

**Discussion of Liu–Marimon–Wicht
“Making Sovereign Debt Safe with a
Financial Stability Fund”**

Alessandro Dovis
U Penn and NBER

Sovereign Debt Conference, Minneapolis Fed
November 2022

Context

- Standard approach to sovereign default: Eaton-Gersovitz model
 - Lack of commitment
 - Incomplete markets (only noncontingent defaultable debt)
 - Restrictions on strategies
 - (Constrained) efficient allocation
 - Lack of commitment (and potentially other frictions)
 - Endogenously incomplete markets
 - No restrictions on strategies
 - Various ways to implement efficient all'n (SWT holds)
 - Alvarez-Jermann, Kehoe-Perri, Dovic
- But FWT does not always hold
- Role for gov't (Fund) to guarantee uniqueness

This Paper

- Consider economy with 3 types of agents
 - Risk averse borrower
 - Private lenders (risk neutral)
 - **Fund** (big player, risk-neutral)
- Constrained efficient allocation (two-sided lack of commitment)
- Show can be implemented with
 - Private lenders hold defaultable debt
 - Fund provides insurance

Properties:

- Along equilibrium path debt is risk-free
 - Seniority of the Fund debt is irrelevant
- Compare constrained efficient all'n with EG outcome for Italy
 - Large welfare gains ($\approx 10\%$)

Constrained Efficient Allocation

$$V(\mathbf{b}_0, \mathbf{a}_0) = \max_{\{c(s^t), T_p(s^t), T_f(s^t)\}} \sum_{t=0}^{\infty} \sum_{s^t} \beta^t \Pr(s^t) U(c(s^t), n(s^t))$$

subject to

$$c(s^t) + T_f(s^t) + T_p(s^t) \leq \theta(s_t) n(s^t)$$

$$\sum_{t=0}^{\infty} \sum_{s^t} q^t \Pr(s^t) T_p(s^t) \geq \mathbf{a}_0$$

$$\sum_{t=0}^{\infty} \sum_{s^t} q^t \Pr(s^t) T_f(s^t) \geq \mathbf{b}_0$$

$$\sum_{r \geq t}^{\infty} \sum_{s^r} \beta^{r-t} \Pr(s^r | s^t) U(c(s^r), n(s^r)) \geq V_{\text{aut}}(s_t) \quad \forall s^t$$

$$\sum_{r \geq t}^{\infty} \sum_{s^r} q^{r-t} \Pr(s^r | s^t) T_f(s^r) \geq \theta_{t-1} Z \quad \forall s^t$$

Constrained Efficient Allocation

$$V(\mathbf{b}_0, \mathbf{a}_0) = \max_{\{c(s^t), T_p(s^t), T_f(s^t)\}} \sum_{t=0}^{\infty} \sum_{s^t} \beta^t \Pr(s^t) U(c(s^t), n(s^t))$$

subject to

$$c(s^t) + T_f(s^t) + T_p(s^t) \leq \theta(s_t) n(s^t)$$

$$\sum_{t=0}^{\infty} \sum_{s^t} q^t \Pr(s^t) T_p(s^t) \geq \mathbf{a}_0$$

$$\sum_{t=0}^{\infty} \sum_{s^t} q^t \Pr(s^t) T_f(s^t) \geq \mathbf{b}_0$$

$$\sum_{r \geq t} \sum_{s^r} \beta^{r-t} \Pr(s^r | s^t) U(c(s^r), n(s^r)) \geq V_{\text{aut}}(s_t) \quad \forall s^t$$

$$\sum_{r \geq t} \sum_{s^r} q^{r-t} \Pr(s^r | s^t) T_f(s^r) \geq \theta_{t-1} Z \quad \forall s^t$$

$$\sum_{j \geq 1} \sum_{s^{t+j}} q^{j-1} \Pr(s^{t+j} | s^t, s_{t+1}) T_p(s^{t+j}) = \mathbf{b}(s^t) \quad \forall s^t, s_{t+1}$$

Sovereign Debt Game with Fund

- State is $(\mathbf{b}, \mathbf{a}(s), s)$
- Fund announces maximal amount of total indebtedness, $\bar{\omega}(s')$
 - Debt sustainability announcement (DSA)
 - Commit to lend $\mathbf{a}(s')$ at risk-free price as long as

$$\mathbf{b}' + \mathbf{a}'(s') \leq \bar{\omega}(s')$$

- Gov't chooses whether to default on its debt(s)
- If no default, choose new $(\mathbf{b}', \mathbf{a}'(s'))$
 - $\mathbf{c} + \mathbf{b} + \mathbf{a}(s) \leq Q(\mathbf{b}', \mathbf{a}', s)\mathbf{b}' + \sum_{s'} \Pr(s'|s)q\mathbf{a}'(s') + \theta(s)\mathbf{n}(s)$
 - $\mathbf{b}' + \mathbf{a}'(s') \leq \bar{\omega}(s')$ for all s'

