

CEPR-RIETI Workshop  
“Fiscal Sustainability”

Handout



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<http://www.rieti.go.jp/en/index.html>



# **Fiscal Sustainability and Self-Fulfilling beliefs**

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# Overview



- The basics
  - Sustainability of sovereign debt is something you can lose quickly
- Fundamental versus self-fulfilling problems
  - They are related
- The role of monetary policy
  - Solution or part of the problem
  - Conventional monetary policy
  - Unconventional monetary policy



# The Basics



$$D_{t+1} = (1+r) D_t - S_{t+1}$$

- $D$ : nominal government debt
- $S$ : the nominal primary surplus  
(revenues minus expenses before interest payments)
- $r$ : nominal interest rate



# The Basics



$$D_{t+1} = (1+r) D_t - S_{t+1}$$

Divide through by GDP ( $Y_{t+1}$ )

$$\begin{aligned} D_{t+1}/Y_{t+1} &= (1+r) D_t/Y_{t+1} - S_{t+1}/Y_{t+1} \\ &= (1+r)[D_t/Y_t][Y_t/Y_{t+1}] - S_{t+1}/Y_{t+1} \\ &= [(1+r)/(1+g)] D_t/Y_t - S_{t+1}/Y_{t+1} \end{aligned}$$



# The Basics



$$d_{t+1} \approx (1+r-g) d_t - s_{t+1}$$

With:

$$d_t = D_t / Y_t$$

$$s_t = S_t / Y_t$$

Everything is in real terms now



# The Basics



$$d_{t+1} \approx (1+r-g) d_t - s_{t+1}$$

- This formula is based on many simplifications, but
- There is an important lesson:

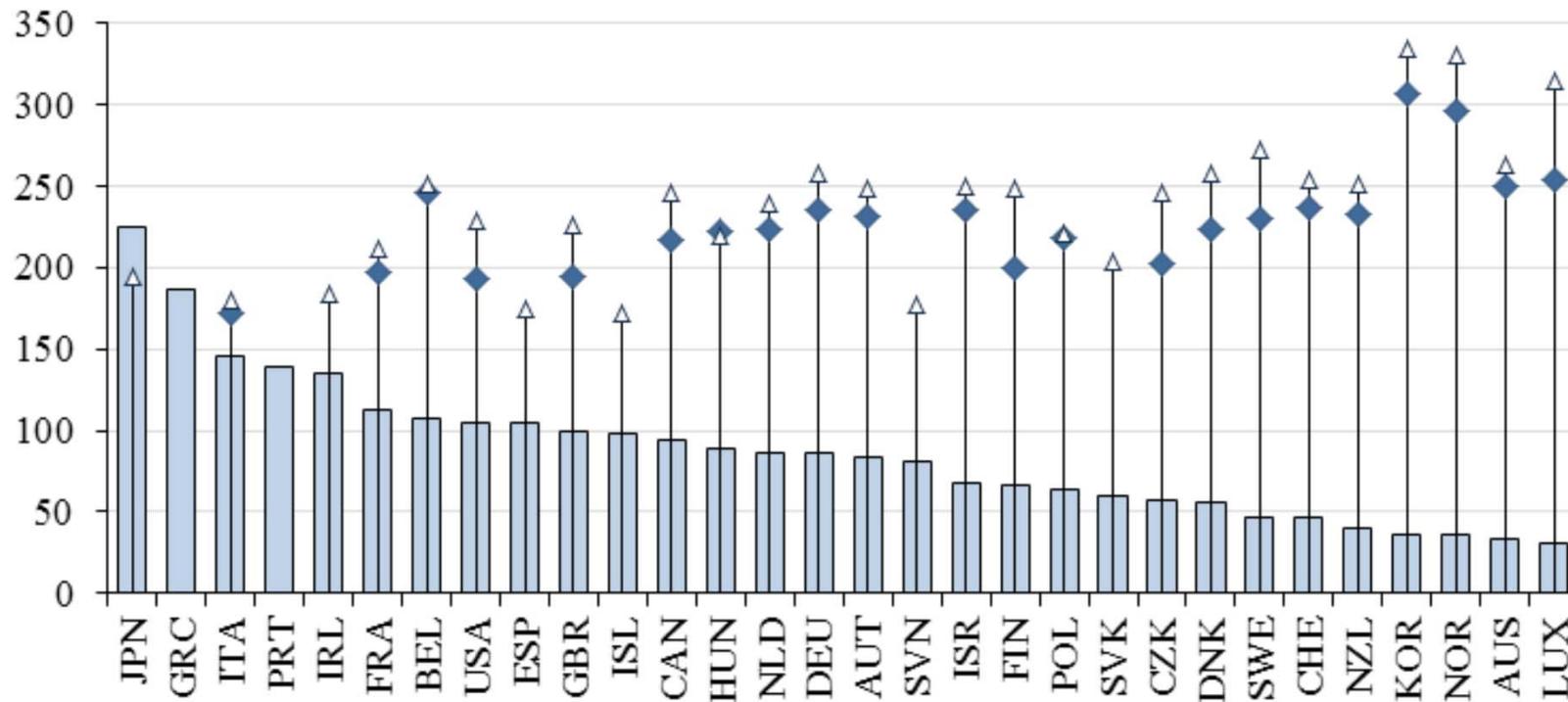
**If  $g$  is low relative to  $r$  then debt is unsustainable  
unless primary surplus is high enough**

# Debt Limits



■ Gross debt in 2013 
 ◆ Debt limit (model based interest rate) 
 △ Debt limit (current interest rate)

Per cent of GDP



Source: OECD (2015) & Fournier and Fall (2015)



Fundamental  
versus  
Self-fulfilling Problems



# When Does Debt Become Unsustainable?



## **I: Fundamental problems**

- Structural problems  $\Rightarrow$  low  $g$
- Low commitment to debt repayment  $\Rightarrow$  high  $r$
- Cyclical problems  $\Rightarrow$  low  $s$
- High initial debt  $\Rightarrow$  high  $r$



