

Inflation, Inflation Uncertainty,
Political Stability, and Economic Growth

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Abstract

Several authors report regressions where inflation slows economic growth. These results have been criticized because of their sensitivity to the sample analyzed and because there does not appear to be a strong theoretical reason for believing that inflation significantly lowers growth. Indeed, researchers have suggested that inflation proxies for inflation uncertainty or poor economic policy. More specifically, empirical and theoretical work suggests that political stability may create both high growth and low inflation. In this paper, we investigate the possibility that political stability may be behind the inflation-growth nexus. We also employ a better measure of inflation uncertainty that is derived from surveys of forecasters. We find that political stability can explain the negative relationship between inflation and growth in our sample. Further, our new measure of inflation uncertainty is unable to overcome the multicollinearity problems with inflation and is also outperformed by political stability.

Fischer (1993) and Barro (1995) presented evidence of a significant negative relationship between inflation and economic growth. However, the source of the negative relationship remains a subject of dispute. Fischer argues that inflation proxies for generally poor policy. Sala-i-Martin (1991) suggests that the role of inflation may be created by spurious correlation arising from an omitted variable.¹ For example, high inflation uncertainty may be the cause of slow growth, but the high cross-country correlation between inflation and inflation uncertainty may cloud the true underlying relationship. More generally, he argues that inflation may proxy for government failures that are to blame for the sluggish growth. In this paper we present some evidence that political stability may lie behind the inflation-growth nexus.

The lack of political stability may directly disrupt production or may hamper growth by threatening property rights that are essential to material progress. Since Barro (1991), the number of revolutions and coups per year has been a standard variable in growth equations to capture this effect. More such disruptions tend to lower growth. Alesina, Ozler, Roubini, and Swagel (1992) (hereafter AORS) and Mauro (1995) using different measures and methods also find that political stability promotes economic growth.

Cuikerman, Edwards, and Tabellini (1992) (hereafter CET) argue that politically unstable countries are prone to high inflation. In the CET model, a high probability of a political regime shift dissuades the incumbent government from investing in the infrastructure necessary to collect income taxes. Instead, the incumbents will rely on seigniorage. Davis and Kanago (1996) argue that in the CET setting a more unstable government also causes greater inflation uncertainty. Cuikerman and Meltzer (1986) make a similar point from a different perspective. In their model, political instability refers to changes in the preferences of the Central Bank, and preferences that change more frequently cause both higher and more uncertain money growth. Combining arguments, political instability may generate both high and uncertain inflation, and slow growth. This, in turn, poses the possibility that inflation uncertainty and inflation may be significant in growth regressions only because they proxy for political instability.

Earlier studies of the effect of inflation uncertainty on economic growth used the sample standard deviation of inflation as the measure of inflation uncertainty. This measure implies that

¹ There have been other criticisms of the cross-country results for the inflation and growth relationship. For example, Clark (1997) shows that the inflation-growth connection is sensitive to the countries included in the sample and the sample time period. Our results compliment these earlier results by suggesting why in some samples there is a negative relationship between growth and inflation.

the expected rate of inflation over the period was constant and equal to the sample mean. This simplification was forced by the absence of survey data and the cost of constructing a regression based measure of expected inflation for each country; and amounts to replacing uncertainty with variability. We have compiled from the pages of *Business Asia*, *Business Europe*, and *Business Latin America* annual forecasts of inflation for a cross section of 44 countries which allow us to construct a standard deviation of inflation that is a measure of uncertainty. We use this measure below to study the effect of inflation uncertainty on growth.

We find that when our measure of inflation uncertainty alone is added to a typical growth equation, it exerts a significant negative influence on growth. This is consistent with earlier studies that used variability. However, once inflation is included in the regression, inflation uncertainty no longer affects growth, but neither does inflation. Bruno and Easterly (1995) argue that times of inflation crisis, inflation episodes that equal or exceed 40% per year for two consecutive years, may be the cause of low growth rather than the inflation itself; but in this sample, inflation crises and the other inflation measures are collinear, and their individual effects cannot be disentangled.

We then bring political stability into the analysis. As in CET, inflation and political stability are negatively related; greater inflation is associated with lower political stability. When both inflation and political stability are in the growth regression; inflation loses its significance, while political stability retains its significance. Similar results hold when we include inflation uncertainty or inflation crisis in a regression with stability.

In the next section we describe the data. In Section 3 we first discuss the basic growth equation and then our results. In Section 4 we discuss the robustness of our results and we conclude in Section 5.

