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An assessment of inflation targeting

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Abstract

The effectiveness of inflation targeting is linked to the stationarity properties of inflation. Without making apriori assumptions about the order of integration, we examine whether there is a change in the inflation persistence in one hundred and twenty-seven countries (developed and developing) using monthly data over the 1970-2021 period. For the inflation targeters, we find that the endogenously identified break dates are not consistent with the formal adoption of IT. Logit analysis reveals that inflation targeters do not experience an increased probability of a change in inflation persistence. The quality of institutions emerges as more significant for taming inflation.

Keywords: persistence change; inflation targeting.
JEL Codes: C12; E4; E5.

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1 Introduction

The effectiveness of inflation targeting (IT) has attracted considerable attention since its implementation in the early 1990s. The three decades that have passed since then, provide the necessary time span to assess retrospectively how successful this policy has been. In October 2011, the (then) Chairman of the Board of Governors of the Federal Reserve System Ben Bernanke noted that during the two decades preceding the financial crisis, central bankers and academics reached a consensus on the intellectual and institutional framework of monetary policy; this broad framework, often called flexible inflation targeting, "increased the effective scope of monetary policy" (Bernanke, 2011). Recognizing that the recent financial crisis will leave a lasting imprint on the theory and practice of central banking, Bernanke (2011) also states that "with respect to monetary policy, the basic principles of flexible inflation targeting– the commitment to a medium-term inflation objective, the flexibility to address deviations from full employment, and an emphasis on communication and transparency - seem destined to survive". Reflecting on twenty years experience of inflation targeting, the (former) Bank of England Governor Mervyn King (2012) notes: "...the results in terms of low and stable inflation have been impressive. There have been pronounced reductions in the mean, variance and persistence of inflation in Britain and elsewhere". More recently, however, Bank of England Governor Mark Carney (2014) argued "that fight [against inflation] culminated in the adoption of an inflation target, which helped secure 15 years of price stability and sustained economic growth. However, with time, a healthy focus became a dangerous distraction."

The views expressed above by influential policy makers are not in line. They do highlight the importance of the issue and the way in which the views have evolved. The debate on the effectiveness of IT is still open. This study aims to look back at the last decades and examine how IT has affected both the persistence of inflation and the variability of inflation. We would approach it as an empirical issue.

There is a large amount of academic work that assesses empirically the effectiveness of adopting an inflation-targeting regime. Focusing on twenty major developed OECD countries (seven of which adopted the IT regime) and through the implementation of the standard "differences in differences" approach, the seminal work of Ball and Sheridan (2005) concludes that the IT regime seems not to affect inflation or inflation variability in a significant way. The observed drop in inflation for the targeting economies is mainly ascribed to the mean reversion effect. Beaudry and Ruge-Murcia (2017) assess the Canadian IT experience and they characterize it as particularly successful when this is compared to the respective experiences of five other developed

IT countries. Inherent in this literature is the challenge that the adoption of IT almost coincides with the Great Moderation and discriminating between the two is more than a trivial issue.

Goncalves and Salles (2008) characterize the Ball and Sheridan (2005) empirical results as "baffling" provided that the group of countries investigated is solely composed of developed economies. Consequently, Goncalves and Salles (2008) argue that the sample selection bias contaminates the reported results. Within the same methodological framework, Goncalves and Salles (2008) attempt to overcome the bias selection problem by examining a sample of thirty-six emerging economies (thirteen of which adopted the IT regime). The findings of Goncalves and Salles (2008) stood in contrast to those suggested by Ball and Sheridan (2005). They conclude that for the developing economies IT delivers irrefutable gains with respect to inflation and growth volatility.

Lin and Ye (2007) apply a variety of propensity score matching methods for twenty-two major industrial countries that allow them to consider the self-selection problem of adopting the IT regime. Additionally, they show that such a policy adoption is non-effective in industrial countries with respect to inflation, inflation variability, long-term interest rates and income velocity of money. Lin and Ye (2009) rely once again on the propensity score matching methodological framework. By focusing on fifty-two developing countries for the years 1985 to 2005, they offer evidence for the effectiveness of the IT regime. The latter appears to constitute a significant parameter for lowering both inflation and inflation variability in the case of developing countries. Their results confirm the earlier empirical findings of Goncalves and Salles (2008). On the other hand, Brito and Bystedt (2010) fail to find evidence that IT improves economic performance for developing countries.

Other studies test for stationarity of the level of inflation by employing either linear or nonlinear unit root tests. This strand of the literature, that is more relevant for our line of work, relies on Svensson (1997) who argues that IT implies base drift of the price level, suggesting that the price level has a unit root and inflation is stationary. Culver and Papell (1997) employ sequential break and panel unit root tests for the inflation rates of thirteen OECD countries. With individual country tests (time series dimension), they find stationarity only in four cases whereas, in the panel dimension, the non-rejection of the unit root for inflation is very fragile. Hassler and Wolters (1995) examine monthly inflation rates of five industrial countries and employ fractional unit root tests. In all cases, the difference parameter is different from one as well as from zero. Gregoriou and Kontonikas (2006) look at five OECD countries (UK, Canada, Sweden, Australia and New Zealand) and two high inflation non-OECD

countries (Chile and Israel). The sample starts from the establishment of IT in each country until 2004. The ADF test fails to reject the non-stationarity null. The Exponential Smooth Transition Autoregressive (ESTAR) unit root test points towards stationarity (nonlinear mean reversion) which indicates successful targeting implementation. Altissimo et al. (2006) provide evidence that the properties of sectoral and aggregate inflation dynamics in the euro area have changed over time. Arestis et al. (2014) examine the stationarity properties of inflation differentials and find that they converge irrespective of the monetary policy framework. Cuestas and Harrison (2010) employ nonlinear unit root tests and argue that inflation rates are stationary in many Central and Eastern European countries over the period 1994 to 2007.

This paper takes a different approach. We examine the effectiveness of IT through the mean reverting properties of inflation. In particular, we do not make any assumption about the stationarity properties of the entire sample but rather, a change in persistence in the stationarity properties of inflation is allowed. In the spirit of Svensson (1997), we examine for changes in persistence where the following four scenarios are encompassed and can be tested: (i) inflation is integrated of order one (henceforth $I(1)$) throughout the sample; (ii) inflation is integrated of order zero (henceforth $I(0)$) and it remains so; (iii) there is a change in persistence from $I(0)$ to $I(1)$, and (iv) there is a change from $I(1)$ to $I(0)$. In the case of the last two scenarios the procedure employed can date the break and as a result, one can compare it with the formal adoption date of inflation targeting.

The starting point of our analysis is similar to Halunga et al. (2009) that employ a change in persistence test for the US and the UK inflation. They find that a change in persistence from $I(0)$ to $I(1)$ took place in the early 1970s with a subsequent reversion in the early 1980s. Within a similar framework, we examine the case for 127 countries (39 of them are IT countries), operating in a sequential way. Our analysis begins with tests for a change in inflation persistence. Once we verify a significant change for a series from $I(1)$ to $I(0)$, we then compare (for the IT countries) the Estimated Break Date (**EBD**) (endogenously determined) with the date that corresponds to the formal adoption of the inflation targeting (**FAD**) regime. We also compare the volatility of inflation before and after the EBD and examine whether there is a significant change. The results indicate that in most countries, the variance of inflation is significantly decreased during the post EBD period. Next, we proceed by employing a logit model to assess whether IT is affecting the probability that a change in persistence occurs in the inflation rate. We find evidence in favor of the significance of IT. Within the seminal contribution of North (1990) and the subsequent literature, we also consider the quality of institutions as a potential driver of the change in the persistence of inflation.

Although the quality of institutions emerges as significant, it has a smaller effect on taming inflation compared to IT.

The plan of the paper is as follows. Section 2 presents the econometric methodology. Section 3 presents the data and Section 4 reports the empirical results. Finally, Section 5 concludes.

2 Methodology

2.1 Change in inflation persistence

To formally examine a possible change in the inflation persistence from $I(1)$ to $I(0)$ and vice versa, we implement the modified Busetti and Taylor (2004) test statistics suggested by Harvey et al. (2006). To test the null hypothesis of a constant I(0) process against a change in persistence from I(0) to $I(1)$ for an unknown breakpoint, Busetti and Taylor (2004) originally proposed the following statistics:

$$H_1(K_M(\cdot) = \max_{\tau\in[\tau_l,\tau_u]} K_M(\tau), \tag{1}$$

$$H_2(K_M(\cdot) = \int_{\tau_l}^{\tau_u} K_M(\tau), \tag{2}$$

$$H_3(K_M(\cdot) = \log \int_{\tau_l}^{\tau_u} \exp(K_M(\tau)), \tag{3}$$

with

$$K_M(\tau) = \frac{\lfloor (1-\tau)T \rfloor^{-2} \sum_{t=\lfloor \tau T \rfloor+1}^{T} (\sum_{i=\lfloor \tau T \rfloor+1}^{t} \hat{e}_{1,i})}{\lfloor \tau T \rfloor^{-2} \sum_{t=1}^{\lfloor \tau T \rfloor} (\sum_{i=1}^{t} \hat{\varepsilon}_{0,i})^2} \tag{4}$$

where $\tau \in (0,1)$, $[\tau_l, \tau_u]$ is a sub-interval of $(0,1)$, T is the sample size and finally, $\hat{\varepsilon}_{0,i})$ and $\hat{\varepsilon}_{1,i})$ are the OLS residuals from the regression of the examined series on a constant for the samples $t = 1, \ldots, \lfloor \tau T \rfloor$ and $t = \lfloor \tau T \rfloor, \ldots, T$, respectively.

To test for a change from $I(1)$ to $I(0)$, under the same null hypothesis, Busetti and Taylor (2004) proposed the use of the reciprocal of $K_M(\cdot)$. The respective analogs for the equations (1), (2) and (3) are denoted by $H_j(1/(K_M(\cdot))$, with $j = 1, 2, 3$. However, the above statistics are severely oversized when the true generating process is constantly I(1). For this reason, Harvey et al. (2006) suggested testing the null of a constant $I(0)$ or $I(1)$ generating process against a change from $I(0)$ to $I(1)$ based on the following modification:

$$H_j(K_M(\cdot))_{j,\min} = \exp(-bJ)H_j(K_M(\cdot)), \quad \text{with} \quad j = 1, 2, 3 \tag{5}$$

where $H_j(K_M(\cdot))_{j,\min}$ is the modified statistic, b is a constant provided by Harvey et al. (2006) and $J_{\min} = \min_{\tau\in[\tau_l,\tau_u]} J_{1,\lfloor\tau T\rfloor}$ equals to T^{-1} times the Wald statistic that corresponds to the test of the joint $\delta_{K+1} = \cdots = \delta_9$ hypothesis, in the regression that is illustrated below:

$$y_t = x_t'\beta \sum_{i=k+1}^{9} \delta_i t^i + u_t, \quad t = 1, \ldots, \lfloor\tau T\rfloor. \tag{6}$$

When the alternative examined hypothesis is of an opposite direction (that is, $I(1)$ to $I(0)$), the $H_j(K_M(\cdot))$ statistic in equation (5) is substituted by $H_j(1/K_M(\cdot))$ and $J_{1,\lfloor\tau T\rfloor}$ factor is replaced with $J^R_{\min} = \min_{\tau\in[\tau_l,\tau_u]} J_{\lfloor\tau T\rfloor,T}$, where $J_{\lfloor\tau T\rfloor,T}$ is defined as $J_{1,\lfloor\tau T\rfloor}$ with the exception that specification (6) is now estimated for $t = \lfloor\tau T\rfloor, \ldots, T$. The modified statistic is denoted by $H_j(1/K_M(\cdot))_{j,\min}$.