# When Does Debt Become Unsustainable?



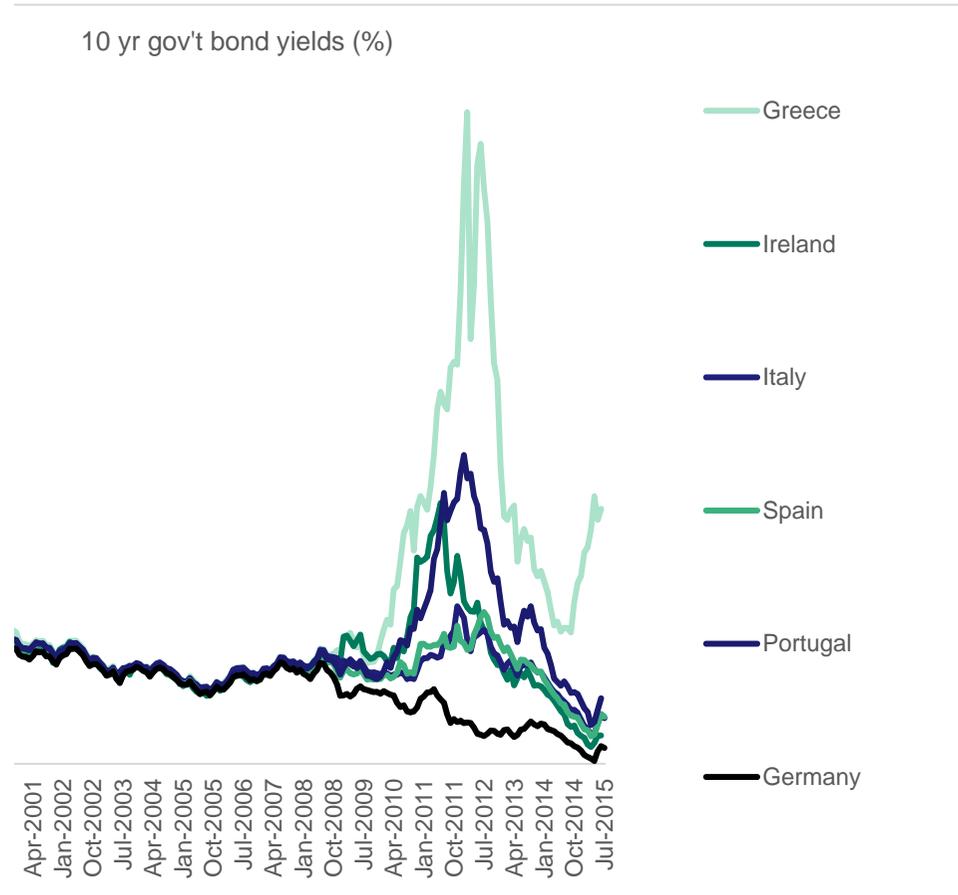
## II: Self-fulfilling problems

- Market loses confidence  $\Rightarrow$  high  $r$
- Debt increases  $\Rightarrow$  higher  $r \Rightarrow$
- Market loses confidence  $\Rightarrow$  etc

**Are these empirically relevant?**



# Fundamental or Sustainable Problem?



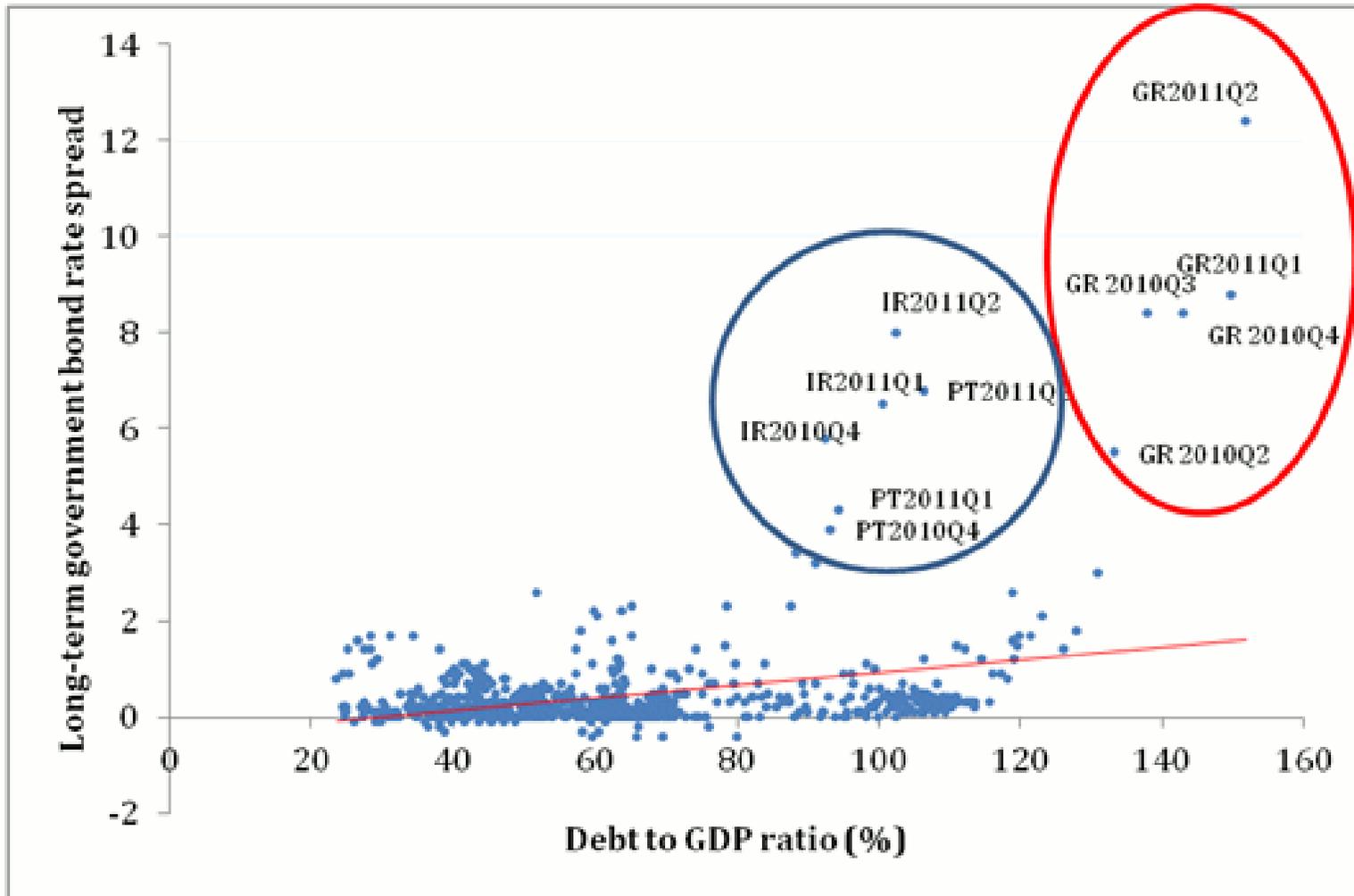


# Do Self-fulfilling Equilibria exist?



Mario Draghi (2012)

