University of Connecticut

Department of Economics Working Paper Series

Does a Threshold Inflation Rate Exist? Quantile Inferences for Inflation and Its Variability

WenShwo Fang
Feng Chia University

Stephen M. Miller
University of Nevada, Las Vegas, and University of Connecticut

Chih-Chuan Yeh
The Overseas Chines Institute of Technology, Taichung

Working Paper 2007-45R

December 2007, revised June 2009

---

341 Mansfield Road, Unit 1063
Storrs, CT 06269–1063
Phone: (860) 486–3022
Fax: (860) 486–4463
http://www.econ.uconn.edu/

Abstract

Using quantile regressions and cross-sectional data from 152 countries, we examine the relationship between inflation and its variability. We consider two measures of inflation – the mean and median – and three different measures of inflation variability – the standard deviation, relative variation, and median deviation. All results from the mean and standard deviation, the mean and relative variation, or the median and the median deviation support both the hypothesis that higher inflation creates more inflation variability and that inflation variability raises inflation across quantiles. Moreover, higher quantiles in both cases lead to larger marginal effects of inflation (inflation variability) on inflation variability (inflation). We particularly consider whether thresholds for inflation rate or inflation variability exist before finding such positive correlations. We find evidence of thresholds for inflation rates below 3 percent, but mixed results for thresholds for inflation variability. Finally, a series of robustness checks, including a set of additional explanatory variables as well as controlling for potential endogeneity with instrumental variables, leaves our findings generally unchanged.

Journal of Economic Literature Classification: C21; E31

Keywords: inflation, inflation variability, inflation targeting, threshold effects, quantile regression

This paper previously circulated with the title ”Quantile Inferences for Inflation and Its Variability: Does a Threshold Inflation Rate Exist?”

1. Introduction

Uncertainty emanates from the difficulty of knowing the future values of the variable of interest. Higher uncertainty reflects higher volatility of the variable's expected value or a higher variability of the variable around a given mean. In his Nobel lecture, Friedman (1977) suggests that higher inflation creates nominal uncertainty, which lowers welfare and output growth. Johnson (1967) and Okun (1971) argue that although desirable, achieving and maintaining steady inflation proves problematic because of political factors or policy differences. That is, inflation variability is unavoidable. Using quantile regression analysis, this paper empirically reexamines the relationship between aggregate inflation and its variability, especially the issue of whether a threshold inflation rate exists.

The linkages, if any, between inflation and inflation variability received considerable attention over the past forty years. Friedman (1977) outlines an informal argument regarding how an increase in inflation raises inflation variability. Ball (1992) formulates Friedman's hypothesis in a model of monetary policy, where high inflation creates uncertainty about future monetary policy and, thus, higher inflation variability. Ungar and Zilberfarb (1993) argue, however, that with rising inflation agents may invest more resources in forecasting inflation, thus, reducing inflation variability.

Cukierman and Meltzer (1986), on the other hand, consider the reverse linkage. To wit, they argue that increases in inflation uncertainty raise inflation by increasing the incentive for the policy maker to create inflation surprises to stimulate output growth in a game-theory framework. Thus, inflation variability leads to higher inflation. In contrast, Holland (1995) suggests that higher inflation variability lowers inflation, if the monetary authorities succeed in stabilizing the economy.

Using annual cross-section data on 17 OECD countries for the period 1951 to 1968, Okun (1971) reports a positive association between the average inflation rate and its standard deviation, supporting the Friedman-Ball hypothesis. In a comment, Gordon (1971) notes that the elimination of the data from the 1950s causes the significant positive correlation to disappear. Logue and Willett (1976) find similar results for 41 countries across the period 1948 to 1970, but note that this strong relationship breaks down when disaggregating the sample. Foster (1978) uses average absolute changes in the inflation rate rather than the standard deviation as a measure of variability for 40 countries from 1954 to 1975 and obtains results similar to those of Okun (1971) and Logue and Willett (1976). Davis and Kanago (1998) employ survey data for 44 countries over 20 years, finding a robust, strong, positive relationship between inflation and its variability across countries, but the support for Okun's hypothesis weakens considerably for intracountry data. Similar findings emerge in Davis and Kanago (2000), who use squared forecast-errors from OECD inflation forecasts for 24 countries. They find a significant, positive cross-section relationship across countries between inflation and inflation uncertainty, but the time-series relationship within countries proves weak, at best. Regarding this weak link at the individual country level, Katsimbris and Miller (1982) and Davis and Kanago (1996) find, on a country-by-country basis for OECD and high-inflation countries, a less pervasive, positive relationship between the inflation rate and its variability than suggested by Okun's (1971) original findings.

Most recent empirical studies that examine the relationship between inflation and its variability focus on time-series analysis of a specific economy, since Engle (1982, 1983) applied the autoregressive conditional heteroskedasticity (ARCH) model to this issue. This approach, however, produces mixed evidence. For example, the Friedman-Ball hypothesis receives support from Ball and Cecchetti (1990), Grier and Perry (1998), Fountas (2001), Fountas et al. (2004), Kontonikas (2004), Conrad and Karanasos (2005), Daal et al. (2005), Henry et al. (2007), Thornton (2007, 2008), Özdemir and Fisunoğlu (2008), and Chen et al. (2008) for a positive relationship for the G7 and other developed and emerging-market countries. Engle (1983), Cosimano and Jansen (1988), and Evans (1991) find no support for the hypothesis, where they focus only on the US. Differing from the ARCH modeling approach, Bhar and Hamor (2004) adopt the Markov-switching heteroscedasticity model and find that high uncertainty associates with a significant positive shift in inflation for Canada, Germany, and Japan in the long-run, for Germany and the US in the short-run, and a significant negative shift in inflation for Canada in the short-run.

The Cukierman-Meltzer hypothesis receives support from Baillie et al. (1996) only for a few high inflation countries. Grier and Perry (1998), Fountas et al. (2004), Daal et al. (2005), Henry et al. (2007), Thornton (2007), Özdemir and Fisunoğlu (2008), and Chen et al. (2008) report mixed evidence to support the hypothesis and even uncover some support for Holland's counter hypothesis in developed and developing countries. Hwang (2001) discovers no statistical evidence for a relationship in the US.

In contrast to time-series tests in individual countries, we apply quantile regressions to the inflation and inflation-variability relationships for a cross-section of 152 countries over 1993 to 2003, returning to the cross-section sampling approach of Okun (1971) and Gordon (1971). Our cross-section analysis exhibits several differences from previous studies. First, we use more sample countries. That is, we employ 152 countries as compared to 17 in Okun (1971), 41 in Logue and Willett (1976), 40 in Foster (1978), 44 in Davis and Kanago (1998), or 24 in Davis and Kanago (2000). A larger sample size can minimize the chances of spurious results from relatively few observations.

Second, the sample period of 1993 to 2003 provides analysis for more recent data that captures several improvements – includes more cross-section observations, covers the period of the Great Moderation, and captures the adoption of targeting. One, we maximize the number of countries within the sample with more recent inflation data. Two, the sample period avoids the issue of potential structural change in inflation variability due to the Great Moderation. That is, inflation increased globally and became more volatile in the 1970s, but since the 1980s, inflation rates fell and became substantially less volatile, as a pattern across many countries. Three, inflation targeting became an increasingly popular monetary policy strategy, since New Zealand's first adoption in 1990. Now, over twenty countries (industrial and emerging market) target inflation with other countries considering the possibility. That is, lower inflation, lower persistence, and lower volatility exist in inflation-targeting countries (Mishkin 1999, King 2002, Mishkin and Schmidt-Hebbel 2007a). Our sample period captures the inflation-targeting era.

Third, we implement quantile regression analysis at different levels of inflation and various degrees of variability. This approach to the issues constitutes an innovation in that prior studies examine Pearson product-moment correlations or ordinary least squares (OLS) regression analysis. Also, we examine both the Friedman-Ball (Okun) hypothesis and the Cukierman-Meltzer hypothesis. Quantile regression permits different (heterogeneous) response effects at different parts of the inflation or inflation variability distributions.

Fourth, in testing the Friedman-Ball and Cukierman-Meltzer hypotheses potential endogeneity of inflation and inflation variability may exist. To control for this issue, we implement instrumental-variable quantile regressions to examine the relationships between inflation and its variability.

Fifth, we use two measures of inflation – the mean and median – and three measures of its variability – the standard deviation, relative variation, and median deviation – to examine the robustness of the relationships, if any. The positive correlation does prove robust across the different measures of level and variability.

Finally, Davis and Kanago (1998, 2000) note that some researchers (Logue and Willet, 1976 and Hafer and Heyne-Hafer, 1981) find that the positive correlation between inflation and its variability does not hold for low inflation countries. Logue and Willett (1976) report insignificant correlation for highly industrialized countries or for those with modest inflation rates between two to four percent over the period 1948-1970.[1] Hafer and Heyne-Hafer (1981) conclude that the threshold level of inflation above which the positive correlation emerges rose from around 4 percent for data in the 1950 to 1970 sample period to around 9 percent for their sample from 1970 to 1979. We split the sample into two different sets of sub-samples. First, we split the sample at the median (i.e., just over 6 percent) and show that, across countries, a significant positive relationship exists between the mean inflation rate and its variability, for both low and high inflation countries. That is, we reject the notion of a threshold effect at 6 percent. Second, we split the low inflation sample (i.e., countries less than the median) at its median (i.e., just under 3 percent), creating low and moderate inflation countries. In this study, we show that low inflation countries with inflation rates below 3 percent exhibit no significant effect of inflation on inflation variability in the period 1993 to 2003.

Finally, we implement two robustness checks on our findings. One, we introduce a set of additional explanatory variables to augment our bivariate results. Two, we address the possible endogeneity of the independent variables by implementing instrumental variables estimation.

---

[1] Gale (1981) reports that a clerical error may explain the insignificant correlation for industrialized countries in the 1949 to 1970 sample.

Quantile regression, developed by Koenker and Bassett (1978) and popularized by Buchinsky (1998), extends estimation of ordinary least squares (OLS) of the conditional mean to different conditional quantile functions. Conditional quantile regressions minimize an asymmetrically weighted sum of absolute errors. Many areas of applied econometrics -- such as investigations of wage structure, earning mobility, educational attainment, value at risk, option pricing, capital structure, and economic development – now employ quantile regressions. Koenker (2000) and Koenker and Hallock (2001) provide an excellent discussion of the intuition behind quantile estimators and various empirical examples. More recently, Chernozhukov and Hansen (2006) and Chernozhukov et al. (2007) extend Koenker and Bassett's (1978) quantile regression model with all exogenous variables to an instrumental variable model to address endogeneity.

We provide the first application of the quantile regression method to the cross-country relationship between inflation and its variability. Our empirical findings support both the Friedman-Ball and Cukierman-Meltzer hypotheses. Moreover, higher inflation and higher inflation variability generally exhibit larger marginal effects and the positive correlation between inflation and its variability proves robust to alternative definition of inflation and its variability. More importantly, we find evidence of thresholds for the effect of inflation (inflation variability) on inflation variability (inflation). That is, for low inflation (inflation variability) countries, inflation (inflation variability) does not affect inflation variability (inflation). Finally, a series of robustness checks, including a set of additional explanatory variables as well as controlling for potential endogeneity with instrumental variables, leaves our findings generally unchanged.

The rest of the paper flows as follows. Section 2 presents a brief review of the quantile regression method and its properties. Section 3 discusses the data and the results. Section 4 considers the possibility of threshold effects. Section 5 includes a set of additional explanatory variables in the quantile regressions as well as quantile regressions with instrumental variables to explore the robustness of our findings. Section 6 concludes.

2. Quantile regressions in inflation and inflation variability

Quantile regression is outlined as follows:

$$y_i = x_i'\beta_\tau + u_{\tau i} \text{ and} \tag{1}$$

$$Quantile_\tau(y_i | x_i) = x_i'\beta_\tau , \tag{2}$$

where y_i equals the dependent variable (i.e., inflation or inflation variability) of country i, x_i' equals a vector of independent variables (i.e., inflation variability or inflation, respectively) of country i, β_τ equals the vector of parameters associated with the τ^{th} quantile (percentile), and $u_{\tau i}$ equals an unknown error term. Unlike ordinary least squares (OLS), the distribution of the error term $u_{\tau i}$ remains unspecified in equation (2). We only require that the conditional τ^{th} quantile of the error term equals zero, that is, $Quantile_\tau(u_{\tau i} | x_i) = 0$. $Quantile_\tau(y_i | x_i) = x_i'\beta_\tau$ equals the τ^{th} conditional quantile of y given x with $\tau \in (0,1)$. By estimating β_τ, using different values of τ, quantile regression permits different parameters across different quantiles of inflation or inflation variability. In other words, repeating the estimation for different values of τ between 0 and 1, we trace the distribution of y conditional on x and generate a much more complete picture of how explanatory variables affect the dependent variable.

Furthermore, instead of minimizing the sum of squared residuals to obtain the OLS (mean) estimate of β, the τ^{th} quantile regression estimate β_τ solves the following minimization problem:

$$\min_\beta \left[\sum_{i \in \{i: y_i \geq x_i'\beta\}} 2\tau |y_i - x_i'\beta| + \sum_{i \in \{i: y_i < x_i'\beta\}} 2(1-\tau)|y_i - x_i'\beta| \right]. \tag{3}$$

That is, the quantile approach minimizes a weighed sum of the absolute errors, where the weights depend on the quantile estimated. Thus, the estimated parameter vector remains less sensitive to outlier observation on the dependent variable than the ordinary-least-squares method. The solution involves linear programming, using a simplex-based algorithm for quantile regression estimation as in Koenker and d'Orey (1987). The median regression occurs when $\tau = 0.5$ and the coefficients of the absolute values both equal one.[2] When $\tau = 0.75$, for example, the weight on the positive errors equals 1.5 and the weight on the negative errors equals 0.5, implying a much higher weight associates with the positive errors and leads to more negative than positive errors. In fact, the optimization leads to 75-percent (25-percent) of the errors less (greater) than zero.

