Sovereign Debt Crisis

Module 2: The Eurozone Crisis

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Introduction

Three big questions

- **Trigger** — what turned trade imbalances into a crisis?
- **Propagation** — why did it spread and escalate?
- **Resolution** — what finally stopped it?

Two competing readings

(i) Incomplete monetary union $\Rightarrow$ more institutional integration required

(ii) Lack of discipline $\Rightarrow$ more rules and self-responsibility required

"Europe will be forged in crises, and will be the sum of the solutions adopted for those crises."

— Jean Monnet

Crisis narrative (Policy Insight 85)

- Build-up: current account imbalances, misallocated capital flows
- Triggers: US subprime + Greek deficit $\Rightarrow$ sudden stop within EMU
- Failed responses: austerity $\rightarrow \uparrow$D/GDP $\rightarrow \uparrow$spreads
- Contagion: sovereign crisis + diabolic loop
- Denouement: ECB *whatever-it-takes* + banking union

Outline

2. A sudden stop — in a monetary union?
3. A (self-fulfilling) debt crisis?
4. The bank-sovereign *diabolic loop*

2. Sudden Stop in a Monetary Union

What is a sudden stop?

- Balance of payments identity: $CA + KA = 0$
  - $\Rightarrow$ Any current account deficit must be financed by capital inflows
  - $\Rightarrow$ BoP crisis: a country can no longer borrow to finance its CA deficit
- A **sudden stop**: sharp, rapid reversal of capital inflows
  - $\hookrightarrow$ Usually triggers banking *and* currency crisis together
  - $\hookrightarrow$ EM episodes: Mexico 1994, South-East Asia 1997, Russia 1998
- Self-validating dynamics:
  - $\rightarrow$ Capital inflows $\rightarrow$ fuel growth and debt $\rightarrow$ attract more inflows
  - $\rightarrow$ Reversal $\rightarrow$ triggers contraction $\rightarrow$ triggers further reversal

Refs: Merler & Pisani-Ferry (2012, Bruegel); Calvo, Izquierdo & Mejia (2004)

2. Sudden Stop in a Monetary Union

A common currency was supposed to make this impossible

- Sudden stops classically require a currency to break
- The canonical view — *One Market, One Money* (EC, 1990):

"A major effect of EMU is that balance-of-payments constraints will disappear (...) Private markets will finance all viable borrowers, and savings and investment balances will no longer be constraints at the national level."

↪ Within a currency zone, nationality does not matter — only borrower solvency

↪ There is no Bavarian or Hamburger budget constraint in Germany

↪ The banking system and the CB smoothly allocate flows between regions

⇒ **Did it happen anyway?**

2. Sudden Stop in a Monetary Union

CA figures look smooth — but rewrite the BoP

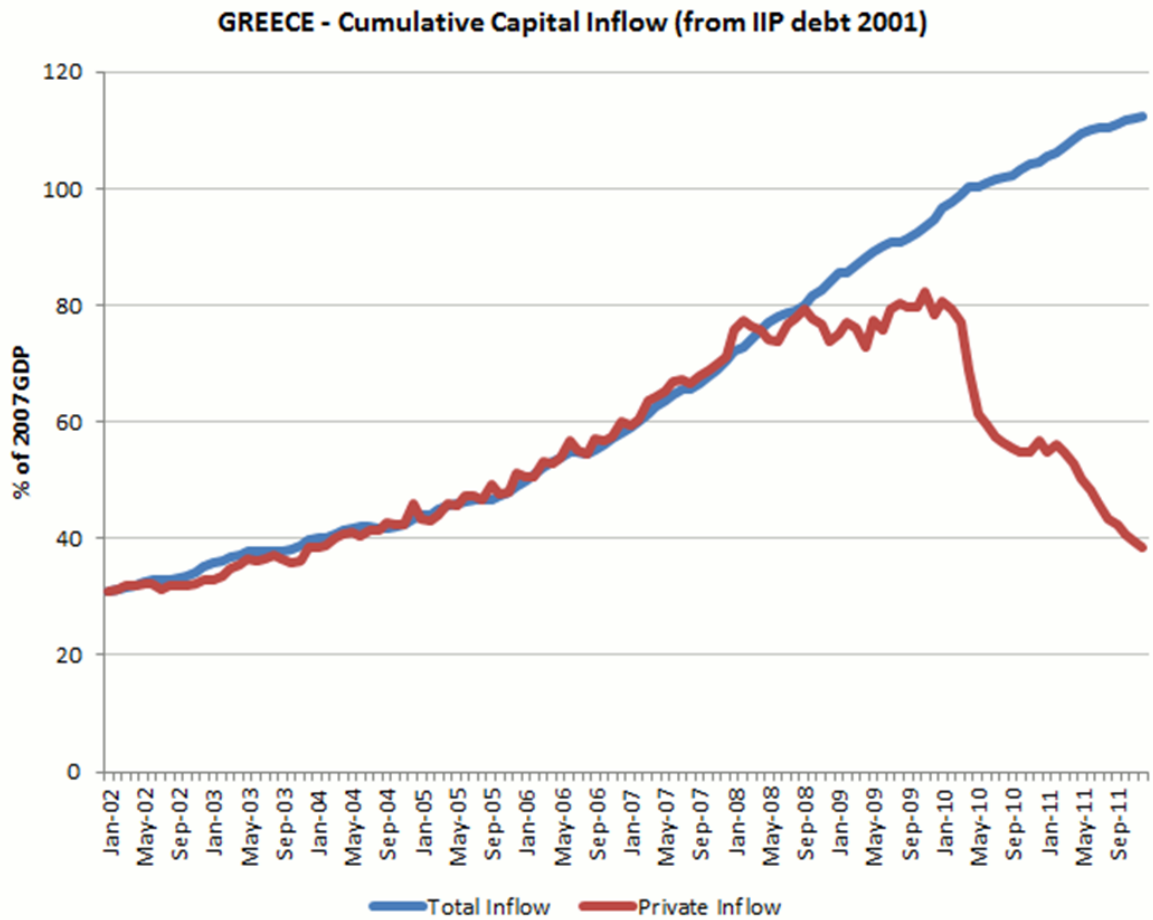
$$CA + \underbrace{PKA}_{\text{private}} + \underbrace{T2 + PGM + SMP}_{\text{public}} = 0$$

- $T2$: Target 2 inflows (ECB settlement system)
- PGM: EU/IMF assistance programmes
- SMP: ECB bond purchasing programme

Private capital fled; public flows silently replaced it.
The single currency did not prevent the sudden stop — it changed *who* absorbed it.

