Quantitative Goals for Monetary Policy

Antonio Fatás, Ilian Mihov, and Andrew K. Rose*

Revised: September 14, 2005

Abstract

We study empirically the macroeconomic effects of an explicit *de jure* quantitative goal for monetary policy. Quantitative goals take three forms: exchange rates, money growth rates, and inflation targets. We analyze the effects on inflation of both having a quantitative target, and of hitting a declared target. Our empirical work uses an annual data set covering 42 countries between 1960 and 2000, and takes account of other determinants of inflation (such as fiscal policy, the business cycle, and openness to international trade), and the endogeneity of the monetary policy regime. We find that both having and hitting quantitative targets for monetary policy is systematically and robustly associated with lower inflation. The exact form of the monetary target matters somewhat (especially for the sustainability of the monetary regime), but is less important than having some quantitative target. Successfully achieving a quantitative monetary goal is also associated with less volatile output.

Keywords: transparency; exchange; rate; money; growth; inflation; target; business cycle.

JEL Classification Number: E52

Antonio Fatás
INSEAD
Boulevard de Constance
77305 Fontainebleau, France
Tel: +33 (1) 6072-4419
fatas@econ.insead.edu
www.insead.fr/~fatas

Ilian Mihov
INSEAD
Boulevard de Constance
77305 Fontainebleau, France
Tel: +33 (1) 6072-4434
ilian.mihov@insead.edu
faculty.insead.fr/mihov/

Andrew K. Rose
Haas School of Business
University of California
Berkeley, CA USA 94720-1900
Tel: +1 (510) 642-6609
arose@haas.berkeley.edu
faculty.haas.berkeley.edu/arose

* Fatás is Professor of Economics, INSEAD, and CEPR Research Fellow. Mihov is Associate Professor of Economics, INSEAD and CEPR Research Fellow. Rose is Rocca Professor of International Business, NBER Research Associate and CEPR Research Fellow. Rose thanks INSEAD, the Reserve Bank of Australia, and the Monetary Authority of Singapore for hospitality while this paper was written. For comments and suggestions, we thank: Roel Beetsma, Mick Devereux, Andrew Filardo, Jordi Gali, Maasimo Giuliodori, Albert Marcet, Patrick Minford, Assaf Razin, Andrew Scott, Ken West, two anonymous referees and workshop participants at the CEPR, ECB and HKMA. This is a shortened version of a paper with the same title; it, a current version of this paper, the data set, and output are available at Rose's website.

1. Introduction and Motivation

The economics profession has gradually moved to the view that transparency in monetary (and other) policies is desirable. For instance, the IMF believes that transparent policies are both more effective and enhance accountability. Accordingly, the Fund encourages countries "… to state clearly the role, responsibility and objectives of the central bank. The objectives of the central bank should be clearly defined, publicly disclosed and written into law."[1] But while the theoretical advantages of transparency have been much analyzed, there is less in the way of empirical support. One objective of this paper is to help fill that gap.

We approach this problem empirically by using a panel of annual data covering over forty countries from 1960 through 2000. We identify "transparent" targets for monetary policy with "quantitative" targets. Quantitative targets are easily measured, allowing the monetary authority's successes (or lack thereof) to be determined mechanistically. That is, quantitative targets are transparent since they can be assessed without (much) debatable personal judgment. However, we are not interested in just the effects of having a transparent policy, but also in the effects of *successful* transparent policy. That is, we are interested in both the *de jure* monetary regime, and the *de facto* success of a central bank in hitting its target (if one exists). Using regression analysis, we find that in practice countries with transparent targets for monetary policy achieve lower inflation, holding other things constant. We also find that countries that hit their targets achieve lower inflation.

In practice, central banks have used three types of quantitative monetary targets, with varying degrees of success: exchange rates, money growth rates, and inflation targets. A number of economists in the past have analyzed the effects of one of these regimes. For instance, there is a large and growing literature on countries with inflation targets. There is an even larger

[1] http://www.imf.org/external/np/exr/facts/mtransp.htm

literature that compares the merits of fixed and floating exchange rate regimes. Rather than focusing on any one of these targets, we use all three. In part this is because we are interested in estimating the effect of transparency in monetary policy, and transparency can take different forms. Indeed, when we compare the effects of different quantitative targets for monetary policy (exchange rate/money growth/inflation) on inflationary *outcomes*, we find differences, but they are small compared to the presence of *any* transparent target.

