

# What makes US government bonds safe assets?

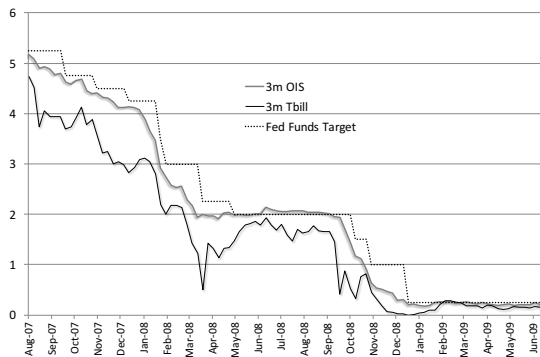
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# Motivation



- ▶ 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  $b_t^i$ , debt to be issued today  $b_{t+1}^i$
- ▶ *Absolute safe debt capacity*:  $B_{t+1}^i$
- ▶ Assume that each country issued up to capacity,  $b_{t+1}^i = B_{t+1}^i$   
[in full paper, noise makes each country want to issue to max]
- ▶ We assume A is the “large” country:  $B_{t+1}^A > B_{t+1}^B$
- ▶ Then default (and shutout from debt market going forward) if

$$p_t^i B_{t+1}^i \leq b_t^i$$

# Equilibrium conditions

▶ Let  $f^i \equiv p_t^i B_{t+1}^i$  be proceeds of country  $i$ 's bond issue

▶ Equilibrium conditions:

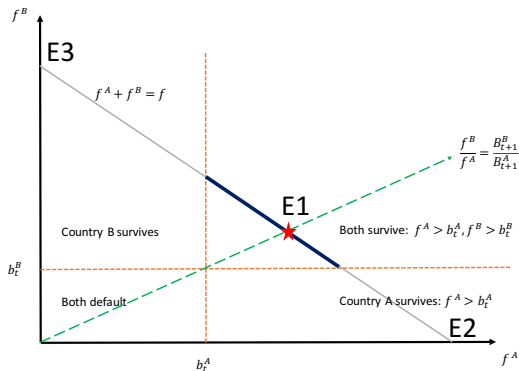
$$\begin{aligned} (1) : & \quad \text{no default if} & f^i & \geq b_t^i \\ (2) : & \quad \text{all funds invested} & f^A + f^B & = f \\ (3) : & \quad \text{no arbitrage} & & \\ & \quad \text{(if both survive)} & \frac{B_{t+1}^A}{f^A} & = \frac{B_{t+1}^B}{f^B} \end{aligned}$$

▶ Assume  $f \geq \min \{b_t^A, b_t^B\}$  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

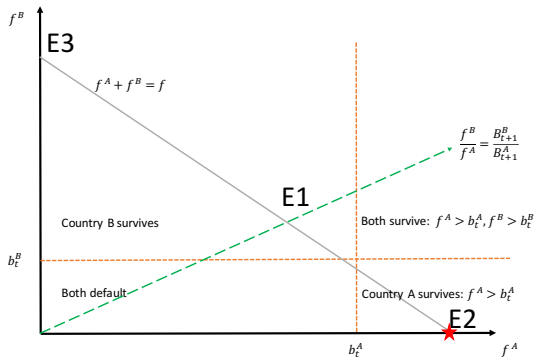


## Three possible equilibria:

1. Joint survival with  $\frac{f^B}{f^A} = \frac{B_{t+1}^B}{B_{t+1}^A}$
2. Only A survives with  $p_t^A = \frac{f}{B_{t+1}^A}$
3. Only B survives with  $p_t^B = \frac{f}{B_{t+1}^B}$

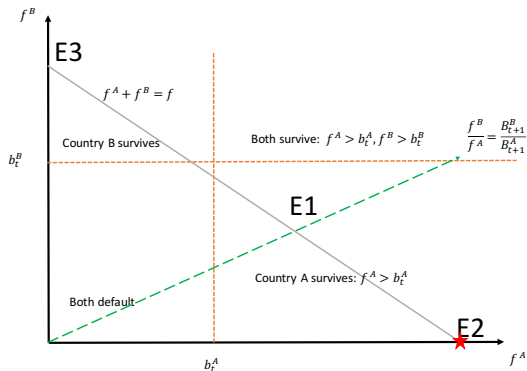
Pareto criterion gives equilibrium ordering  $E1 > E2 > E3$

## 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

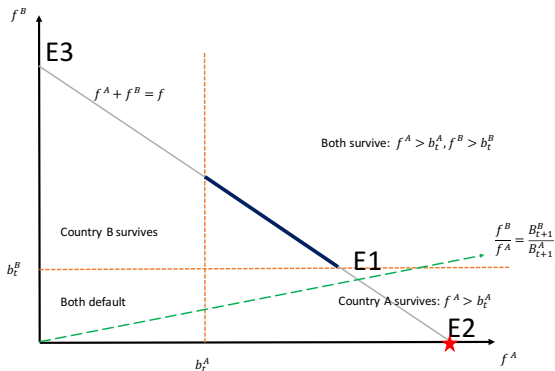
## Size benefit (1): Large initial debt $b_t^B$ of small country B



**Large initial debt  $b_t^B$  can be costly for the smaller country:**

- ▶ Suppose  $b_t^B$  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)

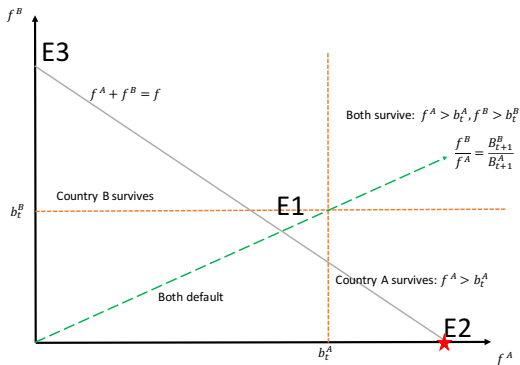
## Size benefit (2): Larger capacity $B_{t+1}^A$ of large country A



- ▶ 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

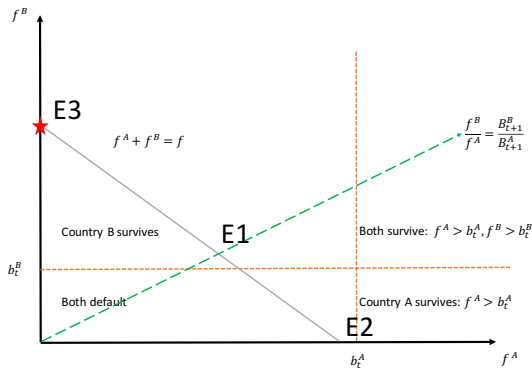


# Negative beta asset



- ▶ Suppose countries receive some fiscal 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, heterogenous 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