2. Sudden Stop in a Monetary Union

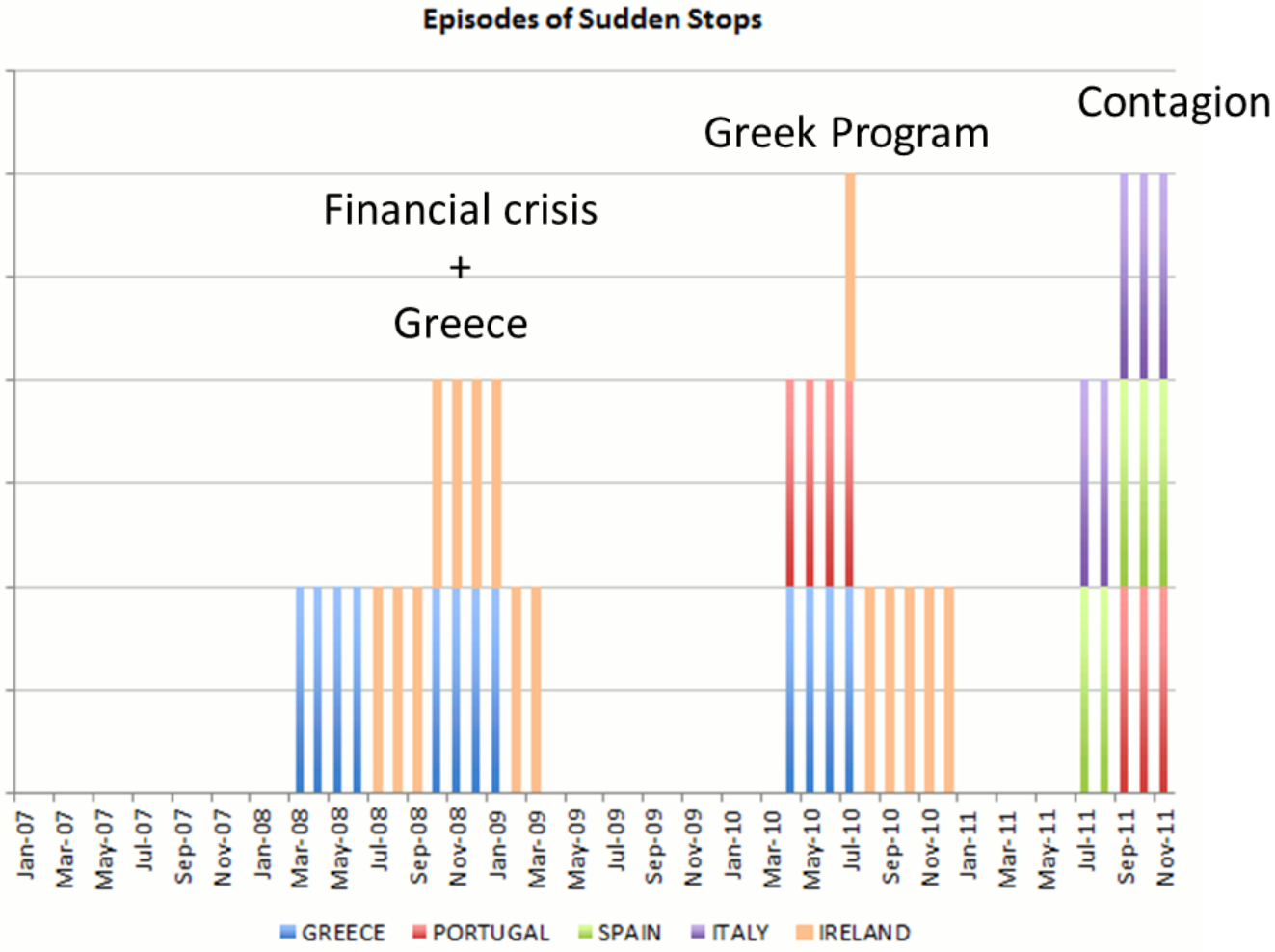
Greece: private outflows replaced by public inflows



Source: Merler & Pisani-Ferry (2012, Bruegel).

2. Sudden Stop in a Monetary Union

Cluster and contagion



Source: Merler & Pisani-Ferry (2012, Bruegel)

2. Sudden Stop in a Monetary Union

Three structural reasons

i. More a fixed exchange rate than an integrated area

   ↪ Redenomination risk made periphery assets effectively "foreign" for core investors

ii. The role of national banks and market segmentation

   ↪ Core banks reduced exposure to periphery risk — retreated home

   ↪ National supervision, national guarantees ⇒ national risk appetite

iii. Erratic political governance

   ↪ No credible backstop, no decisive institution

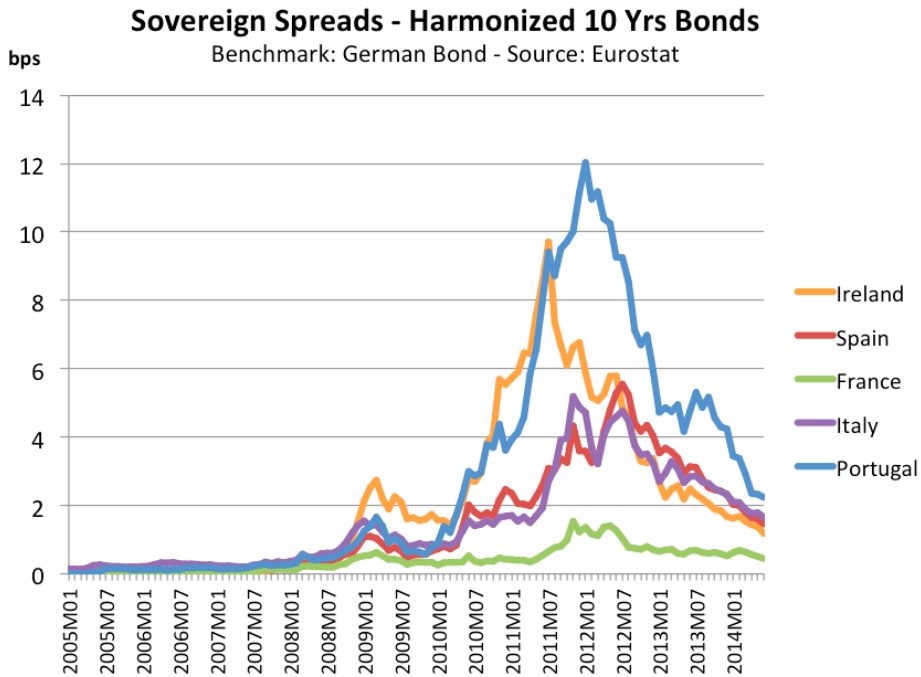
   ↪ Speculation fed on the uncertainty of "last-minute meetings of ultimate chance"

⇒ The sudden stop explains the *trigger*. But why did spreads keep rising long after? Could the crisis have been self-fulfilling?

