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

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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 ...
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 $\nu = 25$ (more on this later)

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

- Another look at the data ...
Stable Demand for Money?

Changes in Monetary Base and Inflation

Change (%) Monetary Base

Inflation (%)
Stable Demand for Money? (1996-2012)

Monetary Base and Inflation

Source: World Bank
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 \( \zeta m \) 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

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

> More than one period debt increases interest cost.

> Structure of the debt (\( \phi \)) and structure of coupons (\( \zeta \)) matters.

> This implies that \( \Delta \pi > 0 \rightarrow \Delta i > 0 \rightarrow \Delta s > 0 \), and back to more seignorage/inflation.
Steady State?

Brazil: Real Interest Rate on Treasury Bonds

Source: World Bank
Computing Interest Rates

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

\[ \zeta m(1+i) + (1+m) = (1+i)^2 \] with \( (1+i) = (1+r)(1+g) \)

which implies that the correct nominal rate is \( i \) (and bonds sell at par)

- Let \( \theta \) be the fraction of one period bonds, estimated interest rate \( i^e \) is such that

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

which gives the right answer if \( i = 0 \).

- \[ \lim_{i \to \infty} \left( \frac{i^e}{i} \right) = \theta + \frac{1 - \theta (1 + \zeta)}{2 \zeta} > 1 \] for all \( \zeta < 1 \)

- If \( i = 15\% \), \( \theta = 0.25 \), and \( \zeta = 0.5 \) then \( i^e = 19\% \)
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):

\[
\begin{align*}
dc_t &= gdt + \sigma_c dW_{ct}, \quad c_t = \log \text{ of cons. per capita} \\
dp_t &= \pi_t dt + \sigma_p dW_{pt}, \quad p_t = \log \text{ of price level,} \\
d\pi_t &= \kappa(\bar{\pi} - \pi_t) dt + \sigma_\pi dW_{\pi t}
\end{align*}
\]

Constant relative risk aversion = $\gamma$. Discount factor = $\rho$
Inflation and Cost of Capital (for the accounting exercise)

- Rate of return on an indexed bond

\[ r^* = \rho + \gamma g - \frac{\gamma^2 \sigma^2}{2}. \]

- Nominal return on the (nominal) bond

\[ i_t = r^* - \gamma \sigma_c \sigma_p \text{cov}(c, p) - \frac{\sigma_p^2}{2} + \pi_t \]

- 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

Figure 1a. Selected Fiscal Indicators of the NFPS, 2000-2012
(Percent of GDP)

Figure 1b. Main Fiscal Aggregates of Subnational Governments, 2000-2012
(Percent of GDP)

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