Financial Crises, Dollarization, and Lending of Last Resort in Open Economies

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Global Research Forum, ECB, November 2018
Motivation

- Dollar-denominated liabilities source of financial instability in emerging economies (recent example: Turkey)
- Bad shock → currency depreciates → debt burden increases
- What creates incentives to accumulate dollar liabilities?
  - Common view: flow of dollars chasing yield
  - Our view: lack of domestic appetite for domestic currency assets
Dollarization, assets and liabilities

For this reason, no measure of domestic bond dollarization is used in the empirical analysis below.

2.1. FD and the currency mismatch

The emphasis on gross (domestic and external) dollar liabilities made in this paper explicitly takes sides on an issue that is certainly far from settled. In general, a currency mismatch could be defined as 'the sensitivity of net worth or of the present value of net income to changes in the exchange rate' (Goldstein and Turner, 2004), which, for the purpose of measurement, could be characterized simply by the net foreign currency position (that is, foreign currency assets minus foreign currency liabilities). However, the level at which the netting should be carried out (individual households and firms, the government, the financial and non-financial sector, the economy as a whole) is far from obvious.

One strand of the literature on currency mismatches stresses the need to centre on the country's foreign currency indebtedness vis-à-vis non-residents, in the view that 'the assets and liabilities of residents cancel out in the aggregate', with no impact on economic performance (Eichengreen et al., 2003). This approach, however, suffers from at least two important shortcomings. First, the available data do distinguish between resident and non-resident holders, and the implicit association between external debt and non-resident holders typically assumed in the measures proposed by this literature is at least debatable.

Reinhart et al. (2003) construct a dollarization index based on the dollarization ratios of domestic deposits, external debt and domestic public debt. As they state in the appendix, however, available data on the latter covers only 23 countries for the period 1996–2001, which severely limits the size of the sample. Alternatively, assuming that all domestic public debt is denominated in the local currency (as in Claessens et al., 2003) would understate FD, as governments in financially dollarized countries such as Argentina, Brazil or Turkey issue substantial amounts of dollar (or dollar-linked) debt domestically.

Figure 2. Deposit and loan dollarization

Note: Foreign currency loans sourced from De Nicoló et al. (2003) and Arteta (2002).

from Levy-Yeyati (2006)
This paper

- Emphasis on self-sustaining nature of financial dollarization:
  - Fear of financial instability increases domestic demand for foreign currency assets by savers
  - This induces more foreign currency borrowing by borrowers
  - Foreign currency debt makes economy more financially fragile

- Look at policies that stabilize financial system, LOLR
  - Surprising “reverse moral hazard” result
  - LOLR makes agents take less risky private decisions ex ante
Ingredients

- Small open economy
- Agents: consumers, banks, international investors
- Collateral constraints for banks
- Currency choice in borrowing/lending
- Segmented markets
- Government with limited fiscal capacity
Timeline

- **t=0**
  - Banks borrow from domestic consumers and from foreign investors

- **t=1**
  - Banks roll over debt and invest in capital

- **t=2**
  - Production, repayment
Timeline

$t=0$
Banks borrow from domestic consumers and from foreign investors

$t=1$
Banks roll over debt and invest in capital

$t=2$
Production, repayment

Here crises can happen
Here dollarization can happen
Model

- Tradable good = numeraire ("dollar")
- Non-tradable good, price $p_t$ ("real exchange rate")
- Risk averse consumers, consume $c_t = (c_t^T)^\omega (c_t^N)^{1-\omega}$
- Risk neutral banks, enter each period with net worth
  \[ r_t k_t - b_t^T + p_t (e_{b,t}^N - b_t^N) \]
- Collateral constraint: banks’ net worth affects investment
- Risk neutral foreign investors: only hold $T$ bonds
Timeline

- **t=0**: Banks borrow from domestic consumers and from foreign investors
- **t=1**: Banks roll over debt and invest in capital
- **t=2**: Production, repayment

Here crises can happen
Equilibrium at $t = 1$
With less T debt, more NT debt
Timeline

\[ \begin{align*}
  &t=0 & t=1 & t=2 \\
  &\text{Banks borrow from domestic consumers and from foreign investors} & \text{Banks roll over debt and invest in capital} & \text{Production, repayment} \\
  &\text{Here dollarization can happen} & & \\
\end{align*} \]
Dollarization

- Will banks choose debt composition that exposes them to a crisis?
- A: Yes
- Banks have a hedging motive, which tends to eliminate multiplicity
- ... but households have a hedging motive too, which can dominate
Fragile equilibrium

- Portfolio choice between T and NT saving/borrowing

- In fragile equilibrium, NT bonds pay lower return in crisis state, when marginal utility of wealth is higher

\[ 1 + i_T^0 - (1 + i_N^0)E \left[ \frac{p_1}{p_0} \right] = Cov \left( \left( 1 + i_N^0 \right) \frac{p_1}{p_0}, \frac{\lambda_1}{E[\lambda_1]} \right) < 0 \]

- This holds both for banks’ and consumers’ marginal utility of wealth \( \lambda_1 \)

- **Theory of dollarization**: banks borrow in dollars because it’s cheap; it’s cheap because dollar appreciate when things go bad
When fragile equilibrium exists, there is also a safe equilibrium in which the continuation equilibrium is unique.

In safe equilibrium:

\[ 1 + i_0^T - (1 + i_0^N)E \left[ \frac{p_1}{p_0} \right] = 0 \]

Now no risk, consumers no longer ask for protection.
Lending of Last Resort

- At $t = 1$ benevolent government transfers $T_b$ to banks in exchange for repayment $R$
- No superior ability to enforce repayment
- But helps agents coordinate
- First externality, through $p_t$
Moral hazard?

- For *given risk premia*, intervention that reduces probability of bad equilibrium give bankers incentive to issue more dollar debt

- However, as households save more in NT, lower NT interest rate gives less incentive to borrow in dollars

**Result:** LOLR that reduces probability of bad equilibrium does not lead to more risk taking

- Second externality, through $i_{NT}$
• What does it mean to have a stable currency?

• Item: having abundant sources of funding in that currency

• Stable inflation is important, but also needs financial stability, so agents willing to save in local currency

• For future work: interactions with other policy tools (monetary policy, regulation, currency interventions)