To estimate the location of the break, Busetti and Taylor (2004) use the ratio-based break point estimators proposed by Kim (2000). These estimators proved to be inconsistent (see Halunga and Osborn, 2012) when the process under investigation is known to have a deterministic term (e.g. mean). To alleviate this issue, we implement the Leybourne et al. (2006) break point estimators. The implemented estimators for a change from $I(0)$ to $I(1)$ and from $I(1)$ to I(0) are presented in equations (7) and (8), respectively.

$$\hat{t}^f = \arg \min_{\tau\in[\tau_l,\tau_u]} \frac{1}{\lfloor\tau T\rfloor^2} \sum_{t=1}^{\lfloor\tau T\rfloor} \hat{\varepsilon}^2_{t,\tau}, \tag{7}$$

$$\hat{t}^r = \arg \min_{\tau\in[\tau_l,\tau_u]} \frac{1}{T - \lfloor\tau T\rfloor^2} \sum_{t=1}^{T-\lfloor\tau T\rfloor} \tilde{\varepsilon}^2_{t,\tau}, \tag{8}$$

where, $\hat{\varepsilon}^2_{t,\tau}$ are the OLS residuals from the regression of the examined series (y_t) on a constant and $\tilde{\varepsilon}^2_{t,\tau}$ the OLS residuals from the regression of the reversed on a constant. The search interval for the identification of the breakpoint is set to $[0.05, 0.95]$.

2.2 Logit analysis

Based on the above test (change in persistence), we investigate whether a significant change in the persistence (from $I(1)$to $I(0)$) is associated with those countries that implement an inflation-targeting policy. Our analysis incorporates some subsequent

steps. In particular, we employ a logit specification to assess if the probability of observing a change in persistence for the inflation series (from $I(1)$to $I(0)$) depends on the fact that a country follows an inflation targeting policy.

The above hypothesis, as already mentioned, can be investigated within a binary choice framework, modeled by a (cross-section) logit regression specification as follows:

$$\log[\pi_i/(1-\pi_i)] = b_0 + b_1 D_{IT,i} + b_2 Q_i + \varepsilon_i, \tag{9}$$

where $i = 1, \ldots, 127$ denotes the country and $j = 1, 2, 3$ denotes the hypothesis examined each time. In other words, for the first specification, $\pi_{1,i}$ is the probability that the country i experiences a significant change in persistence from $I(1)$ to $I(0)$ for the annualized inflation series.

Since each country's $\pi_{1,i}$ is non-observable, we proceed by employing a binary variable D_i. The dummy receives the value of 1 if a significant change in persistence for country is confirmed jointly by the three implemented statistics (see equations (1), (2) and (3) above) at any conventional level of significance and 0 otherwise. Furthermore, $D_{IT,i}$ is a dichotomous dummy variable, which indicates whether the country i is an inflation targeter or not, Q_i is the quality of institutions, b_0, b_1 and b_2 are coefficients to be estimated and ε_i is the error term.

Naturally, significant and positive values for the b_1 coefficients would indicate that inflation-targeting countries perform better, compared to non-inflation targeting countries, for the examined hypothesis (that is, change in persistence). Moreover, all the alternative outcomes related to the sign and the significance of the b_1 coefficient, provide evidence in favor of the great moderation proposition.

Lastly, we will also consider alternative drivers for explaining the left-hand side variable in equation (9). North (1990) seminal thesis provides the foundation for the role of institutions on economic performance. In our case, we will examine whether the quality of institutions can affect the stationarity properties (change in persistence) of inflation. As a result, we will augment the specification and consider the quality of institutions (as quantified by the World Bank) on the right-hand side. A statistically significant b_2 would gauge the contribution of the quality of institutions for taming inflation. At this point, it is useful to reiterate that no causality statement can be derived from this analysis.

3 Data

To investigate the effectiveness of the inflation targeting policies, we focus on 127 countries. We employ monthly time series data for the annualized inflation over the period January 1970 to December 2021. Annualized inflation is the logarithmic difference of the respective Consumer Price Index (CPI). The source of the data is the World Bank database constructed by Ha et al. (2023). Annualized inflation rates are presented in Figure A1 in the appendix. We report the full sample summary statistics in Tables A1 and A2. The ADF unit-root test and the normality results appear in Tables A3 and A4 also in the appendix. For illustration purposes, we partition the countries into 8 groups based on their income (4 categories) and whether they are a targeters or not. Table 1 presents the descriptive statistics for each group. We observe, that both inflation targeting and non-targeting high income countries have a lower mean and standard deviation. Similarly, low income countries have on average a lower inflation compared to middle income countries.

Table 1: Full sample summary statistics.

Country	Mean	Max.	Min.	Sd. Dev.
		Targeters		
High	0.059	0.392	-0.013	0.081
Upper middle	0.193	1.583	-0.003	0.296
Lower middle	0.168	1.834	-0.021	0.312
Low	0.123	0.509	-0.056	0.097
		Non-targeters		
High	0.047	0.328	-0.022	0.062
Upper middle	0.159	1.338	-0.061	0.287
Lower middle	0.124	0.962	-0.030	0.170
Low	0.093	0.504	-0.076	0.092

Notes: i) Each country group contains a different number of countries. ii) Income classification is based on the World Bank GNI per capita Operational Guidelines & Analytical Classifications.

Apart from income level, we also consider the quality of institutions as a potential driver of inflation. We approximate the quality of institutions by the Government Effectiveness Index (GEI), obtained from the Worldwide Governance Indicators (WGI) database of the World Bank.[1] The GEI receives values from -2.5 (weak effectiveness) to 2.5 (strong effectiveness) and it is available from 1996. The index captures perceptions of the quality of public and services, and the degree of its independence from politi-

[1]According to WGI: "The GEI reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."

cal pressures. It also reflects the quality of policy formulation and implementation, as well as the credibility of the government's commitment to such policies. We capture the quality of institutions for each county by the average value of the GEI for the period 1996 to 2020. In particular, in all but 11 cases, the test suggests a significant fall in the variance during the period after the EBD. More importantly, from these 11 countries, only half of them targeters, fact that can be viewed as a supportive signal of the Great Moderation.

4 Results

4.1 Change in inflation persistence

We start our analysis with the standard ADF unit root test. The results from the unit root test are ambiguous regarding the stationarity properties of inflation. Regarding the 39 inflation-targeters, the test rejects the null hypothesis of a unit root for 22 countries. Similarly, the results obtained for the non-targeting countries indicate that in 39 countries, inflation is non-stationary while in the remaining 49, inflation is stationary.

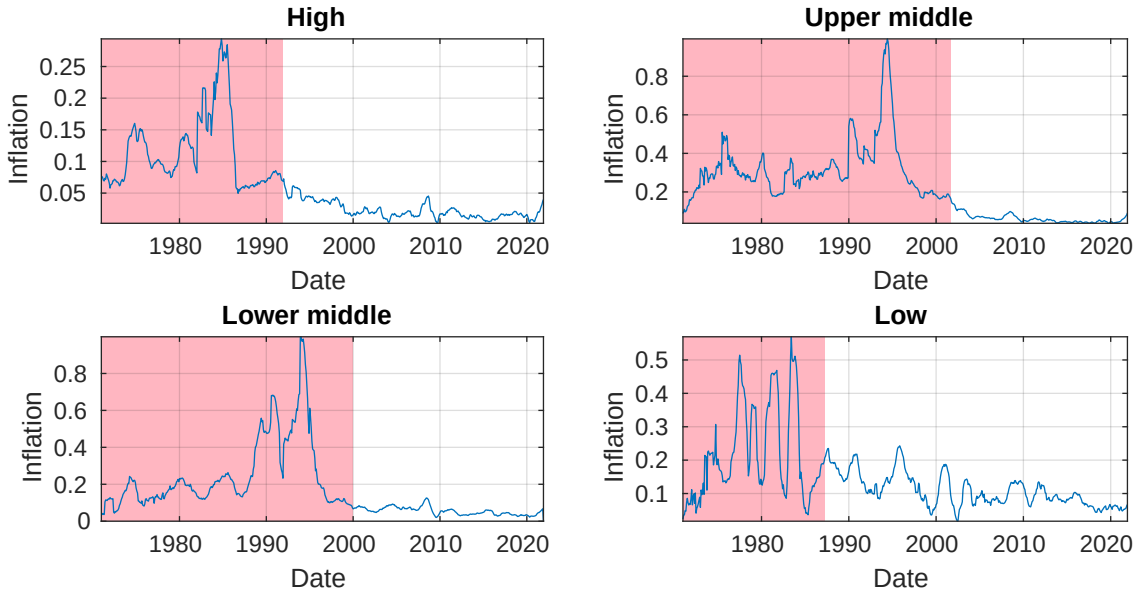
Given the mixed full sample results of the ADF test in Tables A3 and A4 -see in the Appendix- (the stationarity properties of inflation are not constant: see for instance Halunga et al., 2009), we test for a change in persistence. We illustrate the testing results for a change in persistence in Tables 3 and 4 below. Both Tables include the three statistics for the null hypothesis of a change in persistence from $I(1)$ to $I(0)$ and the respective break date when a significant change is identified. Note that we do not report the results regarding the test for a change in inflation persistence from $I(0)$ to $I(1)$ since it is not within the scope of this study. These results (available by the authors upon request) reveal that in most countries there is no change in inflation persistence from $I(0)$ to $I(1)$.

For the majority of countries, all three statistics produce similar results. The results indicate a change in persistence of the inflation of all IT countries regardless of which of the three statistics is used. The only exceptions are India and Sri Lanka where all three statistics fail to reject the null hypothesis at any confidence level. For these two countries, no break date is reported. The results also provide evidence of a change in inflation persistence for the non-targeter countries. The test fails to reject the null only for six countries (regardless of the statistic used) while for the rest of the countries, the null is rejected for at least one statistic (in most cases the null is rejected for all statistics). Figures 1a and 1b plot the average annualized inflation for groups of countries based on their income. The shaded area denotes the average break date in-

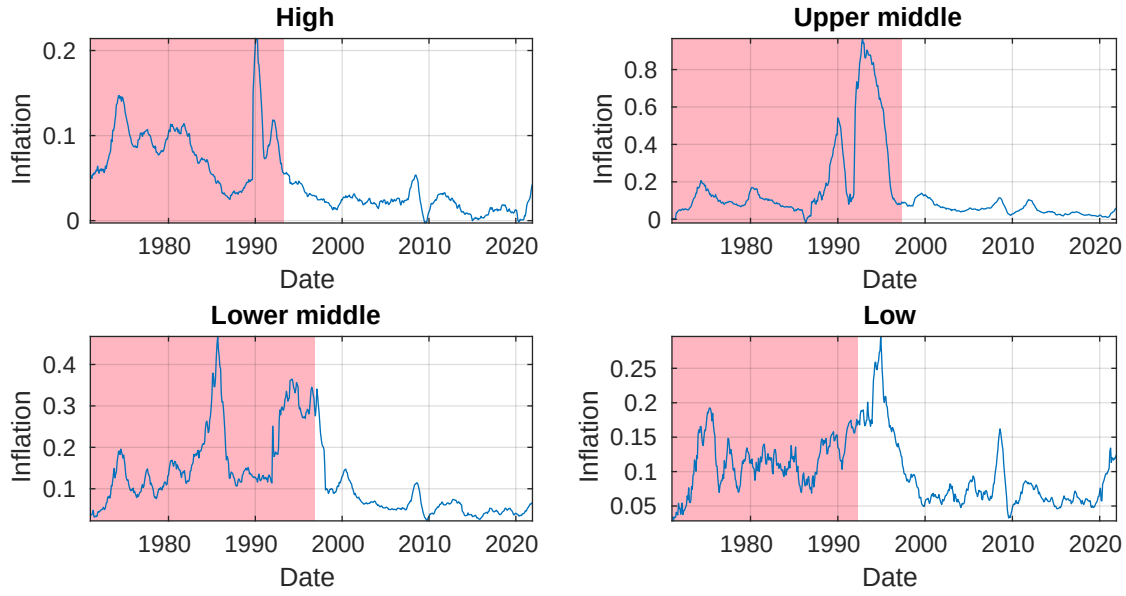
dicated by the change in persistence test for each country. We note that inflation in high and low income countries is under a stationary regime for a longer period compared to the rest of the countries. This is in line with the average summary statistics presented in Table 1.

