Inflation persistence in African countries: Does inflation targeting matter?

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ABSTRACT: This study investigates inflation persistence in annual CPI inflation collected between 1994 and 2014 for 46 African countries.We group these countries into panels according towhether they are inflation targeters or not and conduct estimations for preandpost inflation targeting periods. Interestingly enough,we find that inflation persistence was much higher for inflation targeters in periods before adopting their inflation targeting regimes and inflation persistencedropped by 40 percent for these countriesafter adopting the policy frameworks.For non-inflation targeters inflation persistence has increased by almost 290 percent between the two time periods.

1   Introduction

Commitment to price stability forms the epitome of modern day monetary policyand Central Banksworldwide have undertaken this commitment, either by statutory mandates or by designated exercises of discretion (Phiri, 2016). It thus comes as no surprise that a considerable number of industrialized economies have entirely committed their monetary policy efforts towards adopting explicit inflation targeting regimes. However, such inflation targeting frameworks are less favoured in developing or emerging economies and this case becomesexceedingly obvious when taking into consideration African countries, in which only two countries (i.e. South Africa and Ghana) have explicitly adopted inflation targeting regimes as official monetary policy mandates. Naturally, this is a thought-provoking ordeal considering thatinflation targeting is virtuous in curbing inflation expectations and lowering inflation volatility.Moreover, inflation targeting is built upon pillars like credibility, transparency, independence and accountability, which, in turn, are attributes of monetary policy necessary to ensure a stronger financial environment for African economies.

Regardless of whether Central Banks opt to adopt inflation targeting regimes or not, one thing remains certain; all monetary authorities wish to exert some level of control over prevailing levels of inflation. One particular attribute of the inflation process which serves as a guideline in determining whether Central Banks have appropriate control over inflation, relates to the amount of persistence found in the inflation process. As conveniently noted by Phiri (2012), an inflation process exhibiting low levels of persistence reflects a financial environment in which policymakers can control the inflation process.Conversely, high levels of inflation persistence signal the inability of Central Banks to control inflation such that any deviations of inflation from its steady-state will ensure that inflation does not easily adjust back its long-run equilibrium.The notion of inflation persistence can be theoretically traced tosticky price modelsand represents an inherent feature of staggered prices or wage contracts (Srinivasan and Kumar, 2012).Empirically, a popular measure of inflation persistence is the sum of regression coefficients (SARC) obtained after estimating an autoregressive (AR) model of inflation. If the SARC is equal to or above unity, then inflation is rendered to be highly persistent, and if the SARC is below unity, then inflation is not persistent.

In our study, we employ panel-data estimation techniques to evaluate inflation persistence for 46 African countries.We consider this research as being worthwhile since, to

the best of our knowledge, no other study has conducted a panel data analysis of inflation persistence solely for African countries. Furthermore, we spilt our sample data into twocategories, namely; inflation targeting and non-inflation targeting countries. The rationale behind examining inflation persistence between the two sets of datais quite simple. If inflation targeters are found to exhibit lower levels of inflation persistence in comparison to non-inflation targeters, then inflation targeting in African countries provides Central Banks with a greater degree of control over the inflation process. If the opposite holds true, then inflation targeting is not suited for African countries and other alternativemonetary policy frameworks, such as exchange rate targets, are more compatible for African countries.

Against this backdrop, the rest of the paper is arranged as follows. The next section presents the data whereas the third section outlines the methodology used in the study. The fourth section presents the empirical results whilst the paper is concluded in the fifth section.

2   Data

The data used in the empirical part of the study consists of the annual rate ofchange in the total consumer price index (CPI) for a panel 46 African countries and has been collected from the Federal Reserve Economic Data (FRED) database for the period of 1994-2014. A comprehensive list of all 46 countries used in the study include: Algeria, Angola, Benin, Botswana, Burkino Faso, Burundi, Cameroon, Cape Verde, Central African Republic (CAR), Chad, Democratic Republic of Congo (DRC), Cote d' Ivore, Egypt, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe. As previously mentioned, of all these countries only 2 countries (i.e. South Africa and Ghana) are inflation targeters while the remaining 44 countries represent non-inflation targeters.

