Assessing the Appropriate Size of Relief in Sovereign Debt Restructuring

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- What's the "appropriate" size of relief in a sovereign debt restructuring process?

Recent literature is taking a dangerous road

- Inter-country comparison of market haircuts (Edwards 2015)
  - 180 restructuring episodes with private creditors from 1970 to 2010 (data from Cruces-Trebesch 2013)
  - Actual haircuts vs. Predicted haircuts

$$H_t = 1 - \frac{PV\ new\ bond(r_{t+\epsilon})}{PV\ old\ bond(r_{t+\epsilon})}$$

  - If actual haircut $>>$ ($<<$) predicted haircut $\Longrightarrow$ too much (too little) haircut
- But the approach is flawed

t	3	4	5	6	7
Frequency	0.497	0.525	0.553	0.575	0.6

- Frequency: denotes fraction of restructuring with private creditors (bondholders and bank loans) followed by another restructuring or default with the same group within t years
- This evidence should make us skeptical of papers which use past restructuring episodes as a guide for future debt policy

The relief is appropriate if it restores sustainability *with high probability*

- Principles for sovereign debt restructuring (Guzman-Stiglitz 2015, 2016)
  - Must ensure proper functioning of sovereign lending markets
    - Ex-ante efficiency
    - Ex-post efficiency
    - The restructuring must restore the conditions for pursuing the sovereign's development goals
- The ultimate goal of a sovereign restructuring is the restoration of *debt sustainability*
  - But other principles should be respected as well $\rightarrow$ calls for a broader definition of sustainability

Relation of this paper to the literature

- Empirical literature on fiscal sustainability (Bohn 1995, 2005, 2008, Mendoza-Ostry 2008)
- Effects of debt relief on economic performance (Reinhart-Trebesch 2016
- West Germany recover post WWII would have not been possible with the substantial debt relief provided by the London Debt Agreement (Galofre-Vila et al. 2016)

The concept of debt sustainability

- A general definition: public debt is *economically sustainable* when its repayment does not rely on a sequence of unbounded future borrowings
    - *Economic sustainability* is a necessary but not sufficient condition for *principles-based sustainability*
    - Any statement on debt sustainability is by definition probabilistic

- Notation:

  s_t: fiscal surplus to GDP ratio

  $1 + r = \frac{1+R}{1+\gamma}$

  R: constant nominal interest rate

  γ: constant growth rate of output

  d_t^*: outstanding debt payments in period t as ratio of GDP

- (TC) holds iff (IBC) holds:

(IBC):

$$d_t^* = \sum_{j=0}^{\infty} (1+r)^{-j} E_t s_{t+j}$$

(TC):

$$lim_{j \to \infty} (1+r)^{-j} E_t d_{t+j} = 0$$

A methodology for assessing the appropriate size of relief in sovereign debt restructuring

1. Define "restructuring principles" and translate them into economic terms
2. Describe the model that represents the economy under analysis
3. For each possible economic scenario, find the trajectory of fixed points $\{s_t\}_t$ that satisfies IBC
4. Classify each fixed point according to its economic and "political" feasibility
5. If there is a "sufficiently large" mass of feasible trajectories of fixed points, then the state variable d_t^* satisfies sustainability with high probability
6. Otherwise, there is need for a debt write off large enough as to achieve a "sufficiently large" mass of trajectories of fixed points

- Suppose (IBC) is the appropriate IBC

$$d_t^* = \sum_{j=0}^{\infty} (1+r)^{-j} E_t s_{t+j}$$

- Suppose:

$$s_t = s(\gamma_t, R_t, X_t^s, \epsilon_t^s)$$

$$\gamma_t = \gamma(s_t, X_t^\gamma, \epsilon_t^\gamma)$$

$$R_t = R(s_t, X_t^R, \epsilon_t^R)$$

$$\Longrightarrow$$

$$s_t = s\left[\gamma(s_t, X_t^\gamma, \epsilon_t^\gamma), R(s_t, X_t^R, \epsilon_t^R), X_t^s, \epsilon_t^s\right] = T(s_t) \equiv s_t^*$$

Definition 1

The set of economically feasible s_t *is defined as*

$$J^E = \{s_t : \gamma(s_t, X_t^\gamma, \epsilon_t^\gamma) > -1 \ \wedge \ R(s_t, X_t^R, \epsilon_t^R) > \gamma(s_t, X_t^\gamma, \epsilon_t^\gamma)\}$$

Definition 2

s_t^* *is an economically feasible fixed point if* $s_t^* \in J^E$

Definition 3

The set of economically feasible s_t *is defined as* J^P

Definition 4

s_t^* *is a politically feasible fixed point if* $s_t^* \in J^P$

Definition 5

s_t^* *is a feasible fixed point if* $s_t^* \in J^F = J^E \cap J^P$

Definition 6

$d_{t-1,t}$ is x-sustainable if given the probability distributions for ϵ_t^i $(i = s, \gamma, R)$, there are $\{s_t^*\}_t \in J^F$ s.t. IBC holds with probability mass not smaller than x

