Central Bank Swap Lines as Bilateral Sovereign Debt

Francisco Roldán
IMF

César Sosa-Padilla
Notre Dame

Symmetric and Asymmetric Swap Lines

- Swap line: two lines of credit involving two central banks
  - ... Each makes available an amount of its own currency to the other, for a fixed term
  - ... Short-term arrangements (typically one year, typically renewed)

- Used to mainly involve AEs   Fed–ECB–BoE–BoJ–BoC
  - ... to support lender-of-last-resort functions with multinational firms

- Large increase in bilateral swaps and loans involving EMs since early 2000s
  - ... for EM, swap resources are hard currency
  - ... for EM, swap can be used for financing BoP (or as borrowed reserves)

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· **We abstract from currencies, collateral, and focus on the borrowing**

Tradeoff

· Borrowing with bonds

... interest rate reflects default risk

· Borrowing from the swap line

... interest rate and drawings negotiated

· Defaulting on the debt does not mean defaulting on the swap

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The Dangers of Borrowing through Swap Lines

Main findings

- Swap drawings small relative to debt, but
    - Presence of swaps affects sovereign debt markets
        - … can provide financing when other sources dry up
        - … can increase risk-taking

- Lending around or in default maximizes surplus in swap negotiations
    - Availability of swaps in default:
        - … raises the value of default
        - … which increases the default frequency
        - … and worsens borrowing terms in bond markets
    - Without restricting swaps in default, welfare losses for the government

- Swap lines create overborrowing incentives similar to the debt dilution problem
    - Surplus requires spreads — spreads require risk

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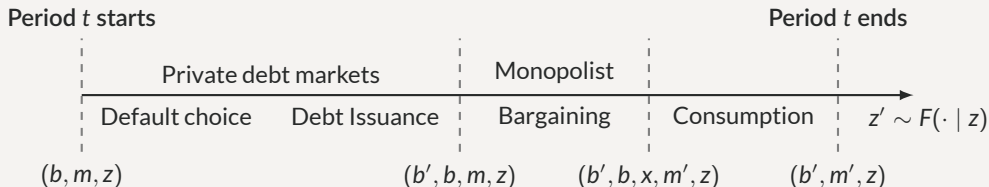# The Dangers of Borrowing through Swap Lines

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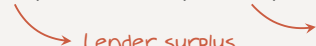# Model

Two markets

- Owe debt b in markets: long-term debt, geometrically-decaying coupons
- Owe drawn amount m to "monopolist" Central Bank   [Total amount available = k]

Period t starts   **Period t ends**

	Private debt markets		Monopolist		
	Default choice	Debt Issuance	Bargaining	Consumption	$z' \sim F(\cdot \mid z)$

(b, m, z) (b', b, m, z) (b', b, x, m', z) (b', m', z)

- Nash bargaining over transfer x and amount owed/drawn m'

$$\max_{x,m'} \mathcal{L}_R(b', x, m, m', z)^{\theta} \times \mathcal{B}_R(b', b, x, m, m', z)^{1-\theta}$$

Lender surplus   Government surplus

Lender surplus	Government surplus
· Interest rate: $x = \dfrac{1}{1+r}m' - m$	· Extra financing after b'
· Expected profits from m'	· Interest rate $\neq$ default prob.

- Lender has pure profit motive   ...and same *sdf* as private creditors

    ... to focus on the effect of market structure

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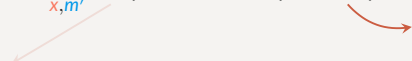- Expected profits from m'

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Dynamics and Quantitative Results

When are gains from trade largest?

- Monopolist cannot offer worse terms than private creditors
  - … Implicit interest rate on the swap cannot exceed that on bonds

- When debt is low and default is unlikely, private markets lend at close to r
  - … Little value added from the monopolist's presence

- When debt is less safe, spreads open up $r^p > r$
  - … Monopolist can offer better terms and make a profit $r^p > r^m > r$

- Twist: monopolist can charge lower rates during debt accumulation episodes
  - … Conversely, charge higher rates during debt deleveraging

- Bilateral relationship creates incentives for risk-taking and overborrowing

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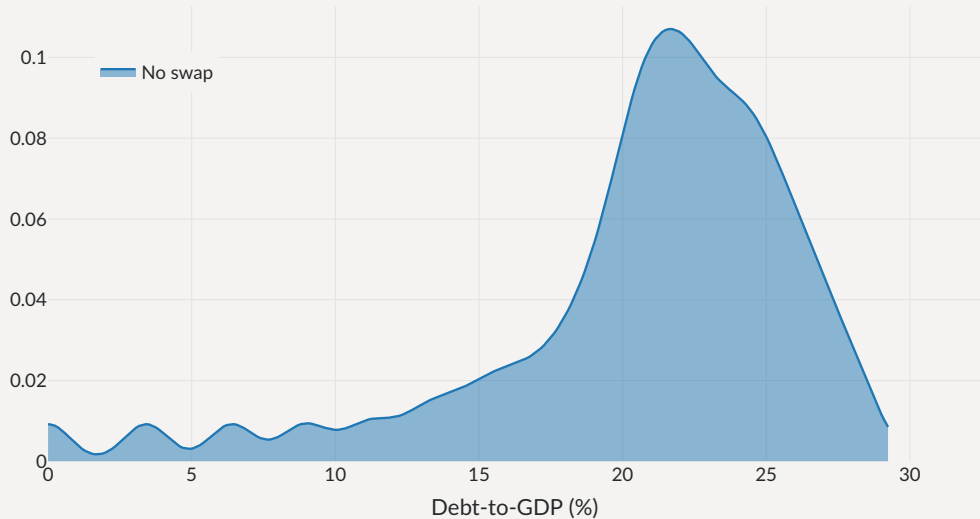- Bilateral relationship creates incentives for risk-taking and overborrowing