3   Methodology

In following Bleaney and Francisco (2005),we specify the following panel ARregressionof inflation (π_t) as:

$$\pi_t = \rho\pi_{t-1} + e_i + u_i + v_{it} \qquad\qquad (1)$$

Where e_i is a country fixed effect, u_t is a time fixed effect and v_{it} is the idiosyncratic error term. Countries are indexed by i and time by t. From equation (1) inflation persistence is measured by the coefficient ρ, and the decision rule for assessing the level of persistence is as follows. If $\rho \geq 1$, then inflation is deemed as being persistent and otherwise if $\rho < 1$. We estimate equation (1) for three panel sets of the data (the full sample, inflation targeters and non-inflation targeters) and we apply three estimation techniques to the regressions (OLS, fixed effects and random effects estimators). Evaluation of the regression estimators are conducted through (1) an F-test (F) to test for the null of fixed effects against the alternative of an OLSregression (2) Hausman'stest (χ^2_{hausen}) of the null hypothesis of random effects against the alternative fixed effects, and (3) the Breusch-Pagantest (LM$_{bp}$) of the null hypothesis of random effects against the alternative of OLS. The decision rules for these three evaluation tests are as follows. If we reject the null hypothesis of the first test and fail to reject the null of the second test, then we choose the fixed effects model. If we reject the null hypotheses of the second and the third tests, then we choose the random effects model. If we fail to reject the null hypotheses of the first and the third test, we choose the OLS specification.

4   Empirical Results

Tables 1, 2 and 3 report our empirical estimation results for the full sample period, the pre-inflation targeting period and the post-inflation targeting period, respectively. In referring to Table 1, we note that for the full sample period of 1994 to 2014, inflation persistence is more than 5 times lower for non-inflation targeters(i.e. $\rho = 0.14$) in comparison to inflation targeters (i.e. $\rho = 0.72$). A similar result is also recorded in Table 2 for the pre-inflation period of 1994 to 2002, in which inflation persistence is approximately 5 times lower for non-inflation targeters((i.e. $\rho = 0.13$) than for inflation targeters (i.e. $\rho = 0.75$).Table 3 paints a completely different picture as inflation persistence in inflation targeters(i.e. $\rho = 0.45$) has been lower than that of its counterpart non-inflation targets (i.e. $\rho = 0.51$) for the post inflation period of 2002 to 2014. Based on these results, three main inferences can be drawn. Firstly, overall inflation in African countries has not been very persistent throughout the last two decades. Secondly, non-inflation targeters experienced lower levels of inflation

persistence in pre-inflation targeting periods and yet this result was reversed in post-inflation targeting periods. Lastly, in transcending from the pre-inflation period to the post-inflation targeting period, inflation targeters reduced their inflation persistence by 40 percent whereas the levels of persistence in non-inflation targets has increased by more than 290 percent.

Table 1: Full sample period: 1983-2014

	Estimators				Evaluation tests		
	OLS	Fixed effects	Random effects	Decision	F (Fixed vs OLS)	χ^2_{hausen} (Random vs fixed effects)	LM$_{bp}$ (Random effects vs OLS)
ρ_{full}	0.14	0.07	0.13	Random	53.47	1.17	0.03
	(0.00)***	(0.05)*	(0.00)***	effects	(0.00)$^{\#}$	(0.22)	(0.87)
ρ_{IT}	0.72	0.56	0.72	OLS	3.78	4.27	0.02
	(0.00)***	(0.00)***	(0.00)***		(0.06)	(0.04)$^{\#}$	(0.88)
$\rho_{NON\text{-}IT}$	0.14	0.01	0.13	OLS	1.16	50.94	0.02
	(0.00)***	(0.05)*	(0.00)***		(0.23)	(0.00)$^{\#}$	(0.88)

Note: ρ_{full}, ρ_{IT} and $\rho_{NON\text{-}IT}$ represent the SARC estimates for the whole sample, inflation targeters and non-inflation targeters, respectively. Significance codes: 1% '***', 5% '**' and 10% '*' and p-values are reported in parentheses. # on the evaluation tests indicates a rejection of the null hypothesis.