Figure 1: Average annualized inflation for different income groups of countries .

(a) Inflation targeting countries.



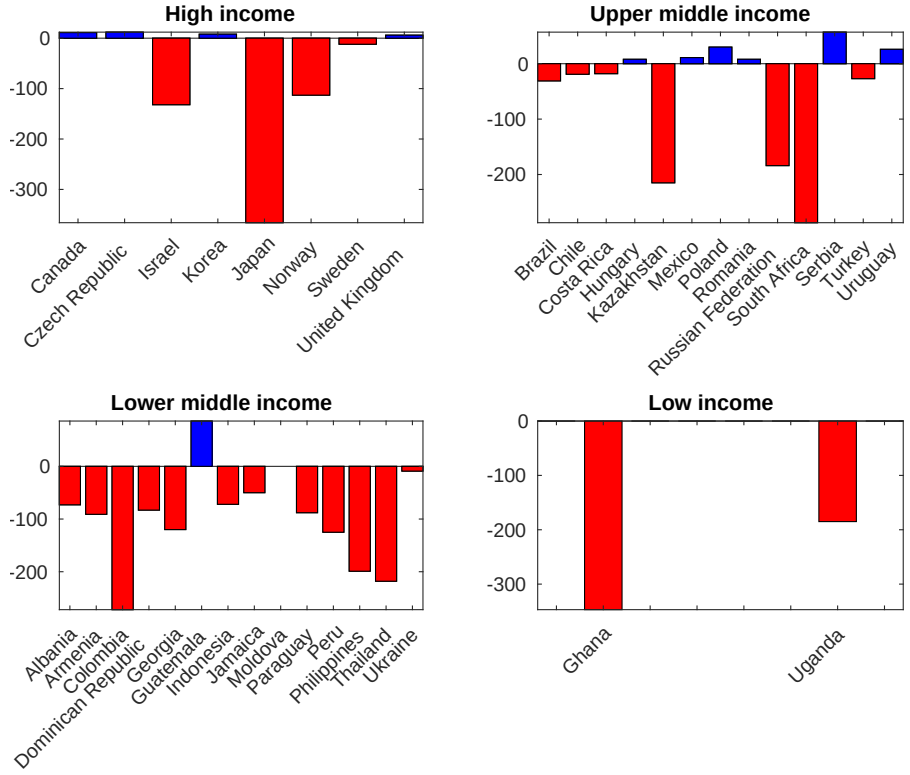
(b) Non inflation targeting countries.



Notes: i) Four income groups are consider (High, upper middle, lower middle and low) based on the ranking of the per capita income of the countries. ii) The shaded area denotes the average period for which inflation was non-stationary for each group of countries.

Overall, for most countries, inflation appears as an $I(1)$ in the early part of the sample and becomes $I(0)$ after a critical point, referred to as Estimated Break Date (EBD). We observe that inflation in many non-targeting countries became stationary during the 1990s despite the forecasts (Staiger et al., 1997). The imprecise forecast estimates were caused by the use of unemployment as a sole indicator of inflation (for example, production costs were reduced during that period but this was not taken into account). For the targeting countries, we do not observe a common period where inflation shifted from non-stationary to stationary since each country became a targeter at a different time. Rather than focusing on the exact point of regime change, we are more interested in whether the break date indicated by the test coincides with the adoption date indicated by the government or a central bank. To this end, in Figure 2, we compare only for presentation purposes the differences (in months) between the EBD and the Formal Adoption Date (FAD) for the IT countries. We split the countries into four groups based on their income. The number of countries in each group is different. The classification is based on the World Bank GNI per capita Operational Guidelines & Analytical Classifications.

Figure 2: Difference between the formal adoption date and the estimated break date.



Notes: Notes: Figures within the parentheses denote the time difference in months between the formal adoption date and the estimated break date for all inflation targeting countries for which the test indicated a change in persistence.

If the EBD and the FAD were in proximity, this would translate into very short vertical bars. However, in 25 countries the EBD leads the FAD (in some cases the EBD leads the FAD for more than 200 months). For the remaining 10 countries, EBD lags FAD. For these countries, we observe that the period from the FAD until the EBD is rather short indicating a potential effect of IT on inflation. Sri Lanka and India are not included in the graph since the tests failed to indicate a change in persistence. Extreme cases are Ghana and Japan, where EBD leads FAD 347 and 366 months, respectively. In total, we find that in most cases, EBD leads FAD. These descriptive results are inadequate to support that the established persistence change of the inflation series can be attributed to the IT regime solely, since IT polices have been adopted mainly after the Great Moderation. Hence, to disentangle the effects of these two events is not a trivial issue.

Having established a change in the inflation persistence from I(1) to I(0) for the great majority of the examined countries, a natural implication of this finding is that the inflation variance is expected to shift from being infinitely large (I(1) regime) to a constant (I(0) regime). To examine this hypothesis, we test for a change in the observed variance of inflation over a pre-specified point in time. We select the EBD as the pre-specified point in time. The results are summarized in Tables A3 and A4 (see in the appendix).[2] Since the standard F-test necessitates normality (the inflation series are far from being normal),[3] We use the statistic proposed by Brown and Forsythe (1974) which remains robust against non-normality preserving at the same time a desirable level of statistical power (Conover et al., 1981). Overall, the results in Tables A3 and A4, confirm a change in the variance of inflation with respect to the EBD.

Table 2 presents the average results from Tables A3 and A4 for the 8 groups of countries (similar to Table 1). For the ADF and the Brown-Forsythe statistics, there is no evidence of significance (the Table presents the averages of these statistics for the different countries). We note that except for the high income targeting countries, inflation is stationary at the 5% significance level. Moreover, for all groups, the variance after the -average- estimated break date is lower. Based on the averages of the Brown-Forsythe statistics this decrease in variance is statistically significant at the 1% significance level.

[2]We exclude the countries for which no change is detected.

[3]Based on the empirical distribution of the data, we test for normality in the inflation series through U^2 test statistic proposed by Watson (1961). See Tables A3 and A4 in the Appendix.

Table 2: Unit root, normality and test for change in variance.

	ADF	U^2 stat	Var. before	Var. after	B-F stat
			Targeters		
High	-2.307	0.782	0.031	0.001	233.4
Upper middle	-3.929	2.613	0.383	0.001	223.2
Lower middle	-4.323	1.192	0.531	0.003	91.48
Low	-3.520	1.529	0.315	0.001	182.7
			Non-targeters		
High	-2.297	0.905	0.022	0.000	212.9
Upper middle	-3.339	1.188	0.303	0.001	160.3
Lower middle	-2.785	1.136	0.189	0.009	127.7
Low	-3.051	1.210	0.011	0.006	101.6

Notes: i) U^2 statistic is used to test the null hypothesis of normality of each series, B-F statistic is used to test for a shift in the variance before and after each break date and 'Var. before' and 'Var. after' denote the inflation variance before and after each break date.

Table 3: Change in persistence testing, higher income counties.

Country	Break date	$H_j((K_M(\cdot))$	$H_2((K_M(\cdot))$	$H_3((K_M(\cdot))$	Country	Break date	$H_j((K_M(\cdot))$	$H_2((K_M(\cdot))$	$H_3((K_M(\cdot))$
		Targeters			Finland	1992-01-01	89.728***	500.614***	218.76***
Canada	1992-01-01	134.644***	404.97***	183.068***	France	1992-07-01	124.424***	1397.565***	Inf***
Czech Republic	1999-01-01	26.484***	135.253***	54.386***	Germany	1995-02-01	35.879***	82.45***	34.135***
Israel	1986-06-01	2474.161***	16718.939***	Inf***	Greece	2012-08-01	28.277***	341.194***	Inf***
Korea	1998-12-01	129.71***	1166.974***	Inf***	Ireland	1986-04-01	61.567***	349.768***	147.359***
Japan	1982-07-01	126.105***	787.577***	352.854***	Italy	1996-10-01	53.865***	460.348***	Inf***
Norway	1991-10-01	151.568***	978.409***	Inf***	Netherlands	1988-12-01	39.191***	133.696***	53.824***
Sweden	1992-01-01	108.852***	1359.091***	Inf***	Portugal	2013-01-01	420.81***	4598.581***	Inf***
United Kingdom	1993-04-01	96.844***	523.007***	Inf***	Singapore	1982-04-01	9.059***	38.615***	14.342***
Brazil	1996-11-01	952.473***	1869.611***	Inf***	Spain	1996-03-01	31.432***	201.991***	74.745***
Chile	1998-02-01	2919.97***	10536.701***	Inf***	Switzerland	1994-03-01	26.351***	222.898***	92.084***
Costa Rica	2016-07-01	34.582***	809.434***	Inf***	United States	1991-08-01	18.234***	47.97***	19.132***
Hungary	2002-02-01	11.619***	129.741***	52.14***	Slovakia	1995-09-01	4.185*	23.554**	5.881**
Kazakhstan	1997-09-01	2239.731***	6389.886***	Inf***	Slovenia	2008-11-01	5164.35***	25808.598***	Inf***
Mexico	2001-12-01	1703.36***	4842.41***	Inf***	Hong Kong	2005-07-01	26.53***	177.521***	78.709***
Poland	2001-07-01	157.744***	241.817***	Inf***	Kuwait	1983-04-01	4.698**	12.644	4.1*
Romania	2006-04-01	48.2***	245.762***	Inf***	Saudi Arabia	1988-01-01	2.077	13.465	4.214*
Russia	1999-09-01	190.897***	849.88***	Inf***	Azerbaijan	1995-12-01	672.182***	1822.155***	Inf***
South Africa	1976-03-01	18.293***	211.299***	94.724***	Belarus	2012-09-01	757.468***	5714.375***	Inf***
Serbia	2013-10-01	125.978***	417.081***	Inf***	Botswana		0.452	2.076	0.482
Turkey	2003-10-01	6.519**	79.802***	29.904***	Croatia	1994-10-01	3978.839***	21814.002***	Inf***
Uruguay	2007-03-01	2135.376***	13234.291***	Inf***	Equatorial Guinea	1989-09-01	21.413***	135.109***	57.933***
		Non-targeters			Gabon	1995-08-01	119.248***	419.071***	198.485***
Austria	1985-01-01	77.277***	233.487***	103.611***	Latvia	2009-04-01	354.744***	1176.909***	Inf***
Bahrain	1982-07-01	24.2***	61.447***	24.275***	Lithuania	1998-01-01	603.952***	1418.862***	Inf***
Belgium	1986-02-01	74.397***	401.076***	182.611***	Malaysia	1983-02-01	6.387**	14.714*	4.702*
Cyprus	1985-06-01	4.656**	77.02***	30.684***	Mauritius	1980-11-01	18.813***	137.612***	60.177***
Denmark	1990-01-01	41.504***	299.498***	114.115***	Panama		1.65	9.31	2.728
Estonia		0.288	0.959	0.132	Trinidad and Tobago	1985-01-01	5.912**	235.948***	96.953***

Notes: i) ***, ** and * denote a change in persistence at the 0.01, 0.05 and 0.10 significance level, respectively.