One additional comment distinguishes quantile regression from within quantile OLS regressions. That is, some analysts think that results similar to quantile regression occur when one segments the dependent variable's unconditional distribution and then uses OLS estimation on these subsamples. Koenker and Hallock (2001) argue that such "truncation on the dependent variable" generally fails precisely because of the sample selection issues raised by Heckman (1979).

To conduct parameter tests, we employ the design matrix bootstrap method to obtain estimates of the standard errors, using STATA, for the parameters in quantile regression (Buchinsky, 1998). In every case, we use 10,000 bootstrap replications. This method performs well for relatively small samples and remains valid under many forms of heterogeneity. More conveniently, these bootstrap procedures can deal with the joint distribution of various quantile regression estimators, allowing the use of the F-statistic to test for the equality of slope parameters across various quantiles (Koenker and Hallock, 2001).

---

[2] That is, the least or minimum absolute deviation (LAD or MAD) estimator occurs with $\tau = 0.5$. We insert the twos so that the value of the function equals the LAD or MAD function value when $\tau = 0.5$. Some references exclude the twos, since the estimates prove invariant to its inclusion or exclusion.

We estimate the following two simple linear quantile regression models:[3]

$$V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i} \text{ and} \quad (4)$$

$$\prod_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}, \quad (5)$$

where V_i equals the measure of the inflation-rate variability of country *i* – the standard deviation, relative variation, or median deviation -- over 1993 to 2003, $\prod_i$ equals the measure of the inflation rate of country *i* – mean or median -- over 1993 to 2003, $\gamma_\tau, \delta_\tau, \alpha_\tau$, and β_τ equal unknown parameters that are estimated for different values of τ, and $v_{\tau i}$ and $u_{\tau i}$ equal the random error terms. By varying τ from 0 to 1, we trace the entire distribution of inflation variability (or inflation), conditional on inflation (or inflation variability). Friedman and Ball predict that $\delta_\tau > 0$ and Cukierman and Meltzer, that $\beta_\tau > 0$.

3. Data and empirical results

Annual inflation rates equal the percentage change in the logarithm of the consumer price index (base year in 2000) gathered from the International Monetary Fund (IMF) *International Financial Statistics* for 152 countries from 1993 to 2003. We proxy the inflation-rate variability by the standard deviation, relative variation, or median deviation of the inflation rate.[4] Average and median values of the inflation rates and the three measures of the inflation rate variability in each country comprise 152 sample observations. Table 1 presents the summary statistics as well as statistics for the five countries with the highest and lowest means and standard deviations of the

[3] We also include a number of other potential explanatory variables. See below.

[4] We note that inflation variability measured by the standard deviation will equal inflation uncertainty, when the expected inflation rate of the sample period equals the average inflation rate over that period. That is, inflation uncertainty typically equals the variability of the actual inflation rate around its expected value. So, if average inflation equals the expected inflation, then the standard deviation of the inflation rate will equal the inflation uncertainty as well.

inflation rates.[5] Both the mean and the median exhibit highly right-skewed distributions with outliers, as evidenced by a larger mean than the median. Quantile regression proves robust to departures from normality with skewed tails.

Geometrically, the mean of a variable equals its center of gravity. In Table 1, the mean inflation ranges from 0.1341 percent in Japan to 68.6939 percent in Turkey, and responds significantly to extreme values. The highly skewed distribution (skewness=2.3257) suggests that the median may provide a better alternative to measure central location. The median, a positional value, divides the observations on the inflation rate into two equal parts. It does not equal the mean, and does not respond to extreme values. Different measures of inflation and its variability, that is, the mean and standard deviation versus the median and median deviation, should not influence the relationship between the two variables for a robust relationship. Additionally, in Table 1, the five countries with the highest inflation rates (standard deviations) face higher standard deviations (inflation rates), while countries with the lowest inflation rates (standard deviations) face lower standard deviations (inflation rates). The mean value and its standard deviation appear positively related. This appearance, however, seems to disappear for countries with the lowest inflation rates and the lowest standard deviations. Compare Japan to the US, for example, a lower inflation rate does not mean a lower standard deviation, or *vice versa*. Thus, low-inflation countries may exhibit different patterns between inflation and its variability from high-inflation countries. To consider a unit-free measure, we also consider a relative measure of variation, the standard deviation divided by one plus the mean inflation, as suggested by Davis (1989) and Davis and Kanago (1992), to

[5] Tables A1 and A2 in the Appendix report the average inflation rate and the standard deviation, respectively, for all 152 countries.

measure variability in our analysis.[6]

Table 2 presents results of estimating the quantile regressions, using the mean and standard deviation of the inflation rate, for $\tau = 0.05, 0.25, 0.50, 0.75$ and 0.95, an OLS regression, and F-statistics testing for equality of the estimated slope parameter between various quantiles. The homogeneity test considers whether the five slope coefficients equal each other across the five quantiles. Such tests provide a robust alternative to conventional least-squares-based test of heteroskedasticity, because we can construct them to remain insensitive to outlying response observations.

Panel A1 in Table 2 reports the results of estimating the Friedman-Ball hypothesis. The OLS regression generates positive and significant coefficient of inflation at the 1% level. The five-quantile regression estimates of inflation, conditional on inflation variability, all prove positive and significant at the 1% level. These results support the Friedman-Ball hypothesis that inflation creates inflation variability. Moreover, the quantile regression results illustrate that the marginal effect of inflation on inflation variability increases as one moves from lower to higher inflation variability quantiles. That is, at higher inflation variability quantiles, inflation exerts a larger effect on inflation variability. This evidence suggests that potential information gains associate with the estimation of the entire conditional distribution of inflation variability, as opposed to the conditional mean only. In the bottom of Panel A, significant F-statistics indicate a statistically significant difference in the effect of inflation across the distribution of inflation variability, except between the 0.50^{th} and 0.95^{th}, and 0.75^{th} and 0.95^{th} quantiles. The homogeneity

[6] We originally used the coefficient of variation as a measure of relative uncertainty. An anonymous referee suggested using the measure proposed by Davis and Kango (1992), who use a theoretical model of Driffill, Mizon, and Ulph (1990) and the intuitive example from Davis (1989) to argue that researchers use relative variability (i.e., the standard deviation divided by one plus the mean) to measure inflation uncertainty. An earlier version of this paper provides the results for the coefficient of variation. See University of Connecticut Working Paper #2007-45 at http://ideas.repec.org/s/uct/uconnp.html.

test rejects the null hypothesis that all five slope coefficients equal each other. Inflation exhibits a larger effect on inflation variability for the upper tail distribution of inflation variability than the lower tail. The intercept term does not differ significantly from zero, except at the 0.25^{th} and 0.50^{th} quantiles.

Panel B of Table 2 reports the results of estimating the Cukierman-Meltzer hypothesis. All estimates of inflation variability prove positive and significant at the 1% level. The marginal effects of inflation variability on inflation rise significantly across quantiles except at the 0.95^{th} quantile tail, as the F-statistics, testing for equality of slope estimates across quantiles, demonstrate. The homogeneity test, once again, rejects the null hypothesis that all five slope coefficients equal each other. The intercept term, which proves significantly positive except insignificantly positive at the 0.95^{th} quantile, increases across quantiles. The evidence supports the Cukierman-Meltzer hypothesis.

Table 3 reports the OLS and quantile estimates for the Friedman-Ball and Cukierman-Meltzer hypotheses, using the mean and the relative measure of variation of the inflation rate. The OLS regressions find a significant relationship between inflation and its variability, or vice versa. The constant terms also prove significant. Examining the quantile results, inflation positively affects inflation variability significantly at the 0.05^{th}, 0.25^{th}, and 0.50^{th} quantiles in Panel A, but the coefficients prove small in magnitude. Inflation variability positively affects the inflation rate significantly except at the 0.05^{th} and 0.95^{th} quantiles in Panel B.[7] The constant terms rise across the quantiles and prove significant. Thus, the use of the relative measure

---

[7] The F-statistics testing for the equality of the slope coefficients across quantiles cannot reject equality, except between 0.95^{th} and each of the lower quantiles in the Friedman-Ball model and between 0.05^{th} and each of the higher quantiles in the Cukierman-Meltzer model, at the 10-percent level. The homogeneity tests still reject the null hypothesis that all five slope coefficients equal each other.

of variation, the same as the standard deviation, generally finds support for the Friedman-Ball and Cukierman-Meltzer hypotheses in the OLS and quantile specifications. The widely agreed positive association between inflation and its dispersion proves robust to the relative measure. The findings, however, provide much less support for difference in responses across quantiles, as seen for the standard deviation (see Table 2).

Table 4 reports the estimates for the Friedman-Ball and Cukierman-Meltzer hypotheses, using the median and median deviation of the inflation rate. The OLS regressions find a significant positive relationship between inflation and its variability. Inflation significantly and increasingly affects inflation variability at each of the quantiles.[8] The constant terms prove significantly positive at the higher tails of 0.75th and 0.95th. Similarly, inflation variability significantly affects the inflation rate at each of the quantiles.[9] Thus, the use of the median and the median deviation produces a positive correlation, supporting the Friedman-Ball and Cukierman-Meltzer hypotheses and matching the findings for the mean and standard deviation as well as the mean and the relative variation. The relationship between the mean and relative variation differs from the other two sets of results because differences in responsiveness changes across quantiles appears only at the 0.05th and 0.95th.

4. Does a Threshold Inflation Rate Exist?

Most researchers find a positive relationship between inflation and its variability across countries, as we report in Section 3. A few authors, however, do find that for low inflation countries, the

---

[8] The F-statistics testing for the equality of the slope coefficients across quantiles rejects equality for the 0.75th and 0.95th quantiles relative to the 0.05th, 0.25th, and 0.50th quantiles in the Friedman-Ball model at least at the 5-percent level. The homogeneity test rejects the null hypothesis that all five slope coefficients equal each other.

[9] The F-statistics testing for the equality of the slope coefficients across quantiles rejects equality for the 0.75th and 0.95th quantiles relative to the 0.05th and 0.25th quantiles in the Cukierman-Meltzer model at the 1-, 5-, or 10-percent levels. The homogeneity test, once again, rejects the null hypothesis that all five slope coefficients equal each other.

positive relationship does not prove significant (e.g., Logue and Willet, 1976 and Hafer and Heyne-Hafer, 1981). This section revisits the issue of whether a threshold level of inflation exists before finding the positive correlation between inflation and its variability in the inflation targeting era. The analysis of this section considers the Friedman-Ball and Cukierman-Meltzer hypotheses using only the mean and standard deviation of the inflation rate. A summary of the results for other specifications appears at the end of this section.

The Appendix Table reports the average annual inflation over 1993 to 2003 for all 152 countries. Generally, developed and successful developing countries exhibit low average inflation rates, other countries, which do not develop over time, exhibit high inflation rates. We split the full sample into two sub-samples, low-inflation countries and high-inflation countries, at the median inflation (i.e., 6.1471 percent), to examine the relationship between mean inflation and its standard deviation for each sub-group (76 countries in each group).

Panel A of Table 5 presents the results of estimating the Friedman-Ball hypothesis from the high- and low-inflation country samples, respectively. All slope parameters of inflation in the OLS and quantile regressions prove positive and significant and they rise as we move from lower to higher quantiles. That is, for the Friedman-Ball hypothesis, the same basic pattern of effects occurs across the quantiles for the high and low inflation country samples. This decomposition of our 152-country sample at the median inflation rate shows that inflation variability and the level of inflation positively relate across countries in each group. Thus, no evidence of a threshold effect emerges.

When we estimate and test the Cukierman-Meltzer hypothesis, we first split the full sample at the median standard deviation (i.e., 4.3639 percent) into two sub-samples, high- and low-inflation-variability countries. Panel B of Table 5 presents the estimated results. Since both sample countries exhibit the positive correlation between inflation and its variability significantly, no threshold effect emerges. We note, however, that all significant positive slope parameters in the high-inflation-variability countries prove less than those in the low-inflation-variability countries. This consistent pattern may reflect Holland's (1995) view that the monetary authorities in high-inflation-variability countries actively stabilize the economy. As a result, inflation turns out to be less sensitive to inflation variability, even if not lower, on average.

Policymakers may want to know the inflation rate above which significant increases in variability occur, lowering welfare and output growth. Barro (1995, 1996) finds a negative relationship between inflation and economic growth, Bruno and Easterly (1996), however, argue that the evidence for this negative relationship is weak at low inflation rates. Mishkin and Schmidt-Hebbel (2007b) claim that finding an empirical direct relationship between inflation and growth will not help to discriminate between different inflation goals under 10 percent. They suggest choosing the long-run inflation target that establishes price stability.

Previous studies provide only limited and mixed evidence on the sensitivity of inflation variability to its level in high-, low-, or moderate-inflation regimes. Logue and Willett (1976) find insignificant correlation for countries with moderate inflation between two to four percent. Hafer and Heyne-Hafer (1981) discover the upper bound of the threshold increases sharply from four to nine percent in the 1970s. Ram (1985) argues that although the average inflation rate rises during the 1970s, the level-variability correlation falls in the 1970s. Moreover, a significant positive correlation emerges only when inflation rates exceed eight percent in the 1960 to 1970 sample and twenty percent in the 1972 to 1981 sample. Edmonds and So (1993) discover significant relationships for a group of high- and low-inflation countries, but not for a group of moderate-inflation between six and ten percent. Hess and Morris (1996), on the other hand, demonstrate a significant positive relation for countries with low- and moderate-inflation less than fifteen percent a year. Davis and Kanago (1996) find a significant positive relation in ten high inflation countries, however, the coefficients are no longer significant when David and Kanago (2000) restrict the sample to OECD countries with inflation rates under eight percent. More recently, Kiley (2007) argues that moderate-to-high inflation at levels around four percent per year associate with inflation volatility.

