

# The Perils of Bilateral Sovereign Debt

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# Official Sovereign Debt

- A large share of sovereign borrowing takes the form of **official** debt  
... Multilaterals, development banks, other governments
- Emergence of new bilateral creditors **outside** the Paris Club  
... with claims to **seniority** and sometimes **opaque** terms

► IDS data

## Questions

- How does the presence of a large senior lender affect sovereign debt markets?
- What are its welfare implications for borrowing governments?

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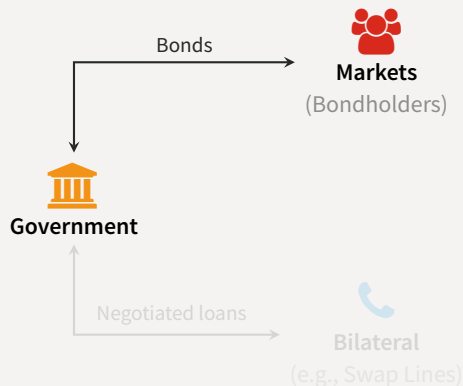
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# Evaluating Senior Official Creditors

Quantitative sovereign debt model with

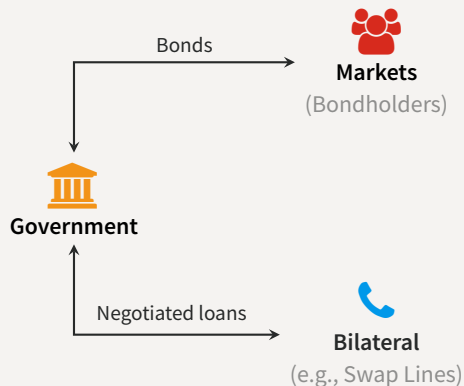
- Competitive creditors in private **markets**
- Large **bilateral** lender
  1. Superior enforcement  
[de-facto seniority]
  2. Bargained terms  
[price and quantity]
  3. Short-maturity loans
- Prime example: Central Bank **swap** lines  
(Horn et al., 2021)
- Focus on the **interaction** between both funding sources



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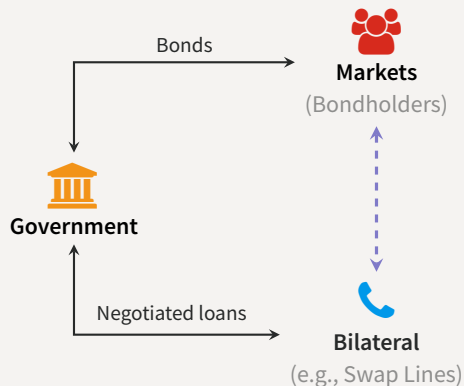
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# Relational Overborrowing

## Main findings

- Bilateral loans have significant effects on equilibrium outcomes
  - ... provide funding when other sources dry up (e.g. because of default risk) ▲
  - ... can also incentivize more **risk-taking** ▼
- If the rate on bilateral loans is decreasing in *market* debt [cross-elasticity]
  - ... government issues market debt more quickly, delevers more slowly
  - ... spends longer in the risky region
  - ... defaults more frequently
  - ... **welfare losses for the government**
- Cross-elasticity can emerge endogenously from **bargaining** ☎
  - ... at plausible values for bargaining weights
  - ... increased frequency of defaults dominates extra liquidity
  - ... **relational overborrowing**

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# Relational Overborrowing

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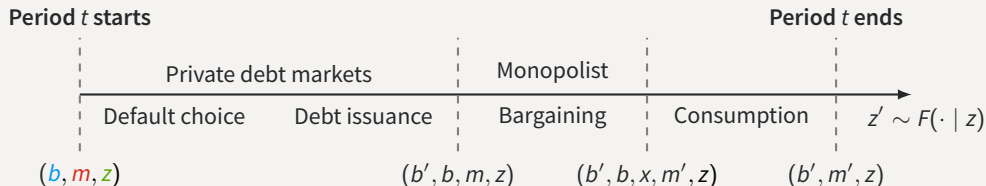
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# Theory

