Discussion of “Monetary and Fiscal History of Latin America: Brazil” by Garcia, Guillén and Kehoe

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Introduction

- Paper describes some aspects of different stabilization plans in Brazil over the last 40 years.
- This version: some graphs and no tables.
- Accounting exercise.
- Question: "How much of the inflationary experience can be attributed to fiscal policy."
- A promise.

A Wish List

- Accounting for the shocks that affect the fiscal situation:
  - Interest rates.
  - Real exchange rates.
  - Expenditures (current vs investment)
  - Tax revenues.
- Policies in response to the shocks:
  - Monetary policy (including changes in required reserves and other forms of increasing the demand for money)
  - Debt policy (including structure of the debt in terms of maturity and type)

A Wish List (cont.)

- Changes in the structure of taxes: capital vs. consumption.
- Cyclical properties of expenditures and tax revenue.
- Brazil before 1980?
- And at the conference ...

The Accounting Exercise

- Government budget constraint that includes three types of bonds:
  - Nominal.
  - Indexed (price level)
  - Issued in foreign currency (or indexed to the exchange rate)
- Nice tool to organize shocks.
- Preliminary results revert to a simple version.

Puzzle: Why Was Inflation Low During the Real Plan?

- Result: Inflation should have been higher.
- Result is based on:
  - Gov't budget constraint (accounting identity).
  - Demand for money (theory).
  - Steady state (assumption).
  - Data.
- The government budget constraint implies

$$s = d - b(1-q), \text{ where } q = \frac{1+r}{1+g} > 1$$

and imposing the QT

$$1+\pi = \frac{1}{1+g}\frac{m}{m-d+(1-q)b}, \text{ where } m = \frac{M_t}{P_t Y_t}$$

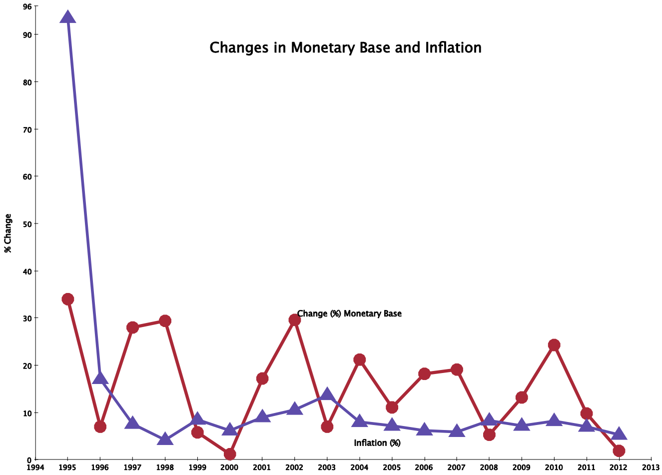
Puzzle: Why Was Inflation Low During the Real Plan?

- Critical: value of $r - g$.
- What if: First few years let b_t increase (say from 45% to 60%) and then stabilize that ratio with low inflation?
- Illustration: real interest rate on T-bills 2000-2013 (from World Bank) 6.6%, and assume $g = 2\%$. As in the paper, I assume $v = 25$ (more on this later)

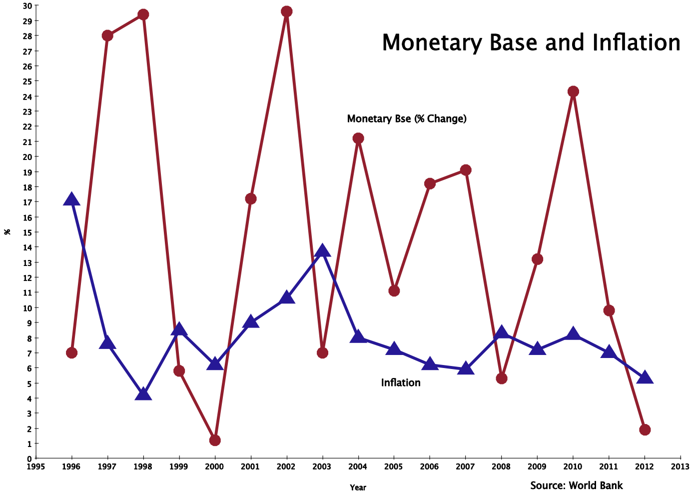
$$1 + \pi = \frac{1}{1+g} \frac{0.04}{0.04 + 0.0236 - 0.045 \times 0.60} = 1.071$$

- Another look at the data ...

Stable Demand for Money?



