

Quantitative Goals for Monetary Policy

Antonio Fatás, Ilian Mihov,

and Andrew K. Rose

Key Question

- Does having an explicit *de jure* quantitative goal for monetary policy affect macroeconomic outcomes?
- Three forms of quantitative targets exist:
 1. Exchange rate target
 2. Money growth target
 3. Inflation target

Answer

- Yes: *any* formal quantitative goals lowers inflation
 - Hitting target helps too
 - Output volatility unaffected (perhaps falls)
 - Exact form of target matters less than having *some quantitative target*

Empirical Strategy

- Annual panel data set, 1960-2000, 42 countries
- Account for other determinants of inflation
- Use both declared (*de jure*) and actual (*de facto*) policy:
 - include a) declared policy, and b) success in hitting target
- Sensitivity analysis
 - Special emphasis on endogeneity of monetary regime

Motivation 1: Transparency

- Much focus on *transparency* of late in economics
- Especially true of macroeconomic policy
- Here: equate transparency with quantitative targets
 - Easier to measure objectively
- Test superiority of transparent monetary policy

Motivation 2: What's the Alternative?

- Large literature on performance of inflation targeters
 - Svensson, Cukierman, Mishkin, Ball, Bernanke ...
- Huge literature comparing fixes to floaters
 - Baxter-Stockman, Flood-Rose ...

○ Common to Both: what's the alternative hypothesis?

▪ *A Floating Exchange Rate is not a well-defined monetary policy!*

▪ Similarly countries without inflation target (e.g., USA) must do something else; *what?*

○ We compare transparent to “opaque” monetary regimes

Empirical Model

$$\begin{aligned}\Pi_{it} = & \beta_1 \text{DJTarget}_{it} + \beta_2 \text{Success}_{it} \\ & + \gamma_1 \text{Open}_{it} + \gamma_2 \text{Budget}_{it} + \gamma_3 \text{BusCycle}_{it} \\ & + \gamma_4 \text{GDPpc}_{it} + \gamma_5 \text{GDP}_{it} + \varepsilon_{it}\end{aligned}$$

where i denotes a country, t denotes a year

Estimated with OLS (IV later), robust standard errors

Π denotes the annual inflation rate in percentage points

- DJTarget_t dummy for quantitative monetary policy target
- Success = 1 if country hit its *de jure* quantitative target during t
- γ_i nuisance coefficients,
- Open trade (exports plus imports) as a percentage of GDP,
- Budget budget surplus (+) or deficit (-), percentage of GDP,
- BusCycle = real GDP growth - average GDP growth (%)
- GDPpc natural logarithm of real GDP per capita,
- GDP log real GDP
- ε well-behaved residual term

- Coefficients of interest: β_1 and β_2
 - β_1 is effect of having a formally declared *de jure* quantitative monetary target on inflation, *ceteris paribus*.
 - β_2 is effect on inflation of successfully hitting a quantitative monetary target

Important Data Issues

1. Words or Deeds for Classifying Regimes?

- Clearly an issue in exchange rate regimes (Reinhart-Rogoff, Levy-Yeyati-Sturzenegger)
- Resolved here by including both *de jure* regime and *de facto* success in achieving this

2. Regime Endogeneity

- Another serious issue: inflation lower because of fix, or do low-inflation countries fix?
 - (Traditionally not considered for other regimes)
- Usually handled through instrumental variables
- Related to issues in political economy and optimum currency area literatures

3. Measuring Regimes

- *De Jure* and *De Facto* exchange rate regimes from Reinhart-Rogoff
- Inflation and Money Growth Regimes from various sources (tabulated in paper)

- Inflation targets usually straightforward
- Money growth targets more complicated (sometimes “reference” targets; we use judgment and try to rely on several sources)
 - Ranges vs. single-point target complications
- Use CPI and actual monetary outcomes to measure *de facto* success in hitting targets
- Drop years around regime-shifts (conservative strategy)

Data Description

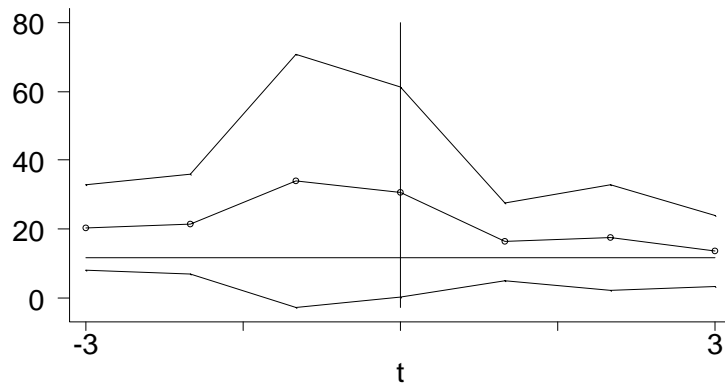
- Annual data set, 1960-2000
- All countries with 1960 GDP p/c > \$1,000 in Penn World