How low (moderate or high) is a low (moderate or high) inflation rate? No theory or empirical analysis gives a definite answer. That is, although sample dates, countries, measures of variability, and sources of data may lead to different results, the relevant policy question for most industrialized countries and many emerging market countries in recent years concerns the benefits from reducing inflation from high or moderate levels to low levels. Our sample period, 1993-2003, encompasses the inflation-targeting era and the period of the Great Moderation. Thus, we search for a threshold level of inflation, if any, based on the inflation targets adopted by inflation-targeting countries. Inflation targeting provides an operational framework for monetary policy to attain price stability. Typically, inflation targets correspond to an annual rate of inflation in the low single digits (Bernanke et al. 1999, Batini and Yates 2003). Table 6 (International Monetary Fund 2005) lists 21 countries that use inflation targets, their inflation-targeting adoption years and their current inflation targets. The Table includes 8 industrial countries and 13 emerging market countries.

The numerical inflation target typically reflects an annual rate for the CPI in the form of a range, such as one to three percent (e.g., New Zealand and Canada). Alternatively, the inflation rate target equals a point target with a range, such as a two-percent target plus or minus one percent (e.g., Sweden) or a point target without any explicit range, such as a two-percent target (e.g., the United Kingdom). For industrial countries, the targets range between zero and three percent. For emerging market countries, they all adopt a target range or a point target with a range. The middle of the range or the point target generally exceeds that in the industrial countries. The range runs from zero and six percent (except for seven percent in Brazil), which nearly matches the range from zero to median inflation rate (6.1471 percent) in our sample. We saw in Panel B of Table 5 that inflation variability positively and significantly relates to the inflation rate for the sample of inflation rates between zero and 6.1471 percent. The practice of inflation targeting in the world leaves open the question of whether inflation variability differ in high or low inflation-targeting regimes, even at the already lower level of inflation. Thus, we further break our sample at a lower inflation rate to look for a threshold. An examination of our sample data, the median inflation of our 76 low-inflation countries (or, equivalently, the 25 percent of our 152 countries) equals 2.9349 percent, which matches the edge of the three percent rate target for the industrial countries. The specification of the optimal long-run inflation goal remains an unsolved issue that is central to inflation-targeting regimes. Mishkin and Schmidt-Hebbel (2007b) suggest that any inflation target between 0 and 3 percent seems appropriate for price stability (p.426). We, thus, split our 76 low-inflation countries at its median inflation into two groups (38 countries in each) – low and moderate inflation rate countries.

Panel A of Table 7 presents the estimation results from the moderate- and low-inflation country samples, respectively. For the moderate-inflation countries, all slope parameters of inflation in the OLS and quantile regressions prove positive and significant, except at the 0.50^{th} quantile. That is, the Friedman-Ball hypothesis holds in countries with moderate inflation rates. For the low-inflation countries, however, all slope parameters in the OLS and quantile regressions appear insignificant, where marginal effects of inflation prove much lower than the similar effects in the moderate countries. In sum, different effects occur across quantiles for the moderate and low inflation country samples.

Considerable evidence exists that inflation and its variability positively correlate across countries. Our findings demonstrate that a threshold level of inflation does exist before the positive correlation emerges. The threshold occurs around the three percent inflation rate. Countries with inflation rates below the threshold, such as those industrial countries adopting and achieving inflation targets of less than three percent, generally find no association between inflation and its variability. Countries that achieve their inflation rate targets above the threshold, such as most emerging market countries, face the fact that higher inflation associates with higher inflation variability. This evidence suggests that if the authorities want to eliminate the uncertainty of inflation, then inflation targets must not exceed the threshold of three percent.

We further examine whether a threshold level of inflation variability exists in low-variability countries. We split the 76 low-inflation-variability countries at its standard deviation (i.e., 1.7284 percent) into two sub-samples for the moderate- and low-inflation-variability countries. Panel B of Table 7 presents the estimated results for the two subsamples separately. The significant OLS estimate of the slope proves less in the moderate-inflation-variability countries than in the low-inflation-variability countries, the latter is significant at the 10-percent level. The quantile regressions provide diverse, non-systematic results. At low quantiles (i.e., 0.05^{th}, 0.25^{th}, and 0.50^{th}), the significant positive slope parameters suggest that the moderate-inflation-variability countries exhibit higher marginal effects of inflation variability than low-inflation-variability countries. The situation reverses at high quantiles (0.75^{th} and 0.95^{th}), however. Higher marginal effects emerge in the low-inflation-variability countries. The evidence of a threshold level of inflation variability in the Cukierman-Meltzer model proves weaker than that of the Friedman-Ball model.

We also examine the threshold effect, if any, for the mean and relative variation and the median and median deviation for the two hypotheses. For the Friedman-Ball hypothesis, the use of the median and the median deviation identifies a threshold effect. That is, in those countries with inflation rates below the median inflation rate 2.3879 (i.e., the 25 percent of our 152 countries), the relationship between inflation and its variability proves insignificant. The use of the mean and the relative variation, however, exhibits no evidence of a threshold effect. For the Cukierman-Meltzer hypothesis, neither of the two sets of measures displays a threshold effect. As a comparison, using the mean and standard deviation in the text, we find a threshold effect below the inflation rate 2.9349 (or, equivalently, the 25 percent of our 152 countries) for the Friedman-Ball hypothesis, while no evidence of a threshold effect emerges for the Cukierman-Meltzer hypothesis. In sum, our empirical evidence of the threshold effect for the mean and standard deviation and the median and median deviation does not prove robust to the relative measure. Thus, this study raises one issue that deserves further attention: which measure more appropriately captures variability – absolute or relative measure.

5. Robustness Checks: Additional Explanatory Variables and Instrumental Estimation

This section considers the robustness of our findings by conducting a multiple regression model including a set of additional explanatory variables and an instrumental variable estimation. Initially, we consider those factors associated with the level of inflation and its variability. Then, we implement an analysis, using of instrumental variables.

In their study evaluating quantitative goals of monetary policy for 42 countries from 1960 to 2000, Fatás et al. (2007) indentify four factors that significantly lower inflation -- an inflation targeting dummy variable, openness measured by exports plus imports as a percentage of GDP, the budget surplus as a percentage of GDP, and real GDP per capita.[10] Tables 8, 9, 10, 11, 12, and 13 report estimation results from including this set of regressors for our full sample of countries. The coefficients δ_τ and β_τ capture the effect of inflation on inflation variability and the effect of inflation variability on inflation, respectively, in the two models. They are significantly positive and generally correspond to the estimates without these conditioning variables in Tables 2, 3, and 4. Our findings seem robust. Caveats certainly exist, however. Almost all of the auxiliary regressors are not significant. Fatás et al. (2007) use OLS estimation. They also find no effect of the inflation targeting dummy variable on inflation variability, once they control for the level of inflation as shown in Panels A. For the Cukierman-Meltzer hypothesis, we find that only inflation variability affects inflation significantly. Inflation targeting affects inflation positively or negatively, but all coefficients, save one, are insignificant in Panels B. In Fatás et al. (2007) when they use post-1982 data estimating their inflation regression model, they find that only inflation targeting and real GDP per capital exhibit significance.[11]

Tables 14, 15, and 16, respectively, report the sensitivity of the results with respect to inclusion of the four factors for the high-, moderate-, and low-inflation countries and high-, moderate-, and low-inflation-variability countries.[12] [13] The Friedman-Ball regression model reports insignificant coefficients of inflation, δ_τ, for the OLS and each of the quantiles only in the

[10] The authors also include the difference between real GDP growth and average GDP growth as a business cycle variable in their study, which proves insignificant in many cases. We drop this variable in this study.

[11] We find that real GDP per capital becomes significant negative in 25-percent of the coefficient estimates and the budget surplus to GDP becomes significantly positive for three coefficients in the Freidman-Ball specification (never significant in the Cukierman-Meltzer specification. Exports plus imports to GDP never achieves a significant coefficient.

[12] To repeat, high-inflation (variability) means the inflation rate (variability) above 6.1471 (4.3639); moderate-inflation (variability) denotes the inflation rates (variability) between 2.9349 (1.7284) and 6.1471 (4.3639); and low-inflation (variability) represents the inflation rate (variability) below 2.9349 (1.7284).

[13] Note that in Table 6, industrial countries adopt inflation targets below 3 percent and most of those emerging market economies adopt inflation targets between 3 to 6 percent.

low-inflation countries (Table 16). The conclusion of no association between inflation and its variability in countries with inflation rates below three percent also holds when we include the inflation targeting dummy variable (IT) and the other three covariates. The Cukierman-Meltzer model, including the four variables in the OLS regression, reports significant coefficients on inflation variability, β_τ, at least at the 10 percent level in the three Tables as in Table 7. All the effects in quantile regressions, however, appear insignificant in the low-inflation-variability countries (Table 16). According to this evidence, a threshold level of inflation variability at 1.7284 percent in the Cukierman-Meltzer model exists. For the low-inflation and low-inflation-variability countries in Table 16, the policy dummy variable (IT) does not significantly influence the inflation rate or inflation variability. Ball and Sheridan (2005) and Lin and Ye (2007) also find insignificant effects of the inflation targeting monetary policy on inflation or inflation variability for developed countries, which generally experience low inflation rates and low inflation variability.

Tables 17, 18, and 19 use instrumental variable estimation to account for possible endogeneity in each of the two equations for the full sample. Barro (1995, 1996) proposes the use of lagged inflation to isolate exogenous variation in inflation. We extend our coverage to include the inflation targeting dummy variable, since inflation targeting countries exhibit, on average, low inflation and low inflation variability, as well as lagged values of openness, the budget surplus to GDP, and real GDP per capita.

Thus, in the first stage of our two-stage estimation, we estimate the reduced form equations for inflation and inflation variability, where inflation (inflation variability) relates to lagged inflation (inflation variability) over the five years (1988-1992) prior to the sample period (1993-2003) as an instrument along with the inflation targeting dummy variable and the lagged values openness, the budget surplus to GDP, and real GDP per capita. We estimate the unknown parameters in the reduced form equations by OLS. In the second stage, we estimate equations (4) and (5) by OLS and quantile regressions, except that we replace inflation (Π_i) and inflation variability (V_i) with their predicted values from the first stage regression.

Tables 17, 18, and 19 report estimates, δ_τ and β_τ, from the bivariate regression models, since the additional explanatory variables generally prove insignificant in the multivariate regressions, for the four groups of sample countries. The instrumental variables of inflation and inflation variability seem to work well. For all the sample countries except the low-inflation ones, the estimates, δ_τ and β_τ, for the Friedman-Ball and Cukierman-Meltzer hypotheses are significantly positive and consistent with the findings of our models when we use actual mean and median inflation rates and the standard deviation, relative variability, and median deviation in estimations. The use of the instrumental variables suggests that the estimated relation between inflation and inflation variability does not represent reverse effects of inflation variability on inflation or of inflation on inflation variability. It remains true that the insignificant influence of inflation on inflation variability, δ_τ, shows up only in the low-inflation countries for the Friedman-Ball hypothesis. In addition, we find mixed results for the effect of inflation variability on inflation, β_τ, in the low-inflation-variability countries for the Cukierman-Meltzer hypothesis.

Tables 20, 21, and 22 present the estimation results from the high-, moderate- and low-inflation country samples, respectively. For the high- and moderate-inflation countries, all slope parameters of inflation in the OLS and quantile regressions prove positive and significant. That is, the Friedman-Ball hypothesis holds in countries with high and moderate inflation rates. For the low-inflation countries, however, all slope parameters in the OLS and quantile regressions appear insignificant, where marginal effects of inflation prove much lower than the similar effects in the high- and moderate-inflation-rate countries. In sum, different effects occur across quantiles for the high- and moderate-inflation versus the low-inflation country samples. More specifically, the individual slope coefficients increase monotonically across quantiles. Moreover, these individual coefficients differ significantly from each other across all pairs of quantiles, except for the 0.05^{th} and 0.25^{th} quantiles for the high-inflation countries.

Considerable evidence exists that inflation and its variability positively correlate across countries. Our findings demonstrate that a threshold level of inflation does exist before the positive correlation emerges. The threshold occurs around the three percent inflation rate. Countries with inflation rates below the threshold, such as those industrial countries adopting and achieving inflation targets of less than three percent, generally find no association between inflation and its variability. Countries that achieve their inflation rate targets above the threshold, such as most emerging market countries, face the fact that higher inflation associates with higher inflation variability. This evidence suggests that if the authorities want to eliminate the uncertainty of inflation, then inflation targets must not exceed the threshold of three percent.

We further examine whether a threshold level of inflation variability exists in low-variability countries. As noted above, we split the 76 low-inflation-variability countries at its median standard deviation (i.e., 1.7284 percent) into two sub-samples for the moderate- and low-inflation-variability countries. Table 20, 21, and 22 present the estimated results for the three sub-samples separately. The significant OLS estimate of the slope proves less in the low-inflation-variability countries than in the high- and moderate-inflation-variability countries. The quantile regressions find insignificant slope coefficients for low-inflation-variability countries, except at the 0.95^{th} quantile. The high- and moderate-inflation-variability countries all experience significant positive slope coefficients. Moreover, the magnitudes of the effect for the moderate-inflation-variability countries exceed that for the high-inflation-variability countries.

The evidence of a threshold level of inflation variability in the Cukierman-Meltzer model proves only marginally weaker than that of the Friedman-Ball model. The individual slope coefficients for the high-inflation-variability countries increase monotonically from the lowest to the highest quantiles. Moreover, the individual slope coefficients differ from each other across all pairs of quantiles. None of the individual slope coefficients differ across all quantile pairs for the moderate-inflation-variability countries.

We also examine the threshold effect, if any, for the mean and relative variation and the median and median deviation for the two hypotheses. For the Friedman-Ball hypothesis, the use of the mean and relative variation or the median and median deviation identifies a threshold effect. That is, in those countries with inflation rates below the median inflation rate 2.3879 (i.e., the 25 percent of our 152 countries), the relationship between inflation and its variability proves insignificant (see Tables 25 and 28). For high- and moderate-inflation countries, we find a positive and significant relationship (see Tables 23, 24, 26, and 27), except for the 0.05^{th} quantile for high-inflation countries in Table 23. For the Cukierman-Meltzer hypothesis, both sets of measures display a threshold effect. That is, no significant slope coefficient exists across the quantiles in Tables 25 and 28. In sum, our empirical evidence of the threshold effect for the mean and standard deviation proves robust to the mean and relative variation as well as the median and median deviation measures.