*“The assessment of the Governing Council is that we are in ... a ‘bad equilibrium’, namely an equilibrium where you may have **self-fulfilling expectations** that feed upon themselves and generate very adverse scenarios. So, there is a case for intervening, in a sense, to ‘break’ these expectations ...”*





# Monetary Policy



# Role of Monetary Policy & Unsustainable Debt

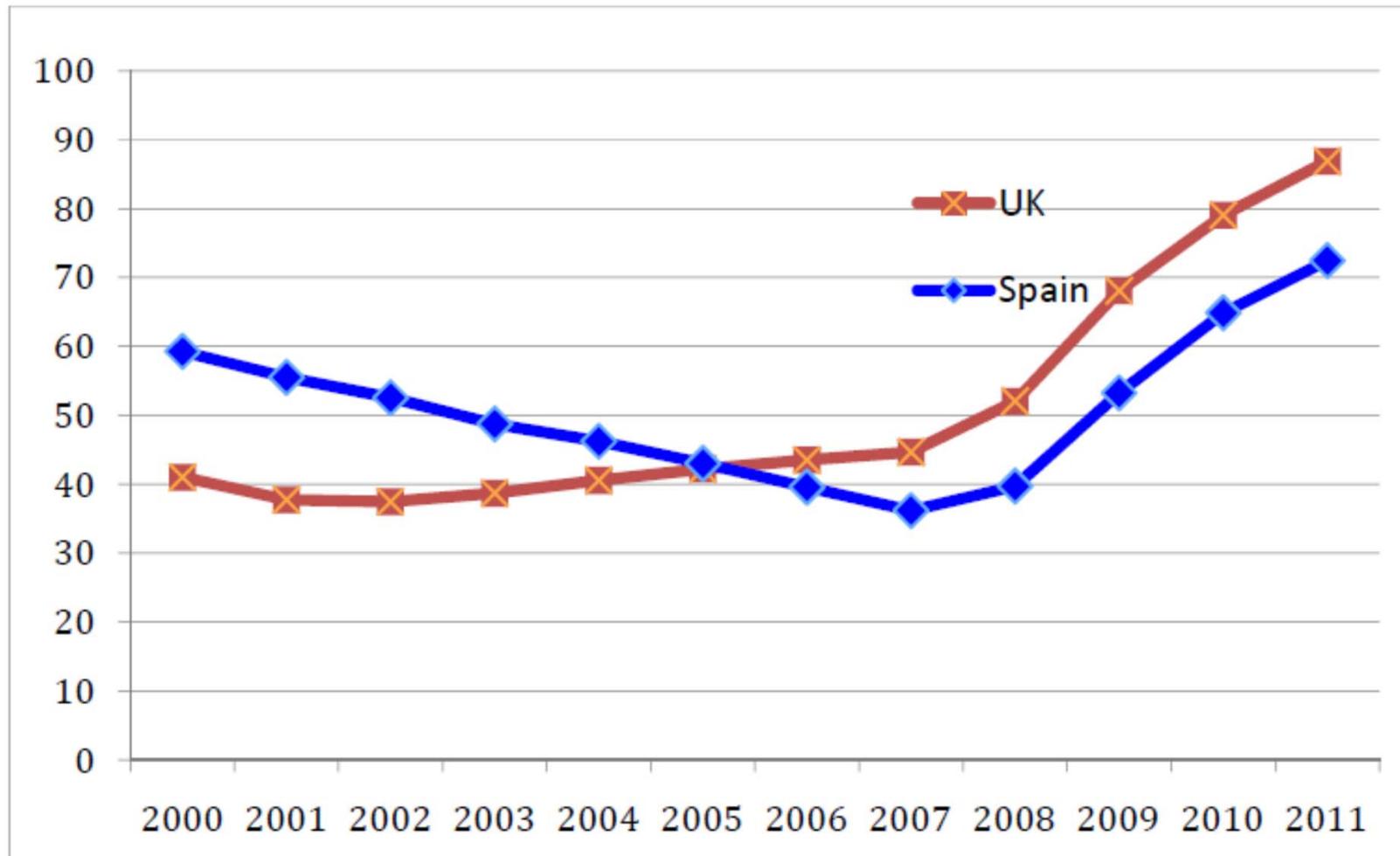


De Grauwe (2011)

*... the UK government is ensured that the liquidity is around to fund its debt. This means that investors cannot precipitate a liquidity crisis in the UK that could force the UK government into default. There is a superior force of last resort, the Bank of England”*