Still, we combine together different types of targets for monetary policy for a more important reason, best explained with an example. Fixed exchange rates are well-defined monetary policies, and are often compared with floating exchange rate regimes. But a float is not a well-defined monetary policy! Similarly, central banks that do not target inflation have to do something else. By using data for *all* quantitative monetary regimes, we can reasonably compare the merits of having a transparent monetary policy to the alternative, which we consider to be "opaque monetary objective(s)."

In section 2, we briefly review the literature; our methodology and data set are presented afterwards. The core of our paper is in section 4, which presents our results for inflation, along with sensitivity analysis. A brief conclusion closes. An extended version of this paper is freely available on the internet, and provides extensive robustness checks, the effects of quantitative targets on the growth and volatility of output, data appendices, and so forth.

2. Brief Literature Review

Our work is related to a number of other classic problems in economics. In this brief section we simply provide markers to it; the interested reader is referred to the online version of this paper, which contains a longer review of the field.

There is a large literature that has focused on the role of domestic institutions in the conduct of monetary policy, most of which is centred on the effects of independence of central banks, and/or, more recently, on inflation targets. Another literature of relevance concerns the choice of monetary target; should the monetary authority target the exchange rate, the money growth rate, the inflation rate, or something else. There is an enormous body of work that compares the attributes of fixed and floating exchange rate regimes. Still, to repeat a standard but important criticism of this area, a fixed exchange rate is a well-defined monetary policy, but a floating exchange rate regime is not. If the monetary authorities are not pegging the exchange rate, they must be doing something else.

Two issues of importance appear repeatedly in the literature. First, should the monetary policy regime by characterized by words or by deeds? It is well known that official statements about monetary policy frequently do not reflect actual policy. Probably the best-known recent example is "fear of floating" analyzed by Calvo and Reinhart (2002) but ostensible money-growth targeters are often thought to be closet inflation-targeters (e.g., Bernanke and Mihov, 1997). Rather than attempt to resolve this issue on a conceptual level, we look at both the effects of having a transparent *de jure* monetary regime, and whether or not it is hit *de facto* in practice.

A second problem that is present throughout the literature is regime endogeneity. Is inflation lower because of, e.g., the fixed exchange rate regime? Or are countries with low inflation (or more distaste of inflation) more likely to adopt fixed exchange rate regimes? We deal with this issue in two ways. First, we follow the literature in attempting to deal with this issue by using a set of instrumental variables based on political and economic arguments. More significantly, our regressions link the one-year lead of inflation to economic determinants to reduce the possibility of simultaneity.

3. Methodology

Our question is whether the establishment of a quantitative target for monetary policy matters for inflation, *ceteris paribus,* and also whether hitting a target (if it exists) matters. A number of researchers have examined such issues using the case-study approach (e.g., Bernanke et al, 1999); we now compliment such work with an econometric study.

3a. Benchmark Model

Our benchmark regression is similar to those used to study the exchange rate regime by Levi-Yeyati and Sturzenegger (2001), and Ghosh et al. (2002); see also Campillon and Miron (1996). Our model is:

$$\Pi_{it+1} = \beta_1 DJTarget_{it} + \beta_2 Success_{it}$$
$$+ \gamma_1 Open_{it} + \gamma_2 Budget_{it} + \gamma_3 BusCycle_{it} + \gamma_4 GDPpc_{it} + \gamma_5 GDP_{it} + \varepsilon_{it}$$

where i denotes a country, t denotes a year, and

- Π denotes the annual inflation rate in percentage points
- $DJTarget_t$ is a dummy variable that is one if the country had a quantitative monetary policy target during period t, and zero otherwise,
- Success is a dummy variable that is one if the country hit its *de jure* quantitative target during t, and zero otherwise,
- γ_i is a set of nuisance coefficients,
- Open is trade (exports plus imports) as a percentage of GDP,
- Budget is the government budget surplus (+) or deficit (-), as a percentage of GDP,
- BusCycle is the difference between real GDP growth and average (country-specific) GDP growth, measured in percentage points,

- GDPpc is the natural logarithm of real GDP per capita,
- GDP is the natural logarithm of real GDP, and
- ε is a well-behaved residual term for all other inflation determinants.

