Adam and Grill: Optimal Sovereign Debt Default

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Overview

Sovereign default to buffer macroeconomic shocks

- Grossman and Van Huyck (1988)
- Minus reputation (excusable default vs. unjustifiable repudiation), plus deadweight losses after default
- Plus commitment: Default rates chosen ex ante

Findings

- Lots of insurance when deadweight losses are small
- Little insurance otherwise
**Mechanics**

Savings problem $\mathcal{P}$ (think of $z_0 \ll \mathbb{E}[z_1^n]$)

$$\max_{b_0, \{a_0^n\}} u \left( z_0 + q_0 b_0 - \sum_{n=1}^{N} q_0^n a_0^n \right) + \beta \mathbb{E} \left[ u(z_1^n - b_0 + a_0^n) \right]$$

where $q_0 = \beta, \ q_0^n = \beta \pi(z_1^n | z_0), \ n = 1, \ldots, N$

- $N + 1$ assets, $N$ states, kernel $\beta$: Indeterminate portfolio
- Actuarially fair prices: Full insurance
Interpretation of portfolio choice in $\mathcal{P}$

- Bond plus Arrow securities
- Bond with state contingent default rates, $\delta^n_1$, chosen ex ante

$$a_0^n \equiv b_0 \delta_1^n$$

$$q_0 b_0 - \sum_{n=1}^N q_0^n a_0^n = \beta b_0 \left( 1 - \sum_{n=1}^N \pi(z_1^n|z_0) \delta_1^n \right)$$

But: Default rates are non-negative, $\delta_1^n \geq 0$

- Restriction not binding, due to redundant asset structure
Savings problem $\mathcal{P}'$

$$\max_{b_0, \{a^n_0\}} \ u \left( z_0 + q_0 b_0 - \sum_{n=1}^{N} q^n_0 a^n_0 \right) + \beta \mathbb{E} \left[ u(z^n_1 - b_0 + a^n_0 (1 - \lambda^n_1)) \right]$$

s.t. $a^n_0 \geq 0, \ n = 1, \ldots, N$

where $q_0 = \beta, \ q^n_0 = \beta \pi(z^n_1|z_0), \ n = 1, \ldots, N$

- $N + 1$ assets, $N$ states, no kernel (overpriced Arrow securities): Determinate portfolio

- **Short-selling constraint**: Bounded portfolio

- **No actuarially fair prices**: No full insurance
Interpretation of portfolio choice in $\mathcal{P}'$

- Bond plus overpriced Arrow securities that cannot be shorted
- Bond with state contingent default rates, chosen ex ante, and output losses after default

$$\text{output loss} \equiv a^n_0 \lambda^n_1 \equiv b_0 \delta^n_1 \lambda^n_1$$

Examples with closed form solutions

- Log utility, two periods, $N = 2$, no capital, comparative statics with respect to $\lambda = \lambda^n_1$, $n = 1, 2$
Figure 1: Small risk of downturn
Figure 2: Large risk of downturn
Figure 3: Small risk of disaster
Sovereign Debt?

What’s wrong with existing models?

- Central predictions, in particular default in bad states, also follow in models without commitment

Restrictive specification of deadweight losses

- Legal costs are fixed costs
- But specification requires proportional ones ($b_0 \delta_1^n \lambda_1^n$)
Commitment on the part of the borrower (but not on the part of the lender)?

- Implausible
- Lack of commitment as defining feature of sovereign borrowing

Commitment on the part of the borrower, yet deadweight losses after “default”

- Rationale: Due to costly explicit contracting, coding delayed until state is known and implicit agreement risks being “forgotten”
- Unrealistic: Sovereign debt contracts are lengthy, detailed
• Implausible: Contracting costs tiny relative to debt, would expect full insurance

• Inconsistent: Problem easily solvable by specifying statute of limitation

• Provocative: Requires one-sided commitment on part of borrower

Alternative view

• Lack of commitment

• Non-contingent bonds because macro shocks can be manipulated
References