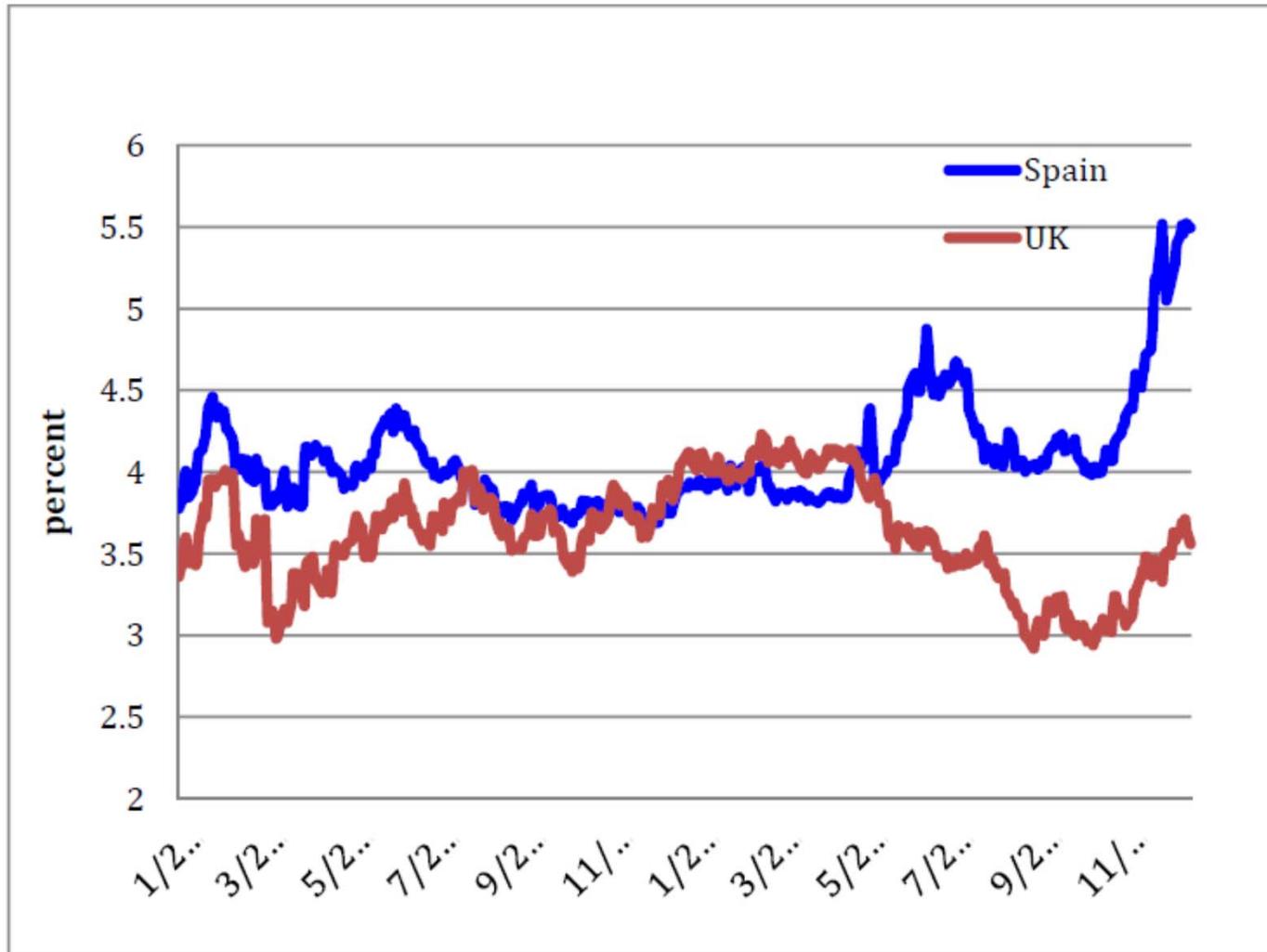


# Gross Government Debt (%GDP)





# 10-year sovereign debt yield





# Role of Monetary Policy & Unsustainable Debt



Krugman (2011)

*“Many people now accept the point ... that ... countries that have given up the ability to print money become vulnerable to self-fulfilling panics in a way that countries with their own currencies aren’t ...”*



# Role of Monetary Policy & Unsustainable Debt



- Traditionally Monetary Policy was thought to be the problem!
- Conventional Monetary Policy
- Unconventional Monetary Policy



# Role of Monetary Policy & Unsustainable Debt



## **Key papers in the literature:**

- Calvo (1988)
- Corsetti and Dedola (2014)
- Hall and Reis (2015)



# Monetary Policy Solution or Source of Problem



Calvo (1988)

*“... The possible empirical relevance of the non-uniqueness issue becomes apparent when examining the role of interest-bearing government debt. ... Will ... debt be paid off in full, will the government find it optimal to resort to higher inflation or currency devaluation to diminish the burden of the debt, etc.?”*



