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Political Instability and Inflation Volatility

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Political Instability and Inflation Volatility[1]

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Abstract

The purpose of this paper is to empirically determine the causes of worldwide diversity of inflation volatility. We show that higher degrees of political instability, ideological polarization, and political fragmentation are associated with higher inflation volatility.

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I. INTRODUCTION

Although the adverse effects of inflation volatility on economic prosperity are generally recognized, its causes are not sufficiently investigated.

Economists generally recognize that high and volatile inflation is harmful to economic growth and societal welfare. This realization had a strong impact on the profession, leading scholars and policymakers to devote great effort to fully comprehend the inflationary process and attain price stability. However, few studies focused on disentangling the effects of high inflation levels from those of high inflation volatility on growth. This is because higher inflation levels are typically associated with higher inflation volatility.[3] Friedman (1977) argues that inflation volatility may indeed harm growth, conjecturing that growing inflation volatility would render the economy less efficient by introducing frictions in markets, and creating a wedge between relative prices prevailing in the economy and those which would have been determined solely by market forces in the absence of inflation volatility. This suggests that high inflation volatility may be as disruptive to the economy as high inflation levels. While studies on the determinants of inflation are abundant in the literature, scholars have not yet extensively investigated the causes of inflation volatility—surprisingly so, given its potential ill effects on growth.[4]

Econometric analysis of the deep determinants of inflation volatility suggests that greater political instability leads to higher inflation volatility.

In a recent study, Rother (2004) concludes that volatility in discretionary fiscal policies has contributed to inflation volatility in a panel of 15 OECD countries for a period of 35 years. However, this result does not shed light on the deep determinants of inflation volatility. Why do some countries have more volatile monetary and fiscal policies than others? This paper attempts to provide some evidence on the deep determinants of inflation volatility. In line with Cukierman, Edwards, and Tabellini (1992), Acemoglu and others (2003), and Aisen and Veiga (2005, 2006), we hypothesize that political and institutional factors are the main determinants of inflation volatility. Politically-unstable countries are often susceptible to political shocks, leading to discontinuous monetary and fiscal policies and higher inflation volatility.[5] Using a panel data set covering around 100 countries from 1975–99, we clearly show that greater political instability, lower economic freedom and higher degrees of ideological polarization and political fragmentation lead to higher inflation volatility.

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[3] For a descriptive analysis showing a high correlation between inflation levels and volatility, see Fischer, Sahay, and Végh (2002).

[4] For a recent study on the effects of inflation volatility on growth, see Fatás and Mihov (2005).

[5] Woo (2003) shows that political instability and weak institutions are among the determinants of public deficits.

II. DATA AND THE EMPIRICAL MODELS

The sources of political and institutional data are: *Database of Political Institutions* (DPI); *Cross National Time Series Data Archive* (CNTS); and *Annual Report of the Economic Freedom of the World* (EFW). Data on economic variables were collected from the World Bank's *World Development Indicators* (WDI) and *Global Development Network Growth Database* (GDN), and from the International Monetary Fund's *International Financial Statistics* (IFS).

To investigate the main political, institutional and economic determinants of inflation volatility across countries and time, we estimated panel data models for standard deviations of inflation (taken from the IFS) for consecutive 3-year periods.[6] Since standard deviations of inflation have very high variability, their logarithms were used as our dependent variable: *Log[SD(Inflation)]*. We hypothesize that these depend on the following explanatory variables:[7]

- Lagged logarithm of inflation volatility (IFS), *Log[SD(Inflation)] (-1)*. Given the abundant evidence of inflation inertia found in empirical studies, we also expect inflation volatility to be persistent. Thus, we anticipate a positive coefficient for *Log[SD(Inflation)] (-1)*;

- Economic structural variables that reflect characteristics of the countries that may affect their capacity to control inflation:

  o *Agriculture (percent of GDP)*: The share of the value added of agriculture in GDP (WDI). According to Cukierman, Edwards, and Tabellini (1992), the agricultural sector is the hardest to tax, which implies greater reliance on seigniorage revenues in countries where its share of GDP is higher. Thus, a positive coefficient is expected for this variable, as higher seigniorage leads to higher inflation levels and volatilities;

  o *GDP per capita* in purchasing power parity (WDI). Following Cukierman, Edwards, and Tabellini (1992), we expect this variable to have a negative coefficient, since the technology for enforcing tax collection is likely to be less efficient in poorer and less developed countries, leading to greater use of seigniorage revenues; and

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[6] The periods are: 1975–77, 1978–80, 1981–83, 1984–86, 1987–89, 1990–92, 1993–95, and 1996–99.

[7] The source of each explanatory variable is indicated between parentheses. Unless otherwise noted, we use 3-year period averages. Although we consider that high inflation results in most cases from high budget deficits that are monetized, we decided not to include money growth and deficits in our baseline model because we are searching for the deep determinants of inflation.