Table 4: Change in persistence testing, lower income counties.

Country	Break date	$H_j((K_M(\cdot))$	$H_2((K_M(\cdot))$	$H_3((K_M(\cdot))$	Country	Break date	$H_j((K_M(\cdot))$	$H_2((K_M(\cdot))$	$H_3((K_M(\cdot))$
Targeters					Jordan	1991-10-01	5.261**	30.594***	11.353***
Albania	2002-12-01	15407.866***	84643.187***	Inf***	Mongolia	1995-09-01	244.015***	1704.251***	Inf***
Armenia	1998-06-01	1936.198***	3426.685***	Inf***	Morocco	1996-01-01	262.47***	1675.297***	Inf***
Colombia	1977-02-01	61.844***	905.826***	Inf***	North Macedonia	1996-11-01	243.325***	429.254***	187.188***
Dominican Republic	2005-02-01	5.033**	22.852**	8.07**	Syrian Arab Republic		0.047	0.095	0.008
Georgia	1999-12-01	115.1***	174.416***	68.351***	Tunisia		0.311	1.25	0.245
Guatemala	2012-03-01	71.629***	658.426***	303.26***	Bangladesh	2016-02-01	297.978***	3265.515***	Inf***
Indonesia	1999-07-01	3.578*	53.872***	21.721***	Benin	1995-12-01	23.252***	91.865***	39.624***
Jamaica	2015-01-01	6.976**	106.33***	43.294***	Burkina Faso	1977-09-01	11.174***	54.778***	22.595***
Moldova	2010-01-01	2972.262***	15092.881***	Inf***	Burundi		0.865	2.506	0.434
Paraguay	2004-01-01	57.593***	497.641***	217.377***	Cambodia	2015-12-01	30.037***	129.989***	57.97***
Peru	1991-08-01	12706.691***	42018.47***	Inf***	Central African Republic	1995-12-01	7.074**	31.118***	11.09***
Philippines	1985-06-01	51.964***	667.339***	295.086***	Chad	1995-03-01	5.853**	20.814**	6.853**
Sri Lanka		1.683	11.861	2.699	Ethiopia	1976-03-01	0.557	2.334	0.292
Thailand	1982-03-01	38.372***	551.947***	257.443***	Gambia	1987-08-01	76.882***	1079.645***	Inf***
Ukraine	2016-03-01	475.117***	2242.288***	Inf***	Guinea-Bissau	1998-06-01	2045.878***	11929.027***	Inf***
Ghana	1978-06-01	15.845***	360.546***	152.553***	Haiti	1976-03-01	0.442	1.632	0.209
India		0.926	5.01	0.827	Kenya	1994-09-01	5.639**	54.018***	21.662***
Uganda	1996-02-01	9.983***	161.962***	71.509***	Kyrgyz Republic	2000-05-01	3.041	6.745	1.876
Non-targeters					Madagascar	1976-03-01	7.117**	43.292***	17.331***
Algeria	1997-05-01	37.471***	115.617***	50.241***	Malawi	1985-03-01	3.68*	56.165***	22.183***
Angola	1997-04-01	32.855***	120.496***	Inf***	Mali	1993-01-01	1.537	7.801	1.567
Bolivia	1986-08-01	422.663***	4566.717***	Inf***	Mauritania	1990-02-01	4.343*	47.027***	18.545***
Bulgaria	1998-02-01	613.979***	4045.475***	Inf***	Mozambique	2017-12-01	0.354	1.814	0.301
Cameroon	1995-08-01	80.605***	418.344***	195.425***	Myanmar	2009-01-01	27.678***	260.264***	111.911***
China	2012-06-01	151.682***	833.727***	389.619***	Nepal	1977-02-01	1.328	29.348**	10.211**
Congo	1997-01-01	46.996***	254.048***	117.689***	Niger	1977-11-01	35.097***	118.248***	52.997***
Cote d'Ivoire	1978-04-01	16.84***	85.839***	36.783***	Nigeria	1996-12-01	19.366***	138.782***	61.468***
Djibouti		2.846	11.552	3.283	Pakistan	1976-03-01	1.302	5.546	1.198
Ecuador	2017-01-01	66.217***	4127.838***	Inf***	Rwanda	1975-12-01	4.507*	12.291	3.676*
Egypt, Arab Rep.	1976-03-01	0.952	2.722	0.529	Senegal	1995-06-01	33.312***	195.161***	87.879***
El Salvador	1997-06-01	30.964***	215.652***	88.141***	Sudan	1976-05-01	0.041	0.082	0.007
Eswatini	1989-02-01	3.934*	19.94**	6.845**	Tanzania, United Rep.	1993-06-01	402.81***	9292.915***	Inf***
Fiji	1991-11-01	4.888**	12.009	3.931*	Togo	1995-08-01	15.501***	66.795***	28.372***
Guyana	2009-02-01	0.359	1.134	0.236	Vietnam	2016-05-01	24.077***	174.518***	77.422***
Honduras	2017-01-01	23.708***	1019.531***	Inf***	Zambia	1994-06-01	16.519***	30.267***	9.633**
Iran, Islamic Rep.		0.242	0.404	0.067					

Notes: i) ***, ** and * denote a change in persistence at the 0.01, 0.05 and 0.10 significance level, respectively.

4.2 Logit analysis

To examine the hypothesis introduced in section 2.3, we estimate equation (9) by using the appropriate binary variable (D_i) as a dependent variable. Based on a sample of 127 countries, we present the estimates of the cross-sectional specification in Table 5. But any statistical inference could be questionable if the estimated specifications do not pass the necessary diagnostic tests. In other words, when we adopt the Maximum Likelihood approach to estimate a model's coefficients, certain types of misspecification (e.g. the assumed symmetry of the logistic function or the presence of heteroskedastic errors) may heavily influence the credibility of our inferences. Logit models are misspecified and deliver inconsistent estimates, in the case where the distribution of the error-term does not meet the assumption of symmetry.

Hence, we use an LM type test (see Thomas, 1993) to examine the symmetry assumption imposed by the underlying logistic distribution. We fail to reject the null hypothesis of symmetry (see in Table 2 the Burr Type 2 LM test), revealing that the use of the logit specification is a rational choice. Additionally, we test the null hypothesis that the specification is the logistic over a more general functional form using a RESET type LM test, as proposed in Davidson and MacKinnon (1984, 2004). Again, we fail to reject the null at the conventional levels of significance (see Table 2 the RESET LM test), supporting further the usage of the logit model.

Another matter of concern is the possible presence of heteroskedasticity in the error-term, an issue that may result in inconsistent estimates. For this reason, we carry out the relevant LM type test for heteroskedasticity, as is illustrated in Davidson and MacKinnon (2004). The conducted LM test (see in Table 5 the Hetero. LM test), fails to reject the null hypothesis of homoskedasticity. Finally, we test for the exogeneity of the binary IT dummy ($D_{IT,i}$) by conducting a Hausman type LR test as described in Knapp and Seaks (1998).[4] To execute the test, we utilize an appropriate instrument. In more detail, we instrument the IT dummy ($D_{IT,i}$) on the median value of inflation before the FAD or the EBD depending on the country (IT targeter or not). In this manner, we create a distinct system of equations that contains two equations.[5] To attain consistent estimates for the parameters, we estimate each system through the Full Information Maximum Likelihood approach. Once we obtain the estimates, we test for the exogeneity ($\rho_{\varepsilon,u}$) of the IT dummy ($D_{IT,i}$) in the system.[6] Based on the results, we fail to reject the null hypothesis that the regressor of interest ($D_{IT,i}$) is exogenous.

[4] Knapp and Seaks (1998) propose a method for testing exogeneity for a dichotomous right hand side variable in a probit specification.

[5] We present analytically the system in the notes section of Table 5.

[6] The term $\rho_{\varepsilon,u}$ refers to the correlation of the error terms that correspond to the two equations of the system.

Once all specifications are shown to be robust in terms of specification testing, we proceed to the resulting inference. With respect to the hypothesis (a significant change in the persistence is associated with the IT countries), both the coefficients of the IT dummy ($D_{IT,i}$) and the government effectiveness are positive and significant at the 5% significant level (1.588 and 0.647). These results suggest that, in comparison to non-IT countries, IT countries face a similar probability of a significant change in the inflation persistence from I(1) to I(0). The quality of institutions emerges as significant for the observed changes in the persistence of inflation at the 0.05 significance level.

Table 5: Binary logit estimates.

Independent variables	Estimate	Std. error
c	1.253***	0.278
D_{IT}	1.588**	0.780
Q	0.674**	0.301
Regression diagnostics	Statistic	p-value
McFadden R^2	0.134	
LR stat.	7.536	0.023
Log-likelihood	-24.345	
Burr Type 2 LM test	0.129	0.718
Hetero. LM test	8.545	0.013
RESET LM test	0.879	0.378
LR stat. for exogeneity (D_{IT})	2.654	0.103

Notes: i) ***, ** and * denote a change in persistence at the 0.01, 0.05 and 0.10 significance level, respectively. ii) The system used to test for exogeneity is: $D_i = b_0 + b_1 + D_{IT,i} + b_2 Q_i + \varepsilon_i$ and $D_{IT,i} = b_3 + b_4 M_i^b + u_i$. iii) M_i^b the median value of inflation before the FAD or the EBD (depending on the country).

5 Conclusions

Inflation targeting has become an important tool for monetary policy. There have been at least two possible explanations for the significant reduction in inflation and inflation variability that has been observed in the past decades. One argument is that this is the outcome of Great Moderation. An alternative one is that inflation targeting was the catalyst for the observed change in the persistence of inflation.

This paper employs a change in persistence test to examine whether the stationarity properties of inflation have changed. We employ monthly data from 127 countries and consider a change in persistence from I(1) to I(0). The evidence that emerges supports a change in persistence from I(1) to I(0) for most of the cases. The methodology

employed allows us to date the break of the change in persistence in the inflation series (endogenous break). We compare the estimated break date from the change in persistence test with the formal adoption date of inflation targeting. Graphical analysis indicates that the two dates do not overlap. Logit analysis indicates that IT affects the change in persistence at the 5% statistical significant level. Quality of government is also examined as an alternative driver and it emerges as significant for the change in persistence.

It has been argued that inflation targeting distracts, to some extent, central banks from monitoring the banking system and financial assets exhibiting explosive behavior. Despite the ongoing discussion regarding inflation targeting, there are no definitive answers. Overall, the evidence provided suggests that in most cases, inflation has been a mean-reverting process for more than two decades, regardless of whether the country is an inflation targeter or not. This suggests, that while inflation targeting is effective, it is not the only available tool. Governments and central banks ought to find the most suitable policy to support price stability. The quality of institutions also emerges as a significant driver of the change in inflation persistence. This finding reinforces the view that during uncertain economic times, such as the aftermath of the recent economic crisis and the presence of near-zero interest rates, inflation targeting is not a panacea. Governments and institutions should cooperate to provide financial stability. This issue has recently been taken up by (among others) Balls et al. (2018) who argue that central banks need to work more closely with a range of institutions (including the government) in terms of monetary-fiscal coordination, monetary-debt management coordination, and systemic risk monitoring. With this in mind, we also note the research by Fazio et al. (2015) which argues that IT national banking systems are more stable, possess sounder systemically important banks, and are less distressed than (or at least as distressed as) other banks during periods where global liquidity shortages emerge. The research agenda on all these issues is definitely on.

References

Altissimo, F., Bilke, L., Levin, A., T., M., and B., M. (2006). Sectoral and aggregate inflation dynamics in the euro area. *Journal of the European Economic Association*, 4:585–593.