6. Conclusion

Using cross-sectional data on 152 countries over the period 1993 to 2003 our empirical results support both hypotheses of Friedman-Ball and Cukierman-Meltzer from the parametric quantile model when we use the mean and standard deviation, the mean and relative variation, or the median and median deviation of the inflation rate to measure inflation and its variability. First, inflation and inflation variability positively relate to each other across quantiles. Second, higher inflation associates with more inflation variability, supporting the Friedman-Ball hypothesis. Third, inflation variability raises inflation, supporting the Cukierman-Meltzer hypothesis. The results for the mean and the relative variation as well as the median and median deviation specifications provide nearly the same support for both hypotheses.

Given the positive relationship between inflation and its variability across countries, we explore the possibility of threshold effects. We find evidence of a threshold effect in the Friedman-Ball hypothesis. That is, for inflation rates under 3 percent, higher inflation does not associate with higher inflation variability. This finding is robust in a multivariate regression that includes a set of additional explanatory variables or in instrumental variables regressions to correct for any potential endogeneities. This finding proves consistent with those of Logue and Willett (1976) and Hafer and Heyne-Hafer (1981), who find threshold inflation rates of 4 and 9 percent, respectively. Given differences in average inflation rates in the differing sample periods, our 3 percent threshold seems in the ballpark for the sample period that includes the Great Moderation. This evidence also supports Mishkin and Schmidt-Hebbel's (2007b) conjecture that the long-run inflation target between 0 and 3 percent is reasonable, operational, and consistent with price stability. Kiley (2007) shows that many inflation targeters in developing countries pursue moderate to high (above 4 percent annually) targets and that this may contribute to inflation instability. "Lower target inflation rates may contribute to macroeconomic stability."(p.196). Ball and Sheridan (2005) and Lin and Ye (2007) find insignificant effects of the inflation targeting monetary policy on inflation variability for developed countries, which all target the inflation rate below 3 percent as shown in Table 2. We also find similar evidence of a threshold effect for inflation variability in the Cukierman-Meltzer hypothesis.

Prior cross-section studies examined the relationship between inflation and its variability using data from the 1950s, the 1960s, the 1970s, and the 1980s. Logue and Willett (1976) argue that cross-section tests prove valuable as long as the governments do not alter their long-run inflation objectives within the sample period. Our current analysis of the 1993 to 2003 sample period covers a period of time when many countries adopted inflation targeting. As such, our findings provide new evidence for a different inflation regime.

References

Baillie, R., Chung, C., and Tieslau, M., 1996. Analyzing inflation by the fractionally integrated ARFIMA-GARCH model. *Journal of Applied Econometrics* 11, 23-40.

Ball, L., 1992. Why does high inflation raise inflation uncertainty. *Journal of Monetary Economics* 29, 371-388.

Ball, L., and Cecchetti, S., 1990. Inflation and uncertainty at short and long horizons. *Brookings Paper on Economic Activity* No.1, 215-245.

Ball, L., and Sheridan, N., 2005. Does inflation targeting matter? In Bernanke, B. and Woodford, M. (eds.), *The Inflation Targeting Debate,* Chicago: The University of Chicago Press.

Barro, R. J., 1995. Inflation and economic growth. *Bank of England Quarterly Bulletin*, May, 166-176.

Barro, R. J., 1996. Inflation and growth. Federal Reserve Bank of St. Louis *Review*, 78(3), 153-169.

Batini, N., and Yates, A., 2003. Hybrid inflation and price-level targeting. *Journal of Money, Credit and Banking* 35, 283-300.

Bernanke, B. S., Laubach, T., Mishkin, F. S., and Posen, A. S., 1999. Inflation targeting: Lessons from the international experience. Princeton, N.J.: Princeton University Press.

Bhar, R., and Hamori, S., 2004. The link between inflation and inflation uncertainty: Evidence from G7 countries. *Empirical Economics* 29, 825-853.

Bruno, M., and Easterly, W. 1996. Inflation and growth in search of a stable relationship. Federal Reserve Bank of St. Louis *Review*, 78(3), 139-146.

Buchinsky, M., 1998. Recent advances in quantile regression models: a practical guideline for empirical research. *Journal of Human Resources* 33, 88-126.

Chen, S. W., Shen, C. H., and Xie, Z., 2008. Evidence of a nonlinear relationship between inflation and inflation uncertainty: The case of the four little dragons. *Journal of Policy Modeling* 30, 363-376.

Chernozhukov, V., and Hansen, C., 2006. Instrumental quantile regression inference for structural and treatment effect models. *Journal of Econometrics* 132, 491-525.

Chernozhukov, V., and Hansen, C., and Jansson, M., 2007. Inference approaches for instrumental variable quantile regression. *Economics Letters* 95, 272-277.

Conrad, C., and Karanasos, M., 2005. On the inflation-uncertainty hypothesis in the USA, Japan and the UK: a dual long memory approach. *Japan and the World Economy* 17, 327-343.

Cosimano, T., and Jansen, D., 1988. Estimates of the variance of US inflation based on the ARCH model. *Journal of Money, Credit and Banking* 20, 409-421.

Cukierman, A., and Meltzer, A., 1986. A theory of ambiguity, credibility, and inflation under discretion and asymmetric information. *Econometrica* 54, 1099-1128.

Daal, E., Naka, A., and Sanchez, B., 2005. Re-examining inflation and inflation uncertainty in developed and emerging countries. *Economics Letters* 89, 180-186.

Davis, G., 1989. Relative uncertainty. *Economics Letters* 29, 307-310.

Davis, G., and Kanago, B., 1992. Misspecification bias in models of the effect of inflation uncertainty. *Economics Letters* 38, 325-329.

Davis, G., and Kanago, B., 1996. The missing link: intra-country evidence on the relationship between high and uncertain inflation from high-inflation countries. *Southern Economic Journal* 63, 205-222.

Davis, G., and Kanago, B., 1998. High and uncertain inflation: results from a new data set. *Journal of Money, Credit and Banking* 30, 218-230.

Davis, G., and Kanago, B., 2000. The level and uncertainty of inflation: results from OECD forecasts. *Economic Inquiry* 38, 58-72.

Driffill, J., Mizon, G., and Ulph, A., 1990. Costs of inflation. In Friedman, B., and Hahn, F., *Handbook of Monetary Economics,* Vol. II. New York, North-Holland, 1013-1066.

Edmonds, R. G., and So, J. C., 1993, Variability and inflation: Evidence from developed and developing countries. *Journal of Macroeconomics* 15, 679-708.

Engle, R.F., 1982. Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica* 50, 987-1007.

Engle, R.F., 1983. Estimates of variance of US inflation based on ARCH model. *Journal of Money, Credit and Banking* 15, 286-301.

Evans, M., 1991. Discovering the link between inflation rates and inflation uncertainty. *Journal of Money, Credit and Banking* 23, 169-184.

Fatás, A., Mihov, I., and Rose, A. K., 2007. Quantitative goals for monetary policy. *Journal of Money, Credit and Banking* 39, 1163-1176.

Foster, E., 1978. The variability of inflation. *Review of Economics and Statistics 60*, 346-350.

Fountas, S., 2001. The relationship between inflation and inflation uncertainty in the UK: 1885-1998. *Economics Letters* 74, 77-83.

Fountas, S., Ioannidis, A., and Karanasos, M., 2004. Inflation, inflation uncertainty and a common European monetary policy. *Manchester School* 72, 221-242.

Friedman, M., 1977. Nobel lecture: inflation and unemployment. *Journal of Political Economy* 85, 451-472.

Gale, W. A., 1981. Temporal variability of United States consumer price index. *Journal of Money, Credit and Banking* 13, 273-297.

Gordon, R. J., 1971. Steady anticipated inflation: Mirage or oasis? *Brookings Papers on Economic Activity*, 499-510.

Grier, K. B., and Perry, M. J., 1998. On inflation and inflation uncertainty in the G7 countries. *Journal of International Money and Finance* 17, 671-689.

Hafer, R. W., and Heyne-Hafer, G., 1981. The Relationship between Inflation and Its Variability: International Evidence from the 1970s. *Journal of Macroeconomics* 3, 571-77.

Heckman, J. J., 1979. Sample selection bias as a specification error. *Econometrica* 47, 153-61.

Henry, O. T., Olekalns, N., and Suardi, S., 2007. Testing for rate dependence and asymmetry in inflation uncertainty: Evidence from the G7 economies. *Economics Letters* 94, 383-388.

Hess, G. D., and Morris, C. S., 1996. The long-run costs of moderate inflation. Federal Reserve Bank of Kansas City *Economic Review*, 71-88.

Holland, A. S., 1995. Inflation and uncertainty: tests for temporal ordering. *Journal of Money, Credit and Banking* 27, 827-837.

Hwang, Y., 2001. Relationship between inflation rate and inflation uncertainty. *Economics Letters* 73, 179-186.

International Monetary Fund, 2005. Does inflation targeting work in emerging markets? IMF *World Economic Outlook*. Washington D.C.: International Monetary Fund.

Johnson, H. G.., 1967. *Essays in Monetary Economics.* Cambridge, Mass: Harvard University Press.

Katsimbis, G. M., and Miller, S. M., 1982. The relation between the rate and variability of inflation: further comments. *Kyklos* 35, 456-467.

Kiley, M., 2007. Is moderate-to-high inflation inherently unstable? *International Journal of Central Banking* 3, 173-201.

King, M., 2002. The inflation target ten years on. Speech delivered to the London School of Economics. 19 November, London, England.

Koenker, R., 2000. Galton, Edgeworth, Frisch, and prospects for quantile regression in econometrics. *Journal of Econometrics* 95, 347-374.

Koenker, R., and Bassett, G., 1978. Quantile regression. *Econometrica* 46, 33-50.

Koenker, R., and d'Orey, V., 1987. Computing regression quantiles. *Applied Statistics* 36, 383-393.

Koenker, R., and Hallock, K. F., 2001. Quantile regression. *Journal of Economic Perspectives* 15, 143-156.

Kontonikas, A., 2004. Inflation and inflation uncertainty in the United Kingdom, evidence from GARCH modelling. *Economic Modelling* 21, 525-543.

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.

Logue, A. M., and Willett, T. D., 1976. A note on the relation between the rate and variability of inflation. *Economica* 43, 151-158.

Mishkin, F. S., 1999. International experiences with different monetary policy regimes. *Journal of Monetary Economics* 43, 579-605.

Mishkin, F. S., and Schmidt-Hebbel, K. 2007a. Monetary policy under inflation targeting: An introduction. In Mishkin, F. and Schmidt-Hebbel, K. (eds.), *Monetary Policy Under Inflation Targeting*, Santiago, Chile: Banco Central de Chile.

Mishkin, F. S., and Schmidt-Hebbel, K. 2007b. A decade of inflation targeting in the world: What do we know and what do we need to know? In Frederic S. Mishkin (ed,), *Monetary Policy Strategy*, MIT Press, Cambridge, MA.

Okun, A. M., 1971. The mirage of steady inflation. *Brookings Papers on Economic Activity*, 485-498.

Özdemir Z. A., and Fisunoğlu, M., 2008. On the inflation-uncertainty hypothesis in Jordan, Philippines and Turkey: A long memory approach. *International Review of Economics & Finance* 17, 1-12.

Ram, R., 1985. Level and variability of inflation: Time-series and cross-section evidence from 117 countries. *Economica* 52, 209-223.

Thornton, J., 2007. The relationship between inflation and inflation uncertainty in emerging market economies. *Southern Economic Journal* 73, 858-870.

Thornton, J., 2008. Inflation and inflation uncertainty in Argentina, 1810-2005. *Economics Letters* 98, 247-252.

Ungar, M., and Zilberfarb, B., 1993. Inflation and its unpredictability-theory and empirical evidence. *Journal of Money, Credit and Banking* 25, 709-720.

Table 1: Summary Statistics, 1993-2003

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Mean Inflation	10.4803	6.1471	11.5342	0.1341	68.6939
Median Inflation	7.7287	4.5901	8.9223	-0.1267	66.0971
Standard Deviation	8.8951	4.3639	10.3310	0.4108	50.1844
Relative Variation	0.7109	0.5789	0.4489	0.1325	2.2854
Median Deviation	9.4901	4.5462	11.2509	0.4220	54.1824

Five Countries with Lowest Mean Inflation:

Variable	Japan	Saudi Arabia	Bahrain	Panama	Switzerland
Mean Inflation	0.1341	0.4251	0.7144	1.0299	1.0831
Median Inflation	-0.1267	0.2301	0.5292	1.2472	0.8248
Standard Deviation	0.8613	1.7184	1.4749	0.4108	0.8697
Relative Variation	0.7594	1.2058	0.8603	0.2024	0.4175
Median Deviation	0.9037	1.7305	1.4877	0.4697	0.9109

Five Countries with Highest Mean Inflation:

Variable	Venezuela	Zimbabwe	Sudan	Romania	Turkey
Mean Inflation	**40.9447**	**47.5610**	**50.9852**	**58.5441**	**68.6939**
Median Inflation	**35.7827**	**29.7040**	**31.8777**	**42.2479**	**66.0971**
Standard Deviation	**25.5075**	**38.0382**	**50.1844**	**47.7647**	**23.0884**
Relative Variation	**0.6081**	**0.7833**	**0.9654**	**0.8022**	**0.3313**
Median Deviation	**26.0758**	**42.4406**	**54.1824**	**50.7596**	**23.2485**

Five Countries with Lowest Standard Deviation of Inflation:

Variable	Panama	Denmark	France	United States	Belgium
Mean Inflation	**1.0299**	**2.1613**	**1.5734**	**2.4939**	**1.8736**
Median Inflation	**1.2472**	**2.1114**	**1.6915**	**2.6074**	**1.6427**
Standard Deviation	**0.4108**	**0.4188**	**0.5522**	**0.5727**	**0.6036**
Relative Variation	**0.2024**	**0.1325**	**0.2146**	**0.1639**	**0.2101**
Median Deviation	**0.4697**	**0.4220**	**0.5659**	**0.5849**	**0.6504**

Five Countries with Highest Standard Deviation of Inflation:

Variable	Macedonia	Lao PDR	Bulgaria	Romania	Sudan
Mean Inflation	**16.1209**	**31.9632**	**39.9488**	**58.5441**	**50.9852**
Median Inflation	**2.3906**	**15.4894**	**14.4943**	**42.2479**	**31.8777**
Standard Deviation	**39.1288**	**39.9621**	**44.4381**	**47.7647**	**50.1844**
Relative Variation	**2.2854**	**1.2123**	**1.0852**	**0.8022**	**0.9654**
Median Deviation	**41.7197**	**43.5373**	**51.9103**	**50.7596**	**54.1824**

Note: Inflation equals the annual rate calculated as the percentage change in the logarithm of consumer price index. The standard deviation, relative variation, and median deviation of the inflation rate proxy for inflation variability, where the relative variation equals the standard deviation of inflation divided by one plus the mean of inflation as suggested by Davis and Kanago (1992).