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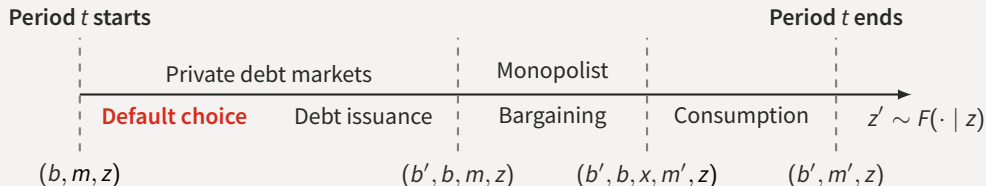
# Timeline of Events

- Enter period  $t$  owing  $b$  to bondholders,  $m$  to monopolist, income  $y(z)$



# Timeline of Events

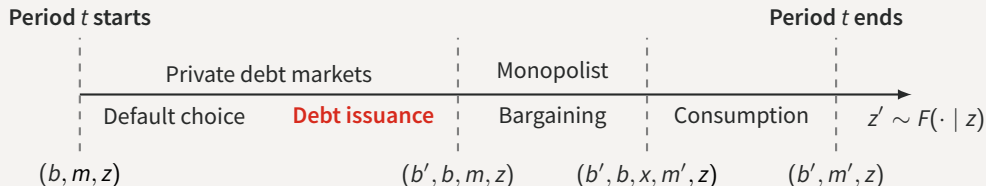
- Choose to **repay** or **default** the *market* debt subject to convex output costs



$$v(b, m, z) = \max \{ v_R(b, m, z) + \epsilon_R, v_D(m, z) + \epsilon_D \}$$

# Timeline of Events

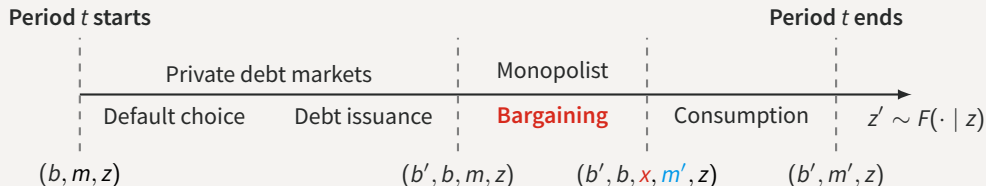
- If repaid, issue new (long-term) debt  $b'$  in markets at price  $q$  [coupon rate  $\kappa$ , maturity  $1/\delta$ ]



$$q(b', b, m, z) = \beta_L \mathbb{E} [(1 - 1_{\mathcal{D}}(b', m', z')) (\kappa + (1 - \delta)q(b'', b', m', z')) | z]$$

# Timeline of Events

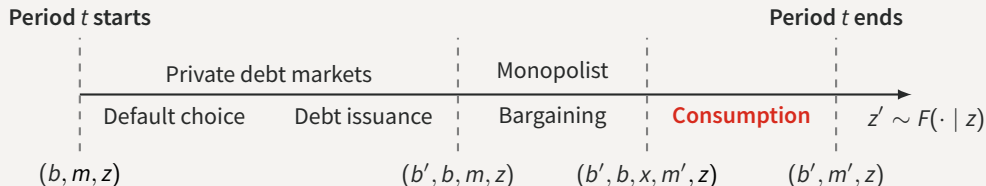
- Meet with senior lender, decide any transfers  $x$  and new/remaining balance  $m'$



$$r(x, m', m) = \frac{m'}{x + m} - 1$$

# Timeline of Events

- Consume **output** plus **revenues from debt issuance** plus **transfers** minus **debt service**



$$c_R = y(z) + q(b', b, m, z)(b' - (1 - \delta)b) + x_R(b', b, m, z) - \kappa b$$

$$c_D = y(z) - h(z) + x_D(m, z); \quad x_D(m, z) \leq \Gamma(m)$$

## Exogenous Bilateral Terms

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# Programming the Large Lender: Possible Rules

