
Discussion of Giancarlo Corsetti & Luca Dedola's

The Mystery of the Printing Press:
Self-fulfilling debt crises and monetary sovereignty

by **Ramon Marimon**

*European University Institute and UPF – Barcelona GSE,
and CEPR & NBER*

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The aim of the paper:

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- To disproof a claim of a syndicated journalist !

The syndicated journalist:



The claim:

The proposition [is] that countries without a printing press are subject to self-fulfilling crises in a way that nations that still have a currency of their own are not.

(P. Krugman, "The Printing Press Mystery", 2011, quoted by C&D)

The strength of the paper:

The strength of the paper:

- Builds on the work of an imaginative economist !

The imaginative economist:



Calvo's lessons (1988)

- Two conditions to obtain self-fulfilling debt crisis (equilibria with (partial) debt repudiation driven by expectations):
 1. A government with limited commitment.
 2. The cost of repudiation dependent on the size, or the fraction, of the repudiated debt.
(with independent costs equilibrium are typically unique)
 - This is true whether there is explicit or – *through monetization* – implicit (partial) debt repudiation.
(difference: dependence is on size (explicit) versus fraction (implicit))
 - Commitment devices can kill self-fulfilling equilibria.
(examples: price indexation and/or interest-rate ceilings)
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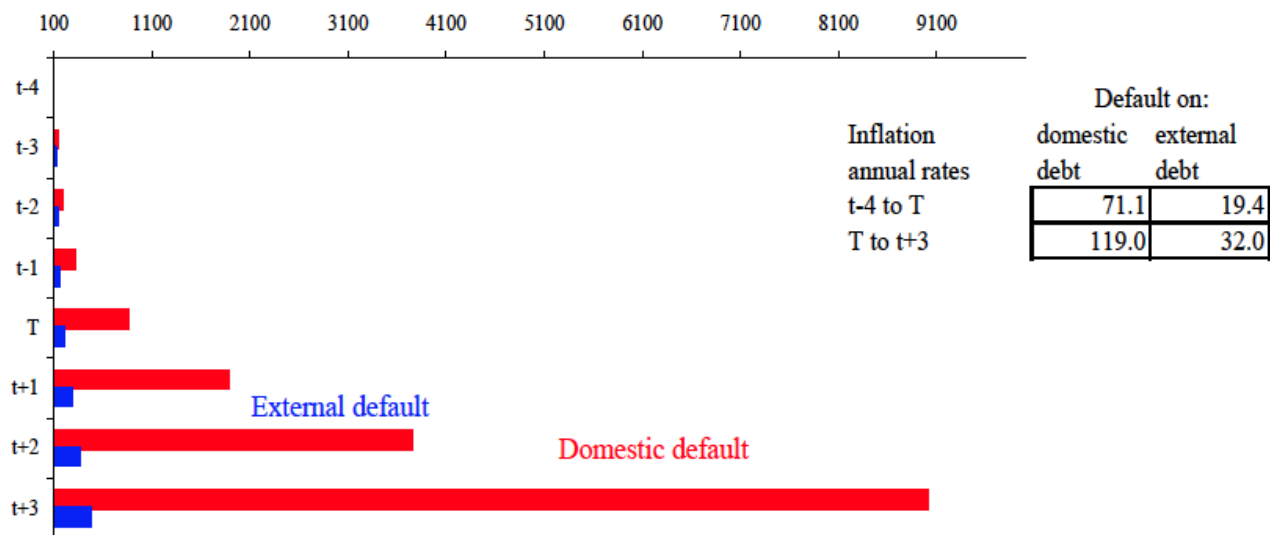
C&D 25 years later

- We have learned few things in these years:
 - Dynamic models of *fundamental* debt repudiation: Arellano (2008), etc.
 - A little more about self-fulfilling debt crisis: Cole and Kehoe (2000), etc.
 - On the relevance of *domestic debt crisis*: Reinhart and Rogoff (2008)
- The C&D contribution
 - A simple combined model of **fundamental** + **self-fulfilling**
(fundamental: fixed cost of default & default only when fundamentals are weak)
 - As in Calvo, *explicit* and *implicit* (monetization) debt repudiation.