Table 2: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95^{th}
γ_τ	0.9770 (0.23)	-0.2755 (0.33)	-0.4388** (0.02)	-0.5396** (0.03)	0.7216 (0.38)	3.7429 (0.18)
δ_τ	0.7555*** (0.00)	0.3401*** (0.00)	0.5555*** (0.00)	0.8162*** (0.00)	1.0410*** (0.00)	1.1950*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	4.76** (0.03)			
0.50th	31.89*** (0.00)	8.28*** (0.00)		
0.75th	48.60*** (0.00)	18.68*** (0.00)	8.02*** (0.01)	
0.95th	9.12*** (0.00)	4.80** (0.03)	1.91 (0.17)	0.32 (0.57)
Homogeneity F-Test	11.82*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95^{th}
α_τ	2.1032*** (0.00)	0.7271* (0.07)	0.8615** (0.01)	1.5311*** (0.00)	2.1072*** (0.00)	5.9568 (0.22)
β_τ	0.9418*** (0.00)	0.4093*** (0.00)	0.7135*** (0.00)	0.9249*** (0.00)	1.1776*** (0.00)	1.4698*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	11.33*** (0.00)			
0.50th	27.50*** (0.00)	5.14** (0.02)		
0.75th	46.48*** (0.00)	16.75*** (0.00)	7.84*** (0.01)	
0.95th	3.89*** (0.00)	1.97 (0.16)	1.06 (0.31)	0.32 (0.57)
Homogeneity F-Test	12.98*** (0.00)			

Note: *V* equals the standard deviation of the inflation rate and *Π* equals the mean inflation rate. F-statistics test for the equality of the slope estimate across quantiles. The homogeneity F-statistic tests for the equality of the slope coefficient across all quantiles. Numbers in parentheses equal p-values. We use 10,000 bootstrap replications to obtain estimates of the standard errors, using STATA, for the parameters in quantile regression (Buchinsky, 1998).

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 3: Model Estimates: Mean and Relative Variation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.6526***	0.2004***	0.2908***	0.5051***	0.9372***	1.6354***
	(0.00)	(0.000)	(0.00)	(0.00)	(0.00)	(0.00)
δ_τ	0.0056**	0.0019**	0.0087***	0.0090***	0.0037	-0.0131
	(0.05)	(0.02)	(0.00)	(0.01)	(0.51)	(0. 49)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	0.70 (0.40)			
0.50th	0.44 (0.51)	0.01 (0.93)		
0.75th	0.12 (0.73)	0.81 (0.37)	1.06 (0.30)	
0.95th	7.89*** (0.01)	14.69*** (0.00)	12.47*** (0.00)	6.47*** (0.01)
Homogeneity F-Test	5.42*** (0.01)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	7.8733***	1.0724**	1.7564***	3.9503***	7.5738***	13.6245**
	(0.00)	(0.05)	(0.00)	(0.01)	(0.00)	(0.04)
β_τ	3.6674**	0.8303**	2.3263***	3.3863*	8.8028***	15.1268**
	(0.03)	(0.04)	(0.00)	(0.07)	(0.00)	(0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	5.63* (0.02)			
0.50th	3.23* (0.07)	0.27 (0.60)		
0.75th	3.92** (0.05)	2.55 (0.11)	2.03 (0.16)	
0.95th	3.32* (0.07)	1.17 (0.28)	0.21 (0.65)	1.03 (0.31)
Homogeneity F-Test	4.18*** (0.00)			

Note: See Table 2. *V* equals the standard deviation of inflation divided by one plus the mean of inflation and *Π* equals the mean inflation rate. Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 4: Model Estimates: Median and Median Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95th
γ_τ	3.6033*** (0.00)	-0.3312 (0.22)	-0.0152 (0.97)	0.2991 (0.51)	3.4637** (0.04)	11.5234** (0.02)
δ_τ	0.7617*** (0.00)	0.3567*** (0.00)	0.4765*** (0.00)	0.7417*** (0.00)	1.2889*** (0.00)	2.0668*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	1.35 (0.25)			
0.50th	5.84 (0.02)	4.05** (0.05)		
0.75th	11.84*** (0.00)	10.42*** (0.00)	5.30** (0.02)	
0.95th	6.70*** (0.01)	5.98** (0.02)	4.19** (0.04)	1.53 (0.22)
Homogeneity F-Test	3.75*** (0.01)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95th
α_τ	3.1828*** (0.00)	0.7898*** (0.01)	1.3728*** (0.00)	2.0893*** (0.00)	3.5524*** (0.00)	5.7856 (0.23)
β_τ	0.4790*** (0.00)	0.0384*** (0.00)	0.2528*** (0.00)	0.4568*** (0.00)	0.6538*** (0.00)	1.3066*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	13.98*** (0.00)			
0.50th	19.27*** (0.00)	6.60*** (0.01)		
0.75th	14.62*** (0.00)	6.83*** (0.01)	1.93 (0.17)	
0.95th	7.62*** (0.01)	5.32** (0.02)	3.50* (0.06)	2.29 (0.13)
Homogeneity F-Test	7.16*** (0.00)			

Note: See Table 2. *V* equals the median deviation of the inflation rate and *Π* equals the median inflation rate. Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 5: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

High-Inflation Countries

	Quantile					
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	2.3651	-0.8919	-2.4655*	-1.1654	2.0942	6.1672
	(0.12)	(0.18)	(0.06)	(0.55)	(0.38)	(0.15)
δ_τ	0.7048***	0.3491***	0.6832***	0.8358***	0.9432***	1.0573***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Low-Inflation Countries

	Quantile					
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-0.6828	-0.4203	-0.4416*	-0.4416	-0.8877	1.0100
	(0.20)	(0.00)	(0.10)	(0.25)	(0.414)	(0.33)
δ_τ	1.1149***	0.4351***	0.6317***	0.8276***	1.6226***	1.6663***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Panel B: Cukierman-Meltzer Regression Model, $\prod_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

High-Inflation-Variability Countries

	Quantile					
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	2.0941	0.8250	-1.6393	-0.6138	2.3117	7.8486
	(0.13)	(0.30)	(0.14)	(0.78)	(0.34)	(0.26)
β_τ	0.9397***	0.4063***	0.8409***	1.0162***	1.1584***	1.2975***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Low-Inflation-Variability Countries

	Quantile					
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	0.8411**	-0.0655	0.5306	0.7623	1.2080*	3.8657
	(0.02)	(0.91)	(0.15)	(0.12)	(0.09)	(0.30)
β_τ	1.6120***	0.8342***	1.1869***	1.4376***	1.7695***	2.0898***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: See Table 2. We split the full-sample (152 countries) into high-inflation (-variability) countries and low-inflation (-variability) countries (76 countries in each group) at the median inflation rate 6.1471 percent (at the median standard deviation 4.3639 percent). Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 6: Countries that Target Inflation

	Inflation Targeting Adoption Year*	Current Inflation Target (percent)
Emerging market countries		
Israel	1997	1-3
Czech Republic	1998	3(+/-1)
Korea	1998	2.5-3.5
Poland	1999	2.5(+/-1)
Brazil	1999	4.5(+/-2.5)
Chile	1999	2-4
Colombia	1999	5(+/-0.5)
South Africa	2000	3-6
Thailand	2000	0-3.5
Mexico	2001	3(+/-1)
Hungary	2001	3.5(+/-1)
Peru	2002	2.5(+/-1)
Philippines	2002	5-6
Industrial countries		
New Zealand	1990	1-3
Canada	1991	1-3
United Kingdom	1992	2
Australia	1993	2-3
Sweden	1993	2(+/-1)
Switzerland	2000	<2
Iceland	2001	2.5
Norway	2001	2.5

Note: IMF, World Economic Outlook, 2005.

* This year indicates when countries de facto adopted inflation targeting. Official adoption dates may vary.

Table 7: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \Pi_i + v_{\tau i}$

Moderate-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-1.3488	-1.2819***	-1.8992*	-2.8637	-5.2539**	0.7565
	(0.37)	(0.00)	(0.07)	(0.52)	(0.02)	(0.14)
δ_τ	1.2644***	0.6929***	0.9284***	2.0376**	2.6209***	1.7101***
	(0.00)	(0.00)	(0.00)	(0.04)	(0.00)	(0.00)

Low-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.2334	0.2969	0.5892*	0.8467**	1.3292**	0.9176
	(0.72)	(0.27)	(0.08)	(0.03)	(0.03)	(0.67)
δ_τ	0.6301	0.1106	0.0740	0.1089	0.1084	1.8866
	(0.14)	(0.46)	(0.66)	(0.58)	(0.77)	(0.19)

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Moderate-Inflation Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	2.1079	0.0627	-0.7892	1.8183	5.2631*	5.3837**
	(0.18)	(0.95)	(0.53)	(0.36)	(0.10)	(0.03)
β_τ	1.2155**	0.8043***	1.6991***	1.1626*	0.5199	1.7311***
	(0.03)	(0.00)	(0.00)	(0.09)	(0.62)	(0.01)

Low-Inflation Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	0.6712	1.2199**	1.5252**	1.0782*	.9979	.4377
	(0.42)	(0.04)	(0.03)	(0.08)	(0.16)	(0.78)
β_τ	1.6457*	-.4625	0.0873	0.9991*	2.0190***	4.1159**
	(0.10)	(0.19)	(0.89)	(0.08)	(0.00)	(0.05))

Note: See Table 2. We further split the low-inflation sample (76 countries) in Table 5 into moderate-inflation (-variability) countries and low-inflation (-variability) countries (38 countries in each group) at its median inflation rate 2.9349 percent (at its median standard deviation 1.7284 percent). Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 8: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Friedman-Ball Regression Model, Full-Sample Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.7367	1.4368	-2.2893	-1.0405	6.5933	7.7285
	(0.87)	(0.77)	(0.39)	(0.71)	(0.29)	(0.42)
δ_τ	0.8427***	0.5080***	0.6486***	0.8314***	0.9384***	1.1562***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
IT	-0.5347	-0.3033	0.1065	-0.0465	-0.3111	-2.0093
	(0.67)	(0.68)	(0.89)	(0.92)	(0.76)	(0.39)
Openness	0.1595	-0.8296	0.1465	0.3029	0.0572	0.2109
	(0.87)	(0.18)	(0.74)	(0.45)	(0.96)	(0.90)
Budget	0.4048	0.8791*	0.1885	-0.1221	0.0427	0.5347
	(0.24)	(0.08)	(0.69)	(0.63)	(0.89)	(0.33)
GDP_{pc}	-0.2877	-0.1428	0.0344	-0.1101	-0.7581	-0.7844
	(0.45)	(0.73)	(0.89)	(0.60)	(0.13)	(0.31)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		1.29				
		(0.26)				
0.50th		9.38***	2.29			
		(0.00)	(0.13)			
0.75th		8.42***	3.48*	0.96		
		(0.00)	(0.07)	(0.33)		
0.95th		8.88***	5.01**	2.73*	1.18	
		(0.00)	(0.03)	(0.10)	(0.28)	
Homogeneity F-Test		44.76***				
		(0.00)				

Note: See Table 8. *V* equals the standard deviation of the inflation rate and *Π* equals the mean inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 9: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Cukierman-Meltzer Regression Model, Full-Sample Countries						
		Quantile				
	OLS	0.05th	0.25th	0.50th	0.75th	0.95th
α_τ	7.4579* (0.10)	3.0080 (0.56)	4.0090 (0.34)	5.3452* (0.09)	9.3505* (0.06)	22.0885** (0.02)
β_τ	0.9235*** (0.00)	0.4223*** (0.01)	0.6911*** (0.00)	0.9356*** (0.00)	1.1364*** (0.00)	1.3956*** (0.00)
IT	0.3628 (0.78)	0.3281 (0.66)	0.3803 (0.59)	0.1290 (0.84)	-0.1796 (0.86)	-0.5477 (0.72)
Openness	-0.3281 (0.74)	-0.7719 (0.28)	0.1741 (0.80)	-0.1872 (0.73)	-0.1175 (0.86)	0.1215 (0.93)
Budget	-0.1868 (0.60)	-0.1121 (0.58)	0.1800 (0.39)	0.2581 (0.34)	-0.0704 (0.92)	-1.3779 (0.21)
GDP_{pc}	-0.4140 (0.30)	0.1364 (0.75)	-0.4211 (0.23)	-0.3457 (0.25)	-0.6866 (0.12)	-1.7027** (0.04)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		3.66* (0.06)				
0.50th		9.58*** (0.00)	5.12** (0.03)			
0.75th		16.02*** (0.00)	10.23*** (0.00)	2.36 (0.13)		
0.95th		18.26*** (0.00)	12.88*** (0.00)	5.60** (0.02)	2.10 (0.15)	
Homogeneity F-Test		29.62*** (0.00)				

Note: See Table 8. *V* equals the standard deviation of the inflation rate and *Π* equals the mean inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 10: Model Estimates: Mean and Relative Variation of the Inflation Rate