- Explore interest rate rules of the form

$$r(b', m') = \max\{r^*, \alpha_0 + \alpha_b b' + \alpha_m m'\}$$

- Two versions

Size-dependent

$$\alpha_0 > 0, \alpha_b = 0, \alpha_m > 0$$

Risk-inducing

$$\alpha_0 > 0, \alpha_b < 0, \alpha_m \geq 0$$

- First-order condition for bonds

$$u'(c) \left( q + \frac{\partial q}{\partial b'} i + \frac{1}{1+r_b} \frac{\partial m'}{\partial b'} + \frac{\partial \frac{1}{1+r_b}}{\partial b'} m' \right) = \beta \mathbb{E} \left[ v_b(b', m', z') + v_m(b', m', z') \frac{\partial m'}{\partial b'} \mid z \right]$$

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## Equilibrium with Exogenous Rules

- ‘Only market’ standard calibration to Argentina 1993-2001

	Only market	Size dependent $r$	Risk inducing $r$
Avg spread (bps)	714	623	921
Std spread (bps)	399	315	552
$\sigma(c)/\sigma(y)$ (%)	113	115	115
Debt to GDP (%)	22.5	23.5	22.8
Loan to GDP (%)	0	0.71	0.972
Loan spread (bps)	–	682	1,264
Corr. loan & spreads (%)	–	62.5	48.1
Default frequency (%)	5.72	5.13	6.92
Welfare gains (rep)	–	0.21%	-0.079%

## Equilibrium with Exogenous Rules

- Default rates:  with size dependent  with risk-inducing

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- Spreads:  with size dependent  with risk-inducing

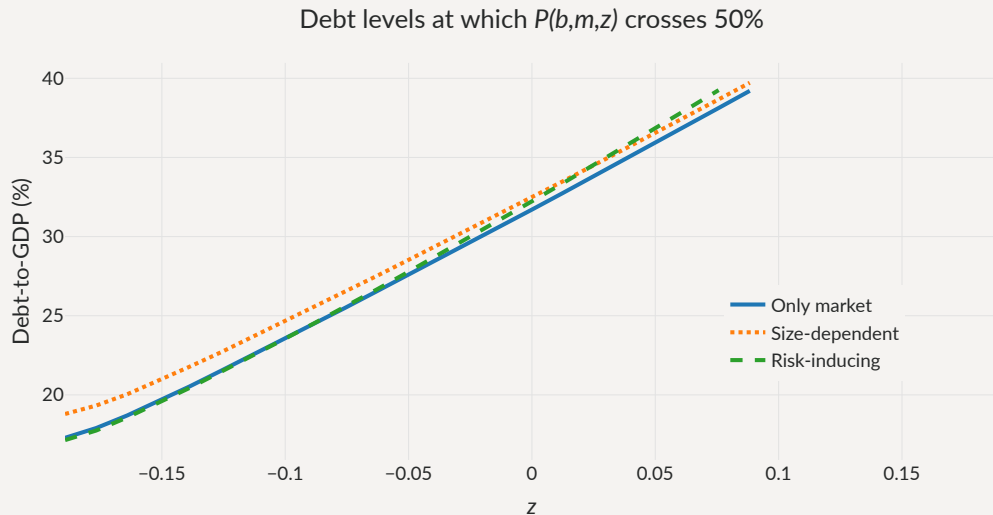
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- Welfare:  with size dependent  with risk-inducing