Sovereign Debt Game with Fund

- State is $(\mathbf{b}, \mathbf{a}(s), s)$
- Fund announces maximal amount of total indebtedness, $\bar{\omega}(s')$
 - Debt sustainability announcement (DSA)
 - Commit to lend $\mathbf{a}(s')$ at risk-free price as long as

$$\mathbf{b}' + \mathbf{a}'(s') \leq \bar{\omega}(s')$$

- Gov't chooses whether to default on its debt(s)
- If no default, choose new $(\mathbf{b}', \mathbf{a}'(s'))$
 - $\mathbf{c} + \mathbf{b} + \mathbf{a}(s) \leq Q(\mathbf{b}', \mathbf{a}', s)\mathbf{b}' + \sum_{s'} \Pr(s'|s)q\mathbf{a}'(s') + \theta(s)\mathbf{n}(s)$
 - $\mathbf{b}' + \mathbf{a}'(s') \leq \bar{\omega}(s')$ for all s'

Idea:

- Choose $\bar{\omega}(s')$ as *not-too-tight debt limit* in Alvarez-Jermann
- Then never default and Q is risk-free rate

Compare with EG equilibrium outcome

- Very large welfare gains ($\approx 10\%$)
- Two sources for gains:
- More insurance
 - $c(s^t, s_{t+1})$ less volatile
 - Bounded by Lucas' cost of business cycle
- Front-loading consumption
 - Borrower is impatient ($\beta < q$)
 - With complete markets can raise up to $\sum_s' q \Pr(s'|s)\bar{\omega}(s')$
 - With incomplete markets there is a trade-off:
 - if issue debt up to maximal amount of sustainable debt in states when high repayment incentives, then default in other states

Compare with EG equilibrium outcome

- Very large welfare gains ($\approx 10\%$)
- Two sources for gains:
- More insurance
 - $c(s^t, s_{t+1})$ less volatile
 - Bounded by Lucas' cost of business cycle
- Front-loading consumption
 - Borrower is impatient ($\beta < q$)
 - With complete markets can raise up to $\sum_s' q \Pr(s'|s)\bar{\omega}(s')$
 - With incomplete markets there is a trade-off:
 - if issue debt up to maximal amount of sustainable debt in states when high repayment incentives, then default in other states
- Are we sure reputational forces not critical to account for data?

1 Question and 2 Comments

- Role of decentralization?
- Role of Fund to guarantee uniqueness
- Taking model to the data: Int'l risk sharing vs. public finance

Why Alvarez-Jermann Decentralization?

- Show constrained efficient all'n (uniquely) implemented with
 - Uncontingent defaultable debt held by private agents
 - Fund providing insurance
- Is it just to derive price of Arrow securities when sustainability constraint for the Fund binds?
- Fund large player, not price taker

Role of Fund

- Provide state contingent assets (not needed)
- Ensure constrained efficient all'n is unique equilibrium outcome (not mentioned)
 - In Alvarez-Jermann there are multiple equilibria
 - E.g. see Wright et al, Bloise et al, Kirpalani
 - Funds provides minimal amount of new issuances even if private lenders coordinate on bad equilibrium
 - Can borrow up to $\bar{\omega}(s^t, s_{t+1})$
 - Similar to Roch-Uhlig, Bocola-Dovis for rollover risk

Role of Fund

- Provide state contingent assets (not needed)
- Ensure constrained efficient all'n is unique equilibrium outcome (not mentioned)
 - In Alvarez-Jermann there are multiple equilibria
 - E.g. see Wright et al, Bloise et al, Kirpalani
 - Funds provides minimal amount of new issuances even if private lenders coordinate on bad equilibrium
 - Can borrow up to $\bar{\omega}(s^t, s_{t+1})$
 - Similar to Roch-Uhlig, Bocola-Dovis for rollover risk
 - Minimal intervention and co-existence w/ private agents
 - Prices can reflect private lenders' info about debt sustainability
 - Dovis-Kirpalani: Robust policy to uniquely implement constrained efficient outcome when gov't/fund must learn from prices

Taking model to the data

- International risk sharing

$$c + g + x + nx = y$$

Taking model to the data

- International risk sharing

$$c + nx = \tilde{y}$$

Taking model to the data

- International risk sharing

$$c + nx = \tilde{y}$$

- Public finance

$$g + (\delta b - Qb') = \tau$$

Taking model to the data

- International risk sharing

$$c + nx = \tilde{y}$$

- Public finance

$$g + (\delta b - Qb') = \tau$$

- Is this model of (c, nx) or $(g - \tau, B)$?
 - Bocola-Bornstein-Dovis
 - Cyclical properties of external debt/NFA and gov't debt different
 - Same for various measures of indebtedness (external vs. gov't)

Conclusion

- Interesting paper connecting dynamic contracts literature with sovereign default
- What makes Fund “essential”?