Sovereign Debt Crises and Floating-Rate Bonds

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Overview

- Sovereign debt markets plagued by numerous “frictions”
  - **(i)** No or limited state contingency
  - **(ii)** An incentive to “dilute” legacy creditors
  - **(iii)** Large deadweight costs to default and lengthy renegotiations
  - **(iv)** Vulnerability to self-fulfilling crises
  - **(v)** Currency mismatch
  - **(vi)** Political economy distortions

Maturity Choice

- Short maturity:
  - Provides correct incentives to government regarding fiscal policy
  - Minimizes risk of inefficient “fundamental” default
- Long maturity:
  - Safety from rollover risk
  - Good hedge

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- Floating rate bonds
  - A happy medium?

Environment

- SOE facing endowment fluctuations
- Trades non-contingent bond with risk-neutral lenders
- Contracts:
  - Perpetual youth bonds that mature with probability λ
  - Pay coupon κ

Equilibrium Objects

No Rollover Risk

$$V^R(s,b) = \max_{c,b'} \begin{cases} u(c) + \beta \mathbb{E} V(s',b') \\ \text{subject to: } c = y(s) - (\kappa+\lambda)b + q(s,b') * (b' - (1-\lambda)b) \end{cases}$$

$$V(s) \equiv \max \left\{ V^R(s,b), V^D(s) \right\}$$

$$q(s,b') = R^{-1} \mathbb{E}_s \left[(1 - \mathcal{D}(s',b'))(\kappa + \lambda + (1-\lambda) q(s', \mathcal{B}(\cdot)) \right]$$

Short-maturity Bonds

- One-period bonds solve a pseudo-planning problem
- Equilibrium "as if" lender sets fiscal policy
- Absent rollover risk, equilibrium is constrained efficient

Efficiency Logic

- There is no endowment risk
- Suppose $V^D(s)$ is a random draw from a distribution with cdf F
- Defaults with probability $1 - F(v')$ where $v' = V^R(b')$
- Consider a planner solving a Pareto problem:

$$B(v) = \max_{c,v'} \left\{ y - c + (1 - F(v')R^{-1}B(v') \right\}$$

$$\text{subject to: } v = \log(c) + \beta \mathbb{E} \max\{v', V^D(s')\}$$

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- FOC ($\beta R = 1$):

$$c' = c + \frac{f(v')B(v')}{F(v')}.$$

- Default risk induces savings

Efficiency Logic

- Result: Planning allocation can be implemented with one-period bond
- Why does government save in equilibrium?
  - No precautionary reason
  - Strategic default: defaults when V^D high
  - Key is prices: Government bears entire cost or benefit from marginal change in default risk
  - Reflects that all debt is rolled over every period

Variable Rate Coupon

- Index κ to yield on one-period bond

$$\begin{aligned}\kappa(s, b') &= \frac{1}{q_S} - 1 \\ &= \frac{R}{\mathbb{E}_s(1 - \mathcal{D}(s', b'))} - 1\end{aligned}$$

- Any change in default risk generates a change in the promised coupon
- Result: Planning allocation can be implemented with floating-rate console

Assessment

- Floating rate coupon provides same incentive as one-period bond
- Maturity irrelevant – all that matters is the government internalizes any change in the probability of default due to fiscal policy
- Lose hedging properties of long-maturity bonds
- Open the door to “Calvo” multiplicity: Need a cap on κ

Adding Rollover Risk

- Add rollover risk as in Cole-Kehoe (2000)
- Failed auction can be self-fulfilling
  - Zero price: Need to pay maturing liabilities out of endowment
  - Forces government to default
- Maturity is key to vulnerability
- Long-maturity floating rate bonds provide protection and incentives

Quantitative Examples

- Calibration as in Chatterjee-Eyigungor (2012)
- Short- and long-term bonds
- With and without rollover risk (CK vs. EG)

Simulated Moments

	FR	EG-ST	CK-ST	EG-LT	CK-LT	FR $\overline{\kappa} = 0.015$
$\mathbb{E}\left[\frac{b'}{y}\right]$	0.77	0.82	0.38	0.94	0.94	0.87
$\mathbb{E}\left[\frac{q*b'}{y}\right]$	0.77	0.82	0.37	0.72	0.72	0.78
Default Rate†	0.002	0.003	0.002	0.067	0.067	0.033
$\mathbb{E}\left[r - r^{\star}\right]^{\dagger}$	0.003	0.003	0.002	0.080	0.080	0.038
StDev$(r - r^{\star})^{\dagger}$	0.004	0.004	0.003	0.044	0.044	0.029
$\mathbb{E}\kappa$	0.011	0.010	0.010	0.010	0.010	0.011
StDev(κ)	0.001	0	0	0	0	0.002
Max κ	0.023	0.010	0.010	0.010	0.010	0.015
Fraction						
Runs	0.775	0	1.00	0	0.003	0.003
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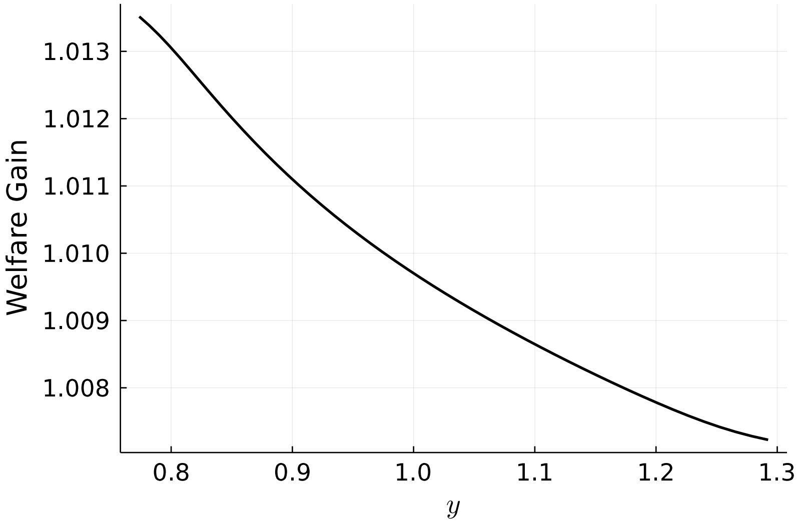
Welfare Gains