# Monetary Policy

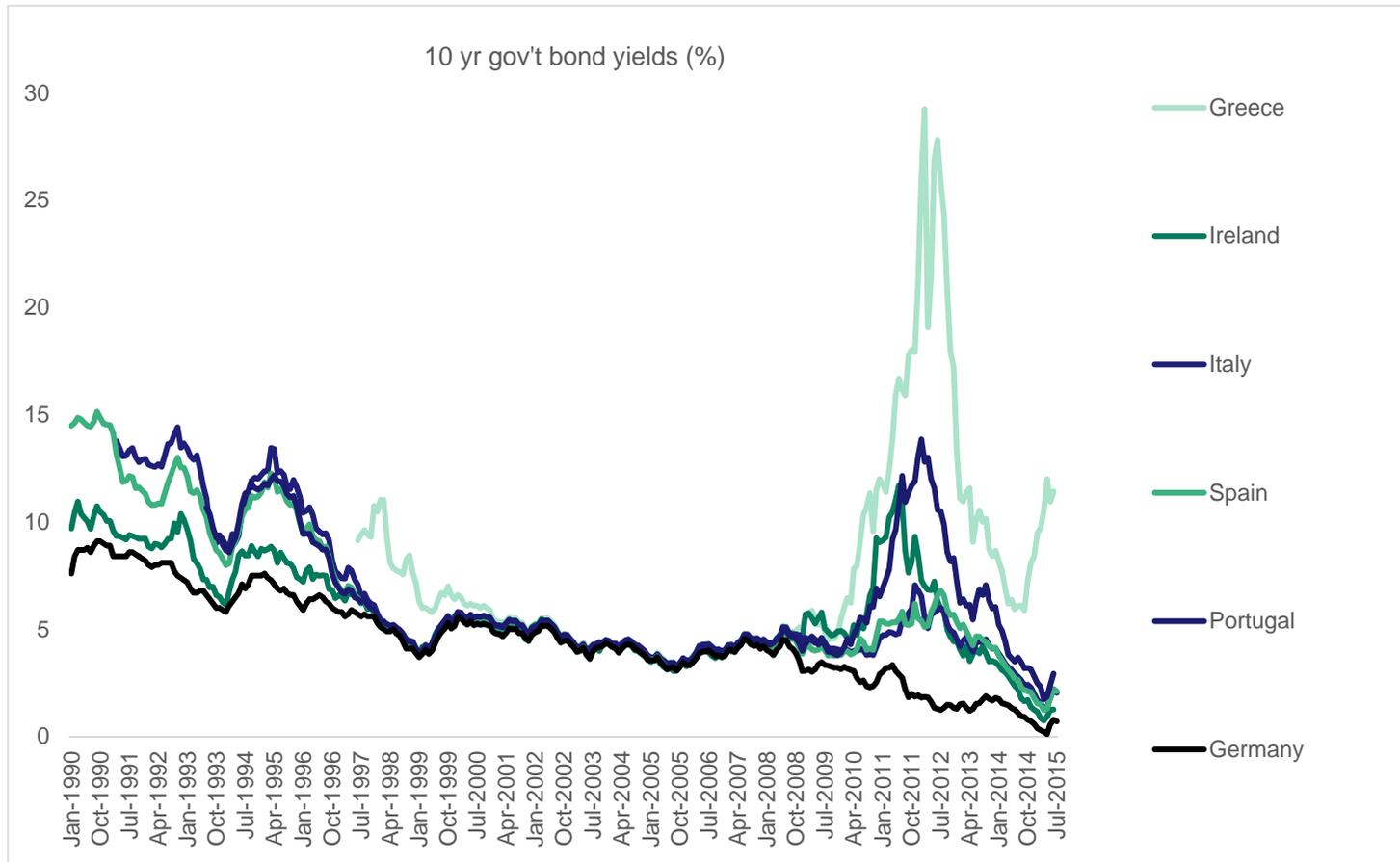
## Solution or Source of Problem



- Unpredictable monetary policy was believed to be important for risk premia and high interest rate
- $\Rightarrow$
- Independent monetary policy can be source of unsustainable debt



# Monetary Policy: Problem or Solution?





# Calvo (1988)

## Easy to Get Self-fulfilling Crises

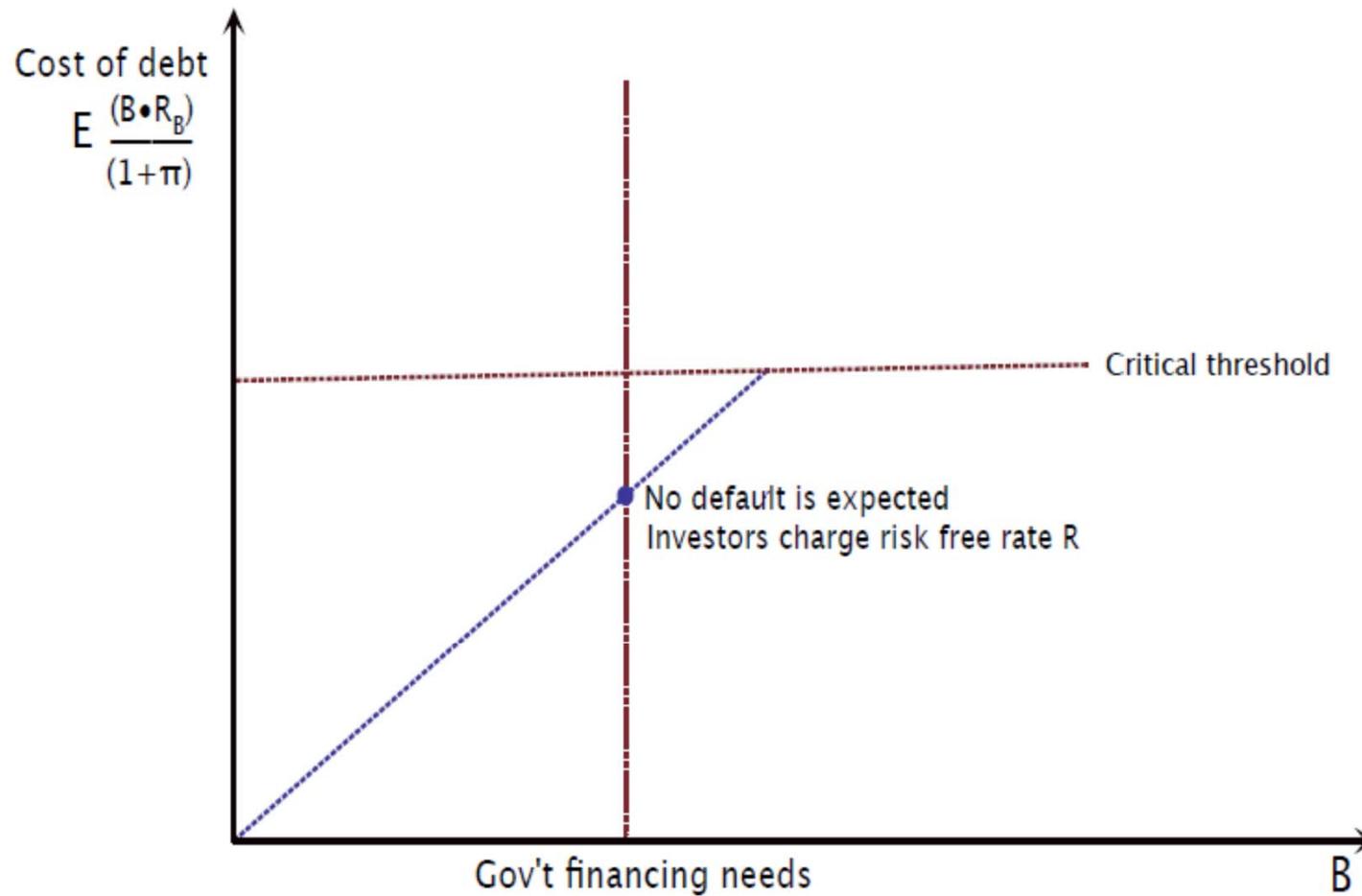


### Setup:

- Simple two-period model
- No commitment: Government reoptimizes in period 2
- Rational investors
- Financing need government =  $B$
- Interest Rate =  $R$

