What makes US government bonds safe assets?

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Motivation

- US Treasury bonds have been the world safe asset for a long time
  - Safe asset portfolios tilted towards US Treasury bonds
  - “Convenience yield” on US Treasury bonds
  - Higher premium in bad states ("negative $\beta$") & flight to quality
    - Persists despite a high US debt/GDP ratio
- Safety endogenous: when investors believe an asset is safe, their actions can make that asset safe
Model Setup

Risk-neutral Investors:
- Measure $f$ of investors with one unit of funds each
- **Must** invest their funds in sovereign debt

Countries/debt $(i)$:
- Two countries $i = A, B$ with one-period rollover debt
- Debt due today $b^i_t$, debt to be issued today $b^{i}_{t+1}$
- **Absolute safe debt capacity**: $B^i_{t+1}$
- Assume that each country issued up to capacity, $b^i_{t+1} = B^i_{t+1}$ [in full paper, noise makes each country want to issue to max]
- We assume $A$ is the “large” country: $B^A_{t+1} > B^B_{t+1}$
- Then default (and shutout from debt market going forward) if

$$p^i_t B^i_{t+1} \leq b^i_t$$
Equilibrium conditions

Let \( f^i \equiv p^i_t B^i_{t+1} \) be proceeds of country \( i \)'s bond issue

Equilibrium conditions:

1. No default if \( f^i \geq b^i_t \)
2. All funds invested \( f^A + f^B = f \)
3. No arbitrage (if both survive) \( \frac{B^A_{t+1}}{f^A} = \frac{B^B_{t+1}}{f^B} \)

Assume \( f \geq \min \{ b^A_t, b^B_t \} \) so enough funds to make at least one country safe

Further, assume pareto equilibrium selection rule

[In full paper He et al 2015, heterogenous signals (i.e., a global game) will help narrow down the possible equilibria]
Three equilibria

Three possible equilibria:

1. Joint survival with \( \frac{f^B}{f^A} = \frac{B_t^B}{B_t^A} \)
2. Only A survives with \( p_t^A = \frac{f}{B_t^A} \)
3. Only B survives with \( p_t^B = \frac{f}{B_t^B} \)

Pareto criterion gives equilibrium ordering E1 > E2 > E3
Size benefit (1): Large initial debt $b_t^A$ of large country $A$

- Suppose $b_t^A$ large enough so joint safety (E1) infeasible
- $b_t^A$ not too large so individual safety for both countries (E2 & E3)
- Equilibrium selection picks larger debt capacity country $A$ (E2)
- Worsening turmoil in both US and the world in 2008 led to increased financing needs for countries
  - As a result, joint safety disappeared, and US sole safe asset
Size benefit (1): Large initial debt $b^B_t$ of small country B

Large initial debt $b^B_t$ can be costly for the smaller country:

- Suppose $b^B_t$ is large enough so that joint safety (E1) cannot hold
- Still assume that $f$ is large enough so that individual safety possible for either country (E2 & E3)
- Then equilibrium selection picks the country with the larger debt capacity, country A (E2)
Size benefit (2): Larger capacity $B_{t+1}^A$ of large country A

![Diagram showing the relationship between $f^A$, $f^B$, $b_t^A$, and $b_t^B$.]

- For large enough $B_{t+1}^A$ no-arbitrage violated (no E1). Why? Country B would have issue bonds at higher prices than country A.
- Individual safety does not involve such a no-arbitrage condition $\Rightarrow$ Selection rule picks country A with the larger debt capacity (E2).
- Supply of US safe assets rose from 2008-2010, leading to European bonds losing their safe asset status, precipitating a sovereign crisis.
Suppose countries receive some fiscale surplus $\theta^i = \theta B_{t+1}^i$ in addition to bond proceeds

This modification only affects default condition: $\theta B_{t+1}^i + f^i \leq b_t^i$

Negative shock to $\theta$ shifts out the orange dashed lines if large enough, E1 disappears and switch to E2, so country A’s bond price increases (negative beta)
Large debt size can be a burden: Low global funding $f$

- Suppose global savings $f$ are small compared to average debt sizes $b_t^i$.
- When $f$ is small enough:
  - Joint safety disappears (E1), but also
  - Individual safety for country A disappears (E2), and only country B can possibly be safe (E3)
Conclusion

- Safety is endogenous: when investors believe an asset is safe, their actions can make that asset safe

- We analyzed this multiple equilibrium by assuming a Pareto equilibrium selection rule
  [In full paper He et al 2015, heterogeneous signals (i.e., a global game) will help narrow down the possible equilibria]

- Main result: there can be benefits (in terms of a higher chance of being the safe asset) from
  1. Large absolute initial debt size
  2. Large absolute safe debt capacity

- Large initial debt size can be a burden in a low funding world

- Interpret some of the safe asset shifts from 2008 to 2010 through lens of shifting equilibrium