2. The Data

Our data on inflation forecasts come from the pages of *Business Latin America*, *Business Asia*, and *Business Europe*. These periodicals have provided annual inflation forecasts for a large set of countries for the last twenty to twenty-five years. The countries are listed in the appendix. We will briefly describe the data here, the details may be found in Davis and Kanago (1998). The forecasting units for the three periodicals have provided an annual inflation forecast for forty-four

countries over the past two decades. We matched these forecasts with the actual inflation rates to calculate forecast errors. We use the squared forecast errors from 1969 to 1988 to calculate the standard deviation over the sample period. We have argued elsewhere that the raw variance or standard deviation is not the correct measure of inflation uncertainty.² Instead, we suggest that the appropriate measure is the standard deviation of inflation divided by the gross expected rate of inflation, and we call this measure real or relative uncertainty.³ We use this measure below, but our results also hold for the unadjusted standard deviation.

We use the measure of political stability compiled and described by Mauro (1995). This measure elicits the responses of *Business Intelligence* analysts and correspondents on a scale of 0 to 10 on the country's political stability. Political stability is defined by "Conduct of political activity, both organized and individual, and the degree to which the orderly political process tends to disintegrate or become violent." A score of 10 indicates a high degree of stability, while a score of 0 indicates instability. Mauro reports, and we use, the average of this index for the four years 1980 to 1983. We also use the revolution and coups variable from Barro (1991). This is the average number of revolutions and coups per year in each country from 1970 to 1985.

Bruno and Easterly (1995) identify twenty-six countries who suffered one or more inflation crises over the past forty years. Our data on inflation expectations, which begins in the late sixties for most of the countries and ends in 1988, includes forty-four countries, eight of which experienced a crisis. These eight are: Argentina, Bolivia, Brazil, Chile, Costa Rica, Mexico, Peru, and Uruguay. Ecuador began a crisis period in 1988, but since this coincides with the last year in our sample, we did not mark it as a crisis country. The data for output growth rates, average inflation rates, and levels of real-per-capita GDP come from Fischer (1993) and from Summer and Heston (1991). Secondary school enrollments and revolutions and coups were kindly provided to us by Ross Levine.

3. The Results

a. *the basic growth equation*

² See Davis and Kanago (1992).

³ The gross expected rate of inflation is one plus the expected rate of inflation. Earlier authors, for example Vroman (1989) and Emery (1993), suggested that the coefficient of variation of inflation was a better measure than the standard deviation. However, our work shows that it is relative uncertainty, not the coefficient of variation that is appropriate.

In the broad sample of countries covered by the Summer-Heston data, a bivariate regression of growth on initial income does not perform well. The now standard scatter diagram reveals no correlation between initial income and subsequent growth.⁴ This result is known as non-convergence; poor countries do not appear to catch-up or converge with rich countries. The inclusion of secondary or primary school enrollments improves matters. The enrollments variable itself is significant with the expected positive sign, and once this measure is included in the regression, the coefficient on initial income is negative and significant. Those countries with low levels of initial income tend to grow faster than those countries with initially high income, and conditional convergence is said to hold. As a result, the basic growth equation regresses the percent change in per-capita-real GDP against the log of the level of initial per-capita GDP and the log of secondary school enrollments, or some other measure of human capital, or investment in human capital. These regressors are found in virtually all work since Barro (1991).

Our sample differs from the usual sample in two ways. Because of the availability of the forecast data and data on political stability, the sample includes only thirty-eight countries. Also as a result of data availability, the sample begins in 1969.⁵ These two differences in sample specification produce different results for the basic equation. In particular, convergence holds unconditionally. A simple bivariate regression of growth in per-capita-real GDP from 1969 to 1988 on the log level of per- capita-real GDP in 1969, call it Y69, yields

$$\text{growth} = .11 - .009(\text{Y69})$$

(4.29) (2.79)

where t-statistics are in parentheses.

When primary school enrollments are included in the regression, convergence still holds, the coefficient on lagged income is still significant, but the coefficient on primary school enrollments is not. When we include secondary school enrollments instead of primary enrollments, problems occur. The regression for this specification is

⁴ See, for example, Barro (1991).

⁵ Barro (1991) does report results for a sample that begins in 1970 and finds conditional convergence.

$$\text{growth} = .10 - .007(\text{Y69}) - .001(\text{SECENROLL})$$

(2.53) (1.33) (1.17)

Evidently, in our sample initial income and secondary school enrollments are highly correlated. A regression between the two yields an R^2 of .55 and this correlation produces a multicollinearity problem. We want to avoid contaminating the results for the variables of interest with noise or problems between the controls, so we include only the initial level of income and a constant as standard variables in each regression.

b. the results for the inflation variables

We first examine the effects of inflation, inflation uncertainty, and inflation crisis alone. These results are reported in Table 1. Consistent with earlier studies, inflation, inflation uncertainty, and inflation crisis separately have a negative and significant impact on economic growth. Moreover, the quantitative impacts are similar to those found in other studies. For example, in Barro (1996) a 10 percentage point increase in inflation lowers the growth rate by about .2 to .3 percentage points.⁶ Lines four through six in this table show that our data does not overcome the multicollinearity problem between inflation, inflation uncertainty, and inflation crisis. This is so even though inflation uncertainty here is measured by real uncertainty. In short, our sample of countries appears to be fairly representative with respect to the impact of inflation variables on economic growth.