Stable Demand for Money? (1996-2012)



Debt Composition

- Does the maturity structure matter?
- One period debt

$$s = d - b(1-q), \text{ where } q = \frac{1+r}{1+g} > 1$$

- Two period debt that pays (nominal) coupon ζm in first period and $(1+m)$in the second, where

$$\zeta m(1+i) + (1+m) = (1+i)^2 \text{ with } (1+i) = (1+r)(1+g)$$

implies

$$s = d - b_1(1-q) - b_2(1 - q(R_1 + qR_2))$$

where

$$R_1 = R = \frac{\zeta(1-k^2)}{\zeta + k} < 1, \text{ and } R_2 = 1 - R, \text{ with } k = \left(\frac{1}{1+i}\right)$$

Debt Composition

- Given

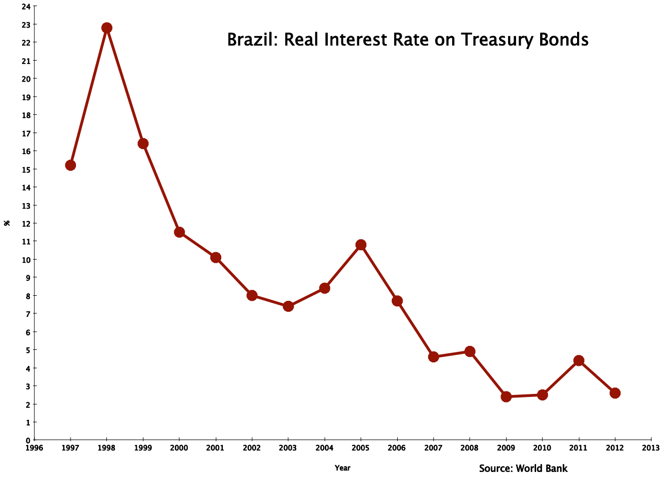
$$s = d - b_1(1-q) - b_2(1 - q(R + q(1-R)))$$

let

$$s = d - b(1-q)\underbrace{\left[\phi + \frac{(1-\phi)(1-q(R+q(1-R)))}{1-q}\right]}_{>1}$$

- More than one period debt increases interest cost.
- Structure of the debt (ϕ) and structure of coupons (ζ) matters.
- This implies that $\Delta\pi > 0 \rightarrow \Delta i > 0 \rightarrow \Delta s > 0$,and back to more seignorage/inflation.

Steady State?



Computing Interest Rates

- One period and two period bonds.
- Coupon satisfies as before

  $$\zeta m(1+i) + (1+m) = (1+i)^2 \text{ with } (1+i) = (1+r)(1+g)$$

  which implies that the correct nominal rate is i (and bonds sell at par)
- Let θ be the fraction of one period bonds, estimated interest rate i^e is such that

  $$\frac{i^e}{i} = \theta + \frac{1-\theta}{2}\frac{(1+\zeta)(2+i)}{1+\zeta(1+i)}$$

  which gives the right answer if $i = 0$.
- $$\lim_{i\to\infty}\left(\frac{i^e}{i}\right) = \theta + \frac{1-\theta}{2}\frac{(1+\zeta)}{\zeta} > 1 \text{ for all } \zeta < 1$$
- If $i = 15\%$, $\theta = 0.25$, and $\zeta = 0.5$ then $i^e = 19\%$

Inflation and Cost of Capital (for the accounting exercise)

- Structure of debt and "average" cost of capital.
- Price pure discount bonds (easy to price coupons)
- Two types of bonds: nominal and indexed
- Simple model (semi partial equilibrium):

$$\begin{aligned} dc_t &= g\,dt + \sigma_c dW_{ct}, \;\; c_t = \text{log of cons. per capita} \\ dp_t &= \pi_t dt + \sigma_p dW_{pt} \;\; p_t = \text{log of price level,} \\ d\pi_t &= \kappa(\bar{\pi} - \pi_t)dt + \sigma_\pi dW_{\pi t} \end{aligned}$$

- Constant relative risk aversion $= \gamma$. Discount factor $= \rho$

Inflation and Cost of Capital (for the accounting exercise)

- Rate of return on an indexed bond

$$r^* = \rho + \gamma g - \frac{\gamma^2 \sigma_c^2}{2}.$$

- Nominal return on the (nominal) bond

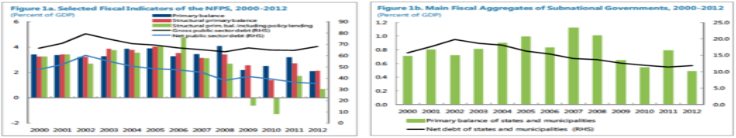
$$i_t = \underbrace{r^* - \gamma \sigma_c \sigma_p cov(c, p) - \frac{\sigma_p^2}{2}}_{r \,=\, \text{real return on bond}} + \pi_t$$

- If $cov(c, p) < 0$ (and approximately constant) then the impact of variability in unexpected inflation is not monotone (positive at low levels of variability and negative at high)

Minor Issues

- Model that delivers: "Change in monetary policy after 1994 gave the Central Bank the ability to control the **real** interest rate."
- Difference between "passive" and "active" monetary policy and fiscal policy.
- Why could banks offer "dollar-like" deposits when (real) interest rates were low and not when they are high? (Their assets earn the real interest rate)

IMF Data on Primary Surplus



Source: Central Bank of Brazil, Ministry of Finance and Fund staff estimates.