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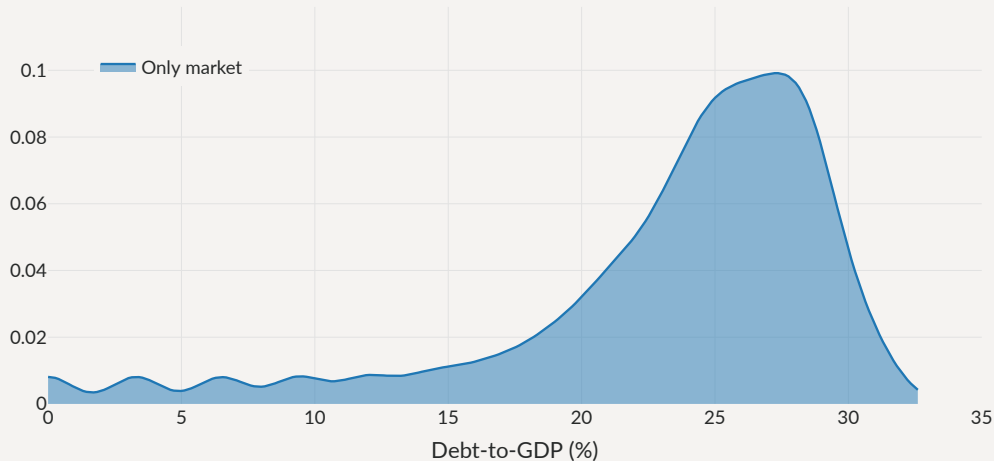
## Default barriers with Exogenous Bilateral Rules





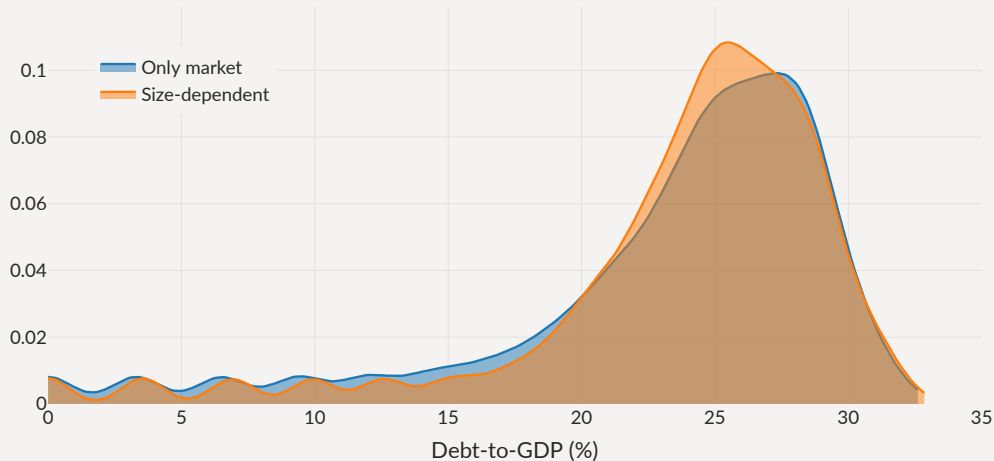
# Debt Levels with Exogenous Bilateral Rules

Distribution of debt levels



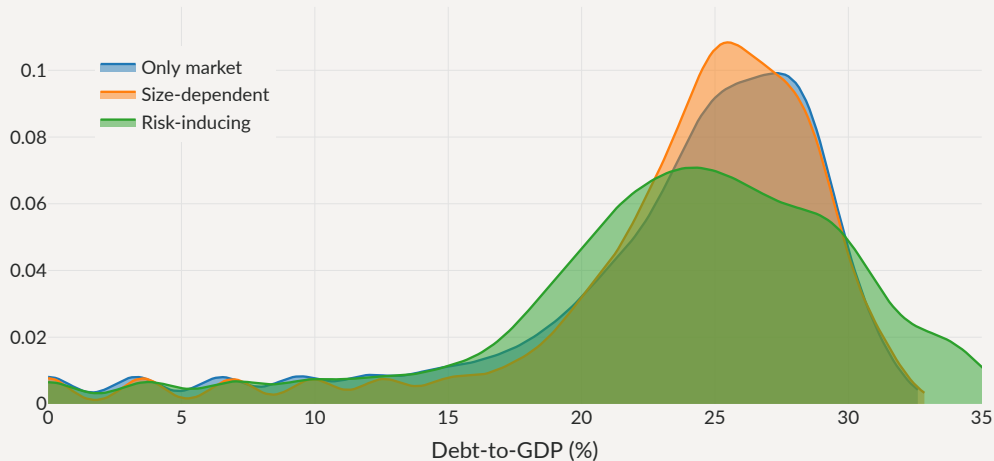
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# Endogenous Bargaining