	Friedman-Ball Regression Model, Full-Sample Countries					
		Quantile				
	OLS	**0.05^{th}**	**0.25th**	**0.50th**	**0.75th**	**0.95^{th}**
γ_τ	1.0113	0.8988	-0.8876	0.5510	4.5717	5.6546
	(0.66)	(0.74)	(0.50)	(0.74)	(0.15)	(0.27)
δ_τ	0.4212***	0.2613***	0.3280***	0.4173***	0.4655***	0.5794***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
IT	-0.2812	-0.1568	0.0201	-0.0338	-0.0838	-1.1691
	(0.67)	(0.68)	(0.96)	(0.90)	(0.89)	(0.39)
Openness	0.1406	-0.4298	0.1150	0.0940	0.1377	-0.0694
	(0.78)	(0.21)	(0.60)	(0.69)	(0.82)	(0.94)
Budget	0.2169	0.4822*	0.0405	-0.1114	0.0461	0.2450
	(0.23)	(0.08)	(0.88)	(0.46)	(0.80)	(0.37)
GDP_{pc}	-0.2168	-0.0873	-0.0016	-0.1079	-0.5425**	-0.4480
	(0.27)	(0.69)	(0.99)	(0.40)	(0.03)	(0.29)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		1.05				
		(0.31)				
0.50th		7.47***	2.02			
		(0.01)	(0.16)			
0.75th		6.72***	2.79*	0.67		
		(0.01)	(0.10)	(0.42)		
0.95th		5.56**	3.42*	1.66	0.82	
		(0.02)	(0.07)	(0.20)	(0.37)	
Homogeneity F-Test		40.28***				
		(0.00)				

Note: See Table 8. V equals the standard deviation of inflation divided by one plus the mean of inflation and Π equals the mean inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 11: Model Estimates: Mean and Relative Variation of the Inflation Rate

Cukierman-Meltzer Regression Model, Full-Sample Countries						
		Quantile				
	OLS	0.05th	0.25th	0.50th	0.75th	0.95th
α_τ	7.2413 (0.12)	2.2373 (0.67)	3.0562 (0.52)	6.9845** (0.02)	9.3626* (0.07)	20.6141** (0.03)
β_τ	1.7968*** (0.00)	0.8137*** (0.01)	1.3497*** (0.00)	1.6402*** (0.00)	2.1918*** (0.00)	2.7763*** (0.00)
IT	0.3683 (0.79)	0.4875 (0.56)	0.5002 (0.52)	0.4283 (0.53)	-0.0141 (0.99)	-0.3225 (0.85)
Openness	-0.5581 (0.58)	-0.7120 (0.29)	0.1496 (0.85)	-0.4916 (0.40)	-0.1528 (0.84)	-0.0844 (0.96)
Budget	-0.1798 (0.63)	-0.1269 (0.58)	0.1860 (0.39)	0.4483 (0.11)	0.1160 (0.86)	-0.9792 (0.40)
GDP_{pc}	-0.3232 (0.43)	0.1563 (0.73)	-0.3417 (0.37)	-0.4601 (0.13)	-0.7516* (0.10)	-1.6058* (0.06)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		3.58* (0.06)				
0.50th		6.36*** (0.01)	1.84 (0.18)			
0.75th		14.92*** (0.00)	9.19*** (0.00)	5.63** (0.02)		
0.95th		18.82*** (0.00)	12.51*** (0.00)	8.78*** (0.00)	2.61 (0.11)	
Homogeneity F-Test		24.76*** (0.00)				

Note: See Table 8. V equals the standard deviation of inflation divided by one plus the mean of inflation and Π equals the mean inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 12: Model Estimates: Median and Median Deviation of the Inflation Rate

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95th
Friedman-Ball Regression Model, Full-Sample Countries						
γ_{τ}	5.6272 (0.47)	3.2571 (0.34)	-0.0243 (0.99)	5.5320 (0.38)	16.1245* (0.06)	27.3836 (0.21)
δ_{τ}	0.9582*** (0.00)	0.3120** (0.03)	0.5747*** (0.00)	0.7130*** (0.01)	1.1036*** (0.00)	1.3007*** (0.01)
IT	-1.5725 (0.48)	0.0963 (0.91)	0.0200 (0.98)	-0.1906 (0.83)	-0.1360 (0.93)	-4.7754 (0.31)
Openness	0.7511 (0.65)	-0.2866 (0.58)	0.1812 (0.67)	0.3969 (0.65)	0.3183 (0.86)	0.3961 (0.93)
Budget	0.7998 (0.18)	0.2585 (0.51)	0.1641 (0.63)	0.0397 (0.92)	0.2052 (0.69)	1.3388 (0.32)
GDP_{pc}	-1.0296 (0.12)	-0.3043 (0.29)	-0.1724 (0.44)	-0.7768 (0.13)	-1.8560*** (0.00)	-2.7009 (0.13)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		13.45*** (0.00)				
0.50th		5.42*** (0.01)	12.27*** (0.00)			
0.75th		16.75*** (0.00)	22.48*** (0.00)	15.04*** (0.00)		
0.95th		6.13*** (0.00)	15.35*** (0.00)	6.32*** (0.00)	0.19 (0.67)	
Homogeneity F-Test		9.61*** (0.00)				

Note: See Table 8. *V* equals the median deviation of the inflation rate and *Π* equals the median inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 13: Model Estimates: Median and Median Deviation of the Inflation Rate

Cukierman-Meltzer Regression Model, Full-Sample Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	11.2494*** (0.02)	2.6998 (0.45)	5.9716 (0.19)	7.8917** (0.02)	12.3726** (0.02)	21.2252** (0.03)
β_τ	0.7723*** (0.00)	0.3660*** (0.01)	0.5545*** (0.00)	0.7413*** (0.00)	0.9478*** (0.00)	1.3945*** (0.00)
IT	0.6759 (0.62)	1.1984 (0.13)	0.6398 (0.34)	0.5848 (0.45)	0.2576 (0.80)	0.6997 (0.70)
Openness	-0.8859 (0.39)	-0.1319 (0.84)	-0.3302 (0.64)	-0.4905 (0.43)	-0.4611 (0.55)	-0.2578 (0.86)
Budget	-0.1351 (0.72)	-0.0877 (0.63)	0.1364 (0.47)	0.3593 (0.19)	0.0819 (0.88)	-1.0934 (0.25)
GDP_{pc}	-0.5539 (0.18)	-0.1654 (0.63)	-0.3921 (0.25)	-0.5042 (0.15)	-0.8703* (0.06)	-1.5376* (0.07)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	3.65* (0.06)			
0.50th	6.28*** (0.01)	2.27 (0.14)		
0.75th	14.62*** (0.00)	8.24*** (0.01)	2.24 (0.14)	
0.95th	17.48*** (0.00)	12.36*** (0.00)	7.02*** (0.01)	3.97** (0.05)
Homogeneity F-Test	14.70*** (0.00)			

Note: See Table 8. *V* equals the median deviation of the inflation rate and *Π* equals the median inflation rate. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 14: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

High-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-2.8116 (0.77)	3.6965 (0.71)	1.4864 (0.84)	-2.8606 (0.81)	-5.3035 (0.77)	1.1057 (0.96)
δ_τ	0.8568*** (0.00)	0.6043*** (0.00)	0.8637*** (0.00)	0.8840*** (0.00)	0.9920*** (0.00)	0.8473*** (0.00)
IT	-1.0730 (0.70)	0.3646 (0.86)	-1.3244 (0.57)	0.6804 (0.78)	-2.8391 (0.58)	-5.8616 (0.44)
Openness	0.4722 (0.82)	-0.2562 (0.90)	-1.7514 (0.37)	-0.1137 (0.97)	1.8423 (0.64)	-0.6737 (0.89)
Budget	0.7467 (0.26)	1.6691 (0.17)	0.9033 (0.47)	0.9450 (0.44)	-0.0069 (1.00)	0.8111 (0.60)
GDP_{pc}	-0.1050 (0.91)	-1.2359 (0.25)	0.0951 (0.91)	-0.1668 (0.85)	-0.1965 (0.91)	1.3994 (0.59)

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

High-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	5.8956 (0.58)	7.7810 (0.53)	-8.0922 (0.53)	12.2503 (0.45)	3.6438 (0.83)	2.8173 (0.90)
β_τ	0.9542*** (0.00)	0.4912* (0.06)	0.8094*** (0.00)	0.9568*** (0.00)	1.1576*** (0.00)	0.9990*** (0.00)
IT	1.4307 (0.70)	3.4609 (0.49)	1.2339 (0.79)	3.2411 (0.46)	4.0761 (0.40)	-3.4416 (0.52)
Openness	-0.3737 (0.87)	-1.8948 (0.54)	1.5569 (0.58)	-2.8077 (0.43)	0.6445 (0.87)	0.4112 (0.92)
Budget	-0.5344 (0.49)	-0.4492 (0.75)	-0.0656 (0.95)	0.1963 (0.89)	-1.6129 (0.45)	-4.3333* (0.08)
GDP_{pc}	-0.2052 (0.85)	0.0189 (0.99)	0.1706 (0.91)	-0.0037 (1.00)	0.0220 (0.99)	2.3223 (0.26)

Note: See Table 2 and Table 8. High-inflation (variability) means the inflation rate above 6.1471 (4.3639) percent per year. 76 countries are in each of the two samples. Numbers in parentheses equal p-values. Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 15: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Moderate-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	6.0895 (0.34)	-0.3067 (0.76)	0.5580 (0.70)	9.9161 (0.44)	12.7371 (0.26)	7.6368 (0.79)
δ_τ	0.9843** (0.05)	0.9364*** (0.00)	0.6360*** (0.00)	0.8997** (0.03)	1.1930* (0.09)	1.1172* (0.06)
IT	-0.9876 (0.51)	0.0681 (0.77)	-0.5733*** (0.01)	-0.2834 (0.92)	-1.8285 (0.57)	-4.1747 (0.56)
Openness	-0.6082 (0.58)	-0.2000 (0.28)	0.4190 (0.11)	-0.7748 (0.73)	-2.3716 (0.39)	-0.4849 (0.92)
Budget	-0.2150 (0.72)	0.2173** (0.03)	0.1644 (0.23)	0.0233 (0.98)	-0.2754 (0.77)	-0.9774 (0.75)
GDP_{pc}	-0.4547 (0.30)	-0.1733** (0.02)	-0.4089*** (0.00)	-0.8761* (0.09)	-0.2472 (0.67)	-0.1377 (0.95)

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Moderate- Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	7.1236 (0.18)	6.2811 (0.23)	7.2309 (0.20)	8.1713 (0.19)	1.9479 (0.76)	13.3023* (0.07)
β_τ	0.8591* (0.08)	1.3537* (0.09)	1.2826* (0.10)	1.1246* (0.09)	1.2150* (0.10)	1.3543** (0.02)
IT	0.1617 (0.88)	1.2018 (0.32)	0.9051 (0.46)	0.5485 (0.66)	-1.0184 (0.56)	-0.6337 (0.68)
Openness	-0.2183 (0.83)	-1.7530 (0.22)	-1.6250 (0.23)	-1.0461 (0.41)	1.4675 (0.40)	-2.1534 (0.12)
Budget	0.3284 (0.36)	-0.0558 (0.93)	0.0591 (0.93)	0.2971 90.32)	-0.1589 (0.82)	0.4130 (0.56)
GDP_{pc}	-0.4742 (0.27)	0.0915 (0.87)	-0.0340 (0.95)	-0.3477 (0.52)	-0.5536 (0.41)	0.0133 (0.99)

Note: See Table 2 and Table 8. Moderate-inflation (variability) denotes the inflation rates (variability) between 2.9349 (1.7284) and 6.1471 (4.3639) percent per year. 38 countries are in each of the two samples. Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 16: Model Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Low-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	7.8369**	-1.9108	1.1115	5.4518	9.1432	18.0063**
	(0.04)	(0.46)	(0.69)	(0.22)	(0.19)	(0.02)
δ_τ	0.2668	0.3607	0.1077	-0.1981	0.2912	0.2327
	(0.54)	(0.23)	(0.70)	(0.52)	(0.45)	(0.67)
IT	0.2421	0.2488	0.0189	-0.0224	0.3617	0.1297
	(0.71)	(0.34)	(0.94)	(0.94)	(0.40)	(0.82)
Openness	0.0118	0.4509	0.1258	0.0384	0.2879	0.3725
	(0.98)	(0.11)	(0.61)	(0.90)	(0.48)	(0.48)
Budget	0.0591	-0.0054	-0.0589	0.0055	0.0647	0.2108
	(0.72)	(0.97)	(0.67)	(0.97)	(0.74)	(0.44)
GDP_{pc}	-0.7731***	-0.0393	-0.1033	-0.4351	-0.9968	-1.8936***
	(0.00)	(0.85)	(0.67)	(0.29)	(0.15)	(0.01)

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Low-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	12.1346***	11.0388**	8.6639*	6.7914	6.5444	22.5878**
	(0.00)	(0.03)	(0.08)	(0.33)	(0.49)	(0.03)
β_τ	1.5139*	0.2590	0.6766	1.1004	1.0551	0.2123
	(0.06)	(0.76)	(0.45)	(0.29)	(0.38)	(0.89)
IT	-0.2084	-0.3063	-0.2590	-0.4312	-0.2031	-0.2341
	(0.75)	(0.48)	(0.64)	(0.52)	(0.82)	(0.85)
Openness	-0.9668*	-1.1823**	-0.8488	-0.4681	-0.4070	-0.0111
	(0.06)	(0.05)	(0.12)	(0.41)	(0.42)	(0.99)
Budget	-0.1627	-0.3327	-0.1607	0.0820	0.2038	-0.7912
	(0.47)	(0.23)	(0.53)	(0.80)	(0.73)	(0.26)
GDP_{pc}	-0.6752**	-0.4051	-0.3665	-0.3497	-0.3438	-1.7720*
	(0.02)	(0.25)	(0.29)	(0.55)	(0.69)	(0.07)