- o *Trade (percent of GDP)*: Openness to trade (WDI). Countries with a larger foreign trade sector are more exposed to external shocks that may increase inflation levels and volatility. On the other hand, countries more open to foreign trade are also more likely to raise funds through import duties. Being less dependent on seigniorage revenues, they could also exhibit lower inflation rates and volatilities. Thus, the sign of the coefficient is uncertain.

- Variables accounting for economic performance and external shocks:

  - o *SD(GDP growth)*: Standard deviation of GDP growth (WDI). Assuming that inflation volatility may, in some cases, result from output volatility, a positive coefficient is expected;
  - o *Real overvaluation*: Real effective overvaluation of the national currency (GDN). A negative sign is anticipated, as an overvalued currency leads to cheaper imports and tends to bring inflation levels and volatilities down.;
  - o *Log(Inflation)*: Logarithm of inflation levels (IFS). According to Fischer, Sahay, and Végh (2002), inflation becomes more volatile at higher levels. Thus, a positive coefficient is expected; and
  - o *Change in oil prices*: Percentage change in oil prices (IFS). Since higher oil prices lead to greater costs of production and prices, they are associated with higher and more volatile inflation (a positive coefficient is expected).

- Variables representing political instability and institutions:

  - o *Executive changes* (CNTS): number of times in a year that effective control of the executive power changes hands. According to Cukierman, Edwards and Tabellini (1992) and Aisen and Veiga (2005 and 2006), higher political instability leads to greater reliance on seigniorage revenues and to higher inflation. Since these lead to more volatile inflation rates, a positive coefficient is expected; and
  - o *Index of economic freedom* (EFW). Higher indexes are associated with smaller governments, stronger legal structure and security of property rights, access to sound money, greater freedom to exchange with foreigners, and more flexible regulations of credit, labor, and business. All of these are characteristics of advanced and liberalized economies where seigniorage and other forms of distortionary taxation are generally absent. Thus, we expect that greater economic freedom is associated with lower inflation levels and volatilities (a negative coefficient is expected).

The empirical model for inflation volatility can be summarized as follows:

$$SD\left(Inf_{it}\right) = \mathbf{X}_{i,t}^{'}\boldsymbol{\beta} + v_i + \delta_t + \varepsilon_{it} \qquad\qquad i = 1,...,N \quad t = 1,...,T_i \qquad\qquad (1)$$

where *SD(Inf)* stands for the standard deviation of inflation of country *i* for the three-year period *t*, β is a vector of parameters to be estimated, X is a vector of explanatory variables,[8] ν are country-specific effects, δ are time-specific effects, and, ε is the error term.

III.   EMPIRICAL RESULTS

We start with a model that includes only the economic variables referred to above. The results of column 1 of Table 1 show that the lagged dependent variable is not statistically significant, which means that inflation volatility is not persistent along three-year periods. When this lagged dependent variable is excluded we get a static panel data model that can be estimated by the within groups (fixed effects) estimator without incurring problems of inconsistency.[9] The logarithm of inflation is highly statistically significant, confirming the result of Fischer, Sahay, and Végh (2002) that inflation becomes more volatile at higher levels. But, since the correlation between average inflation and its standard deviation for 3-year periods is very high (77.5 percent), it is more appropriate to exclude *Log(Inflation)* from the model. There are some changes in results when *Log[SD(Inflation)](-1)* and *Log(Inflation)* are not included (column 2): *Trade (percent of GDP)* and *Change in oil prices* are no longer statistically significant, while *Real overvaluation* becomes significant.

The remaining columns report a series of tests that consist of adding political and institutional variables to the model.[10] *Executive changes* and the *Index of economic freedom* are statistically significant and have the expected signs (column 3), indicating that greater political instability and lower economic freedom lead to higher inflation volatility. Furthermore, their effects are sizable: an additional executive change increases the standard deviation of the inflation rate by a factor of 1.51≈exp(0.410), that is by 151 percent; and a decrease of one point of the *Index of economic freedom* increases that standard deviation by a factor of 1.96≈exp(0.672). Concerning the economic variables, results indicate that countries with relatively larger agricultural sectors, lower GDP per capita, and overvalued

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[8] *SD(GDP growth)*, *Real overvaluation* and *Executive changes* are lagged one period, as their contemporaneous values can be affected by inflation.

[9] Hausmann tests clearly indicate that the fixed effects specification is preferable to a random effects model. Furthermore, the country and time-period dummies are globally statistically significant.

[10] The variables *Trade, SD(GDP_gr)(-1)* and *Oil_ch* were excluded from the model. They are never statistically significant when included in the models of columns 3 to 7, and Wald tests allow for their exclusion.