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## Bargaining Stage with Monopolist

- At state  $z$ , owing debt  $b$  bonds and  $m$  on the loan and having issued  $b'$

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

Government surplus  
Lender surplus

- Lender's surplus

$$\mathcal{L}_R(b', x, m, m', z) = \underbrace{(a - x + \beta_L \mathbb{E}[h(b', m', z') | z])}_{\text{agreement}} - \underbrace{(a + m + \beta_L \mathbb{E}[h(b', 0, z') | z])}_{\text{threat point}}$$

- Government's surplus

$$\begin{aligned} \mathcal{B}_R(b', b, x, m, m', z) = & \underbrace{u(y(z) + B(b', b, m, z) + x) + \beta \mathbb{E}[v(b', m', z') | z]}_{\text{agreement}} \\ & - \underbrace{(u(y(z) + B(b', b, m, z) - m) + \beta \mathbb{E}[v(b', 0, z') | z])}_{\text{threat point}} \end{aligned}$$

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same sdf as markets

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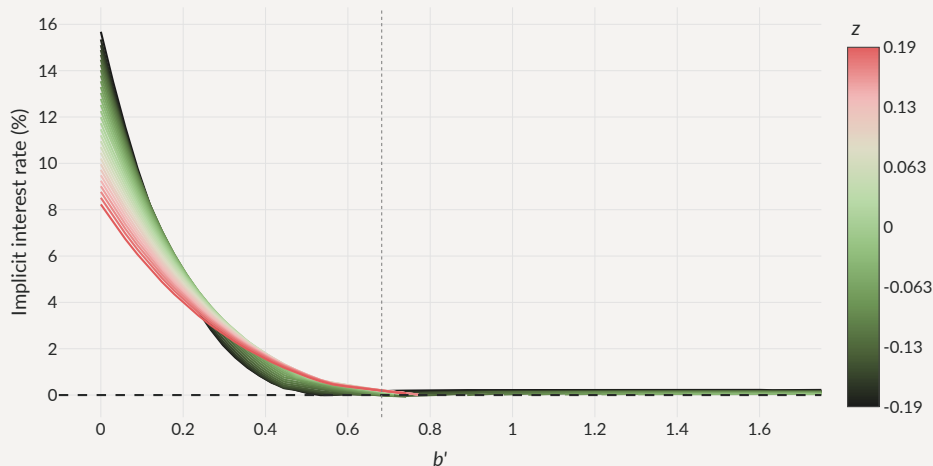
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- Revenues from debt issuance  $B(b', b, m, z)$  modulate the value of the threat point
  - After large revenues (high  $q$ , high  $b'$ ), gov't flush with cash, **strong** in bargaining
  - After bad issuance (low  $q$  or low  $b'$ ), gov't **weak** in bargaining



Threat point manipulation: increase market  $b'$  to reduce bilateral  $r$

Loan interest rate (Limited)