Note: See Table 2 and Table 8. Low-inflation (variability) means the inflation rate (variability) below 2.9349 (1.7284) percent per year. 38 countries are in each of the two samples. Numbers in parentheses equal p-values.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 17: Instrumental-Variable Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Full Sample Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-0.3698 (0.70)	-0.0975 (0.81)	0.2374 (0.53)	-0.7579 (0.45)	-0.4609 (0.50)	5.7454** (0.04)
δ_τ	0.8262*** (0.00)	0.1851** (0.02)	0.3173*** (0.00)	0.8117*** (0.00)	1.1009*** (0.00)	2.6151*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		9.65*** (0.00)			
0.50th		5.55*** (0.01)	9.80*** (0.00)		
0.75th		79.79*** (0.00)	79.73*** (0.00)	87.06*** (0.00)	
0.95th		16.20*** (0.00)	10.04*** (0.00)	4.84*** (0.00)	84.57*** (0.00)
Homogeneity F-Test		46.83*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Full Sample Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	1.0721 (0.21)	0.1213 (0.76)	1.0144*** (0.01)	1.0837*** (0.00)	1.9493** (0.04)	4.3197*** (0.00)
β_τ	1.0936*** (0.00)	0.4614*** (0.00)	0.5566*** (0.00)	0.8876*** (0.00)	1.1969*** (0.00)	2.0656*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		0.60 (0.44)			
0.50th		6.90*** (0.01)	6.41*** (0.01)		
0.75th		9.81*** (0.00)	8.61*** (0.00)	2.44 (0.12)	
0.95th		24.85*** (0.00)	22.15*** (0.00)	14.49*** (0.00)	9.12*** (0.00)
Homogeneity F-Test		16.57*** (0.00)			

Note: See Table 12. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 18: Instrumental-Variable Estimates: Mean and Relative Variation of the Inflation Rate

	OLS	0.05th	0.25th	0.50th	0.75th	0.95th
Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$						
Full Sample Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.0644 (0.90)	0.0471 (0.84)	0.2992 (0.15)	0.2616 (0.62)	0.1364 (0.70)	3.5642** (0.03)
δ_τ	0.4244*** (0.00)	0.0935** (0.04)	0.1601*** (0.00)	0.4488*** (0.00)	0.5568*** (0.00)	0.5752* (0.07)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		9.68*** (0.00)				
0.50th		5.25*** (0.01)	9.92*** (0.00)			
0.75th		64.78*** (0.00)	64.79*** (0.00)	68.82*** (0.00)		
0.95th		3.30** (0.04)	9.96*** (0.00)	4.59*** (0.01)	69.73*** (0.00)	
Homogeneity F-Test		29.71*** (0.00)				
Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$						
Full Sample Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	1.7831*** (0.01)	0.5444 (0.38)	0.7152* (0.06)	1.3570*** (0.00)	1.8618*** (0.01)	5.9530*** (0.00)
β_τ	1.8108*** (0.00)	0.7522*** (0.00)	1.2937*** (0.00)	1.6995*** (0.00)	2.2665*** (0.00)	2.6797*** (0.01)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		7.60*** (0.01)				
0.50th		28.56*** (0.00)	4.51** (0.04)			
0.75th		53.73*** (0.00)	16.65*** (0.00)	9.55*** (0.00)		
0.95th		18.87*** (0.00)	21.13*** (0.00)	57.52*** (0.00)	75.98*** (0.00)	
Homogeneity F-Test		38.36*** (0.00)				

Note: See Table 12.1. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 19: Instrumental-Variable Estimates: Median and Median Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Full Sample Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-0.4953 (0.63)	-0.1065 (0.79)	0.0601 (0.86)	-0.7635 (0.46)	-0.2425 (0.75)	6.7805** (0.03)
δ_τ	0.8836*** (0.00)	0.1901** (0.02)	0.3627*** (0.00)	0.8224*** (0.01)	1.1088*** (0.00)	1.0714** (0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		4.44** (0.04)			
0.50th		5.22** (0.02)	3.22* (0.08)		
0.75th		56.26 (0.00)	47.95*** (0.00)	1.37 (0.24)	
0.95th		64.10*** (0.00)	53.28*** (0.00)	0.14 (0.71)	0.00 (0.95)
Homogeneity F-Test		28.05*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Full Sample Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	1.2528* (0.09)	0.1012 (0.81)	1.0477*** (0.01)	1.2534*** (0.00)	1.2490 (0.11)	3.8469*** (0.00)
β_τ	0.8188*** (0.00)	0.2438*** (0.00)	0.3540*** (0.00)	0.7041*** (0.00)	1.1656*** (0.00)	1.6084*** (0.00)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		9.99*** (0.00)			
0.50th		14.01*** (0.00)	12.24*** (0.00)		
0.75th		28.03*** (0.00)	25.80*** (0.00)	25.41*** (0.00)	
0.95th		13.05*** (0.00)	13.27*** (0.00)	15.40*** (0.00)	25.13*** (0.00)
Homogeneity F-Test		11.55*** (0.00)			

Note: See Table 12.2. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 20: Instrumental-Variable Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

High-Inflation Countries

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95th
γ_τ	-1.8495	1.1819	0.8061	-5.7111	-2.6764	-4.7026
	(0.57)	(0.76)	(0.83)	(0.21)	(0.63)	(0.56)
δ_τ	1.0573***	0.8173***	0.8976***	1.4686**	1.5611**	2.9337**
	(0.00)	(0.01)	(0.00)	(0.02)	(0.02)	(0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		0.24			
		(0.63)			
0.50th		3.29**	3.38**		
		(0.05)	(0.04)		
0.75th		2.88*	2.88*	3.90**	
		(0.07)	(0.07)	(0.03)	
0.95th		3.21**	3.23**	4.96***	4.30**
		(0.05)	(0.05)	(0.01)	(0.02)
Homogeneity F-Test		2.65**			
		(0.05)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

High-Inflation-Variability Countries

	OLS	Quantile 0.05th	0.25th	0.50th	0.75th	0.95th
α_τ	-6.1871	-1.8151	-5.2707	-5.1704	-7.0206	-6.9656
	(0.32)	(0.77)	(0.31)	(0.50)	(0.44)	(0.47)
β_τ	1.2942***	0.7288*	1.0364**	1.0744*	1.5528**	1.7967**
	(0.00)	(0.08)	(0.02)	(0.07)	(0.04)	(0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile					
0.25th		3.92*			
		(0.07)			
0.50th		3.26*	4.27**		
		(0.09)	(0.05)		
0.75th		5.39**	6.71**	4.67**	
		(0.03)	(0.02)	(0.05)	
0.95th		7.68***	8.37***	6.18**	6.13**
		(0.01)	(0.01)	(0.02)	(0.02)
Homogeneity F-Test		3.60**			
		(0.05)			

Note: See Table 12. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 21: Instrumental-Variable Estimates: Mean and Standard Deviation of the Inflation Rate

	OLS	0.05th	0.25th	0.50th	0.75th	0.95th
Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$						
Moderate-Inflation Countries						
		Quantile				
γ_τ	-5.3942	-1.8912***	-4.0274	-6.3715	-8.6342	-16.8077
	(0.22)	(0.00)	(0.21)	(0.12)	(0.18)	(0.11)
δ_τ	2.1495**	0.7217***	1.4672**	2.2360**	3.1418**	5.5291**
	(0.03)	(0.00)	(0.05)	(0.02)	(0.03)	(0.02)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		13.53***				
		(0.00)				
0.50th		12.90***	14.02***			
		(0.00)	(0.00)			
0.75th		10.23***	12.98***	8.68***		
		(0.00)	(0.00)	(0.00)		
0.95th		89.47***	89.90***	84.92***	86.33***	
		(0.00)	(0.00)	(0.00)	(0.00)	
Homogeneity F-Test		38.82***				
		(0.00)				
Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$						
Moderate-Inflation-Variability Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	-3.6660	-5.5182***	-4.8598***	-4.9133**	-2.3988	1.2176
	(0.13)	(0.00)	(0.01)	(0.04)	(0.68)	(0.85)
β_τ	3.4181***	3.2555***	3.2446***	3.6654***	3.2423**	3.5303**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.04)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		0.00				
		(0.97)				
0.50th		0.19	0.30			
		(0.66)	(0.59)			
0.75th		0.00	0.00	0.05		
		(0.99)	(0.99)	(0.82)		
0.95th		0.01	0.02	0.00	0.01	
		(0.90)	(0.90)	(0.95)	(0.91)	
Homogeneity F-Test		9.40***				
		(0.00)				

Note: See Table 12. The number in parenthesis equals p-value.
*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 22: Instrumental-Variable Estimates: Mean and Standard Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Low-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.5447 (0.20)	-0.3059 (0.18)	-0.4509 (0.63)	0.7262 (0.50)	0.8059 (0.66)	-3.7671 (0.27)
δ_τ	0.2681 (0.24)	0.4628 (0.16)	0.6612 (0.20)	0.2845 (0.62)	0.4992 (0.65)	0.8327 (0.11)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	0.19 (0.67)			
0.50th	0.11 (0.75)	0.56 (0.46)		
0.75th	0.00 (0.98)	0.03 (0.87)	0.07 (0.80)	
0.95th	2.73 (0.11)	2.40 (0.13)	3.11* (0.09)	3.03* (0.09)
Homogeneity F-Test	1.73 (0.17)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Low-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	1.0746 (0.02)	-1.9170 (0.31)	-1.1785 (0.49)	1.1269 (0.70)	-1.3185 (0.79)	-9.8507 (0.00)
β_τ	0.8015 (0.11)	2.6561 (0.16)	2.2257 (0.15)	0.8819 (0.76)	3.9543 (0.45)	14.2754 (0.23)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	0.04 (0.84)			
0.50th	0.38 (0.54)	0.34 (0.56)		
0.75th	0.06 (0.81)	0.11 (0.74)	0.49 (0.49)	
0.95th	5.03** (0.04)	5.85 (0.02)	4.69** (0.02)	4.62** (0.02)
Homogeneity F-Test	1.83 (0.16)			

Note: See Table 12. The number in parenthesis equals p-value.
*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 23: Instrumental-Variable Estimates: Mean and Relative Variation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

High-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-9.0125 (0.10)	-3.0671 (0.51)	-2.6379 (0.59)	-3.2758 (0.67)	-8.7648 (0.34)	-11.8882 (0.14)
δ_τ	0.8370*** (0.01)	0.4104 (0.11)	0.4098** (0.05)	0.5324*** (0.04)	0.8605*** (0.03)	1.2346*** (0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	1.61 (0.25)			
0.50th	27.79*** (0.00)	27.05*** (0.00)		
0.75th	12.66*** (0.00)	12.38*** (0.00)	11.88*** (0.00)	
0.95th	13.76*** (0.00)	13.56*** (0.00)	13.23*** (0.00)	13.23*** (0.00)
Homogeneity F-Test	21.32*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

High-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	2.9987 (0.52)	2.5973 (0.47)	-2.7011 (0.63)	-2.4979 (0.56)	0.2066 (0.96)	12.1706 (0.73)
β_τ	1.7387*** (0.00)	0.6531*** (0.01)	1.6838*** (0.00)	2.0855*** (0.00)	2.4024*** (0.00)	2.4036** (0.04)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	4.52** (0.02)			
0.50th	14.63*** (0.00)	14.59*** (0.00)		
0.75th	18.16*** (0.00)	18.66*** (0.00)	22.95*** (0.00)	
0.95th	16.30*** (0.00)	14.62*** (0.00)	14.85*** (0.00)	17.93*** (0.00)
Homogeneity F-Test	9.20*** (0.00)			

Note: See Table 12.1. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 24: Instrumental-Variable Estimates: Mean and Relative Variation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Moderate-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-3.0291 (0.23)	-0.9002 (0.61)	-2.0570 (0.31)	-3.8822 (0.15)	-4.8432 (0.38)	-9.2857 (0.14)
δ_τ	1.2305** (0.03)	0.3811** (0.05)	0.7990* (0.09)	1.3306** (0.04)	1.8025** (0.04)	3.0996** (0.02)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	17.45*** (0.00)			
0.50th	11.16*** (0.00)	2.77* (0.08)		
0.75th	5.99*** (0.00)	6.22 (0.00)	2.67* (0.09)	
0.95th	12.47*** (0.00)	4.30** (0.02)	4.83** (0.02)	3.21* (0.06)
Homogeneity F-Test	4.32*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Moderate-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	0.0057 (1.00)	-5.9963 (0.05)	-2.0309 (0.35)	0.7371 (0.80)	1.4456 (0.73)	5.1931* (0.07)
β_τ	3.3773*** (0.00)	2.8563*** (0.00)	3.4736*** (0.00)	3.5838*** (0.01)	3.5311** (0.04)	3.6107** (0.05)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	7.34*** (0.00)			
0.50th	5.35*** (0.01)	5.10*** (0.01)		
0.75th	5.41*** (0.01)	5.24*** (0.01)	1.59 (0.22)	
0.95th	6.46*** (0.00)	6.12*** (0.01)	2.80* (0.07)	2.35 (0.11)
Homogeneity F-Test	3.37*** (0.01)			

Note: See Table 12.1. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 25: Instrumental-Variable Estimates: Mean and Relative Variation of the Inflation Rate

	Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$					
	Low-Inflation Countries					
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.1185 (0.85)	-0.1745 (0.56)	-0.2151 (0.76)	0.1845 (0.68)	0.0702 (0.93)	-1.9481 (0.36)
δ_τ	0.4540 (0.18)	0.2874 (0.11)	0.3983 (0.30)	0.4529 (0.59)	1.0735 (0.43)	1.3177 (0.19)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		1.44 (026)				
0.50th		1.41 (0.26)	0.61 (0.55)			
0.75th		1.43 (0.26)	0.63 (0.54)	0.11 (0.90)		
0.95th		2.80 (0.08) *	1.86 (0.18)	1.58 (0.23)	1.77 (0.19)	
Homogeneity F-Test		8.76*** (0.00)				

	Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$					
	Low-Inflation-Variability Countries					
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	2.0785 (0.01)	0.9816 (0.21)	1.4373 (0.03)	2.2851 (0.00)	2.2050 (0.01)	1.2581 (0.70)
β_τ	0.4264 (0.69)	0.1577 (0.92)	0.3549 (0.74)	0.4489 (0.71)	0.7709 (0.63)	3.2770 (0.47)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		0.06 (0.94)				
0.50th		0.46 (0.50)	0.84 (0.37)			
0.75th		1.46 (0.25)	1.47 (0.24)	1.49* (0.23)		
0.95th		4.32** (0.04)	4.74** (0.04)	3.95* (0.05)	1.90 (0.18)	
Homogeneity F-Test		1.31 (0.28)				