Table 1. Inflation Volatility for Three-Year Period 1/

Log[SD(Inflation)]	1	2	3	4	5	6	7
Log[SD(Inflation)] (-1)	-0.042 (-0.92)						
Agriculture (percent of GDP)	0.029 (2.2) **	0.067 (3.42) ***	0.054 (2.75) ***	0.058 (2.81) ***	0.028 (1.24)	0.028 (1.24)	0.051 (2.62) ***
GDP per capita	-0.00005 (-2.33) **	-0.00010 (-8.03) ***	-0.00010 (-4.59) ***	-0.00010 (-4.79) ***	-0.00010 (-3.15) ***	-0.00010 (-3.18) ***	-0.00010 (-3.24) ***
Trade (percent of GDP)	-0.009 (-2.21) **	0.0006 (0.13)					
SD(GDP growth) (-1)	-0.011 (-0.94)	0.005 (0.32)					
Real overvaluation (-1)	0.001 (0.56)	0.002 (2.21) **	0.002 (2.00) **	0.002 (2.03) **	-0.001 (-0.45)	-0.001 (-0.45)	0.002 (2.21) **
Log(Inflation)	0.833 (11.8) ***						
Change in oil prices	-0.042 (-2.40) **	-0.004 (-1.31)					
Executive changes (-1)			0.410 (2.59) ***	0.343 (2.06) **	0.444 (2.45) **	0.445 (2.46) **	0.415 (2.23) **
Index of economic freedom			-0.672 (-4.33) ***	-0.606 (-3.90) ***	-0.647 (-4.13) ***	-0.649 (-4.15) ***	-0.679 (-3.94) ***
Ideological polarization				0.286 (2.33) **			
Herfindhal index of parties' shares					-0.877 (-2.10) **		
Fractionalization index						0.854 (-2.11) **	
Number of observations	427 569	593	563	549	515	515	437
Number of countries	97	97	90	90	89	89	69
Adjusted R^2	0.69	0.51	0.58	0.6	0.6	0.6	0.54

1/ (1) Within groups (fixed effects) estimations; (2) models estimated with a constant and dummy variables for countries and 3-year periods; (3) the dependent variable, *Log[SD(Inflation)]*, is the natural logarithm of the standard deviation of inflation over a 3-year period; (4) t-statistics for heteroskedastic-consistent standard errors are in parenthesis; (5) level at which the null hypothesis is rejected: ***, 1 percent; **, 5 percent; and *, 10 percent; and (6) the estimation of column 7 is performed for a sample that only includes developing countries.

currencies have higher inflation volatility.[11] Results presented in the following three columns indicate that greater ideological polarization (column 4), lower Herfindhal index (greater fragmentation) of the political parties' shares of seats in Parliament (column 5), and higher fractionalization ratios (column 6) lead to higher inflation volatility.[12] Finally, the results obtained for a sample that only includes developing countries (column 7) are similar to those for the entire sample (column 3).[13]

[11] Their marginal effects on the standard deviation of inflation are, approximately, 5.4 percent, for *Agriculture* (percent of GDP), around -0.01 percent for *GDP per capita*, and 0.2 percent for *Real overvaluation*. They may seem small, but we should take into account that, for example, an increase of one standard deviation (US$5,855) in the *GDP per capita* would reduce the standard deviation of inflation by 58.55 percent.

[12] These variables were obtained from the DPI (variables *POLARIZ2*, *HERFTOT* and *FRAC*).

[13] Results are weaker for industrialized countries: *Executive changes* and *Real overvaluation* are marginally statistically significant, and the remaining explanatory variables are not significant. Robustness tests that consisted of adding variables to the model of column 3 revealed that the following are associated with higher inflation volatility: greater turnover of central bank presidents; more leftist governments; lower U.S. Treasury

(continued…)

IV. CONCLUSIONS

Higher degrees of political instability, ideological polarization and fragmentation of the political system, and lower economic freedom are associated with higher inflation volatility.

Using the within groups (fixed effects) estimator on a sample covering around 100 countries analyzed in the period from 1975 to 1999, this paper finds that lower economic freedom and higher degrees of political instability, ideological polarization, and fragmentation of the political system generate more volatile inflation rates. These results are in line with those obtained by Aisen and Veiga (2006) for inflation levels, and by Cukierman, Edwards, and Tabellini (1992) and Aisen and Veiga (2005) for seigniorage.

Higher ideological polarization is associated with greater heterogeneity of preferences for economic policies and outcomes. For a given level of political instability, expressed in frequent changes in the effective control of the executive power, it leads to greater reliance on seigniorage revenues and higher inflation rates (see Cukierman, Edwards, and Tabellini, 1992). Furthermore, economic policies tend to be discontinued more often than when countries are more politically stable. This frequent discontinuity of fiscal and monetary policies will then result in more volatile inflation rates. Finally, according to Alesina and Drazen (1991) and Castro and Veiga (2004), greater ideological polarization and fragmentation of the government or parliament generate delays in the implementation of inflation stabilization programs, resulting in even higher and more volatile inflation rates.

Given the high costs in terms of economic growth and welfare generated by inflation volatility, we believe that this is an important message, not only for positive economics, but also in a normative way. Policymakers in developing countries should be aware that, to obtain long-run economic prosperity, it is essential to reform institutions and create viable mechanisms conducive to long-run price stability.

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bill rates; more flexible exchange rate regimes; higher or more volatile external debt as a percentage of GDP; and, more volatile central government debt. When the standard deviation of the annual change in M2 is used as the dependent variable, results are similar to those reported in Table 1. Results not shown in the paper are available upon request.

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