Arestis, P., Chortareas, G., Magkonis, G., and Moschos, D. (2014). Inflation targeting and inflation convergence: International evidence. *Journal of International Financial Markets, Institutions and Money*, 31:285–295.

Ball, L. and Sheridan, N. (2005). Does inflation target matter? In Bernanke, B. and Woodford, M., editors, *The Inflation Targeting Debate*. University of Chicago Press for the National Bureau of Economic Research.

Balls, E., Howat, J., and Stansbury, A. (2018). Central bank independence revisited: After the financial crisis, what should a model central bank look like? Working Paper 87, Harvard Kennedy School.

Beaudry, P. and Ruge-Murcia, F. (2017). Canadian inflation targeting. *Canadian Journal of Economics*, 50:1556–1572.

Bernanke, B. (2011). The effects of the great recession on central bank doctrine and practice. Technical report, Remarks at the 56th Economic Conference of the Federal Reserve Bank of Boston.

Brito, R. and Bystedt, B. (2010). Inflation targeting in emerging economies: Panel evidence. *Journal of Development Economics*, 91:198–210.

Brown, M. B. and Forsythe, A. B. (1974). Robust tests for the equality of variances. *Journal of the American Statistical Association*, 69:364–367.

Busetti, F. and Taylor, A. M. R. (2004). Tests of stationarity against a change in persistence. *Journal of Econometrics*, 123:33–66.

Carney, M. (2014). One mission. one bank. promoting the good of the people of the united kingdom. Mais lecture, Cass Business School, City University.

Conover, W. J., E., J. M., and Johnson, M. M. (1981). A comparative study of tests for homogeneity of variance with applications to the outer continental shelf bidding data. *Technometrics*, 23:351–361.

Cuestas, J. C. and Harrison, B. (2010). Inflation persistence and nonlinearities in central and eastern european countries. *Economics Letters*, 106(2):81–83.

Culver, S. and Papell, D. (1997). Is there a unit root in the inflation rate? evidence from sequential break and panel data models. *Journal of Applied Econometrics*, 12:435–444.

Davidson, R. and MacKinnon, J. (2004). *Econometric Theory and Methods*. Oxford University Press, Oxford.

Davidson, R. and MacKinnon, J. G. (1984). Convenient specification tests for logit and probit models. *Journal of Econometrics*, 25:241–262.

Fazio, D. M., Tabak, B. M., and Cajueiro, D. O. (2015). Inflation targeting: Is IT to blame for banking system instability? *Journal of Banking and Finance*, 59:76–97.

Goncalves, C. and Salles, J. (2008). Inflation targeting in emerging economies: What do the data say? *Journal of Development Economics*, 85:312–318.

Gregoriou, A. and Kontonikas, A. (2006). Inflation targeting and the stationarity of inflation: new results from an estar unit root test. *Bulletin of Economic Research*, 58:309–322.

Ha, J., Kose, M. A., and Ohnsorge, F. (2023). One-stop source: A global database of inflation. *Journal of International Money and Finance*, 137:102896.

Halunga, A. and Osborn, D. (2012). Ratio-based estimators for a change point in persistence. *Journal of Econometrics*, 171:24–31.

Halunga, A., Osborn, D., and Sensier, M. (2009). Changes in the order of integration of us and uk inflation. *Economics Letters*, 102:30–32.

Harvey, D., Leybourne, S., and Taylor, A. (2006). Modified tests for a change in persistence. *Journal of Econometrics*, 134:441–469.

Hassler, U. and Wolters, J. (1995). Long memory in inflation rates: International evidence. *Journal of Business & Economic Statistics*, 13:37–45.

Kim, J. (2000). Detection of change in persistence of a linear time series. *Journal of Econometrics*, 95:97–116.

King, M. (2012). Twenty years of inflation targeting. Technical report, London School of Economics.

Knapp, L. and Seaks, T. (1998). A hausman test for a dummy variable in probit. *Applied Economics Letters*, 5:321–323.

Leybourne, S., Taylor, R., and Kim, T. (2006). CUSUM of squares-based tests for a change in persistence. *Journal of Time Series Analysis*, 28:408–433.

Lin, S. and Ye, H. (2007). Does inflation targeting really make a difference? evaluating the treatment effect of inflation targeting in seven industrial countries. *Journal of Monetary Economics*, 54:2521–2533.

Lin, S. and Ye, H. (2009). Does inflation targeting make a difference in developing countries? *Journal of Development Economics*, 89:118–123.

North, D. (1990). Institutions, institutional change and economic performance. Technical report, Cambridge.

Staiger, D., Stock, J. H., and Watson, M. W. (1997). The NAIRU, Unemployment and Monetary Policy. *Journal of Economic Perspectives*, 11(1):33–49.

Svensson, L. (1997). Monetary policy and inflation targeting. Technical report, NBER Reporter.

Thomas, J. (1993). On testing the logistic assumption in binary dependent variable models. *Empirical Economics*, 18:381–392.

Watson, G. (1961). Goodness-of-fit tests on a circle. *Biometrika*, 48:109–114.

A Supplementary tables and figures

Figure A1: Annualized inflation.

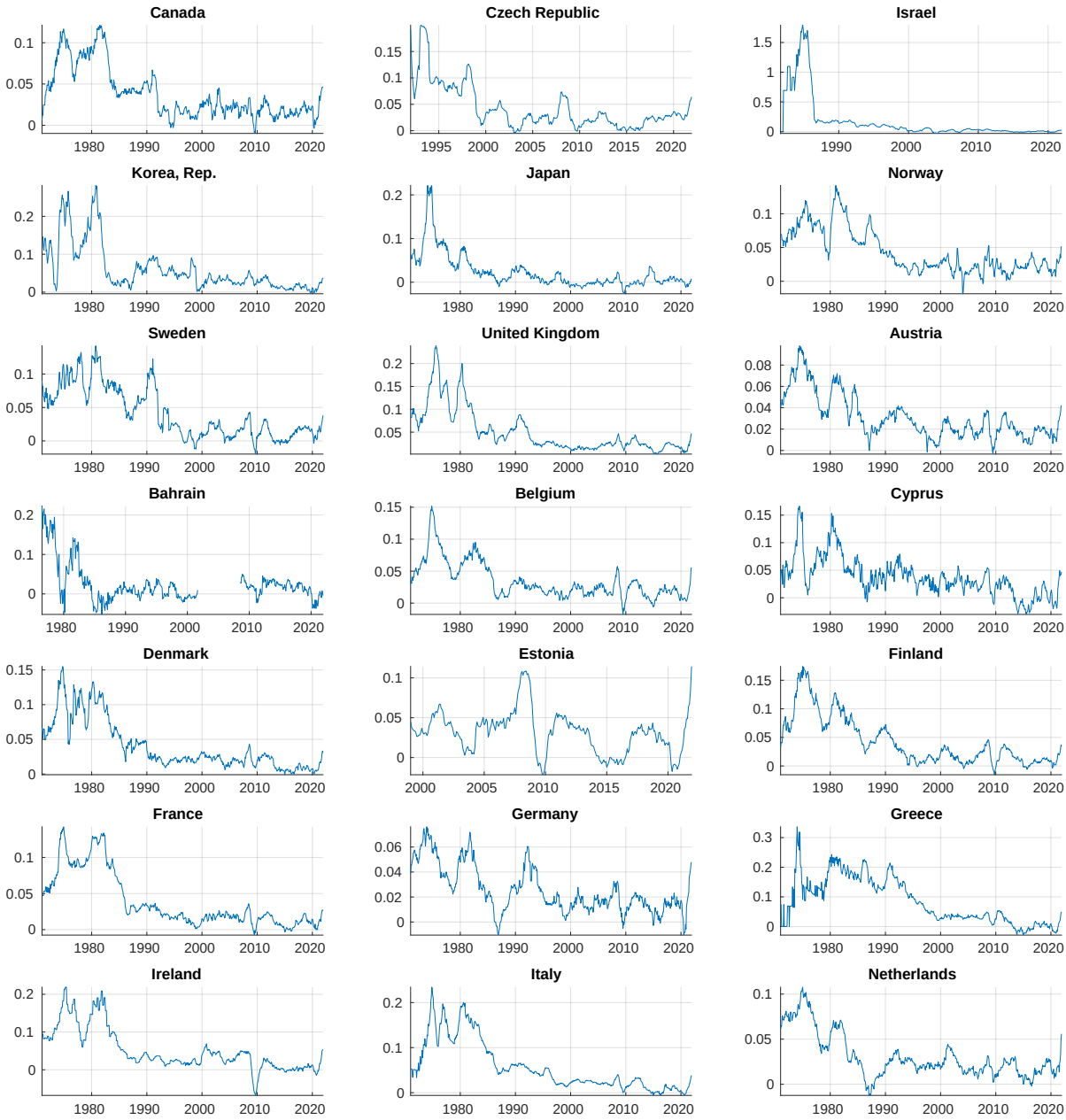


Figure A1: Annualized inflation, cont'd.

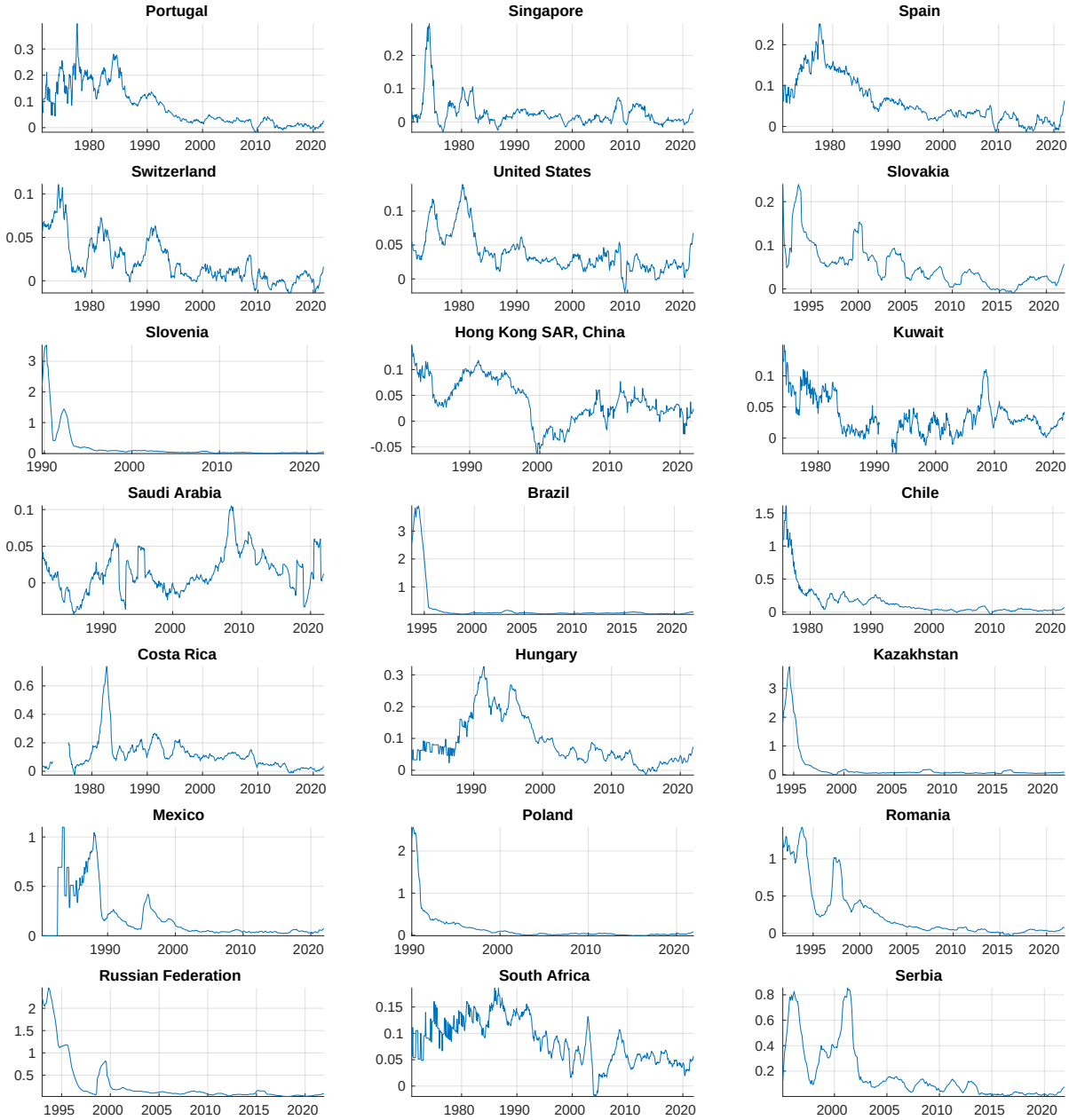


Figure A1: Annualized inflation, cont'd.