Ref: Eichengreen & Wyplosz, *How the euro crisis was successfully resolved*, VoxEU

3. Self-Fulfilling Debt Crisis

Spread behaviour 2010–2012



... a common factor drives risk simultaneously across countries — difficult to explain by country-specific fundamentals alone ...

↪ What is a *self-fulfilling* debt crisis?

↪ Was it self-fulfilling in the Eurozone?

3. Self-Fulfilling Debt Crisis

Self-fulfilling when...

... economic outcomes are sensitive to *sentiment*, not only economic fundamentals ...

3. Self-Fulfilling Debt Crisis

A self-fulfilling debt crisis when...

- The price of government debt is sensitive to investors' sentiment:

↪ If investors are optimistic: low interest rate ⇒ no default ✓

↪ If investors are pessimistic:
  - they charge a high interest rate ...
  - ... leading to default if the country is hit by a negative shock ...
  - ... which *justifies* the initial increase in the interest rate !

⇒ No irrationality required to generate self-fulfilling crises.

Refs: Calvo (1988); Camous & Cooper

3. Self-Fulfilling Debt Crisis

Formally: a game between investors and the government

Consider a two-period economy:

- Today
  - The government issues debt b
  - Investors form beliefs about default $P(d)$ and charge rate $(1+i)$:

$$(1+i)\big(1-P(d)\big) = R$$

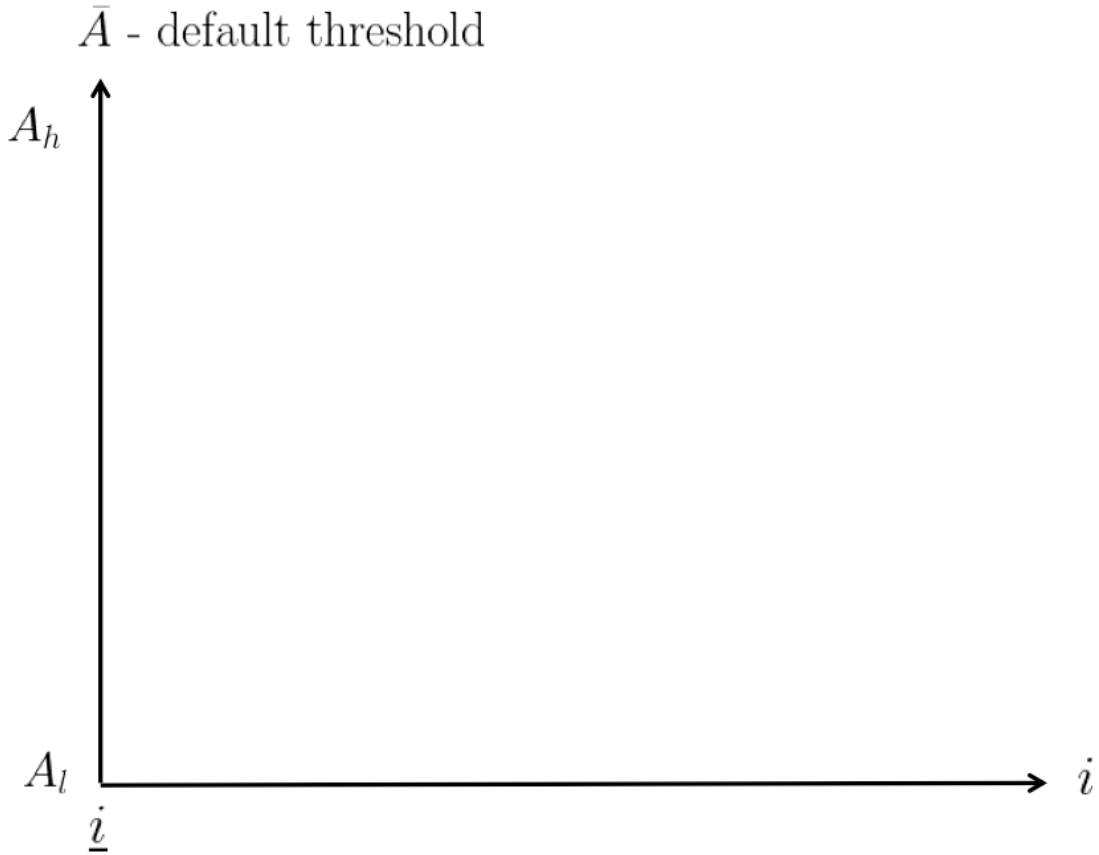
- Tomorrow, given $(1+i)b$ and income realisation $A \sim [A_l, A_h]$:
  - $\rightarrow$ Repay: raise labour taxes $\Rightarrow$ welfare $W^r(A, i, b)$
  - $\rightarrow$ Default (costly): welfare $W^d(A, i, b)$

$$\Delta(\cdot) = W^d(\cdot) - W^r(\cdot)$$

  - $\Rightarrow$ Default is optimal only when A is low (repayment cost is high)