<p>Table 1</p> <p>Results for the Inflation Variables</p>

⁶ Time series results differ on whether inflation uncertainty affects growth temporarily or permanently. Holland (1988) finds a permanent effect, while Davis and Kanago (1996) only find a temporary effect.

real uncertainty	inflation	inflation crisis	adjusted R ²
-.048 (2.64)			0.24
	-.0003 (2.31)		0.28
		-.013 (2.03)	0.26
.009 (.18)	-.0003 (1.1)		0.26
-.002 (.74)		-.008 (.78)	0.25
	-.0003 (1.73)	-.0009 (.11)	0.26
Notes: t-statistics are in parentheses and were calculated using heteroscedastic-consistent standard errors.			

c. adding political stability

The work of CET, among others, argues that inflation and political stability should be inversely related, and the work of AORS finds that political stability promotes growth. We find both of these results in our data. Political stability is negatively correlated with all of the inflation variables with cross correlation coefficients ranging from -.20 for inflation crisis to -.34 for real uncertainty and with p-values of .20 for inflation crisis, .10 for inflation, and .03 for real uncertainty. When political stability is included in the growth regression, we expect its coefficient to be positive, and the first row of Table 2 shows that it is.

The relationship between political stability and both growth and inflation raises the possibility that when the inflation variables are included in the growth regression and political stability is not, the inflation variables may be serving as proxies for stability. This possibility finds support in the results gathered in Table 2. When any of the inflation variables are included in a regression with political stability the inflation variable is no longer significant, but the stability measure is. These results are consistent with the argument that political stability is behind both low inflation and high growth for this set of countries.

Table 2				
Results when both Political Stability and an Inflation Variable are included in the Regression				
inflation	real uncertain y	inflation crisis	political stability	adjusted R ²
			0.008 (2.55)	0.37
-0.02 (1.59)			.007 (2.21)	0.40
	-0.03 (1.28)		.008 (2.10)	0.38
		-.009 (1.20)	.007 (2.21)	0.39
Notes: t-statistics are in parentheses and were calculated using heteroscedastic-consistent standard errors				

4. Robustness Checks

a. other measures of political stability

To check the robustness of our results we first tried alternative measures of political stability. We experimented with the Edwards and Tabellini (1991) measure of the frequency of regime shifts and the number of revolutions and coups introduced by Barro and used by many others. For the Edwards-Tabellini measure, in the subsample for which we have data the inflation variables were not significant when they were included in the growth regression. So, like Clark (1997), the results with respect to the inflation variables are sensitive to the countries included in the sample. Revolutions and coups was not significant in regressions that included inflation or real uncertainty, but neither were the inflation variables. Revolutions and coups was significant in a regression with inflation crisis, but inflation crisis was also nearly so. To see how the three measures of political stability compared, we ran the Davidson-MacKinnon J-test.

A regression which includes all three measures yields the result

$$\text{growth} = .09 - .014(Y69) - .02(E-T) + .008 (\text{Mauro}) + .024(\text{Revs \& Coups})$$

(2.22) (2.54) (1.41) (2.62) (1.27)

where the t- statistics in parentheses use heteroscedastic-consistent standard errors. The Mauro measure dominates both the Edwards-Tabellini measure and the number of revolutions and coups. The political measure with the most information in the sense of the J-test is thus Mauro's.

b. endogeneity problems

The regressions considered above assume that there is no feedback from growth to inflation or political instability. This assumption has been criticized by, among others, AORS because it is plausible that low growth leads to political instability thereby inducing a simultaneous equations bias into our results. Two considerations argue against this being a severe problem. First, after jointly estimating political instability and growth, AORS (p. 1) conclude that "Contemporaneous low economic growth is not found to increase the contemporaneous propensity of government change." In addition, CET find that consumption growth and inflation have an insignificant effect on the probability of government change so that there does not appear to be strong feedback from economic growth to either inflation or political instability.

Nevertheless, we attempted to find instruments for political instability and inflation. We used the ethnolinguistic fractionalization variable that Mauro employed and region as instruments in the regression. In the instrumental variable estimation, political stability has the correct sign, but is not significant with a p-value .18. The coefficient on inflation has the wrong sign and a p-value of .54. So, political stability outperforms inflation in the instrumental variable estimation, but it is no longer significant at conventional levels.

5. Conclusion

Earlier authors have documented the sensitivity of estimates of the effect of inflation on economic growth. In this paper we have investigated the possibility that some of the sensitivity is caused by a third variable that affects both inflation and economic growth, political stability. In our sample political stability dominates inflation, real uncertainty, and inflation crisis as explanatory variables of economic growth. When both are included in the regression, political stability retains its significance. However, like earlier results, this one is sensitive. The effect of inflation on economic growth is sensitive to the countries included in the sample and neither inflation nor political stability are significant when instrumental variables are used to estimate the model.

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Countries Included in the Regressions