Vs. Short-term Debt with Rollover Risk



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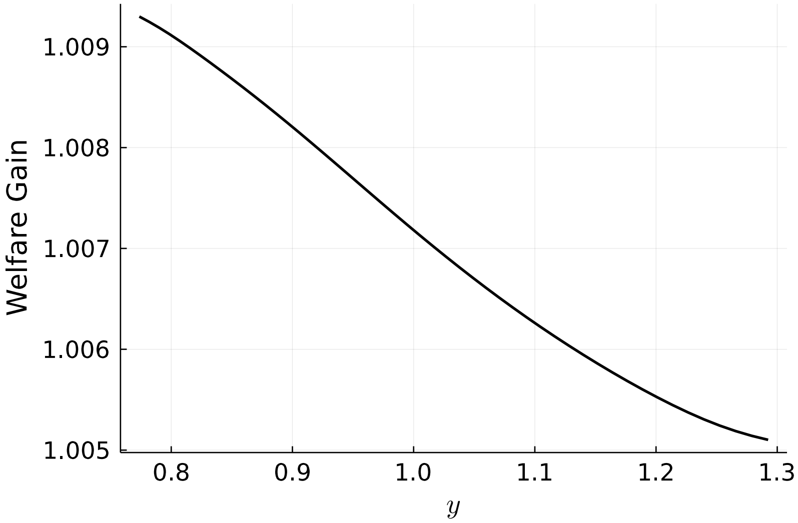

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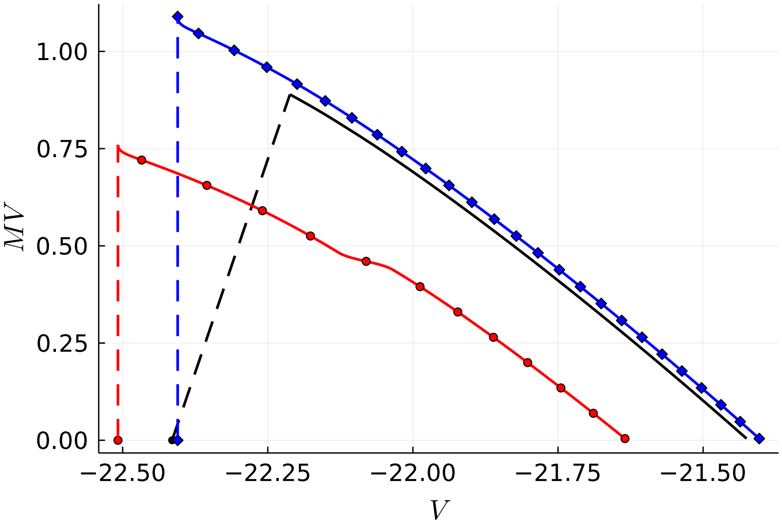

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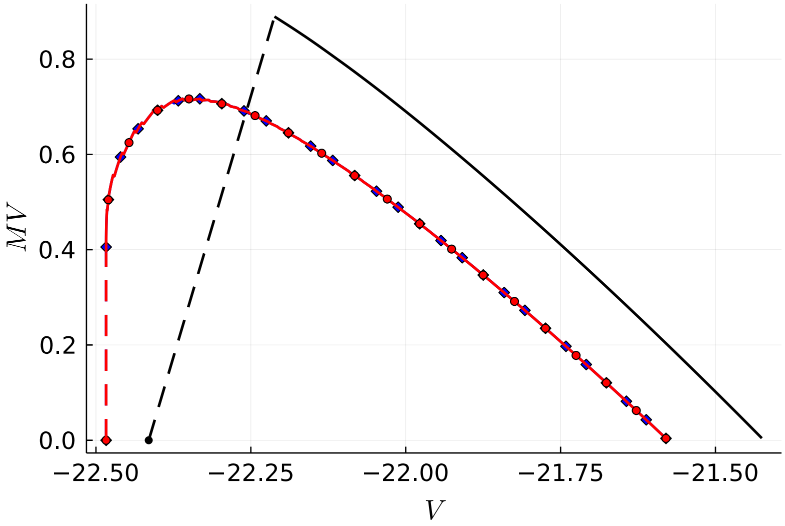

Caveats

- Hedging interest rate or risk premia shocks
- Calvo multiplicity
- Italy's experience