The main lesson is that the ability to print money is not sufficient to rye out self-fulfilling debt crisis. (C&D, 2012)

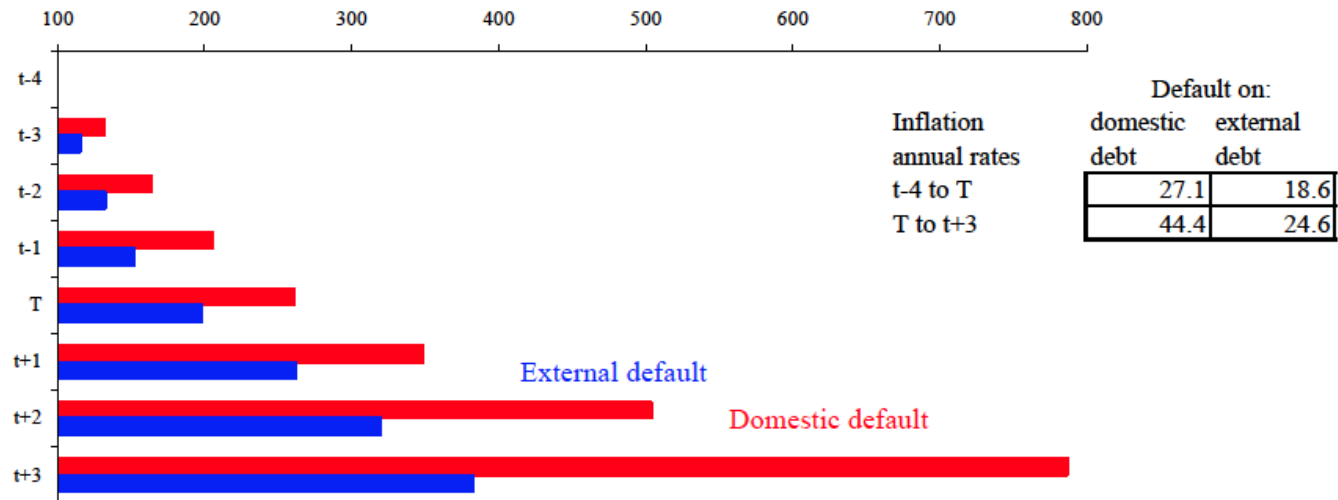
The R&R evidence is not in favor of the claim:

Figure 8a Domestic and External Crises and Prices and Inflation
(Price Level, $t-4 = 100$, all episodes)



The R&R evidence is not in favor of the claim:

Figure 8b Domestic and External Crises and Prices and Inflation
(Price Level, $t-4 = 100$, excluding hyperinflation episodes)



C&D 25 years later: the extended Calvo model

- In period 1 (0) consumers invest either in government bonds, B , or capital, K .
- In period 2 (1) (state $i, i = L, H$) they get income Y_i and $B\tilde{R}$ and KR .
- In 1 the government issues B and in 2 levies T_i to finance G and payback the debt.
- It may apply a haircut of $\theta_i \in [0, 1]$, at cost $\alpha\theta_i B\tilde{R}$, $\alpha \in [0, 1]$.

$$T_i = G + (1 - \theta_i)B\tilde{R} + \alpha\theta_i B\tilde{R} \quad (1)$$

i.e., $T_i = G + B\tilde{R} - (1 - \alpha)\theta_i B\tilde{R}$

- Deadweight loss of $z(T_i, Y_i)$ and of default ξ_θ , $\xi_0 = 0, \xi_\theta = \xi > 0$ if $\theta \in (0, 1]$.
-

C&D 25 years later: the extended Calvo model

$$C_i(T_i, \theta, \xi_\theta) = [Y_i - z(T_i) - \xi_\theta] + KR + (1 - \theta_i)B\tilde{R} - T_i \quad (2)$$

$$\text{i.e., } C_i(T_i, \xi_\theta) = [Y_i - z(T_i) - \xi_\theta] + KR + B\tilde{R} - \frac{B\tilde{R} + G - T_i}{1 - \alpha} - T_i$$

- Assume, for the moment, that $z(T_i, Y_i) = z(T_i)$.