The two coefficients of interest to us are β_1 and β_2. The first coefficient is of greatest interest; it represents the effect of having a formally declared *de jure* quantitative monetary target on future inflation, *ceteris paribus*. Also of interest to us is β_2, which shows the effect on (the lead of) inflation of successfully hitting a quantitative monetary target (if one exists) *de facto*.

In the sample there were 170 switches of Target (the existence of a quantitative monetary regime). Countries had *de jure* targets for almost 80% of the observations, the majority of these being exchange rate targets.

The other regressors control for "nuisance" factors that affect inflation and might be correlated with the monetary policy regime, but are not of direct interest to us. We include *Open* as a regressor for two reasons. First, Romer (1993) argues that more open economies have lower inflation since the costs of monetary expansion are higher when the country has high trade-to-GDP ratio. Also, more open economies tend to adopt fixed exchange rates. The budget balance (*Budget*) can affect inflation by imposing requirements for money-financed deficits or through aggregate demand. Further, success in hitting a monetary target can be affected by fiscal policy outcomes. We also include the state of the business cycle (*BusCycle*) as a measure of aggregate demand pressures on inflation, and as a covariate that might be correlated with the success of the monetary regime. GDP per capita (*GDPpc*) enters the regression to account for the fact that rich countries have more sophisticated financial sectors, which implies higher opposition to inflation (as in Posen, 1995), and a lower optimal inflation tax since other standard taxes are better developed. Finally, the level of GDP is included to account for market size, which can affect

productivity as in the model of Lucas (1988). Also larger countries are likely to be less open and hence less likely to adopt exchange rate targets.

We estimate the model with least squares, and use robust standard errors. Still, we are cognizant of a number of potential econometric pitfalls associated with this strategy (e.g., simultaneity). Accordingly, we perform extensive sensitivity analysis to take into account a variety of different issues.

During our sample, lower inflation was typically better inflation, though not for all countries and period of time (e.g., Japan during the 1990s which probably experienced excessively low inflation). Thus our methodology does not deliver a message about welfare, and it would be inappropriate for a sample where inflation was typically low.

3b. Data Description

A data appendix in the longer version of this paper describes the sources and variables used in our empirical analysis in detail.

Our annual data set spans 1960 through 2000, and includes all countries for which comprehensive data are available with 1960 GDP per capita of at least $1000 dollars. There is significant variation in monetary policy practices both over time and across countries in the data set. Figure 1 provides a graphical representation of the evolution of various regimes in our sample. Exchange rate pegs are common in the 1960s and for Europeans, money targets appear and then disappear from many countries during the 1980s, and inflation targeting appears in the 1990s.

We use two variables to characterize the monetary policy regime: whether or not there was an announced *de jure* target and whether or not the target was hit *de facto*. Many authors

have struggled with the issue of "words versus actions" in the context of monetary policy. Central banks claim to have adopted strict monetary policy targets of whatever type; often these claims are not validated by actions. Some obvious examples of this behavior include: countries that intervene on foreign exchange markets extensively despite ostensibly floating; missed targets for monetary aggregates; and missed inflation targets. Our strategy is to capture the stated announcements of central banks with our *de jure* classification of monetary targets, and then also to look separately at whether or not the target was hit in practice. Our main data references are Cottarelli and Giannini (1997), and Mishkin and Schmidt-Hebbel (2002).