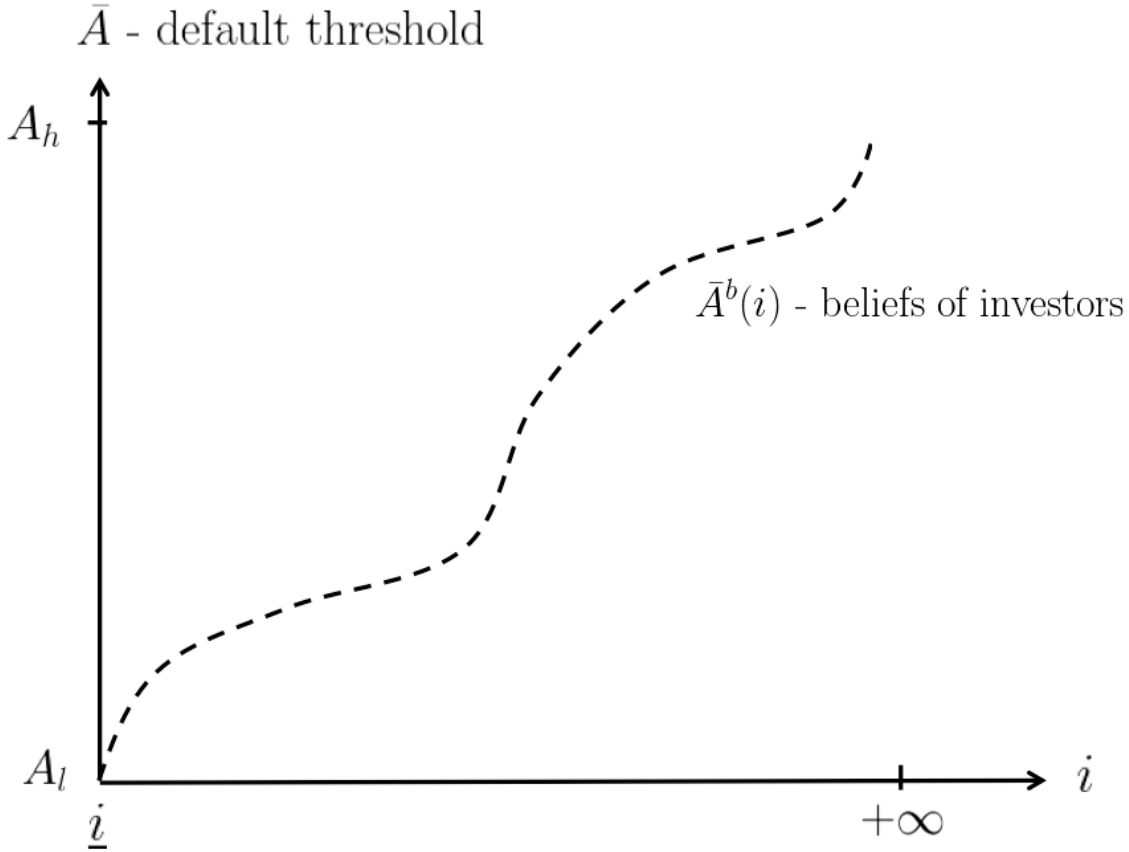
3. Self-Fulfilling Debt Crisis

Graphically



3. Self-Fulfilling Debt Crisis

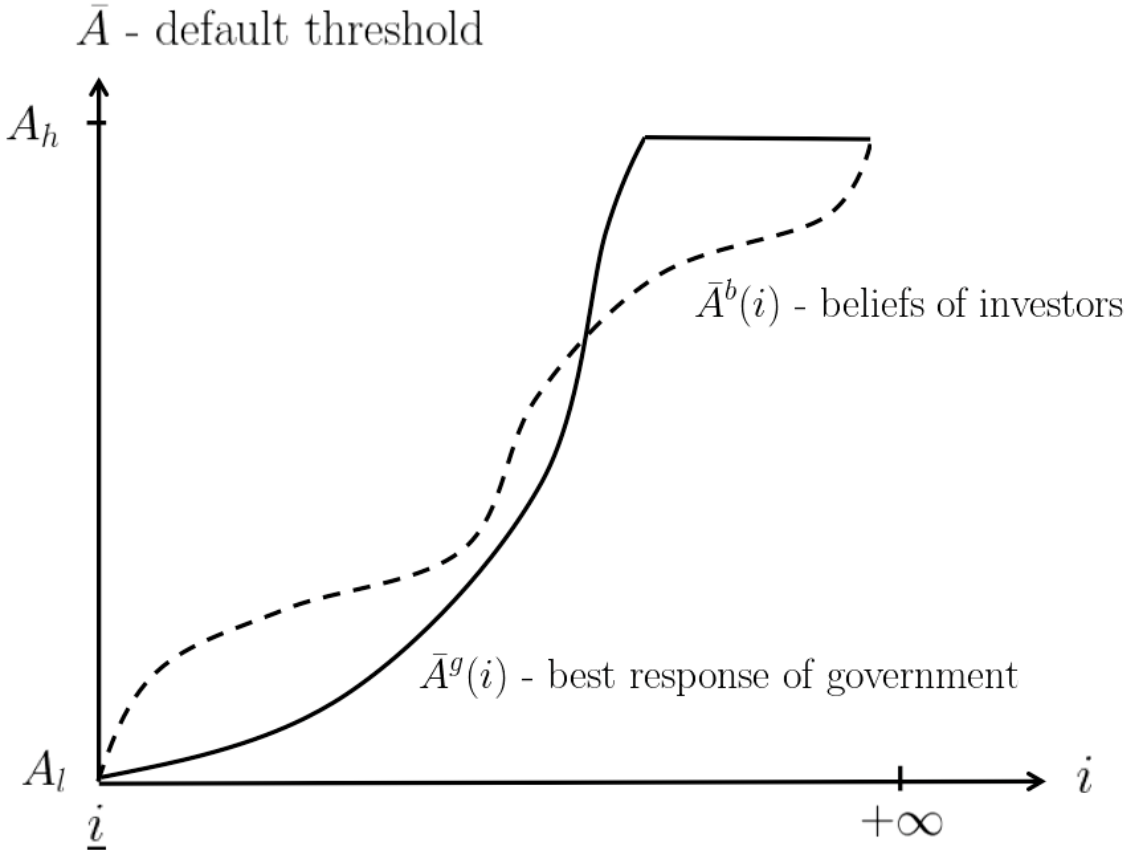
Investors form beliefs about $P(d)$ and charge $(1+i)$