Table (with comprehensive data)

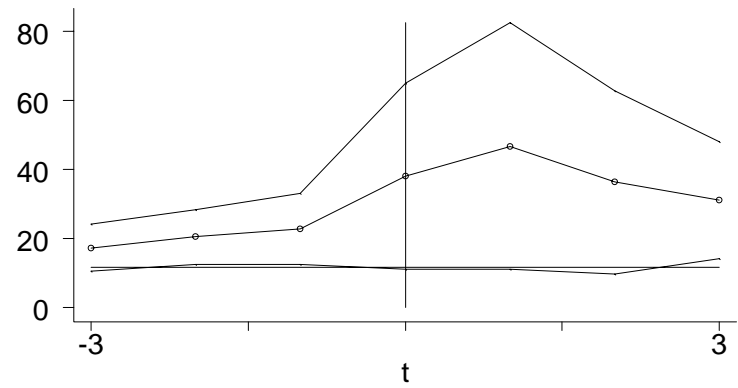
- Much variation across monetary regimes
 - Exchange Rate fixes early on
 - Rising Importance of Money Growth targets in 1970s
 - Inflation targets emerge in 1990s

○ Controls:

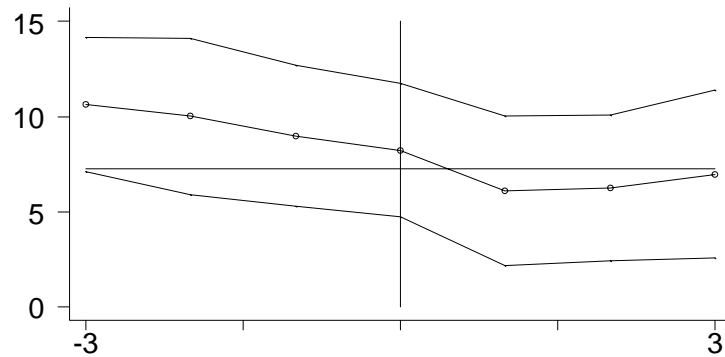
- Openness (Romer)
- Government Budget (aggregate demand, fiscal regime)
- State of Business Cycle (Phillips curve)
- GDP per capita (financial sophistication)
- GDP (market size)
- Similar to literature



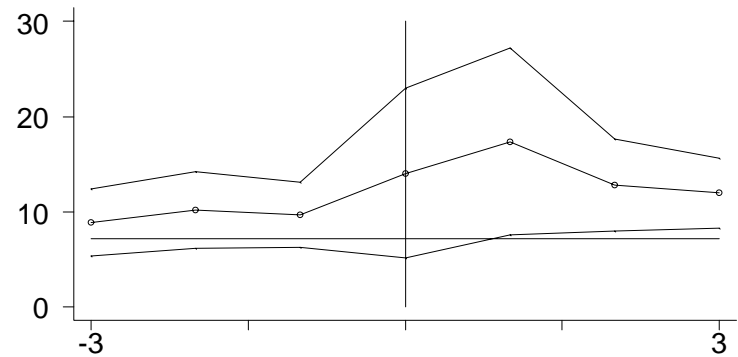
(20) De Jure Regime Entries



(30) De Jure Regime Exits



Without high Inflators
(15) De Jure Regime Entries



Without high Inflators
(21) De Jure Regime Exits

Mean and +/- 2se CI, 3 years around Transition: Tranquil Means marked
Event Studies of Inflation around Monetary Regime Transitions

Results

- Key Coefficient is β_1 effect on inflation of a quantitative monetary policy
 - Annual inflation lower by statistically and economically significant amounts (around 16%)
 - Hitting target lowers inflation further

Table 1: Benchmark OLS Inflation Results

<i>De Jure</i> Quant. Monetary Target	-16.5 (3.16)	-20.8 (3.02)		-16.8 (3.07)
Quant. Monetary Success	-5.52 (1.05)		-14.8 (1.79)	-4.88 (.90)
Openness (% GDP)	-.024 (.009)	-.027 (.009)	-.022 (.008)	
Budget Deficit (% GDP)	-.46 (.17)	-.49 (.17)	-.46 (.18)	
BusCycle (Growth – Avg Growth)	-1.01 (.53)	-1.08 (.52)	-1.00 (.54)	
Log Real GDP p/c	-4.63 (1.10)	-4.54 (1.11)	-5.83 (1.27)	
Log Real GDP	-1.31 (.44)	-0.98 (.42)	-1.53 (.46)	
Observations	1200	1340	1200	1408
R²	.19	.19	.16	.13

Regressand is inflation. Annual data, 1960-2000 for 42 countries.

OLS with robust standard errors in parentheses. Intercepts included but not tabulated.