Establishing a *de jure* classification for exchange rate and inflation targets is not conceptually complicated, though there is much debatable minutiae (e.g., timing regime shifts). For simplicity, we classify monetary authorities as either hitting or missing their targets *de facto*; that is we use a binary 0/1 variable to indicate success or failure of the monetary authorities in achieving their target. Future work might consider finer or continuous gradations of success, since central banks often have partial success in hitting monetary targets.[2] In the case of exchange rate targets, we make use of the Reinhart and Rogoff (2004) classification that characterizes exchange rate regimes by their actions (not their words). For inflation and money targets, we compare the outcome with the announced range for the target.

4. Empirics

4a. Benchmark Results

OLS estimation of our model results in the benchmark estimates presented in Table 1. The coefficient of greatest interest to us is β_1, the effect on inflation of a country's having a

[2] It would be natural to pursue this angle through a loss function approach, though there could be problems if the monetary target is a range rather than a point.

quantitative target for monetary policy of any type (whether an inflation target, a money growth target, or an exchange rate target). The effect is both economically and statistically significant; the existence of a *de jure* target is estimated to lower annual inflation by about fourteen percentage points, with a t-statistic greater than four in absolute value (and hence different from zero at all conventional significance levels). This effect is enhanced if the quantitative target is actually hit. A monetary target that is successfully achieved reduces inflation by another seven percentage points, a result that is again highly statistically and economically significant, especially when mean inflation in the sample was only eleven percent.

Our basic framework is perturbed in five ways in Table 1. First, we drop the dummy variable for successful implementation of a quantitative monetary target. Second and symmetrically, we drop the dummy representing the existence of a quantitative target. Each of the coefficients remains economically and statistically significant if the other is set to zero. Next, we drop all the conditioning variables (that is, we set $\gamma_1=\gamma_2=\ldots=\gamma_5=0$). In another column, we substitute contemporaneous inflation for the dependent variable. Finally, we check the robustness of our results by adding country- and time-specific factors. This is an important check, since it means that the estimation relies only on within-country variation in inflation and monetary regimes over time, while taking into account (through year-specific fixed effects) all global factors such as oil prices, global inflation and so forth.

Our findings seem robust. It seems that countries with transparent (quantitative) *de jure* monetary targets experience lower inflation, and that hitting the target lowers inflation further. While these findings are positive, caveats certainly exist. The model fits the data poorly. While many of the auxiliary regressors are correctly signed (more open economies have lower inflation; tight fiscal policy lowers inflation; richer economies have lower inflation), some are not

(observations with higher-than-average growth display lower inflation). Also, an estimate that spans a wide range of countries and years may not be particularly interesting. A number of technical complications also come to mind. Accordingly, we now engage in sensitivity analysis.

4b. Sensitivity Analysis

Table 2 checks the sensitivity of the results with respect to the precise sample used for estimation. The first perturbation restricts our attention to long-time OECD members (those that entered before 1975). Next we drop outlier observations.[3] We then add in two high-inflation countries, Argentina and Brazil. Next we drop all countries that experienced inflation of more than 100% in our sample (Chile, Israel, Mexico, Turkey and Uruguay). Finally, we provide estimates for both all countries and only the OECD during the post-1982 era, when both major OPEC oil price shocks were over. It is striking that our key coefficient of interest – β_1 – remains economically large and statistically significant in all of these perturbations. (The size of the effect of course varies with the sample; excluding high-inflation countries reduces considerably the potential and actual influence of a quantitative monetary target, while restricting our attention to OECD or low-inflation countries reduces it.) Further, β_2 is also significantly negative (both economically and statistically) cases except when Argentina and Brazil are included.

Table 3 explores whether the three types of quantitative monetary policy targets – inflation, money growth, and exchange rate – have similar effects on inflation. When the three different regimes are allowed to take on different coefficients, the inflation-targeting regime seems to have more of a dampening effect on inflation than the (similar) effects of either exchange rate or money growth targets. The differences between the three targets are significant

[3] The latter are defined as observations with a residual estimated to lie more than 1.5 standard deviations from the mean of zero.

at conventional confidence levels. The effect of a successfully hit monetary target on inflation also varies by the type of target; surprisingly, the effect of successfully hitting an inflation target has a positive coefficient.[4] Still, the most important differences between different types of monetary regimes may be not in their outcomes, but their sustainability. Many countries have abandoned both exchange rate and money growth targets; none has (yet) abandoned an inflation target. Our analysis does not capture this, and it is a subject for future research.