$$(1+i)\big(1-P(d)\big)=R$$

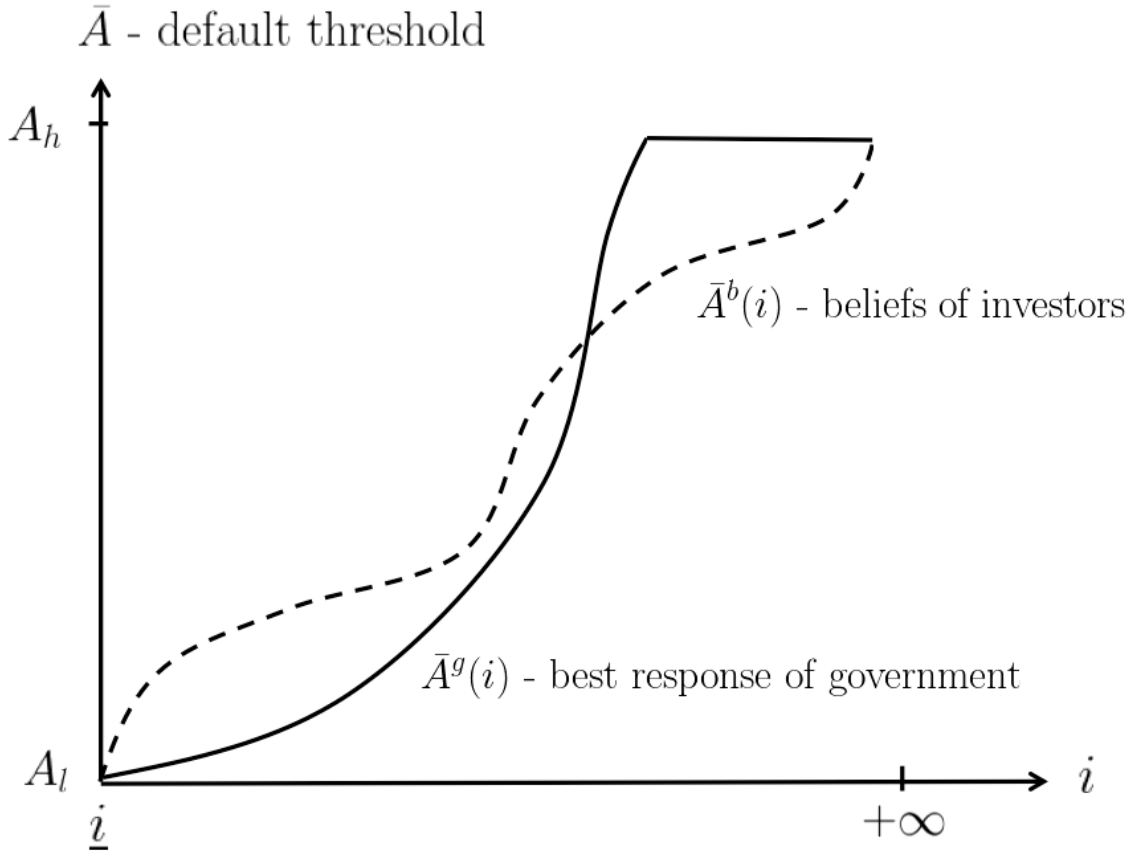
3. Self-Fulfilling Debt Crisis

The higher i, the higher the incentives for Gov to default



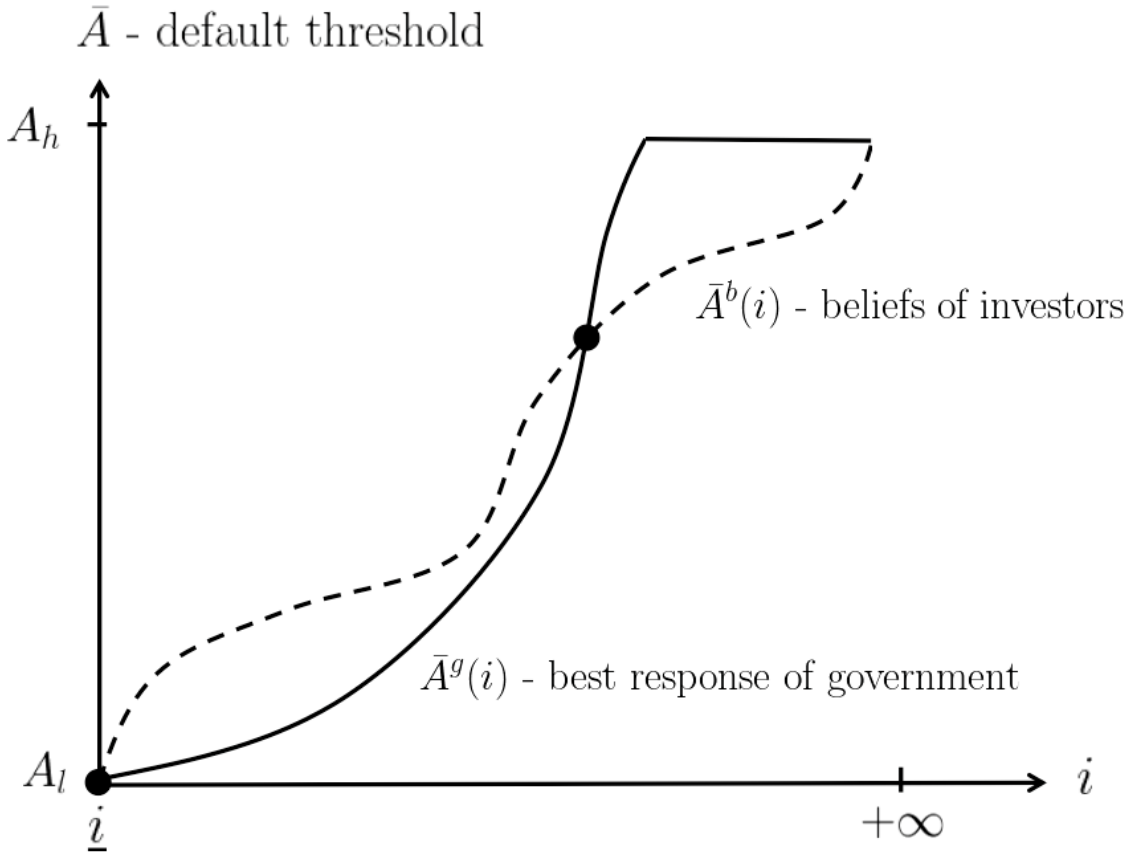
3. Self-Fulfilling Debt Crisis

In equilibrium, beliefs are rational: $P(d) = F(\bar{A})$



3. Self-Fulfilling Debt Crisis

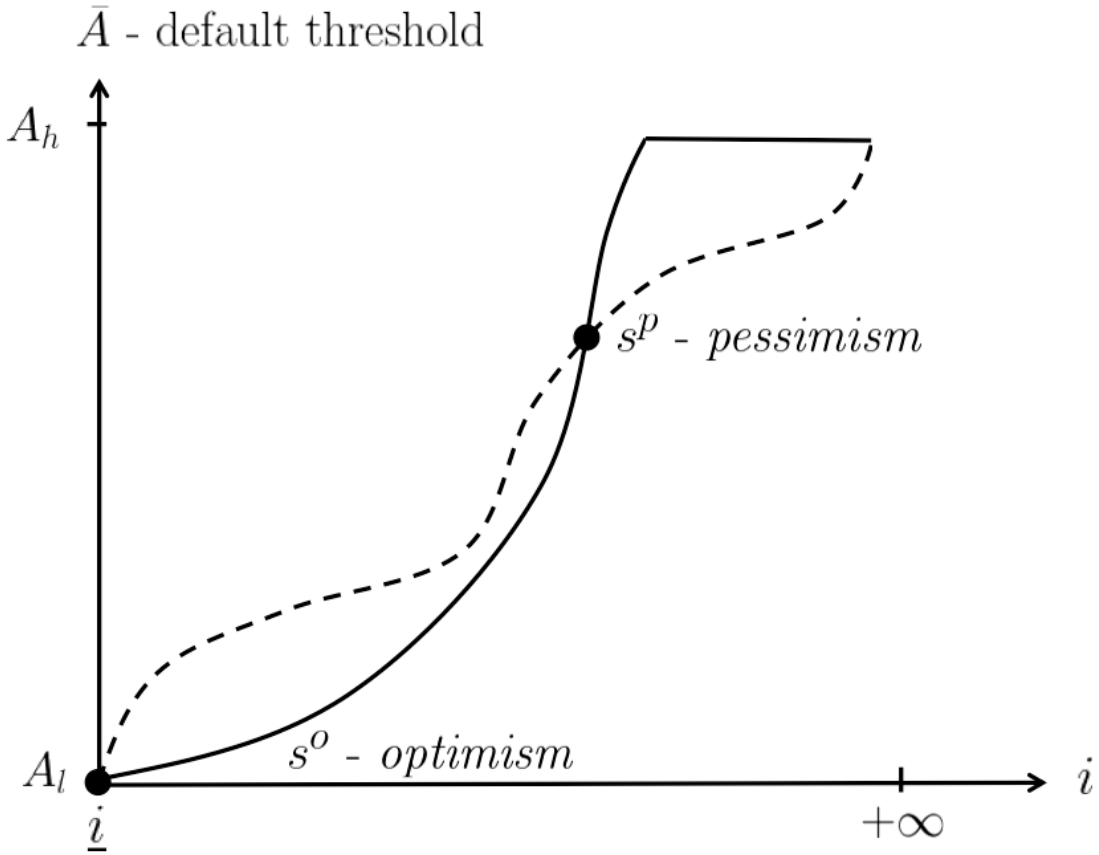
Multiple equilibria: good and bad



For an intermediate range of fundamentals, both a low-spread and a high-spread equilibrium are consistent with rational expectations.

3. Self-Fulfilling Debt Crisis

The sunspot: optimism or pessimism as a coordination device



Sunspot s captures investor sentiment. Which equilibrium prevails is determined by expectations alone — not by fundamentals.

3. Self-Fulfilling Debt Crisis

Was it self-fulfilling? — The policy stakes

Illiquid vs. *insolvent* — two very different implications:

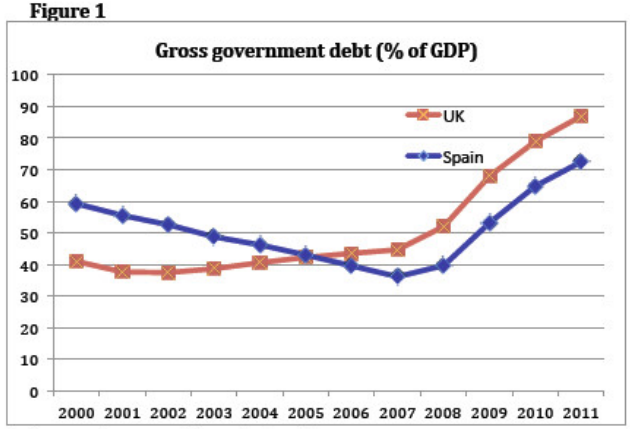
→ Not self-fulfilling: spread rise reflects fundamentals ⇒ need fiscal adjustment

→ Self-fulfilling: need an institution to rule out the bad equilibrium

→ Can be 50/50 — both implications hold simultaneously

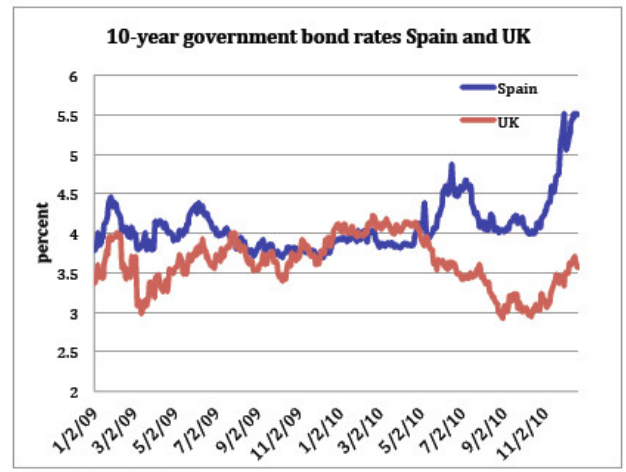
Why was Spain different from the UK?

Figure 1



Source: European Commission, Ameco

Figure 2:



Source: Datastream

Similar debt trajectories, banking crises, deep recessions — but the UK has a central bank that can backstop its sovereign. Spain, inside the euro, did not.

3. Self-Fulfilling Debt Crisis

Testing for self-fulfilling dynamics: three obstacles

i. We cannot directly observe *optimism* or *pessimism*

ii. The change in debt price *changes* fundamentals (endogeneity)

iii. Both fundamental and belief components can coexist

$\Rightarrow$ Can we disentangle changes in beliefs from changes in fundamentals?

Three complementary approaches

(1) An **econometric** analysis — De Grauwe & Ji (2013)

(2) An **accounting** exercise — Aldama (2021)

(3) A **structural** analysis — Bocola & Dovis (2016)

3. Self-Fulfilling Debt Crisis

(1) Econometric: is there a spread component beyond fundamentals?

$$I_{it} = \alpha + z\,\mathrm{CA}_{it} + \gamma\,\mathrm{Debt}_{it} + \mu\,\mathrm{REE}_{it} + \delta\,\mathrm{Growth}_{it} + \alpha_i + \beta_t + \epsilon_{it}$$

- Fundamentals: current account, debt-to-GDP, real exchange rate, growth
- Country fixed effect α_i + time fixed effect β_t
- Estimated separately for EZ and standalone (non-EZ) countries

$\Rightarrow$ If fundamentals fully explain spreads, no EZ-specific component should appear

Ref: De Grauwe & Ji (2013)