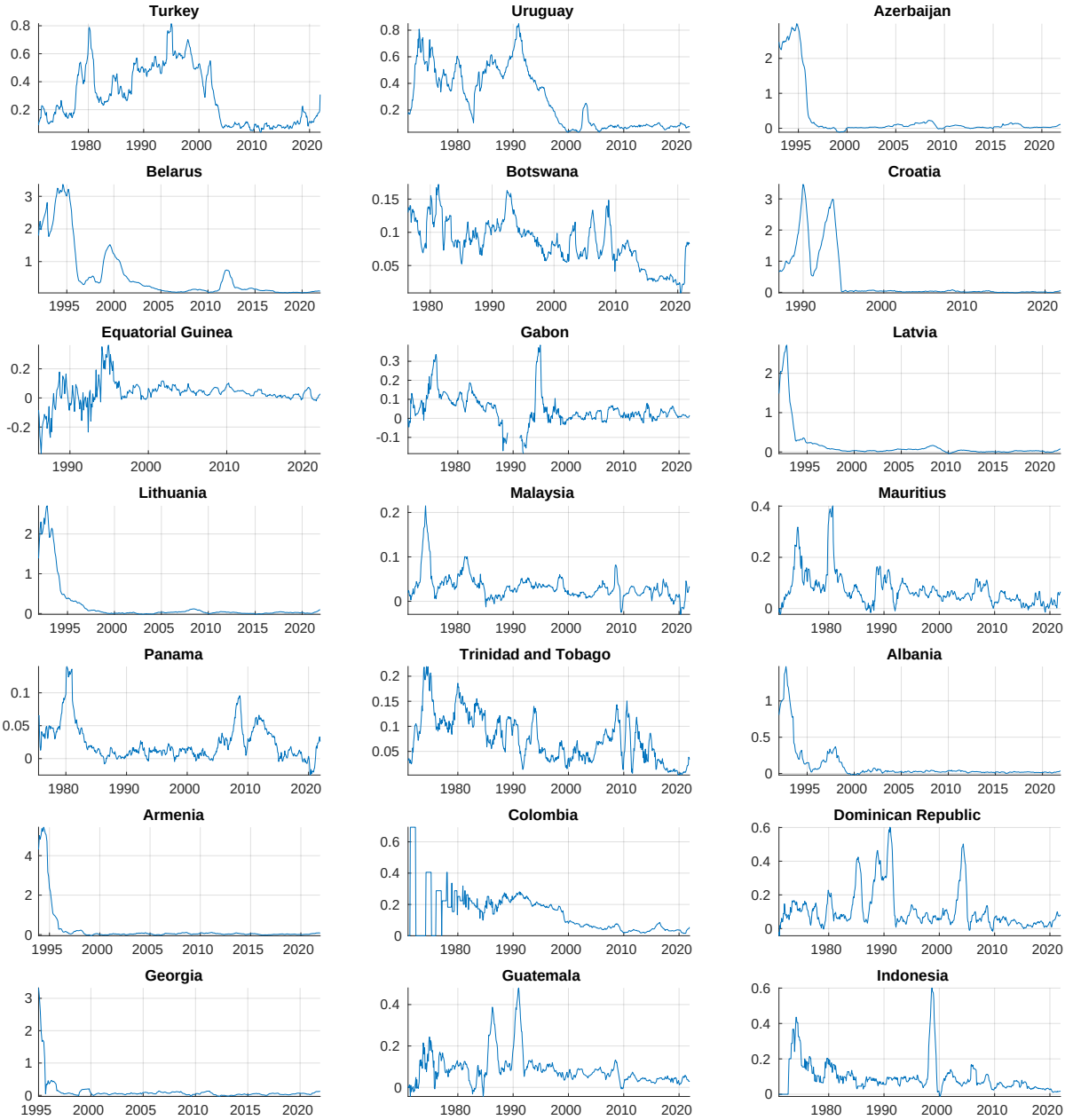


Figure A1: Annualized inflation, cont'd.

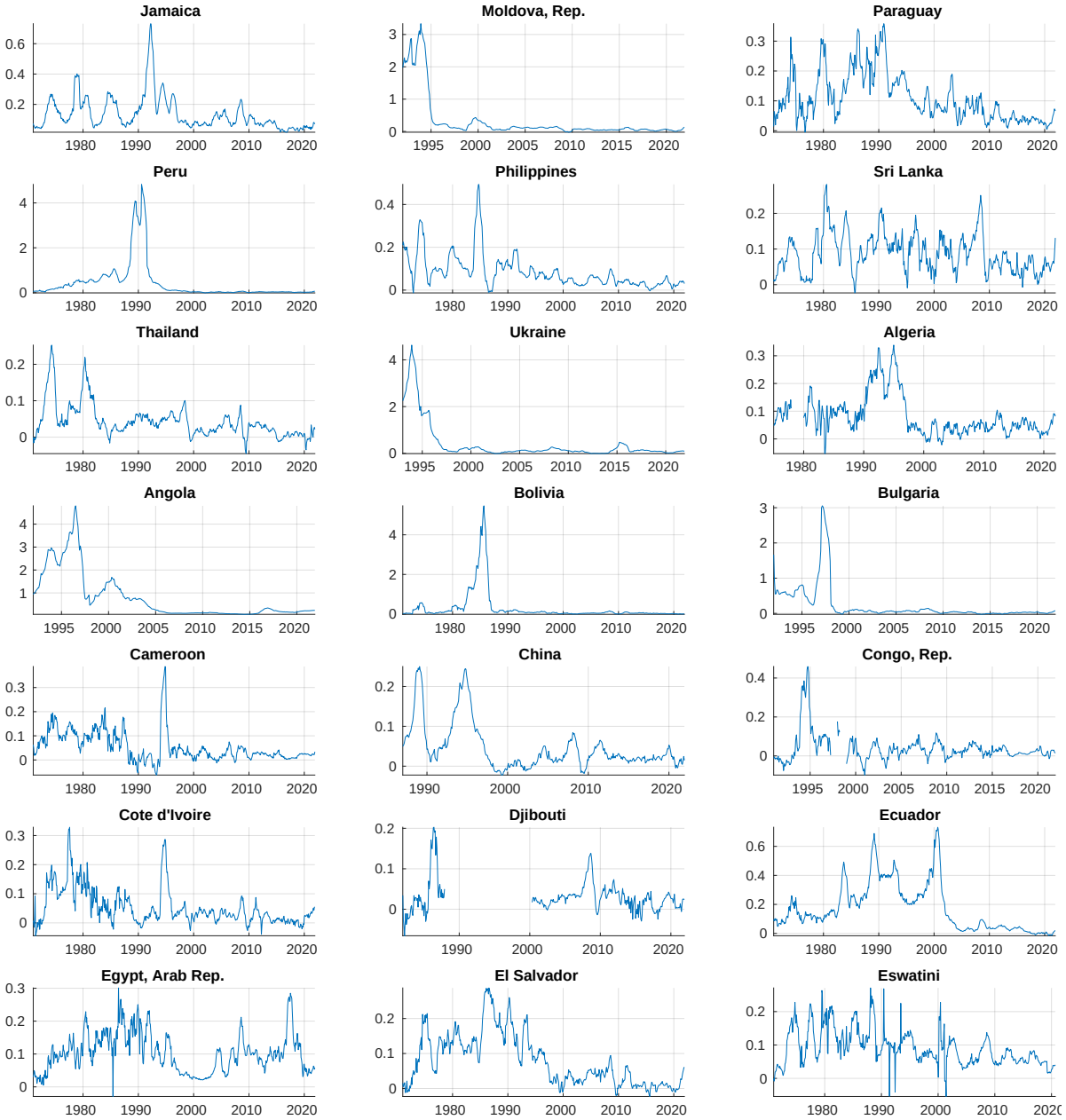


Figure A1: Annualized inflation, cont'd.

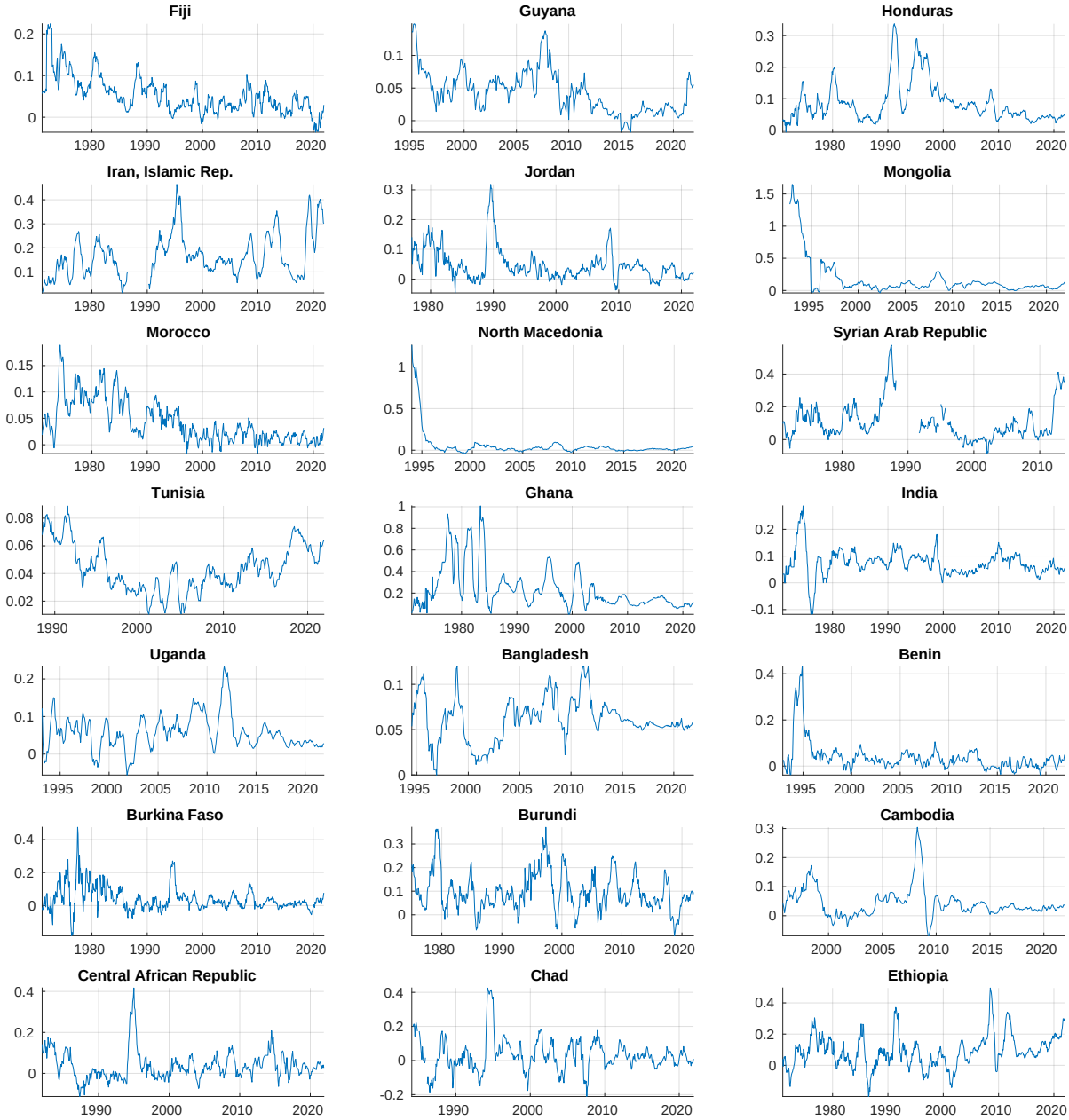


Figure A1: Annualized inflation, cont'd.