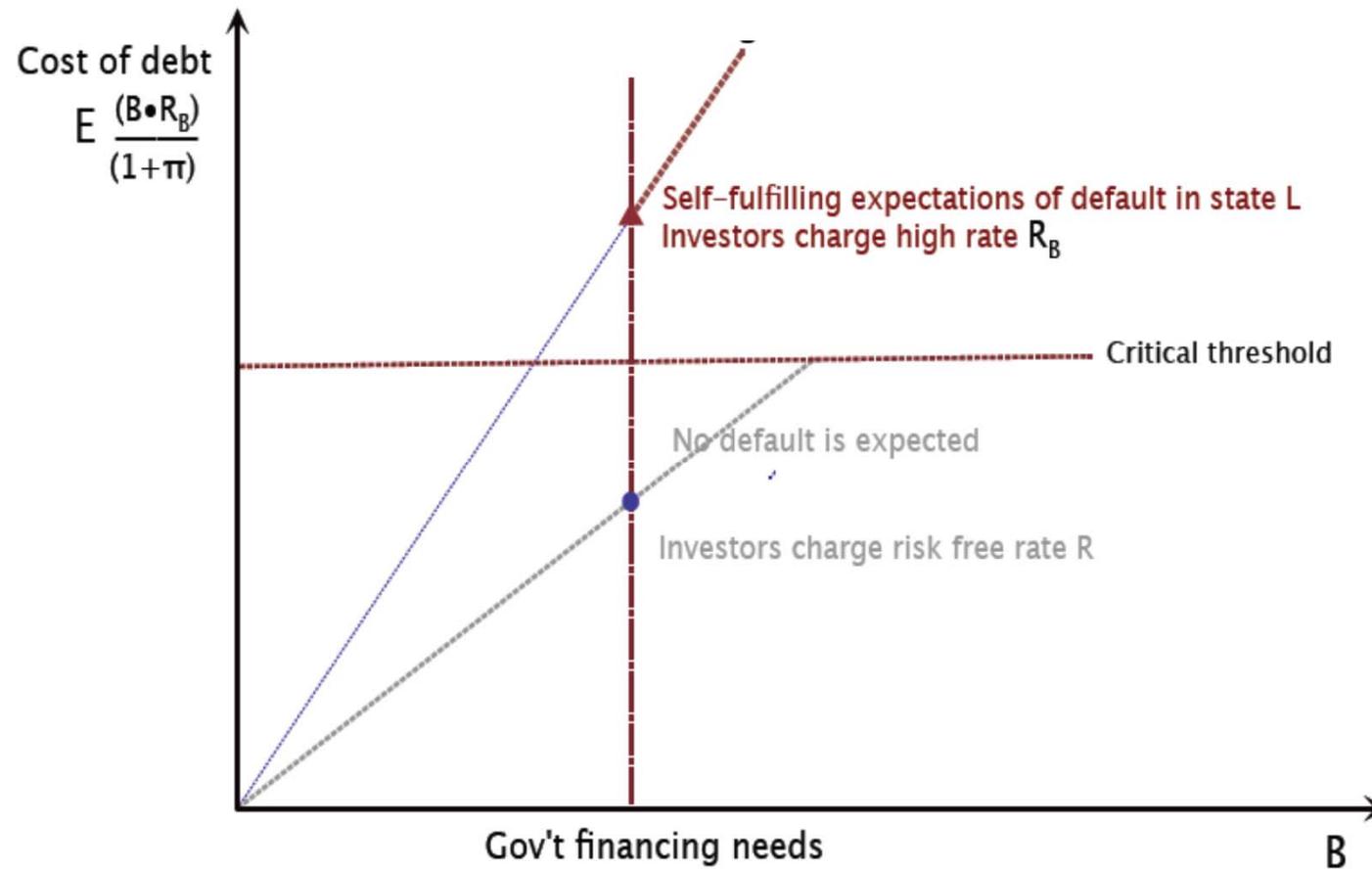


# Calvo (1988) No Default Equilibrium





# Calvo (1988) No Default Equilibrium





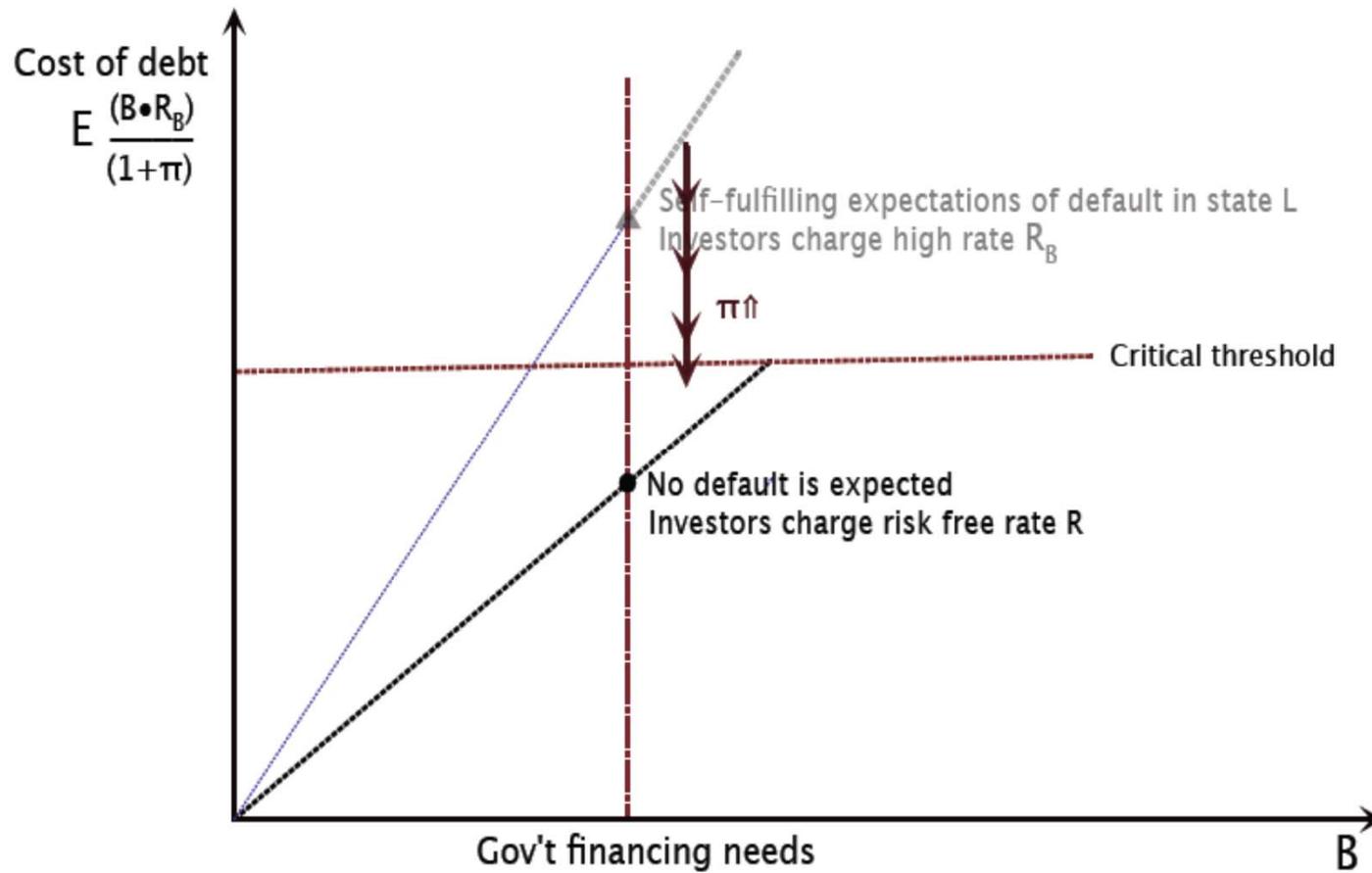
# Conventional Monetary Policy



# Calvo (1988)



## No Default because of Mon. Policy





# Inflating Debt & Eliminating Self-fulfilling Panics



- Inflation must be unexpected
  - More likely if debt is long-term and issued during tranquil times
- The probability of government doing this (ever) must be low. If not, then investors would demand risk premium



## Inflating Debt versus Regular (Partial) Default



- Even small partial default may have large fixed cost