Definition 7

Suppose IBC holds with probability $x' < x$ for d_t^*. Then, the appropriate level of debt relief, Δ, must satisfy $\Delta = d_t^* - d_t^{*'}$, where $d_t^{*'}$ is the maximum value of d that satisfies x-sustainability

A methodology for assessing the appropriate size of relief in sovereign debt restructuring:

An illustration of how to apply it

- Commonly invoked object in practical episodes of restructuring: the debt-stabilizing constant fiscal surplus to GDP ratio
- Suppose (IBC) is the relevant IBC
- Suppose $\gamma_t = \gamma$, $R_{t,t+1} = R$, both r.v. ex-ante
- Let γ^n and R^n be any possible realization of γ and R

$\Longrightarrow$

$$s^n = d_t^* \left(\frac{R^n - \gamma^n}{1 + \gamma^n} \right)$$

- Suppose

$$\gamma^n = \alpha_0 - \alpha_1 s^n$$

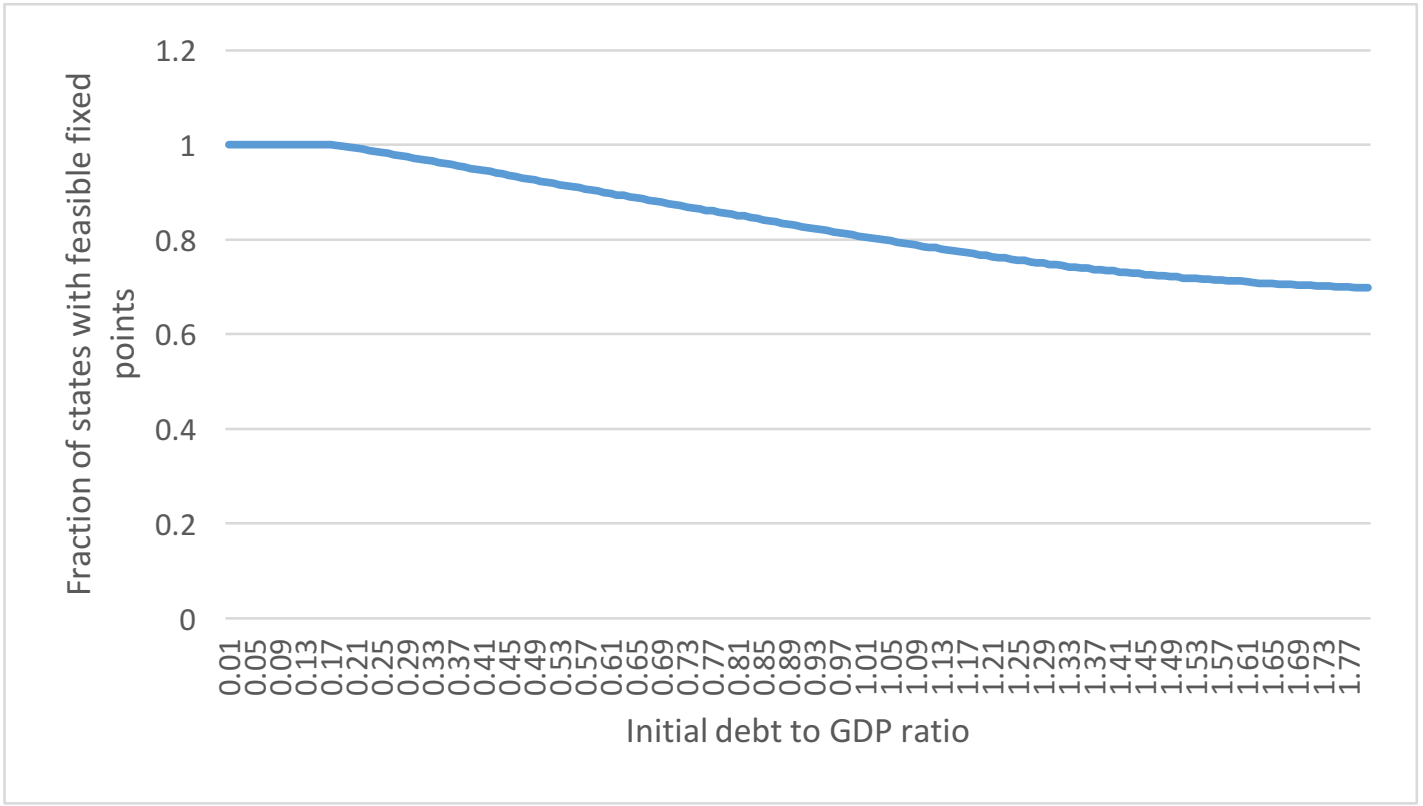
$$R^n = \beta_0 - \beta_1 s^n$$

- α_i and β_i have discrete uniform distributions:
  $\alpha_0 \sim unif(0.02, 0.07)$ with $pmf = 1/6$; $\alpha_1 \sim unif(0, 1)$ with $pmf = 1/11$; $\beta_0 \sim unif(0.03, 0.07)$ with $pmf = 0.2$;
  $\beta_1 \sim unif(0, 101)$ with $pmf = 1/101$