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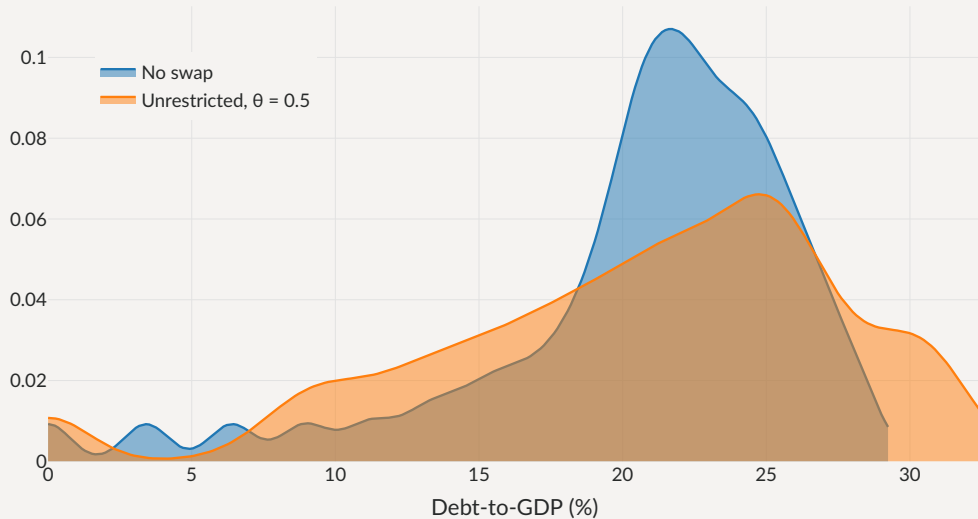# Dynamics with swap lines

need to redo the graph with name Delevered

Distribution of debt levels

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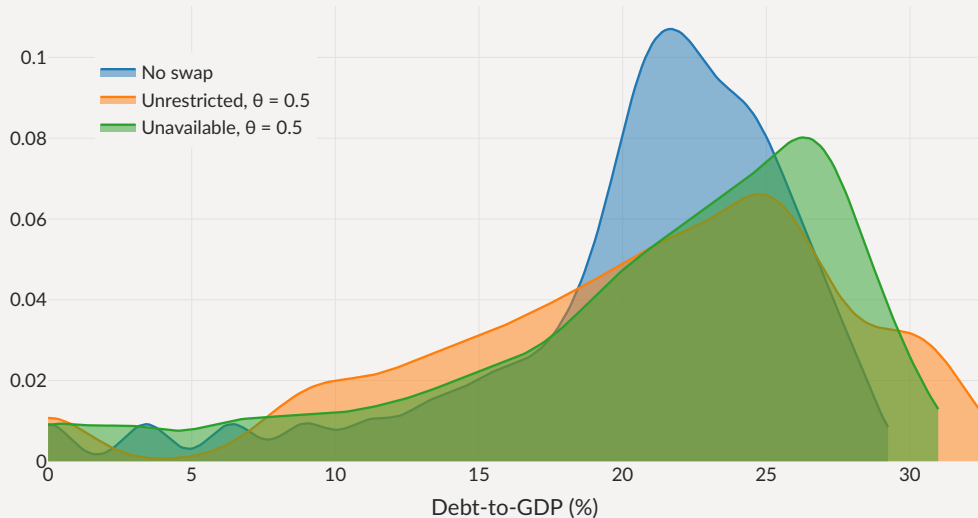

- No swap
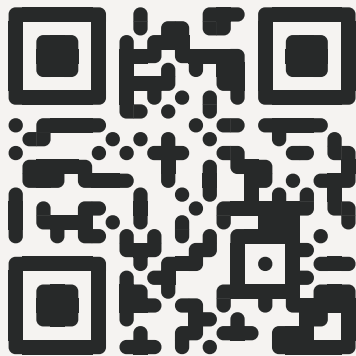- Unrestricted, θ = 0.5

Debt-to-GDP (%)

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Distribution of debt levels

Legend:
- No swap
- Unrestricted, $\theta = 0.5$
- Unavailable, $\theta = 0.5$

Debt-to-GDP (%)

Welfare effects of swap lines

	No swap	Unrestricted, $\theta = 0.5$	Delevered, $\theta = 0.5$
Avg spread (bps)	901	2447	1406
Std spread (bps)	532	1578	960
$\sigma(c)/\sigma(y)$ (%)	110	110	114
Debt to GDP (%)	20.5	19.6	20.5
Swap to GDP (%)	0	3.25	1.27
Corr. swap & spreads (%)	–	62.6	70.1
Default frequency (%)	7.07	15.2	10.7
Welfare gains (rep)	–	-0.36%	-0.22%

Concluding Remarks

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- Simple model with monopolist/fringe structure

- Strong interaction between two markets for sovereign debt
  - … even if swaps are not used intensely on the equilibrium path

- Market power crucial in model
  - … how to discipline in model?
  - … how to affect in reality?

- Large welfare effects, policy challenges
  - How to limit their use during defaults?
  - Strengthened debt dilution – more gains from fiscal rules, state-contingent debt?

Scan to find the paper