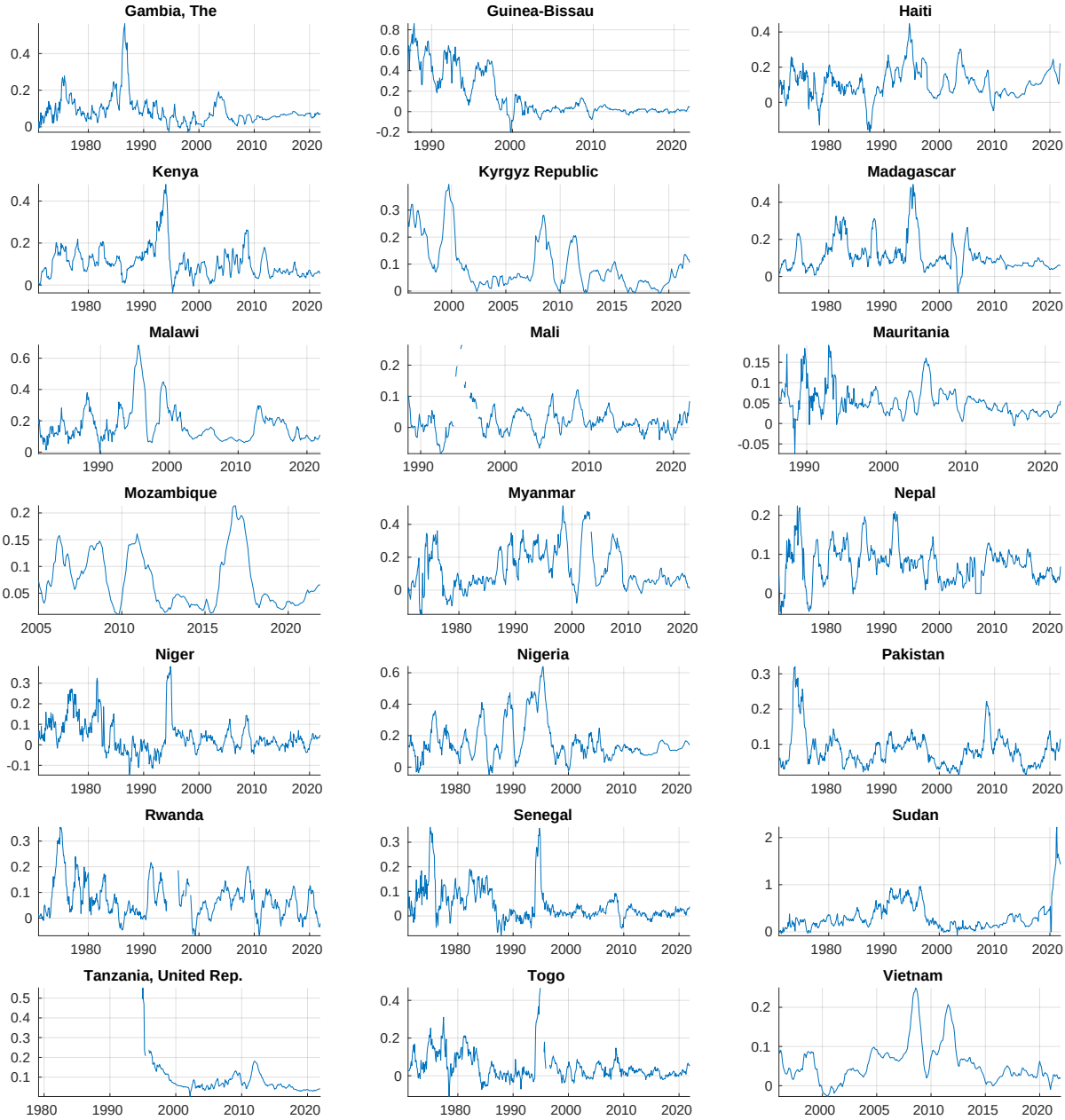


Table A1: Full sample summary statistics, higher income countries.

Country	Mean	Max.	Min.	Sd. Dev.	Country	Mean	Max.	Min.	Sd. Dev.
Targeters					Finland	0.042	0.174	-0.015	0.042
Canada	0.038	0.121	-0.01	0.031	France	0.039	0.142	-0.007	0.038
Czech Republic	0.043	0.2	-0.005	0.042	Germany	0.025	0.076	-0.01	0.019
Israel	0.172	1.792	-0.029	0.361	Greece	0.084	0.336	-0.029	0.077
Korea	0.061	0.281	-0.004	0.062	Ireland	0.051	0.219	-0.068	0.056
Japan	0.023	0.222	-0.026	0.04	Italy	0.057	0.234	-0.006	0.055
Norway	0.043	0.142	-0.018	0.032	Netherlands	0.031	0.108	-0.012	0.025
Sweden	0.041	0.142	-0.02	0.038	Portugal	0.081	0.396	-0.017	0.079
United Kingdom	0.051	0.239	0.002	0.048	Singapore	0.026	0.295	-0.031	0.043
Brazil	0.227	3.907	0.015	0.686	Spain	0.061	0.251	-0.014	0.055
Chile	0.147	1.609	-0.034	0.233	Switzerland	0.021	0.111	-0.014	0.025
Costa Rica	0.115	0.736	-0.027	0.109	United States	0.038	0.139	-0.021	0.028
Hungary	0.09	0.326	-0.015	0.076	Slovakia	0.051	0.239	-0.009	0.048
Kazakhstan	0.238	3.761	-0.012	0.589	Slovenia	0.202	3.526	-0.012	0.543
Mexico	0.172	1.099	0	0.234	Hong Kong	0.04	0.147	-0.063	0.042
Poland	0.156	2.565	-0.013	0.381	Kuwait	0.036	0.15	-0.025	0.03
Romania	0.258	1.428	-0.035	0.362	Saudi Arabia	0.014	0.105	-0.043	0.028
Russia	0.289	2.456	0.022	0.506	Azerbaijan	0.295	2.994	-0.113	0.735
South Africa	0.084	0.186	-0.02	0.042	Belarus	0.587	3.366	0.04	0.85
Serbia	0.17	0.854	0.001	0.212	Botswana	0.084	0.172	0.009	0.034
Turkey	0.294	0.815	0.039	0.204	Croatia	0.382	3.466	-0.019	0.782
Uruguay	0.281	0.849	0.033	0.223	Equatorial Guinea	0.034	0.363	-0.382	0.084
Non-targeters					Gabon	0.046	0.385	-0.185	0.079
Austria	0.031	0.098	-0.003	0.021	Latvia	0.157	2.718	-0.043	0.435
Bahrain	0.024	0.222	-0.052	0.048	Lithuania	0.199	2.708	-0.02	0.52
Belgium	0.034	0.152	-0.018	0.028	Malaysia	0.033	0.215	-0.029	0.029
Cyprus	0.037	0.166	-0.03	0.035	Mauritius	0.072	0.401	-0.023	0.065
Denmark	0.04	0.155	-0.001	0.036	Panama	0.024	0.14	-0.025	0.028
Estonia	0.031	0.114	-0.022	0.027	Trinidad and Tobago	0.076	0.219	0.003	0.047

Table A2: Full sample summary statistics, higher income countries.

Country	Mean	Max.	Min.	Sd. Dev.	Country	Mean	Max.	Min.	Sd. Dev.
	Targeters				Jordan	0.046	0.318	-0.046	0.054
Albania	0.107	1.474	-0.021	0.243	Mongolia	0.172	1.649	-0.038	0.29
Armenia	0.267	5.438	-0.057	0.943	Morocco	0.043	0.189	-0.017	0.04
Colombia	0.14	0.693	0	0.126	North Macedonia	0.054	1.263	-0.041	0.165
Dominican Republic	0.11	0.602	-0.043	0.118	Syrian Arab Republic	0.105	0.576	-0.086	0.111
Georgia	0.12	3.321	-0.034	0.349	Tunisia	0.044	0.089	0.01	0.017
Guatemala	0.086	0.48	-0.044	0.077	Bangladesh	0.061	0.12	0	0.023
Indonesia	0.096	0.601	-0.012	0.09	Benin	0.037	0.431	-0.039	0.066
Jamaica	0.136	0.732	0.017	0.111	Burkina Faso	0.04	0.475	-0.183	0.072
Moldova	0.328	3.334	-0.023	0.703	Burundi	0.097	0.371	-0.089	0.082
Paraguay	0.11	0.358	-0.005	0.08	Cambodia	0.043	0.304	-0.069	0.052
Peru	0.413	4.827	-0.011	0.834	Central African Republic	0.037	0.417	-0.113	0.069
Philippines	0.084	0.494	-0.013	0.078	Chad	0.031	0.426	-0.211	0.095
Sri Lanka	0.088	0.281	-0.023	0.054	Ethiopia	0.089	0.496	-0.2	0.104
Thailand	0.043	0.253	-0.045	0.046	Gambia	0.085	0.563	-0.03	0.077
Ukraine	0.392	4.63	-0.011	0.83	Guinea-Bissau	0.15	0.859	-0.201	0.215
Ghana	0.238	1.008	0.004	0.196	Haiti	0.109	0.447	-0.17	0.086
India	0.074	0.288	-0.118	0.049	Kenya	0.107	0.48	-0.037	0.074
Uganda	0.057	0.233	-0.056	0.046	Kyrgyz Republic	0.093	0.395	-0.007	0.089
	Non-targeters				Madagascar	0.112	0.496	-0.088	0.086
Algeria	0.082	0.338	-0.053	0.072	Malawi	0.17	0.684	-0.01	0.114
Angola	0.78	4.799	0.067	1.014	Mali	0.019	0.264	-0.084	0.046
Bolivia	0.298	5.462	-0.013	0.776	Mauritania	0.053	0.192	-0.074	0.035
Bulgaria	0.224	3.054	-0.026	0.501	Mozambique	0.073	0.213	0.01	0.051
Cameroon	0.054	0.387	-0.063	0.062	Myanmar	0.129	0.513	-0.147	0.127
China	0.046	0.25	-0.022	0.059	Nepal	0.075	0.224	-0.054	0.048
Congo	0.039	0.459	-0.098	0.073	Niger	0.04	0.381	-0.147	0.081
Cote d'Ivoire	0.053	0.328	-0.044	0.062	Nigeria	0.16	0.64	-0.051	0.123
Djibouti	0.03	0.203	-0.066	0.039	Pakistan	0.084	0.321	0.013	0.049
Ecuador	0.173	0.732	-0.016	0.166	Rwanda	0.072	0.354	-0.069	0.071
Egypt, Arab Rep.	0.103	0.301	-0.029	0.059	Senegal	0.045	0.361	-0.081	0.07
El Salvador	0.079	0.287	-0.023	0.074	Sudan	0.316	2.22	-0.084	0.302
Eswatini	0.092	0.271	-0.054	0.054	Tanzania, United Rep.	0.108	0.552	0.002	0.088
Fiji	0.053	0.225	-0.036	0.044	Togo	0.046	0.466	-0.11	0.072
Guyana	0.044	0.149	-0.018	0.033	Vietnam	0.056	0.249	-0.027	0.051
Honduras	0.087	0.338	-0.006	0.063	Zambia	0.278	1.217	0.058	0.264
Iran, Islamic Rep.	0.166	0.464	0.013	0.089					

Table A3: Unit root, normality and test for change in variance, higher income countries.