Table 2: Pre-inflation targeting period: 1983-2001

	Estimators				Evaluation tests		
	OLS	Fixed effects	Random effects	Decision	F (Fixed vs OLS)	χ^2_{hausen} (Random vs fixed effects)	LM$_{bp}$ (Random effects vs OLS)
ρ_{full}	0.13	-0.07	0.13	OLS	1.38	71.61	0.01
	(0.01)*	(0.20)	(0.01)*		(0.07)	(0.00)$^{\#}$	(0.93)
ρ_{IT}	0.75	0.40	0.75	OLS	3.61	4.37	0.03

	OLS	Fixed effects	Random effects	Decision	F (Fixed vs OLS)	χ^2_{hausen} (Random vs fixed effects)	LM$_{bp}$ (Random effects vs OLS)
	(0.00)***	(0.14)	(0.00)***		(0.00)[#]	(0.08)	(0.86)
$\rho_{NON\text{-}IT}$	0.13	-0.07	0.13	OLS	1.38	68.26	0.01
	(0.02)*	(0.21)	(0.01)*		(0.07)	(0.00)[#]	(0.93)

Note: ρ_{full}, ρ_{IT} and $\rho_{NON\text{-}IT}$ represent the SARC estimates for the whole sample, inflation targeters and non-inflation targeters, respectively. Significance codes: 1% '***', 5% '**' and 10% '*' and p-values are reported in parentheses. # on the evaluation tests indicates a rejection of the null hypothesis.

Table 3: Post-inflation targeting period: 2002-2014

	Estimators				Evaluation tests		
	OLS	Fixed effects	Random effects	Decision	F (Fixed vs OLS)	χ^2_{hausen} (Random vs fixed effects)	LM$_{bp}$ (Random effects vs OLS)
ρ_{full}	0.51	0.50	0.51	OLS	0.80	1.54	0.17
	(0.00)***	(0.00)***	(0.00)***		(0.81)	(0.21)	(0.68)
ρ_{IT}	0.45	0.11	0.45	OLS/Random effects	11.30	7.32	1.90
	(0.00)***	(0.47)	(0.00)***		(0.00)[#]	(0.01)[#]	(0.18)
$\rho_{NON\text{-}IT}$	0.51	0.50	0.51	OLS	0.78	1.28	0.26
	(0.01)***	(0.00)***	(0.00)***		(0.84)	(0.23)	(0.61)

Note: ρ_{full}, ρ_{IT} and $\rho_{NON\text{-}IT}$ represent the SARC estimates for the whole sample, inflation targeters and non-inflation targeters, respectively. Significance codes: 1% '***', 5% '**' and 10% '*' and p-values are reported in parentheses. # on the evaluation tests indicates a rejection of the null hypothesis.

5   Conclusion

Do inflation targeters exhibit lower levels of inflation persistence in African countries in comparison to their non-inflation targeting counterparts?Our estimation results prove that theintroduction of inflation targeting policy frameworks has resulted in lower levels of inflation persistence in inflation targeterscompared toother non-inflation targeting economies.In particular, inflation persistence in inflation targeters have been reduced by 40 percent from pre-inflation targeting to post-inflation targeting periods whereas for non-

inflation targeters, levels of inflation persistence have increased by close to 290 percent across the two sample periods. Collectively, these results show that inflation targeting policy framework has the capability of improving the control which Central Banks in African countries exert over their inflation levels.

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