Note: See Table 12.1. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 26: Instrumental-Variable Estimates: Median and Median Deviation of the Inflation Rate

	OLS	0.05th	0.25th	0.50th	0.75th	0.95th
Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$						
High-Inflation Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-19.9461*	-4.5946	-2.4199	-10.2655	-16.7467	-26.9928
	(0.09)	(0.66)	(0.84)	(0.54)	(0.39)	(0.11)
δ_τ	1.7907***	0.7525*	0.6684**	1.2663***	1.6905**	2.6813**
	(0.01)	(0.08)	(0.02)	(0.01)	(0.05)	(0.02)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		1.05 (0.39)				
0.50th		24.56*** (0.00)	23.03*** (0.00)			
0.75th		12.12*** (0.00)	11.38*** (0.00)	11.36*** (0.00)		
0.95th		13.34*** (0.00)	12.63*** (0.00)	12.55*** (0.00)	12.54*** (0.00)	
Homogeneity F-Test		13.59*** (0.00)				
Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$						
High-Inflation-Variability Countries						
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	-3.8230	-8.4316	-4.2706	-4.1379	4.1544	-13.9290
	(0.60)	(0.06)	(0.42)	(0.62)	(0.79)	(0.58)
β_τ	0.8075*	0.8459***	0.6729**	0.7011**	0.4515**	1.9982*
	(0.07)	(0.01)	(0.03)	(0.02)	(0.05)	(0.08)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		5.96** (0.03)				
0.50th		5.65** (0.03)	3.05 (0.11)			
0.75th		5.68** (0.03)	3.11* (0.10)	0.93 (0.44)		
0.95th		6.58** (0.02)	3.81* (0.08)	5.34** (0.03)	5.16** (0.03)	
Homogeneity F-Test		4.39** (0.03)				

Note: See Table 12.2. The number in parenthesis equals p-value

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 27: Instrumental-Variable Estimates: Median and Median Deviation of the Inflation Rate

	Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$					
	Moderate-Inflation Countries					
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	-5.3550 (0.24)	-1.9800 (0.51)	-3.8688 (0.26)	-6.4600 (0.20)	-8.8991 (0.42)	-12.3924 (0.28)
δ_τ	2.1624** (0.03)	0.7501* (0.07)	1.4426* (0.07)	2.2589* (0.06)	3.2446*** (0.01)	4.6819* (0.06)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		2.95* (0.07)				
0.50th		11.23*** (0.00)	2.99* (0.07)			
0.75th		5.91*** (0.00)	3.36** (0.05)	5.46*** (0.01)		
0.95th		16.75*** (0.00)	6.52*** (0.00)	17.09*** (0.00)	16.76*** (0.00)	
Homogeneity F-Test		18.82*** (0.00)				
	Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$					
	Moderate-Inflation-Variability Countries					
		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	-3.9533* (0.10)	-4.0491* (0.09)	-6.2657*** (0.00)	-5.8781*** (0.01)	-1.2169 (0.83)	2.1428 (0.72)
β_τ	3.4439*** (0.00)	2.6743*** (0.00)	3.7810*** (0.00)	3.9172*** (0.00)	2.7078** (0.02)	3.0181* (0.06)
F-Statistics Testing for Slope Equality across Quantiles						
Quantile						
0.25th		11.36*** (0.00)				
0.50th		15.88*** (0.00)	18.03*** (0.00)			
0.75th		4.61** (0.02)	10.61*** (0.00)	14.35*** (0.00)		
0.95th		5.05** (0.03)	11.21*** (0.00)	13.62*** (0.00)	13.82*** (0.00)	
Homogeneity F-Test		8.14*** (0.00)				

Note: See Table 12.2. The number in parenthesis equals p-value

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Table 28: Instrumental-Variable Estimates: Median and Median Deviation of the Inflation Rate

Panel A: Friedman-Ball Regression Model, $V_i = \gamma_\tau + \delta_\tau \prod_i + v_{\tau i}$

Low-Inflation Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
γ_τ	0.7314 (0.63)	0.7116 (0.53)	0.3078 (0.47)	0.8214 (0.64)	0.4711 (0.64)	2.2176 (0.94)
δ_τ	0.4841 (0.23)	0.2936 (0.63)	0.4651 (0.36)	0.4925 (0.65)	0.6721 (0.22)	1.2679 (0.51)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	1.26 (0.30)			
0.50th	2.64 (0.11)	3.85* (0.06)		
0.75th	4.05** (0.05)	4.14** (0.05)	10.40*** (0.00)	
0.95th	3.00* (0.06)	12.86*** (0.00)	5.94*** (0.01)	10.54*** (0.00)
Homogeneity F-Test	4.50*** (0.00)			

Panel B: Cukierman-Meltzer Regression Model, $\Pi_i = \alpha_\tau + \beta_\tau V_i + u_{\tau i}$

Low-Inflation-Variability Countries

		Quantile				
	OLS	**0.05th**	**0.25th**	**0.50th**	**0.75th**	**0.95th**
α_τ	1.2536 (0.62)	-2.0294 (0.30)	-1.0699 (0.50)	1.6286 (0.59)	-0.3225 (0.95)	-7.3480 (0.14)
β_τ	0.7245 (0.72)	2.6380 (0.17)	2.0787 (0.15)	0.7059 (0.86)	2.9832 (0.57)	11.2356 (0.13)

F-Statistics Testing for Slope Equality across Quantiles

Quantile				
0.25th	0.12 (0.73)			
0.50th	0.55 (0.47)	0.45 (0.51)		
0.75th	0.00 (0.96)	0.01 (0.93)	0.19 (0.83)	
0.95th	5.45** (0.03)	6.27** (0.02)	7.75*** (0.01)	4.32** (0.05)
Homogeneity F-Test	1.96 (0.14)			

Note: See Table 12.2. The number in parenthesis equals p-value.

*** denote significance at the 1-percent level.
** denote significance at the 5-percent level.
* denote significance at the 10-percent level.

Appendix

Table A1: Average Annual Inflation (Percent) in Sample Countries: 1993-2003

Country	Π	Country	Π	Country	Π	Country	Π
Albania	17.61	Ecuador	35.72	Latvia	10.40	Saudi Arabia (L)	0.43
Algeria	10.90	Egypt, Arab Rep.	6.09	Lesotho	9.62	Senegal	4.72
Argentina	5.08	El Salvador	6.04	Lithuania	15.26	Seychelles	2.46
Australia	2.56	Estonia	20.55	Luxembourg	2.03	Sierra Leone	16.88
Austria	1.97	Ethiopia	3.71	Macedonia	16.12	Singapore	1.16
Azerbaijan	2.89	Fiji	2.96	Madagascar	15.64	Slovak Republic	8.37
Bahamas	1.78	Finland	1.54	Malawi	30.79	Slovenia	11.81
Bahrain (L)	0.71	France	1.57	Malaysia	2.79	Solomon Islands	9.67
Bangladesh	4.91	Gabon	6.37	Maldives	3.81	South Africa	7.40
Barbados	1.84	Gambia, The	3.79	Mali	4.89	Spain	3.34
Belgium	1.87	Georgia	11.93	Malta	2.76	Sri Lanka	9.42
Belize	1.72	Germany	1.78	Mauritania	5.32	St. Kitts and Nevis	2.95
Benin	7.27	Ghana	28.21	Mauritius	6.44	St. Lucia	2.11
Bhutan	6.53	Greece	6.28	Mexico	14.97	St. Vincent	1.56
Bolivia	5.82	Grenada	1.86	Moldova	16.85	Sudan (H)	50.99
Botswana	9.18	Guatemala	8.21	Mongolia	26.86	Suriname	32.61
Brazil	14.87	Guinea-Bissau	20.42	Morocco	2.76	Swaziland	9.39
Bulgaria	39.95	Guyana	6.14	Mozambique	24.73	Sweden	1.65
Burkina Faso	4.95	Haiti	21.28	Namibia	8.91	Switzerland (L)	1.08
Burundi	14.63	Honduras	15.22	Nepal	6.30	Syrian Arab Rep.	4.23
Cambodia	4.02	Hong Kong	2.43	Netherlands	2.59	Tanzania	14.55
Cameroon	5.96	Hungary	14.97	New Zealand	1.99	Thailand	3.61
Canada	1.85	Iceland	3.19	Nicaragua	10.11	Togo	6.94
Cape Verde	4.37	India	6.98	Niger	5.80	Tonga	4.81
Central African Rep.	5.09	Indonesia	14.04	Nigeria	26.73	Trinidad and Tobago	5.27
Chad	7.76	Iran, Islamic Rep.	22.10	Norway	2.22	Tunisia	3.50
Chile	6.10	Ireland	2.92	Pakistan	7.32	Turkey (H)	68.69
China	5.97	Israel	6.62	Panama (L)	1.03	Uganda	5.20
Colombia	15.12	Italy	3.08	Papua New Guinea	10.96	Ukraine	21.96
Congo, Rep.	8.33	Jamaica	14.57	Paraguay	11.66	United Kingdom	2.48
Costa Rica	12.71	Japan (L)	0.13	Peru	11.13	United States	2.49
Cote d'Ivoire	6.16	Jordan	2.64	Philippines	6.45	Uruguay	22.56
Croatia	14.15	Kazakhstan	13.23	Poland	15.49	Vanuatu	2.56
Cyprus	3.24	Kenya	12.41	Portugal	3.66	Venezuela (H)	40.94
Czech Republic	5.97	Korea	4.16	Romania (H)	58.54	Vietnam	3.13
Denmark	2.16	Kuwait	1.71	Russian Federation	30.95	Yemen, Rep.	20.67
Dominica	1.21	Kyrgyz Rep.	16.62	Rwanda	5.81	Zambia	30.88
Dominican Republic	9.12	Lao PDR	31.96	Samoa	3.51	Zimbabwe (H)	47.56

Note: L and H mean the 5 lowest and 5 highest inflation rates.

Table A2: Standard Deviation of Inflation in Sample Countries: 1993-2003

Country	*V*	Country	*V*	Country	*V*	Country	*V*
Albania	24.79	Ecuador	23.89	Latvia	11.87	Saudi Arabia	1.72
Algeria	11.33	Egypt, Arab Rep.	4.37	Lesotho	11.90	Senegal	9.42
Argentina	8.44	El Salvador	5.51	Lithuania	23.96	Seychelles	2.70
Australia	1.48	Estonia	27.03	Luxembourg	0.84	Sierra Leone	13.70
Austria	0.91	Ethiopia	7.10	Macedonia(H)	39.13	Singapore	1.11
Azerbaijan	8.49	Fiji	1.75	Madagascar	15.26	Slovak Republic	3.11
Bahamas	0.71	Finland	0.83	Malawi	20.80	Slovenia	8.19
Bahrain	1.47	France(L)	0.55	Malaysia	1.26	Solomon Islands	2.12
Bangladesh	2.66	Gabon	12.51	Maldives	6.37	South Africa	1.69
Barbados	2.28	Gambia, The	2.70	Mali	7.57	Spain	1.03
Belgium(L)	0.60	Georgia	13.25	Malta	1.15	Sri Lanka	3.42
Belize	2.06	Germany	1.05	Mauritania	1.89	St. Kitts and Nevis	2.12
Benin	11.06	Ghana	14.08	Mauritius	1.75	St. Lucia	1.76
Bhutan	3.31	Greece	3.84	Mexico	11.03	St. Vincent	1.50
Bolivia	3.77	Grenada	0.92	Moldova	13.63	Sudan (H)	50.18
Botswana	2.19	Guatemala	2.34	Mongolia	28.98	Suriname	32.69
Brazil	19.63	Guinea-Bissau	22.71	Morocco	1.95	Swaziland	3.04
Bulgaria(H)	44.44	Guyana	2.97	Mozambique	22.65	Sweden	1.38
Burkina Faso	7.23	Haiti	11.28	Namibia	1.50	Switzerland	0.87
Burundi	10.63	Honduras	7.35	Nepal	2.93	Syrian Arab Rep.	6.71
Cambodia	5.19	Hong Kong	5.50	Netherlands	0.78	Tanzania	11.00
Cameroon	10.81	Hungary	7.88	New Zealand	1.03	Thailand	2.59
Canada	0.78	Iceland	1.74	Nicaragua	4.50	Togo	11.81
Cape Verde	3.23	India	3.26	Niger	10.67	Tonga	3.80
Central African Rep.	8.72	Indonesia	15.33	Nigeria	24.00	Trinidad and Tobago	2.44
Chad	12.97	Iran, Islamic Rep.	10.98	Norway	0.64	Tunisia	1.18
Chile	3.50	Ireland	1.50	Pakistan	3.96	Turkey	23.09
China	8.80	Israel	4.36	Panama(L)	0.41	Uganda	3.49
Colombia	6.79	Italy	1.17	Papua New Guinea	5.03	Ukraine	25.19
Congo, Rep.	13.44	Jamaica	9.75	Paraguay	4.57	United Kingdom	0.74
Costa Rica	4.23	Japan	0.86	Peru	14.07	United States(L)	0.57
Cote d'Ivoire	7.50	Jordan	1.62	Philippines	2.29	Uruguay	17.52
Croatia	32.79	Kazakhstan	11.19	Poland	12.50	Vanuatu	0.81
Cyprus	1.11	Kenya	13.31	Portugal	1.32	Venezuela	25.51
Czech Republic	3.87	Korea	1.85	Romania(H)	47.76	Vietnam	2.96
Denmark(L)	0.42	Kuwait	1.12	Russian Federation	24.72	Yemen, Rep.	18.82
Dominica	0.68	Kyrgyz Rep.	12.93	Rwanda	4.67	Zambia	11.27
Dominican Republic	6.48	Lao PDR(H)	39.96	Samoa	4.28	Zimbabwe	38.04

Note: L and H mean the 5 lowest and 5 highest standard deviations of the inflation rates.