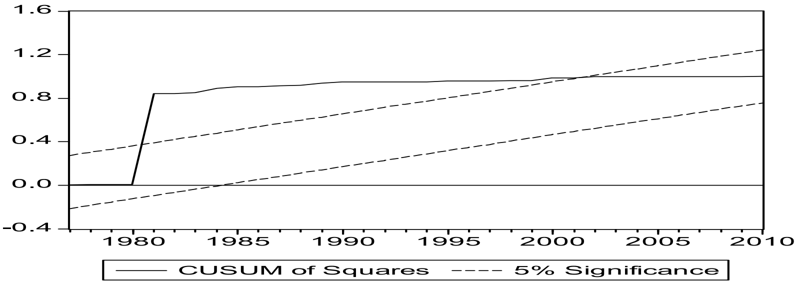


Figure 2. The recursive residuals and CUSUM of squares

Furthermore, issue of the stability of parameters of the model was considered. To this end we adopted the Bahmani-Oskooee and Shin (2002), as well as applying the cumulative sum of recursive residuals (CUSUM) to the residuals of the general model. For stability of short-run dynamics and long-run parameters of Philips relations, it is core that the residuals and cusum of squares stay within the 5 percent critical bound (represented by two straight lines whose equations are detailed in Brown, Durbin, and Evans, 1975, Section). As shown in the fig 2, neither the recursive residuals nor CUSUM of squares plots move outside the 5 percent critical lines. The result is suggestive of coefficient stability, therefore, we can safely conclude that the estimated parameters for the short-run dynamics and long-run of inflation function exists over the entire sample periods since residual result shows the future tendency of further stability. However, as with the CUSUM test, movement outside the critical line between 1981 and 2002 is suggestive of parameter or variance instability. Meanwhile, the test does not tell us the source of the instability that whether on account of intercept or on account of slope. This issue can be address in feature research. Meanwhile, the cumulative sum of squares is generally within the 5 percent significant lines, after 2002 suggesting that the residual variance is somewhat recently stable, corroborating the other stability test results.

The continued existence of this observed relationship implies that policy makers could only choose between inflation or unemployment in the course of macroeconomic management. It means that high levels of employment can only be obtained by tolerating a high rate of inflation. Conversely Nigeria government can achieve low rate of inflation only at the cost of high unemployment rate. Our result revealed the twin evil of macroeconomic with which both unemployment and inflation have being derived at least in the short run.

5. Conclusion

The paper estimates a Philips Curve for Nigeria using ARDL General to Specific bounds testing and DOLS approaches. ADF unit root test is applied to check the order of integration. Results establish co integration between inflation, unemployment, money supply and real gross domestic product for Nigeria suggesting a long run relationship over the study period. The results from General to specific OLS and DOLS confirm a theoretical trade off between inflation and unemployment variables in the short run but prove otherwise statistically in the long run. The result shows that while inflation is increasing unemployment also increase in the long run which implies that Phillips curve does not exists for Nigeria in the long run. This suggests that policy makers cannot use the trade-off relation in choosing appropriate strategy. They should be careful in adopting a monetary policy that would keep inflation at a politically acceptable level in Nigeria. These contradictory results might be as a result of the high level of natural rate of unemployment in Nigeria. Rational policy making therefore means that Nigeria policy makers would have to settle for that combination that minimizes the twin macroeconomic evils.

Meanwhile, the recursive residual, the CUSUM and CUSUMsq tests suggest stability of the parameters in the long run.

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Appendix

Appendix 1. ARDL specific dynamic OLS

Dependent Variable: DINF

Method: Least Squares

Date: 06/02/07 Time: 21:46

Sample(adjusted): 1972 2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.355990	0.125614	-2.833985	0.0075
UN(-1)	0.787819	0.442657	1.779752	0.0836
DUN(-1)	-1.662099	1.506691	-1.103145	0.2773
R-squared	0.193394	Mean dependent var		0.269231
Adjusted R-squared	0.148582	S.D. dependent var		19.49935
S.E. of regression	17.99250	Akaike info criterion		8.691591
Sum squared resid	11654.29	Schwarz criterion		8.819557
Log likelihood	-166.4860	Durbin-Watson stat		2.053761

Appendix 2. ARDL wald test

Wald Test:Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	4.374149	(4, 31)	0.0064
Chi-square	17.49659	4	0.0015
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		-0.666135	0.161882
C(2)		0.674968	392.4126
C(3)		4.067210	36.59857
C(4)		-1.282848	0.993525
Restrictions are linear in coefficients.			
Wald Test: Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	2.688363	(4, 31)	0.0494
Chi-square	10.75345	4	0.0295
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		0.315582	0.106607
C(2)		0.018069	0.023374
C(3)		10.05978	46.32704
C(4)		-1.265454	4.312378
Restrictions are linear in coefficients.			

Appendix 3. ARDL general dynamic OLS

Dependent Variable: DINF

Method: Least Squares

Date: 06/01/07 Time: 16:50

Sample(adjusted): 1972-2010

Included observations: 39 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.666135	0.161882	-4.114936	0.0003
LM2(-1)	0.674968	392.4126	0.001720	0.9986
LY(-1)	4.067210	36.59857	0.111130	0.9122
UN(-1)	-1.282848	0.993525	-1.291208	0.2062
DLM2(-1)	1676.203	898.4109	1.865742	0.0716
DLY(-1)	-157.5581	84.42141	-1.866328	0.0715
DUN(-1)	-0.346899	1.523962	-0.227630	0.8214
C	-26.39144	537.2538	-0.049123	0.9611
R-squared	0.403828	Mean dependent var		0.269231
Adjusted R-squared	0.269209	S.D. dependent var		19.49935
S.E. of regression	16.66928	Akaike info criterion		8.645694
Sum squared resid	8613.810	Schwarz criterion		8.986937
Log likelihood	-160.5910	F-statistic		2.999780
Durbin-Watson stat	1.722052	Prob(F-statistic)		0.015897