The uncommitted benevolent government

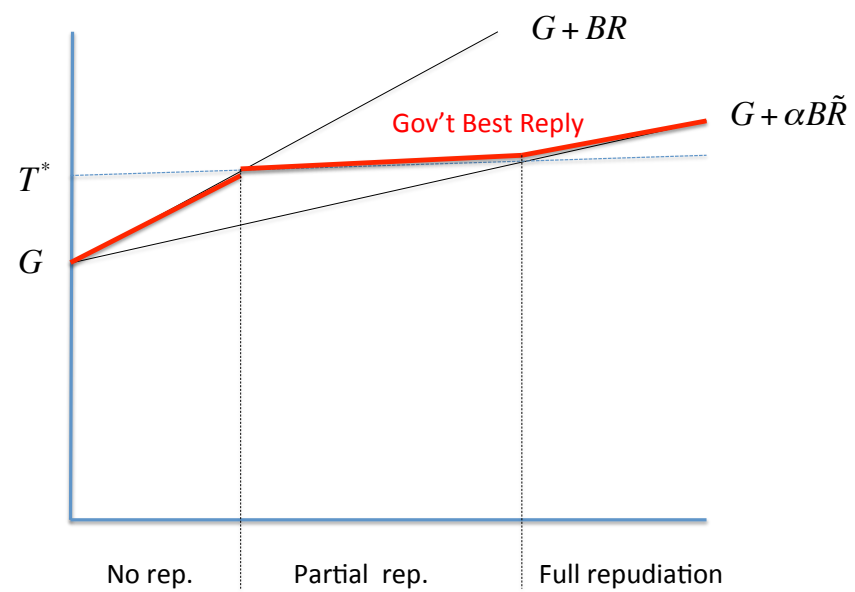
- Let

$$\begin{aligned}\tilde{T}_i &= \arg \min_{T_i} \left\{ z(T_i) - \frac{\alpha}{1-\alpha} T_i \right\} \\ \text{s.t.} \quad & G + \alpha B \tilde{R} \leq T_i \leq G + B \tilde{R}\end{aligned}$$

- Therefore, $\tilde{T}_H = \tilde{T}_L = \tilde{T}$.
- Let $\hat{T} = G + BR$ (full payment of liabilities). Then,

$$T^* = \arg \max_{\{\hat{T}, \tilde{T}\}} \left\{ E_\mu C(\tilde{T}, \xi_\theta), E_\mu C(\hat{T}, 0) \right\}$$

Back to the **Calvo model**. The case $T^* = \tilde{T}$



Arbitrage-Equilibrium conditions:

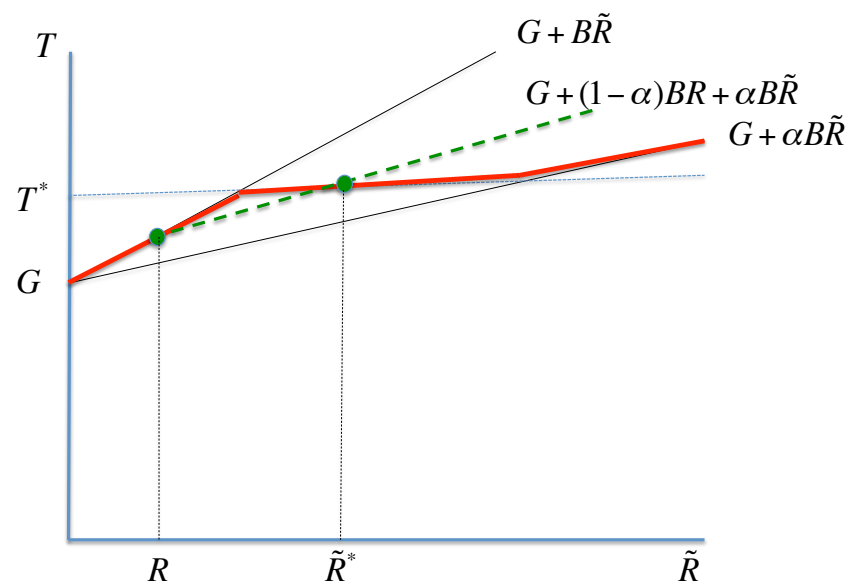
$$[\mu((1 - \theta_H) + (1 - \mu)(1 - \theta_L))] \tilde{R} = R \quad (3)$$

$$\text{i.e. } [\mu\theta_H + (1 - \mu)\theta_L] \tilde{R} = \tilde{R} - R$$

$$\begin{aligned} T^* &= \mu T^* + (1 - \mu) T^* \\ &= G + B\tilde{R} - (1 - \alpha) [\mu\theta_H + (1 - \mu)\theta_L] B\tilde{R} \\ &= G + (1 - \alpha)BR + \alpha B\tilde{R} \end{aligned} \quad (4)$$

- Therefore, *there is no fundamental debt crisis.*
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Back to the **Calvo model**. The case $T^* = \tilde{T}$



Not exactly back to the **Calvo model**.