Table 4 uses instrumental variables estimation to account for possible simultaneity in the equation.[5] We are particularly concerned with the possibility that high inflation induces the authorities to introduce or use quantitative targets. There is also the possibility that a low inflation environment may encourage the authorities to lock in stability with a transparent monetary policy. While using the lead of inflation may help reduce such concerns, it is appropriate to attempt to address them head-on as well.

As instrumental variables for both of our dummy variables, we use three political variables and two variables capturing social characteristics. They are: a) political constraints (used by Henisz, 2000); b) a dummy for observations with a presidential electoral system (Persson-Tabellini, 2001); c) a comparable dummy for observations with majoritarian electoral systems (also Persson-Tabellini, 2001); d) the percentage of males over 25 years old with completed primary education; and e) the percentage of males over 25 years with completed secondary education.

We use these instrumental variables for a number of reasons. The presence of political constraints in the country reveals an overall preference for rules. In addition, countries with

[4] A closer inspection of the data reveals that several countries have missed the target by having inflation below the target range. For example, Sweden in the 1990s had a range between 1% and 3% inflation, but in four years inflation was below 1%. This result is fragile; the coefficient becomes negative if country-specific fixed effects are added.
[5] Measurement error is also a potential issue, especially for de jure monetary performance; as we note above, there may be issues associated especially with exchange rate realignments.

more political constraints have more disciplined fiscal policy. With more discipline on the fiscal side it is more likely that that a monetary regime is sustainable. A somewhat different argument is that if political constraints restrict fiscal policy, then society might prefer to leave monetary policy unconstrained and assign to it a bigger role in smoothing business cycle fluctuations. The nature of the political system (presidential vs. parliamentary) affects regime choice in a similar way. Presidential regimes are often characterized by better separation of powers than parliamentary ones, because the president cannot be subjected to a no-confidence vote by the parliament (except under rare circumstances of impeachment). The executive in a parliamentary system, on the other hand, can be more easily removed. The separation of powers in a presidential system again makes fiscal policy rather constrained, which boosts the case for having flexible monetary policy. The electoral system matters because countries with majoritarian systems are associated with stronger governments relative to those with proportional representation. Proportional systems often lead to the need for coalitions to form a government; Levy-Yeyati, Sturzenegger and Reggio (2002) argue coalition governments are more prone to be influenced by special interests. To avoid a situation where special interests affect monetary policy, the society might opt for a regime with an explicit target. Hence majoritarian systems should be linked with a more flexible regime. Finally, more educated societies may insist on having institutions for low inflation, while education has no direct effect on inflation.

We provide four different perturbations of our IV results. First, we use two different sets of instrumental variables: our set of five political variables either by themselves, or augmented with lags of the *de jure* regime and *de facto* monetary success.[6] For both IV sets, we estimate two models: the benchmark model, and one with country- and year-specific fixed effects.

[6] This effectively deals with supply shocks that affect both inflation and the probability of *de facto* monetary success (since the lag of the *de jure* regime is collinear with the contemporaneous value).

The standard errors for the coefficients of interest are considerably higher for the first IV set, indicating that the first-stage regressions do not fit well. That is, our political and educational instrumental variables do not work particularly well. This is even more obvious from the dramatic increase in the size of the effects; the IV estimates of β_1 are over three times the magnitude of the OLS estimates. Once we control for unobserved country fixed effects, the coefficient on monetary success in hitting a quantitative target becomes positive though insignificant for the first IV set. The effect of *de jure* regime on inflation is, however, consistently negative and significant. More significantly, the results for the second IV set are highly significant and consistent with the findings of our benchmark model.

The longer version of the paper provides more sensitivity analysis, including results estimated on individual decades, analysis of the effects of coups and revolutions, results estimated with data averaged over five-year intervals, and more. As with the sensitivity analysis presented above, we have found little evidence that undermines our finding that both having and hitting a *de jure* quantitative monetary regime is associated with lower inflation.