3. Self-Fulfilling Debt Crisis

(1) Econometric results

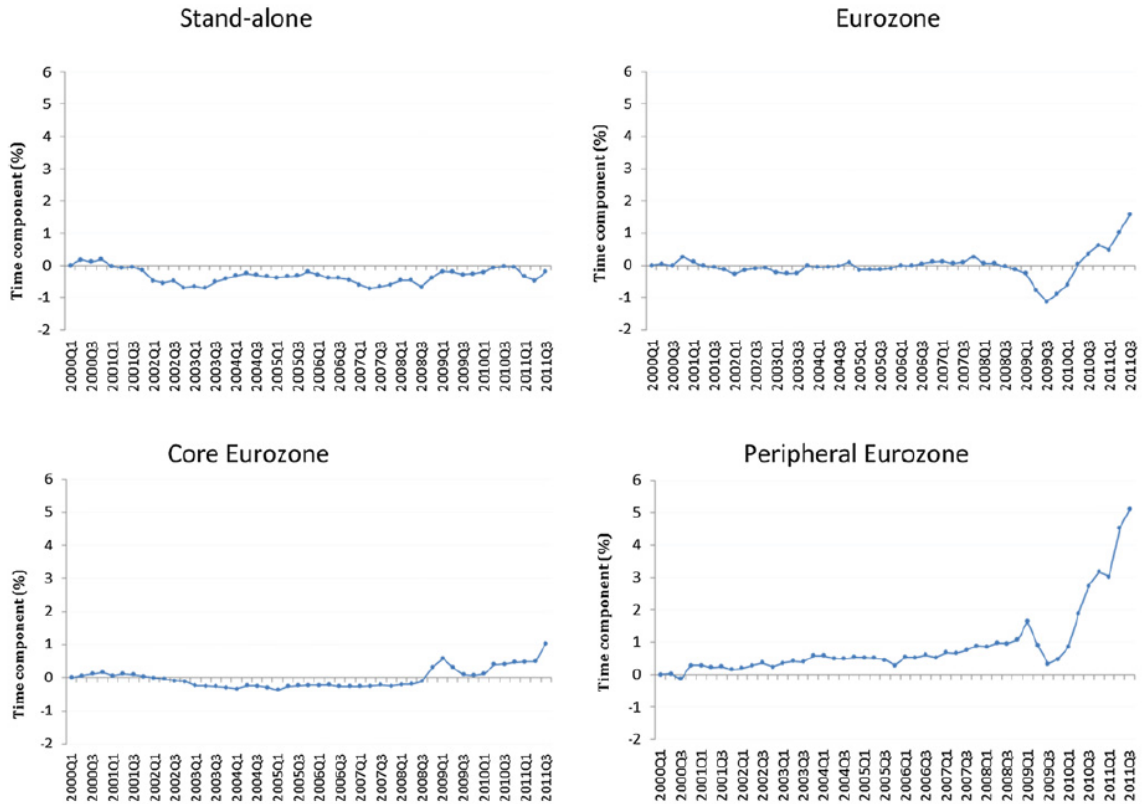
Table 3
Spread and structural break in Eurozone.

	Pre-crisis	Post-crisis
Accumulated current account GDP ratio	0.0004 [0.0017]	−0.0809*** [0.0201]
Real effective exchange rate	−0.0135*** [0.0030]	0.2070** [0.0915]
Growth rate	−0.0005 [0.0037]	0.0053 [0.0266]
Debt/GDP ratio	0.0034 [0.0030]	0.1157*** [0.0248]
Country fixed effect	Controlled	Controlled
Observations	320	150
R^2	0.6758	0.8206

CA deficit and D/GDP ratios correlated with spread spikes post-2010 — the relationship is stronger and shifts specifically in the EZ. (Causality harder to assess...)

3. Self-Fulfilling Debt Crisis

(1) The time fixed effect β_t: a common EZ-specific component



"... this suggests that especially in the periphery, departures occurred in the spreads — an increase that cannot be accounted for by fundamental developments..."

⇒ Evidence of a sentiment or contagion component, distinct from

3. Self-Fulfilling Debt Crisis

(2) Accounting: decomposing the rise in D/GDP

Debt dynamics equation (from Module 1):

$$d_t - d_{t-1} = \frac{i_t}{1+\gamma_t} d_{t-1} - \frac{\pi_t}{1+\gamma_t} d_{t-1} - \frac{g_t}{1+g_t} d_{t-1} + p_t$$

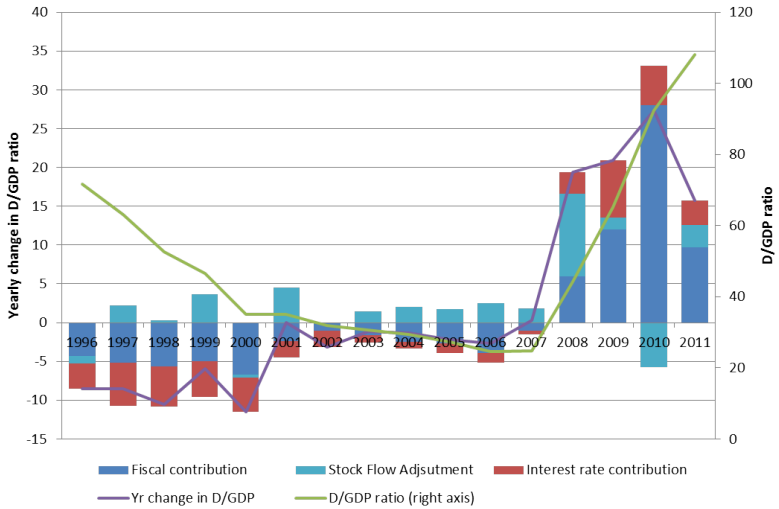
- Interest rate i_t — potentially self-fulfilling channel
- Inflation π_t and real growth g_t
- Primary deficit p_t

$\Rightarrow$ How much of the rise in D/GDP is explained by the interest rate channel? Compare Ireland (bank bailout origin) vs. Greece (fiscal origin)

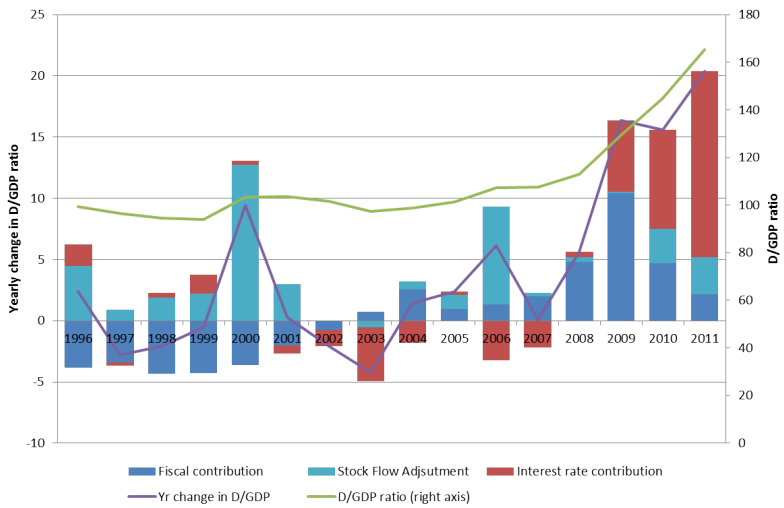
Refs: IMF (2010); Aldama, OFCE (2021)