Country	ADF	U^2 stat	Var. before	Var. after	B-F stat	Country	ADF	U^2 stat	Var. before	Var. after	B-F stat
		Targeters				Finland	-1.582	0.511***	0.0014	0.0001	213.8477***
Canada	-1.477	0.632***	0.0008	0.0001	344.8919***	France	-0.988	2.671***	0.0013	0.0001	688.8936***
Czech Republic	-5.428***	0.397***	0.0016	0.0002	40.3606***	Germany	-2.201	0.483***	0.0004	0.0001	234.8614***
Israel	-2.707*	1.636***	0.2357	0.0038	495.3112***	Greece	-1.658	2.399***	0.0052	0.0002	234.1894***
Korea	-1.85	0.34***	0.0046	0.0002	179.2068***	Ireland	-1.753	0.62***	0.0022	0.0004	251.5032***
Japan	-2.154	0.245***	0.0024	0.0002	184.6112***	Italy	-0.95	0.925***	0.0027	0.0001	394.7094***
Norway	-1.711	0.343***	0.0006	0.0001	226.028***	Netherlands	-2.292	0.97***	0.001	0.0001	382.5186***
Sweden	-1.676	1.517***	0.0006	0.0002	113.6815***	Portugal	-1.289	2.408***	0.0061	0.0000	200.6247***
United Kingdom	-1.459	1.149***	0.0026	0.0001	283.689***	Singapore	-3.412**	0.162*	0.0053	0.0003	179.1162***
Brazil	-11.514***	4.116***	2.2563	0.0006	566.1625***	Spain	-1.072	0.167*	0.0025	0.0002	312.6334***
Chile	-5.281***	1.696***	0.0831	0.0003	82.2367***	Switzerland	-2.291	0.747***	0.0006	0.0001	255.1628***
Costa Rica	-2.579*	1.993***	0.012	0.0001	26.8886***	United States	-1.929	1.542***	0.0009	0.0001	136.2168***
Hungary	-1.442	0.37***	0.0056	0.0005	279.1008***	Slovakia	-3.851***	0.329***	0.003	0.001	22.7893***
Kazakhstan	-6.23***	5.59***	1.3746	0.0011	288.4601***	Slovenia	-7.193***	0.458***	0.4546	0.0001	26.4438***
Mexico	-2.381	2.402***	0.0747	0.0001	188.3187***	Hong Kong	-1.918	0.354***	0.0026	0.0003	173.0608***
Poland	-3.591***	0.559***	0.3147	0.0003	61.0925***	Kuwait	-3.06**	0.556***	0.0005	0.0004	0.6622
Romania	-2.966**	0.45***	0.1619	0.0007	157.2615***	Saudi Arabia	-2.06	0.106	0.0005	0.0007	1.5575
Russia	-7.995***	0.987***	0.5706	0.0033	418.2563***	Azerbaijan	-3.661***	0.653***	0.295	0.0043	164.8955***
South Africa	-2.008	2.461***	0.001	0.0019	14.4699***	Belarus	-1.666	0.145*	0.8921	0.0027	58.0692***
Serbia	-2.433	0.504***	0.0509	0.0002	48.2386***	Botswana	-2.091	5.695***			
Turkey	-1.367	2.73***	0.0301	0.0013	365.4632***	Croatia	-1.578	0.271***	0.7584	0.0004	677.0113***
Uruguay	-1.301	10.123***	0.0464	0.0001	406.154***	Equatorial Guinea	-3.503***	0.778***	0.0196	0.0043	79.4689***
		Non-targeters				Gabon	-2.907**	0.135	0.0112	0.0005	172.8608***
Austria	-1.995	0.795***	0.0003	0.0001	107.2879***	Latvia	-8.8***	0.464***	0.3017	0.0004	22.3411***
Bahrain	-3.281**	0.918***	0.0045	0.0004	256.5271***	Lithuania	-5.945***	0.53***	0.7456	0.0007	223.2122***
Belgium	-1.851	0.213**	0.0007	0.0001	109.2834***	Malaysia	-2.99**	1.995***	0.0018	0.0003	86.1073***
Cyprus	-2.599*	1.028***	0.0013	0.0005	54.2542***	Mauritius	-2.771*	2.148***	0.011	0.0014	115.4835***
Denmark	-1.329	0.577***	0.001	0.0001	449.4213***	Panama	-2.398	0.186**			
Estonia	-2.28	1.887***				Trinidad and Tobago	-1.758	1.262***	0.0018	0.0011	4.3555**

Notes: i) ***, ** and * denote a change in persistence at the 0.01, 0.05 and 0.10 significance level, respectively. ii) U^2 statistic is used to test the null hypothesis of normality of each series, B-F statistic is used to test for a shift in the variance before and after each break date and 'Var. before' and 'Var. after' denote the inflation variance before and after each break date.

Table A4: Unit root, normality and test for change in variance, lower income countries.

Country	ADF	U^2 stat	Var. before	Var. after	B-F stat	Country	ADF	U^2 stat	Var. before	Var. after	B-F stat
		Targeters				Jordan	-3.135**	0.504***	0.0054	0.0009	142.4647***
Albania	-7.954***	2.347***	0.1278	0.0001	104.6447***	Mongolia	-4.758***	0.651***	0.3186	0.0085	484.5575***
Armenia	-10.892***	0.18**	3.7707	0.0011	139.9695***	Morocco	-2.215	0.219**	0.0014	0.0002	209.6717***
Colombia	-3.823***	1.582***	0.0684	0.0078	130.5292***	North Macedonia	-5.232***	0.191**	0.1571	0.0007	193.9741***
Dominican Republic	-2.612*	1.545***	0.017	0.0008	69.777***	Syrian Arab Republic	-2.636*	0.081			
Georgia	-8.467***	0.853***	0.5415	0.0012	62.2305***	Tunisia	-1.894	6.149***			
Guatemala	-3.043**	1.734***	0.0066	0.0001	47.4914***	Bangladesh	-2.917**	7.311***	0.0007	0.0000	87.3868***
Indonesia	-3.273**	2.241***	0.0116	0.0012	40.6826***	Benin	-2.708*	0.559***	0.0204	0.0007	371.3844***
Jamaica	-2.009	0.942***	0.0125	0.0002	41.4809***	Burkina Faso	-4.408***	0.045	0.0155	0.0036	69.8009***
Moldova	-1.844	0.096	0.7388	0.0007	33.4624***	Burundi	-3.908***	0.377***			
Paraguay	-2.376	0.145*	0.0064	0.0007	154.6149***	Cambodia	-2.298	0.284***	0.0033	0.0000	46.963***
Peru	-1.72	1.5***	1.2902	0.0247	109.4424***	Central African Republic	-3.727***	0.106	0.0101	0.0019	71.8113***
Philippines	-3.056**	0.318***	0.0109	0.0015	111.9823***	Chad	-4.768***	0.237**	0.0207	0.0044	56.7203***
Sri Lanka	-3.113**	2.451***				Ethiopia	-3.242**	0.519***	0.0059	0.0111	3.3033*
Thailand	-2.531	0.979***	0.0041	0.0005	221.9661***	Gambia	-2.694*	2.885***	0.0115	0.0015	83.1507***
Ukraine	-8.146***	0.979***	0.8305	0.0013	12.5181***	Guinea-Bissau	-2.64*	0.614***	0.0317	0.0022	283.3424***
Ghana	-2.663*	1.595***	0.0603	0.034	14.4067***	Haiti	-2.722*	1.158***	0.0043	0.0076	3.5842*
India	-4.069***	3.812***				Kenya	-3.09**	1.61***	0.0071	0.0024	30.1298***
Uganda	-2.592*	0.591***	0.0021	0.0022	0.1946	Kyrgyz Republic	-2.741*	0.251**	0.0084	0.0033	26.4652***
		Non-targeters				Madagascar	-2.867**	2.371***	0.0042	0.0077	1.1656
Algeria	-2.147	0.456***	0.0061	0.0005	160.1148***	Malawi	-3.315**	2.606***	0.0028	0.014	10.166***
Angola	-1.292	1.957***	0.8671	0.1565	64.3606***	Mali	-4.099***	0.049	0.0019	0.0021	0.0532
Bolivia	-2.271	0.228**	1.5787	0.0057	136.5505***	Mauritania	-4.217***	2.078***	0.0029	0.001	17.5529***
Bulgaria	-2.736*	0.726***	0.5869	0.0016	116.5799***	Mozambique	-1.976	0.119	0.0029	0.0002	74.199***
Cameroon	-3.087**	0.409***	0.0057	0.0003	224.8824***	Myanmar	-3.166**	0.702***	0.0188	0.0009	213.4797***
China	-2	0.623***	0.0044	0.0001	69.5611***	Nepal	-4.481***	2.878***	0.0066	0.0017	125.8663***
Congo	-3.556***	0.177**	0.0187	0.0012	128.5032***	Niger	-3.471***	0.315***	0.0059	0.0057	2.8147*
Cote d'Ivoire	-3.044**	0.238**	0.0076	0.0027	46.5254***	Nigeria	-3.155**	2.827***	0.0234	0.0019	204.8152***
Djibouti	-3.053**	1.157***				Pakistan	-2.88**	2.346***	0.0088	0.0013	256.8087***
Ecuador	-1.551	0.732***	0.0269	0.0001	62.8554***	Rwanda	-3.509***	0.464***	0.0153	0.0034	140.828***
Egypt, Arab Rep.	-2.762*	2.38***	0.0013	0.0035	9.6663***	Senegal	-3.349**	0.316***	0.0079	0.0005	246.4981***
El Salvador	-1.713	1.346***	0.0043	0.0005	168.1143***	Sudan	-0.701	0.257***	0.0104	0.0965	13.8611***
Eswatini	-4.457***	1.856***	0.0039	0.0014	102.1444***	Tanzania, United Rep.	-2.025	1.347***	0.0042	0.0046	1.1934
Fiji	-3.137**	0.752***	0.002	0.0006	49.8584***	Togo	-3.587***	0.088	0.0087	0.001	136.1646***
Guyana	-2.43	0.964***	0.0008	0.0003	19.2984***	Vietnam	-1.571	0.531***	0.0031	0.0001	44.8321***
Honduras	-2.425	1.473***	0.0042	0.0000	37.7142***	Zambia	-1.32	1.06***	0.0632	0.0069	322.6793***
Iran, Islamic Rep.	-2.538	2.861***									

Notes: i) ***, ** and * denote a change in persistence at the 0.01, 0.05 and 0.10 significance level, respectively. ii) U^2 statistic is used to test the null hypothesis of normality of each series, B-F statistic is used to test for a shift in the variance before and after each break date and 'Var. before' and 'Var. after' denote the inflation variance before and after each break date.0