4c. Other Effects of Quantitative Regimes: Growth and Volatility

The longer version of this person present results on output volatility and growth. We find that having an explicit target does not substantially harm output volatility or growth. If anything, we find that having a quantitative monetary target successfully achieved tends to reduce output volatility slightly, and that such targets also tend to increase growth. That is, having an explicit monetary target does not increase the volatility or lower the growth rate of the economy, and may help in either or both dimensions.

We have also investigated the effects of explicit monetary regimes on inflation volatility. We find that there are no strong signs of any such effect, once we control for the level of

inflation. We interpret this as indicating that countries with explicit targets have lower inflation (as we have documented above), and lower inflation is also less volatile inflation. Again, the reader is referred to the extended version of this paper.

5. Conclusions

In this paper we investigate the effect of quantitative targets for monetary policy on inflation and business cycle volatility. We combine data for three types of targets for monetary policy (exchange rate targets, money growth targets, and inflation targets), so as to be able to compare the effects of both having and hitting transparent objectives for monetary policy against the alternative of having unclear or qualitative goals. Using a panel of macroeconomic data covering over forty years of annual data and countries, we find that having a quantitative *de jure* target for the monetary authority tends to lower inflation and smooth business cycles; hitting that target *de facto* has further positive effects. These effects are large, statistically significant and reasonably insensitive to perturbations in our econometric methodology. Differences in the exact form of the monetary regime have more minor effects on actual inflation than having *some* quantitative target, though some monetary regimes seem more sustainable than others.

During the past decade, there has been much emphasis placed on the importance of transparent goals for monetary authorities; the current consensus is that central banks should independently pursue well-defined goals in a transparent fashion. Our results lead us to conclude that this emphasis seems justified.

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Table 1: Benchmark OLS Inflation Results

					Current Inflation	Country, Year Effects
***De Jure* Quant. Monetary Target**	-13.5 (3.0)	-18.7 (2.7)		-14.4 (2.9)	-16.5 (3.16)	-10.5 (2.2)
Quant. Monetary Success	-6.8 (1.3)		-14.3 (1.6)	-5.8 (1.2)	-5.52 (1.0)	-4.86 (1.9)
Openness (% GDP)	-.018 (.009)	-.022 (.009)	-.017 (.009)		-.024 (.009)	.084 (.039)
Budget (% GDP)	-.82 (.31)	-.85 (.31)	-.82 (.31)		-.46 (.17)	-.81 (.15)
BusCycle (Growth – Avg Growth)	-.38 (.32)	-.47 (.32)	-.37 (.33)		-1.01 (.53)	-.59 (.19)
Log Real GDP p/c	-3.56 (1.02)	-3.46 (1.03)	-4.55 (1.06)		-4.63 (1.10)	-19.8 (6.6)
Log Real GDP	-1.49 (.49)	-1.09 (.46)	-1.66 (.50)		-1.31 (.44)	19.0 (5.7)
Mean Inflation	11.4	11.4	11.4	10.5	11.6	11.4
Observations	1203	1203	1203	1375	1200	1203
R^2	.20	.19	.17	.13	.19	.02

Regressand is lead of inflation. Annual data, 1960-2000 for 40 countries.
OLS with robust standard errors in parentheses. Intercepts included but not tabulated.