- Small partial default *through inflation* probably not very costly
- Inflation means default on **all** debt, that is sovereign and private  
⇒  
Inflation risk will increase yields on **all** debt



# Monetary Policy & Eliminating Self-fulfilling Panics

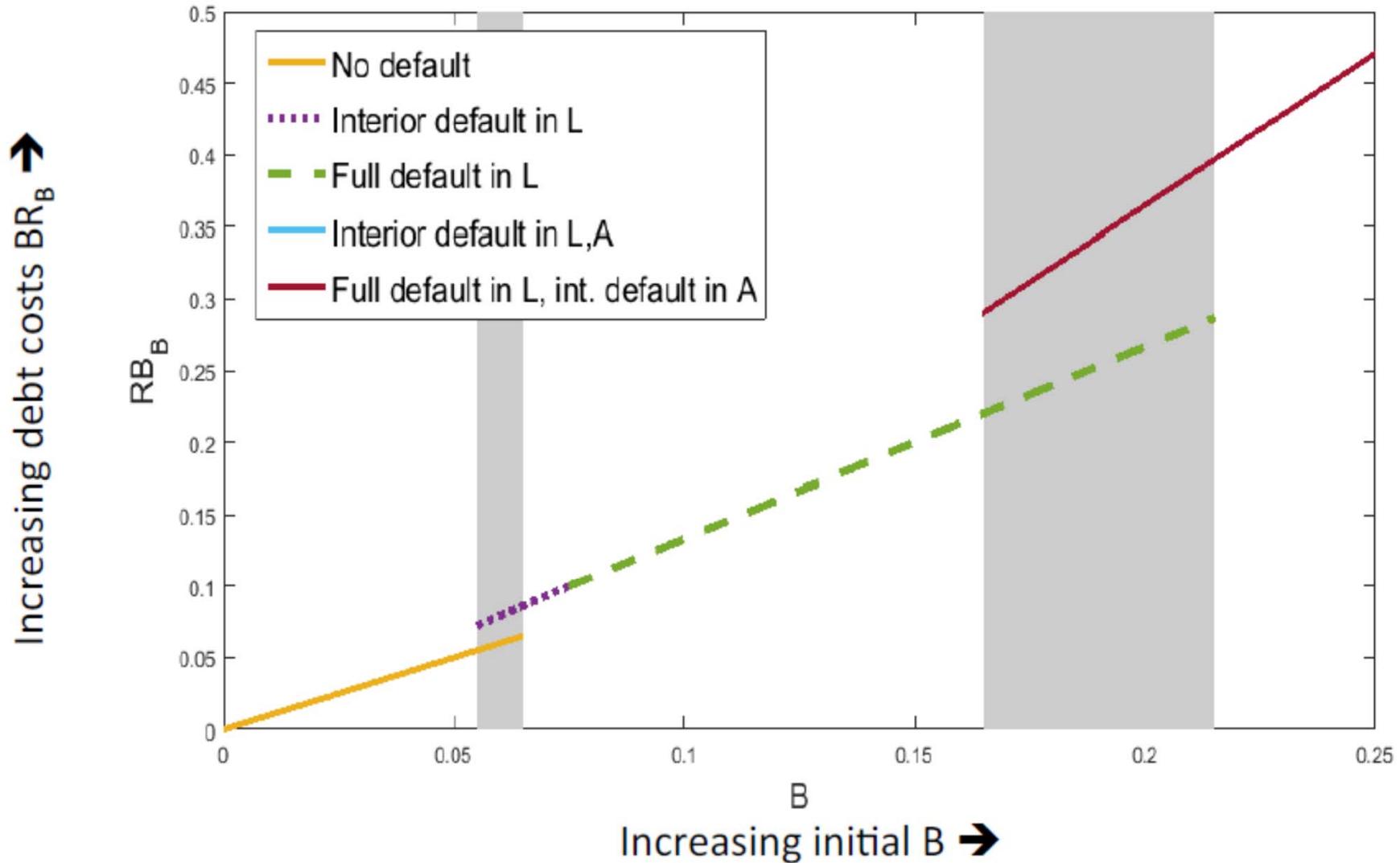


Corsetti & Dedola (2014)

- Default because of self-fulfilling **and** fundamental reasons
- 3 aggregate states:
  - Expansion
  - Recession
  - Severe recession
- In period 2, government only reoptimizes with probability  $\gamma$   
 $\Rightarrow$  only self-fulfilling panic when fundamentals bad and/or government debt high