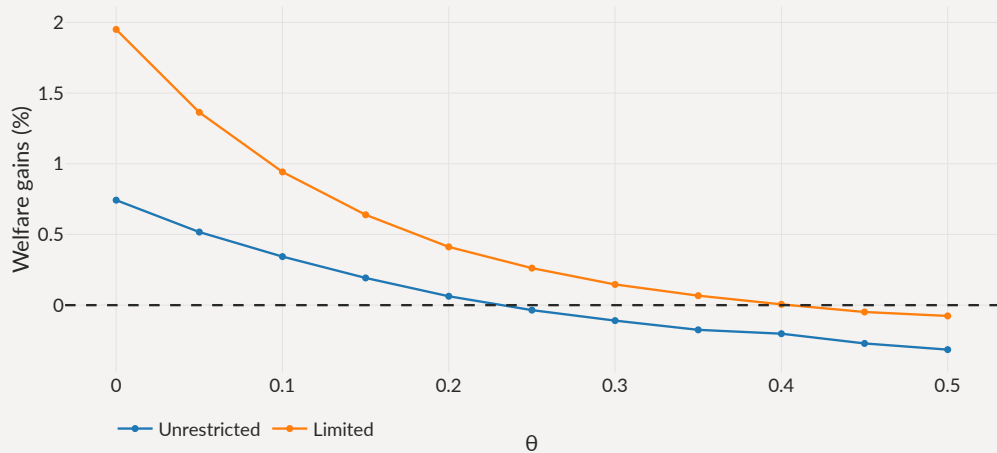


## Limiting Loans in Default

- **Limited:** entire loan must be repaid while in default  $\Gamma(m) = 0$

	Only market	Unrestricted, $\theta = 0.5$	Limited, $\theta = 0.5$
Avg spread (bps)	714	2,105	1,038
Std spread (bps)	399	1,331	612
$\sigma(c)/\sigma(y)$ (%)	113	109	113
Debt to GDP (%)	22.5	21.2	22.5
Loan to GDP (%)	0	3.02	1.06
Loan spread (bps)	–	-429	536
Corr. loan & spreads (%)	–	67.5	71.1
Default frequency (%)	5.72	13	7.72
Welfare gains (rep)	–	-0.43%	-0.2%

## Bargaining Power and Welfare



## Concluding remarks

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# The Perils of Bilateral Sovereign Debt

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- Simple model of borrowing from **markets** and a **senior bilateral lender**
  - ... strong interaction between two markets for sovereign debt
  - ... even if bilateral loans are **not** used intensely on the equilibrium path
- **Dangerous** when bilateral interest rate responds negatively to *market* debt
  - ... cross-elasticity induces risk-taking, more defaults, welfare losses
  - ... Bargaining as an example of situation where cross-elasticity emerges
- Cross-elasticity constitutes a simple test to assess welfare gains of **new** instruments
  - ... or a boost to the gains of fiscal rules, state-contingent debt...

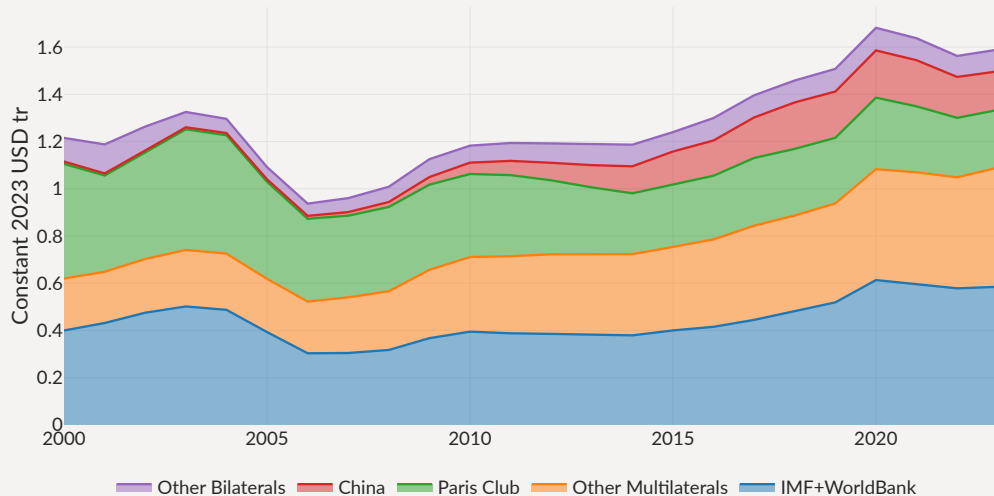


*Scan to find the paper*

# A New Landscape for Official Sovereign Debt

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Total Official Debt



Loan drawings  $m'$  (Limited)