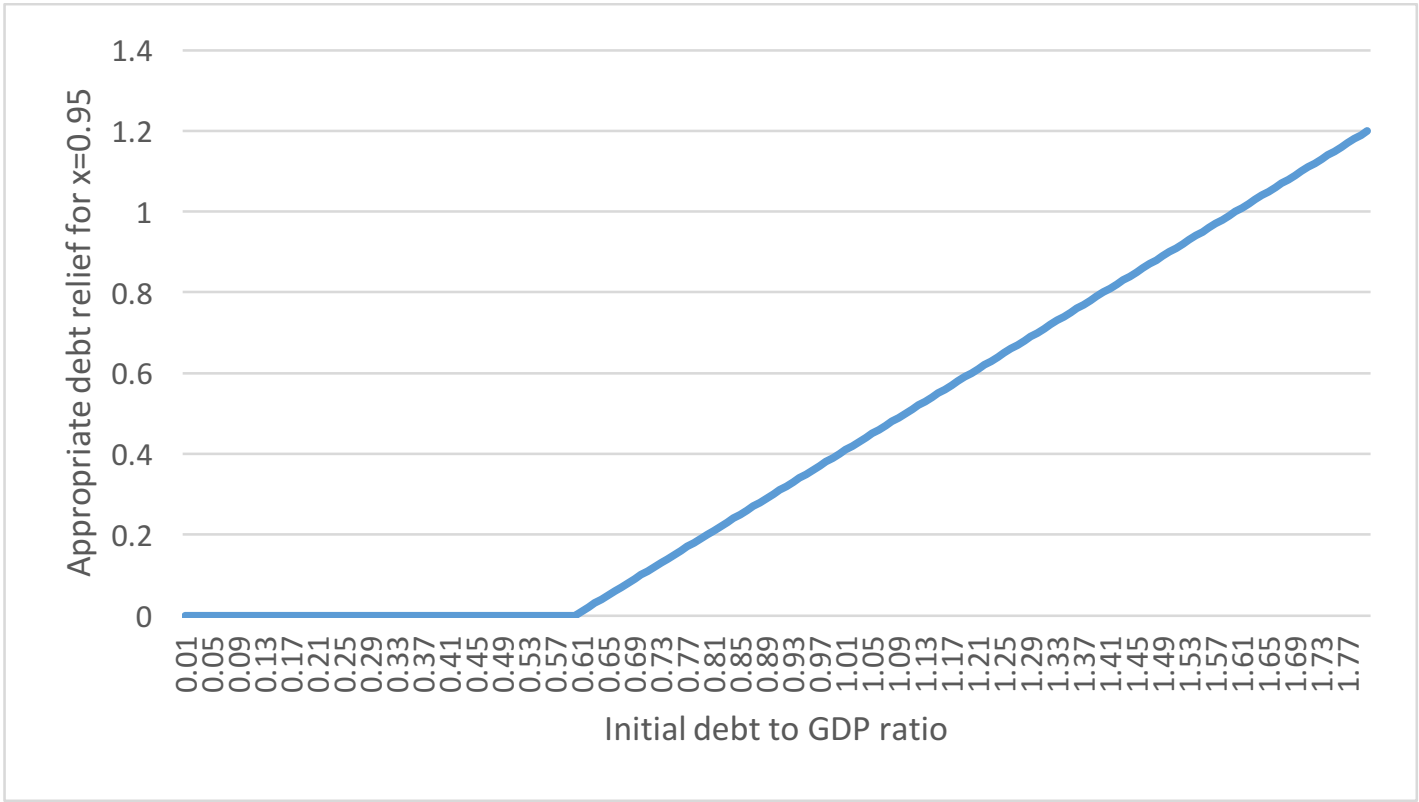
- Under our distributional assumptions, $N = 33,330$ combination of states
- Compute s^n for each n, for $d_t^* \in [0.01, 1.8]$
    - Multiple fixed points

1. Eliminate dynamically inefficient combinations
2. Count scenarios where there is at least one economically feasible fixed point
3. Political feasibility: suppose
   $J^P = \{s_t \in (-1, 1) : \gamma(s_t, X_t^\gamma, \epsilon_t^\gamma) \geq 0.01\}$
4. Count scenarios where there is at least one politically feasible fixed point
5. Compute ratio of relevant scenarios with feasible fixed point

- x-sustainability:



- Appropriate relief, $x = 0.95$



- Computing the appropriate non-contingent relief requires knowledge on the distribution of fiscal multipliers
  - Anomalies such as counterfactual multipliers are ruled out before subsequent analysis is undertaken
- Framework is complementary of IMF Fan Charts Approach (Abiad-Ostry 2005; Celasun-Debrun-Ostry 2006)
  - Fan Chart analysis helps to rule out via stress tests unusual predictions regarding variables over which uncertainty is high

- Framework can be used for identifying the "optimal" fiscal plan from the perspective of debt relief
- Framework can be used for designing GDP linked exchange bonds

- Need for clarifying what's a sensible framework for assessing how appropriate is a debt discount
- Evidence that suggests presence of *too little* syndrome in sovereign debt restructuring
- Possible guide for practitioners
    - Framework could be the basis for the codification the UN *sustainability principle*