Table 2: Sensitivity Analysis

	OECD Only	Without outliers	With Argentina, Brazil	Without High Inflators	Post-1982	Post-1982, OECD
***De Jure* Quant. Monetary Target**	-4.8 (1.8)	-10.5 (2.3)	-85. (23.)	-2.0 (.8)	-10.0 (2.5)	-3.7 (1.6)
Quant. Monetary Success	-5.2 (.8)	-6.9 (1.3)	11. (7.)	-2.7 (.5)	-4.3 (1.4)	-2.5 (.8)
Openness (% GDP)	.026 (.014)	-.021 (.007)	-.055 (.057)	-.016 (.003)	.003 (.020)	.016 (.016)
Budget (% GDP)	-.26 (.06)	-.52 (.14)	-2.38 (1.66)	-.15 (.04)	-1.14 (.71)	.44 (.17)
BusCycle (Growth – Avg. Growth)	-.30 (.24)	-.37 (.32)	-4.83 (2.45)	-.00 (.07)	.07 (.34)	.14 (.49)
Log Real GDP p/c	-13.3 (1.94)	-3.8 (.8)	-28.5 (9.2)	-1.88 (.42)	-7.77 (1.85)	-32.3 (3.9)
Log Real GDP	.44 (.35)	-1.16 (.42)	12.1 (5.0)	-.81 (.17)	-.61 (1.17)	1.76 (.51)
Mean Inflation	7.6	10.8	26.4	7.3	10.4	6.7
Observations	699	1201	1236	1070	560	318
R^2	.38	.26	.07	.21	.23	.65

Regressand is lead of inflation. Annual data, 1960-2000 for 40 countries.
OLS with robust standard errors in parentheses. Intercepts included but not tabulated.
High Inflation countries are: Chile, Israel, Mexico, Turkey, and Uruguay.

Table 3: Dis-Aggregating Monetary Regimes

***De Jure* Inflation Target**	-19.1 (2.3)	-12.7 (1.8)
Inflation Target Success	3.2 (1.8)	
***De Jure* Money Growth Target**	-11.7 (2.6)	-6.7 (2.0)
Money Growth Target Success	-1.6 (3.1)	
***De Jure* Exchange Rate Target**	-3.9 (4.9)	-15.0 (2.1)
Exchange Rate Target Success	-15.3 (4.1)	
Openness (% GDP)	-.013 (.008)	-.022 (.009)
Budget (% GDP)	-.86 (.34)	-.88 (.32)
BusCycle (Growth – Avg Growth)	-.49 (.35)	-.46 (.33)
Log Real GDP p/c	-3.4 (1.1)	-3.7 (1.1)
Log Real GDP	-1.0 (.5)	-1.2 (.5)
Mean Inflation	11.5	11.4
Observations	1026	1203
R^2	.20	.18

Regressand is lead of inflation. Annual data, 1960-2000 for 40 countries.
OLS with robust standard errors in parentheses. Intercepts included but not tabulated.

Table 4: Instrumental Variable Results

	IV 1	**IV 1**	**IV 2**	**IV 2**
	Benchmark	**Country, Year FE**	**Benchmark**	**Country, Year FE**
***De Jure* Quant. Monetary Target**	-47.5 (14.4)	-18.1 (9.6)	-12.0 (3.0)	-9.7 (2.6)
Quant. Monetary Success	3.2 (9.2)	10.3 (16.3)	-8.7 (1.6)	-6.3 (2.9)
Openness (% GDP)	-.015 (.010)	.075 (.048)	-.017 (.009)	.089 (.044)
Budget (% GDP)	-.77 (.29)	-.89 (.17)	-.85 (.31)	-.83 (.15)
BusCycle (Growth – Avg Growth)	-.23 (.33)	-.73 (.22)	-.37 (.33)	-.63 (.20)
Log Real GDP p/c	-.9 (1.6)	-30.6 (16.5)	-4.2 (1.1)	-19.7 (7.3)
Log Real GDP	-2.0 (.8)	26.7 (12.6)	-1.9 (.5)	19.1 (6.2)

Regressand is lead of inflation. Annual data, 1960-2000 for 40 countries. 1151 observations; mean inflation=11.7%.
IV with robust standard errors in parentheses. Intercepts included but not tabulated.
IV 1 uses only political instrumental variables (for *de jure* quantitative monetary target and quantitative monetary success): a) political constraints (Henisz); b) Presidential Electoral System (Persson-Tabellini); c) Majoritarian electoral system (Persson-Tabellini); d) Percentage of males over 25 years old with primary education (Barro-Lee); and e) Percentage of males over 25 years old with secondary education (Barro-Lee).
IV 2 is similar but adds lagged regime as instrumental variable.

Figure 1: Regime Frequencies (1960-2000)