- Recall that

$$T^* = \arg \max_{\{\hat{T}, \tilde{T}\}} \left\{ E_\mu C(\tilde{T}, \xi_\theta), E_\mu C(\hat{T}, 0) \right\}$$

- For ξ large enough there is no self-fulfilling debt crisis (i.e. equilibrium is unique).
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Not exactly back to the **Calvo model**.

- The painful taxation assumption:

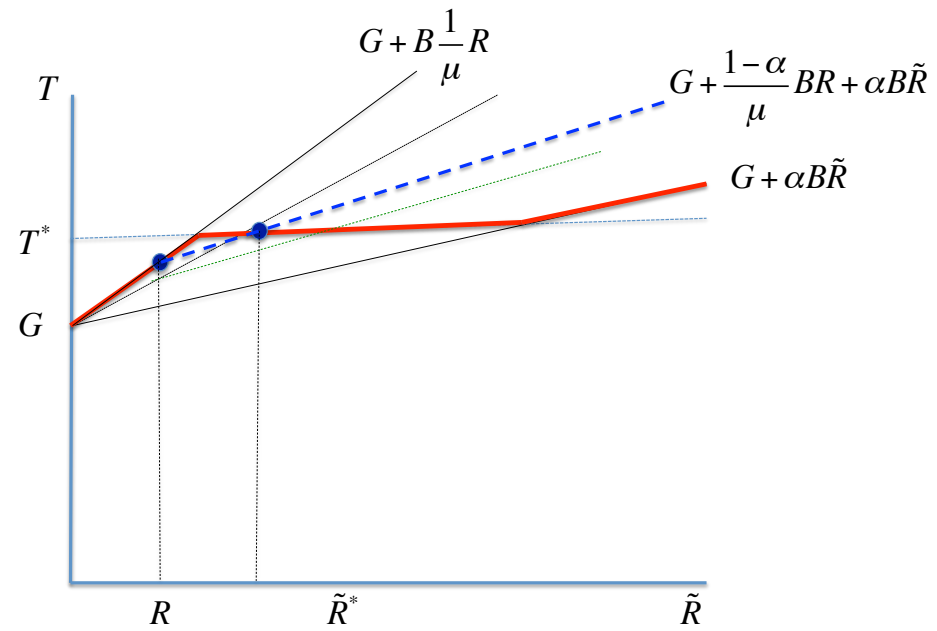
$$z(T, Y_L) > z(T, Y_H)$$

$$z'(T, Y_L) > z'(T, Y_H)$$

- Furthermore, assume that:

- the government can not insure the Low state;
 - debt, B , is so high that $\tilde{T}_L < G + BR$,
 - but the High state is so good that $\tilde{T}_H > G + BR/\mu$
-

Back to the **Calvo model** in the H state.



C&D 25 years later also show that:

- for a set of parameters *fundamental* and *self-fulfilling* can coexist in H and L ;
- the equilibrium may also be unique (already said, for high ξ);
- as in Calvo, since monetization is a haircut, the monetary model behaves similarly;
- as in Calvo, they also discuss commitment devices and, realizing that interest-rate ceilings may not be credible, they move to: *the central bank as a credible institution*:
 - ‘the CB can commit to state contingent policies’(the government no).
 - ‘the CB can use *default free* monetary liabilities’(the governments no).

but this (interesting) discussion is beyond the model, being part of the discussion on...

Chicken games



Is the discussion of 'the journalist claim' over?

- **YES**: it is not supported by evidence and it doesn't pass the (current) theory test.
 - **NO**: there are still open questions on the *inflation vs. partial default* issue:
 - is there a difference in the run-up of the credit boom?
(in the Calvo, and C&D, model the level of debt is exogenous).
 - are hard defaults more likely when soft defaults (monetization) are not feasible?
(this complementary question to the latter is Jean Tirole's question of this morning, but R&R evidence is not very supportive of its relevance).
 - why is there resistance against wage reductions and tax increases and there is almost none when the tax is the *inflation tax*?
 - is there a non-equivalence when ex-post income & damage distribution is accounted for?
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As usually said,

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I enjoyed going through the C&D paper

Thanks!