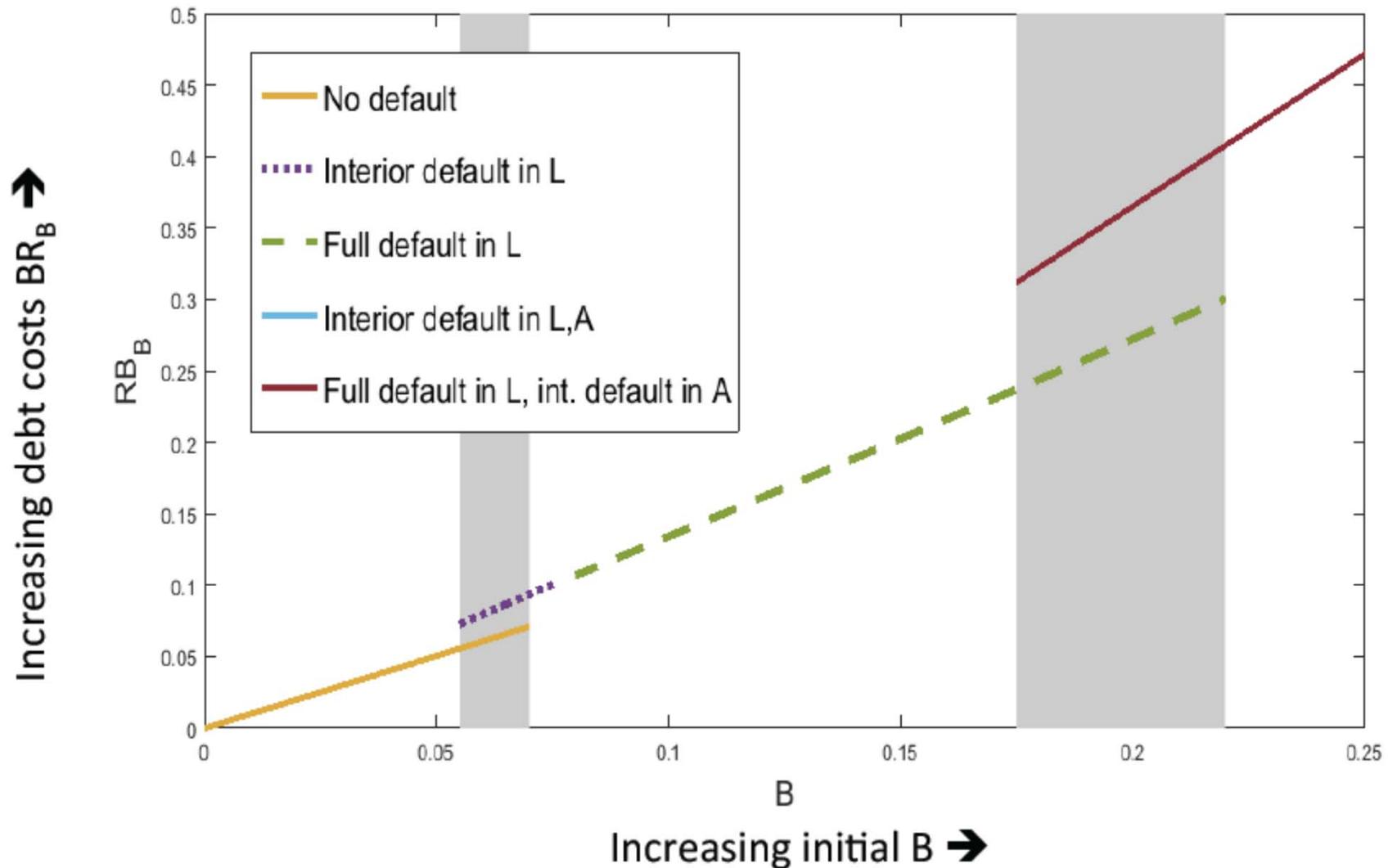


# Corsetti and Dedola (2014) No Monetary Policy





# Corsetti and Dedola (2014) Optimal Discretionary Monetary Policy





# Monetary Policy & Eliminating Self-fulfilling Panics



**Conclusion:** Inflation possibility does not eliminate multiplicity

## **Why so little change?**

- Agents are rational & inflation is costly

## **Why any change?**

- Default and inflation are both distortionary, but there are advantages of smoothing these distortions



# Unconventional Monetary Policy



# Unconventional Mon. Pol. Defined



Unconventional Monetary Policy  $\equiv$  Gov. Bond purchases

- Total liabilities of government (i.e. bonds + reserves) unchanged
- So why would this make any difference?
- Bonds  $\neq$  reserves. Why?
  - Default risk different for bonds and reserves
  - Interest rate could be different



# Unconventional Mon. Pol. at Zero-Lower Bound



- Suppose
  - i. Reserves are risk free and
  - ii. Economy is at zero-lower bound (ZLB)
- $\Rightarrow$  interest rate on gov. bonds  $\approx$  interest rate on reserves
- $\Rightarrow$  unconventional monetary policy replaces **risky** government debt by **risk-free** asset with similar rate of return
- $\Rightarrow$  default equilibrium can disappear for sufficiently large bond purchases



# Unconventional Mon. Pol. outside Zero-Lower Bound



- Suppose
  - i. Reserves are risk free and
  - ii. Central bank pays interest on reserves
- $\Rightarrow$  interest rate on gov. Bonds (without default premium)  $\approx$  interest rate on reserves
- $\Rightarrow$  unconventional monetary policy replaces **risky** government debt by **risk-free** asset with similar rate of return
- $\Rightarrow$  default equilibrium can disappear for sufficiently large bond purchases



## Too Good to be True?



- If multiplicity can be broken by unconventional monetary policy
- $\Rightarrow$
- Central banks should always engage in unconventional monetary policy



## What is the Tricky Bit?



- Key in previous discussion is that central banks do not default
- Is that true?
- What happens if central banks have negative equity?



# Central Banks & Negative Equity



## Two views

1. Central banks cannot have negative equity  
⇒ central bank may default or  
⇒ government recapitalizes central bank
2. Negative equity not a problem

## Implied consequences

1. Default is not different unless this introduces a commitment mechanism for the government not to default
2. No default if central banks can have negative equity?



# Central Banks & Negative Equity



Central bank balance sheet after default:

Assets		Liabilities	
Government Bonds	0	Reserves	1000
		Equity	-1000

Is there a problem?

- Central banks can no longer reduce reserves in the usual way, that is by selling government bonds
- $\Rightarrow$ 
  - there could be default by inflation
  - required reserves  $\uparrow$ , which is similar to default



# Central Banks & Negative Equity



Should we worry about central banks getting negative equity?

Hall and Reis (2015):

- **FED (no default risk):** *There is risk for the FED losing the ability to stabilize prices given the historical volatility of interest rates and bond prices.*
- **ECB (with default risk):** Little risk as long as default risk is priced into the bonds (that is, bonds can be bought cheaply).
- **CBs with exchange risk:** Here the situation is more problematic and it is important for such central banks to retain earnings during good times



# References



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