Table 2: Sample Sensitivity (Key Coefficients)

	Without pre- 1975	GDP p/c at least \$5,000	Without outliers	With Argentina, Brazil	Without High Inflators
<i>De Jure</i> Quant. Monetary Target	-15.1 (2.6)	-12.1 (2.24)	-13.2 (2.14)	-77.2 (21.2)	-3.11 (.98)
Quant. Monetary Success	-4.14 (.99)	-4.88 (1.02)	-5.69 (1.01)	11.2 (6.78)	-3.57 (.53)

- Result is sensitive to exclusion of high inflation countries
 - High inflation countries: annual inflation > 100% at some point in sample (Chile, Israel, Mexico, Turkey, Uruguay)

Table 3: Robustness Checks (Key Coefficients)

	Country Fixed Effects	Year Fixed Effects	Country, Year Effects	Country, Year Effects
<i>De Jure</i> Quant. Monetary Target	-12.7 (2.5)	-16.2 (2.2)	-12.6 (2.5)	-15.8 (3.5)
Quant. Monetary Success	-2.4 (2.1)	-6.8 (2.0)	-3.2 (2.1)	.97 (1.85)
AR(1) Coefficient				.87

Table 4: Dis-Aggregating Monetary Regimes (Key Coefficients)

<i>De Jure</i> Inflation Target	-20.2 (2.5)	-13.2 (1.83)
Inflation Target Success	4.1 (1.9)	
<i>De Jure</i> Money Growth Target	-11.2 (2.7)	-7.6 (1.9)
Money Growth Target Success	-2.43 (3.23)	
<i>De Jure</i> Exchange Rate Target	-10.9 (4.0)	-16.7 (2.3)
Exchange Rate Target Success	-10.2 (2.7)	

- Inflation Target more effective than others
- Differences between targets statistically significant

Instrumental Variables

- Political Constraints (Henisz)
- Presidential Electoral System (Persson-Tabellini)
- Majoritarian Electoral System (ditto)
- Percentage Males >25 with Primary Education (Barro-Lee)
- Percentage Males >25 w/Secondary Education (Barro-Lee)

- But first stage doesn't work well; precision poor

Table 6: Instrumental Variable Results (Key Coefficients)

Instrumental variables	Political				Political and lagged regime			
	Benchmark	Country Fixed Effects	Year Fixed Effects	Country, Year Effects	Benchmark	Country Fixed Effects	Year Fixed Effects	Country, Year Effects
<i>De Jure</i> Quant. Monetary Target	-41.2 (16.9)	-33.4 (11.3)	-34.6 (16.3)	-29.4 (11.8)	-13.6 (3.2)	-11.2 (2.9)	-12.9 (2.6)	-10.5 (2.9)
Quant. Monetary Success	-1.31 (11.2)	29.1 (12.3)	-13.5 (10.2)	33.8 (19.8)	-9.3 (1.7)	-5.6 (3.1)	-11.7 (2.6)	-7.0 (3.2)

Table 7: Using Five-Year Averaged Data (Key Coefficients)

	<i>De Jure</i> Quantitative Monetary Target (β_1)	Quantitative Monetary Target Hit (β_2)
Benchmark	-11.8 (4.4)	-3.5 (1.5)
Without pre-1975	-10.8 (4.2)	-3.12 (1.62)
GDP p/c at least \$5,000	-11.4 (4.7)	-2.9 (1.7)
Without Controls	-12.3 (4.0)	-3.5 (1.3)
With Argentina, Brazil	-87.4 (56.2)	19.7 (19.3)
Without High Inflators	-1.6 (1.9)	-4.24 (1.15)
With Time and Country Effects	-7.9 (2.6)	-3.3 (2.1)
IV, Benchmark	-40.6 (13.8)	5.3 (9.0)
IV, Time and Country Effects	-1.31 (7.7)	-5.0 (12.8)

Table 8: Effects of Regimes on Output Volatility: Benchmark Results.

<i>De Jure</i> Quant. Monetary Target	.17 (.35)	-.18 (.29)		.13 (.51)	-.56 (.33)
Quant. Monetary Success	-.43 (.24)		-.33 (.22)	-.55 (.31)	.33 (.26)
Openness (% GDP)	-.002 (.002)	-.002 (.002)	-.002 (.002)	-.001 (.002)	
Budget Deficit (% GDP)	-.03 (.02)	-.03 (.02)	-.03 (.02)	-.03 (.02)	
Log Real GDP p/c	-.32 (.18)	-.31 (.18)	-.31 (.17)	-.24 (.19)	
Log Real GDP	-.30 (.08)	-.27 (.08)	-.29 (.08)	-.37 (.10)	
Lag of volatility				.11 (.08)	
Observations	211	211	211	153	237
R²	.21	.20	.21	.31	.01

Summary

- Having an explicit *de jure* quantitative goal for monetary policy *does* affect macroeconomic outcomes
 - Inflation lower
 - More effects if target actually hit
 - Business Cycle Volatility no higher, possibly lower
 - Results reasonably robust

- Transparent Monetary Policy seems more effective
 - Annual inflation lower by statistically and economically significant amounts (16% for broad panel)