3. Self-Fulfilling Debt Crisis

(2) Accounting: Ireland and Greece



Ireland: SFA (bank bailout) dominates



Greece: interest cost + primary balance

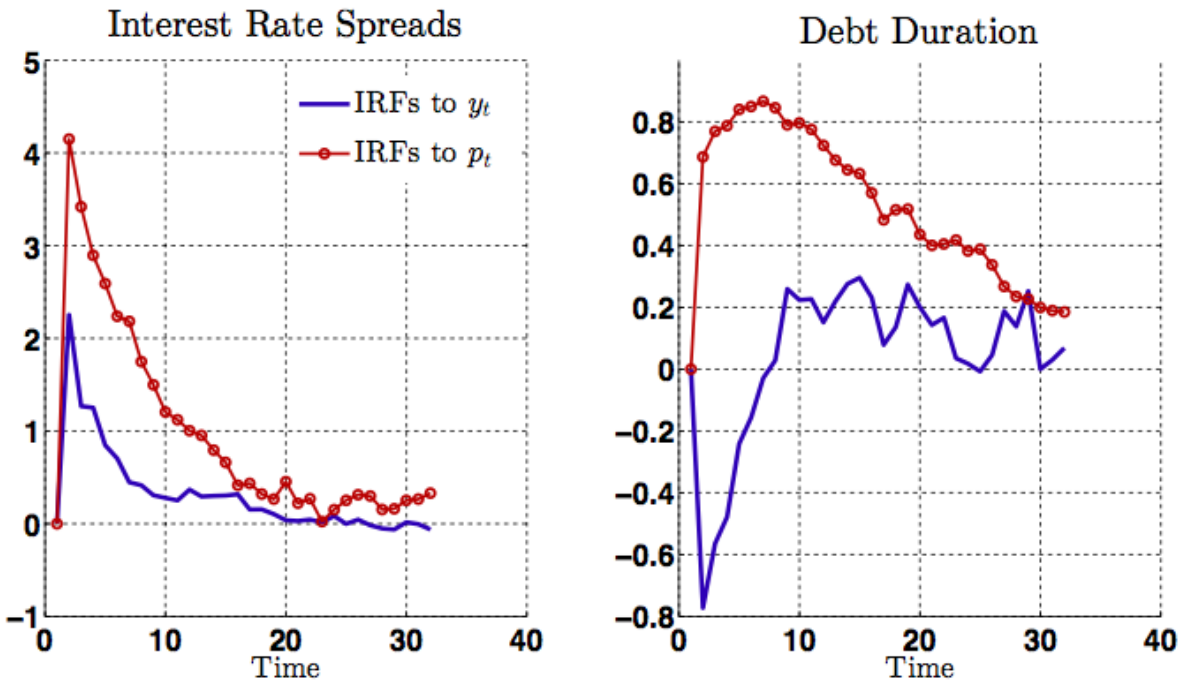
In Greece, the interest rate channel appears non-negligible — one possible reading is that a self-fulfilling component may have contributed to the debt dynamics, though disentangling it from fundamentals remains difficult.

3. Self-Fulfilling Debt Crisis

(3) Structural identification — Bocola & Dovis (2016)

- Two key problems for identification:
  - ↪ Endogeneity of prices and outcomes
  - ↪ Sentiments are not observable
- The key insight: **debt maturity as an identification device**

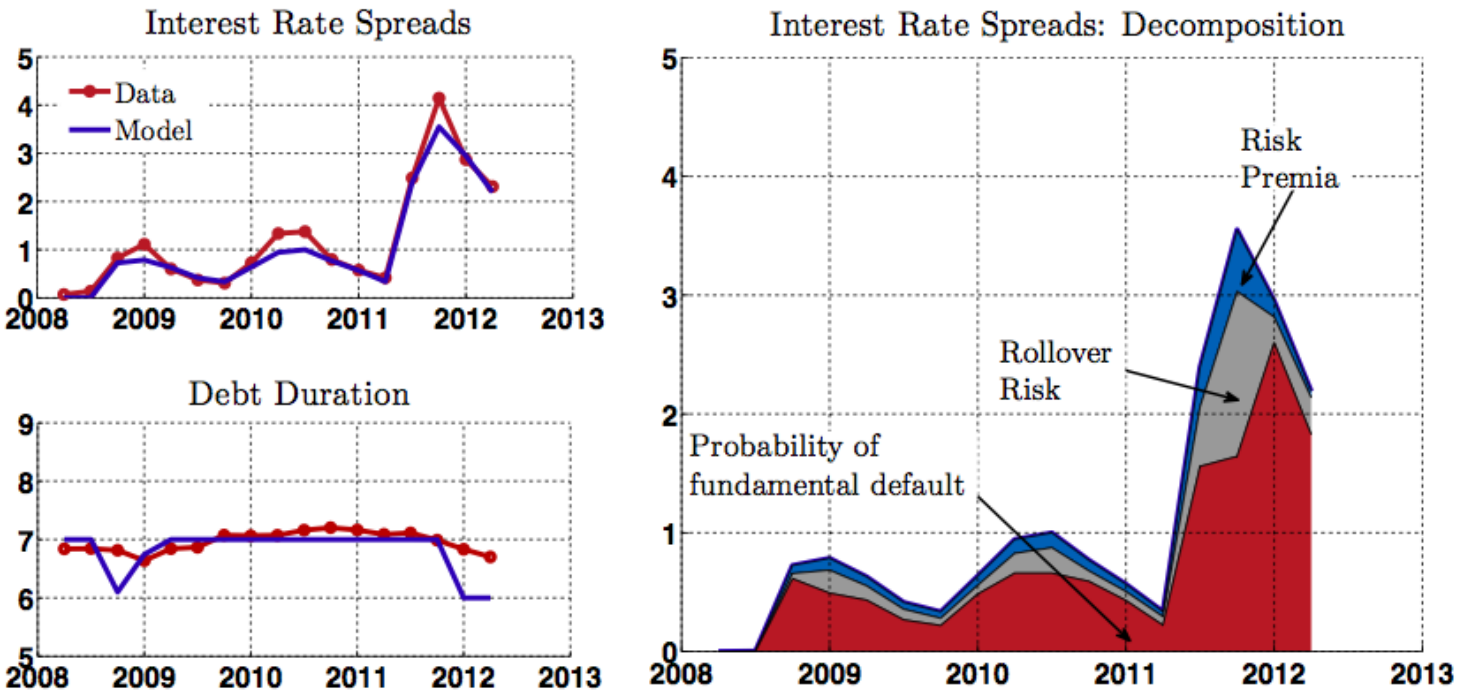
Figure 1: **The dynamics of interest rate spreads and debt duration**



3. Self-Fulfilling Debt Crisis

(3) Application to Italy 2008–2012

Figure 5: **Contribution of rollover risk to interest rate spreads**



- LHS: model fit to observed spread and maturity data
- RHS: decomposition — a significant share of the 2011–12 spread spike is attributed to the *belief component*, especially at the peak

3. Self-Fulfilling Debt Crisis

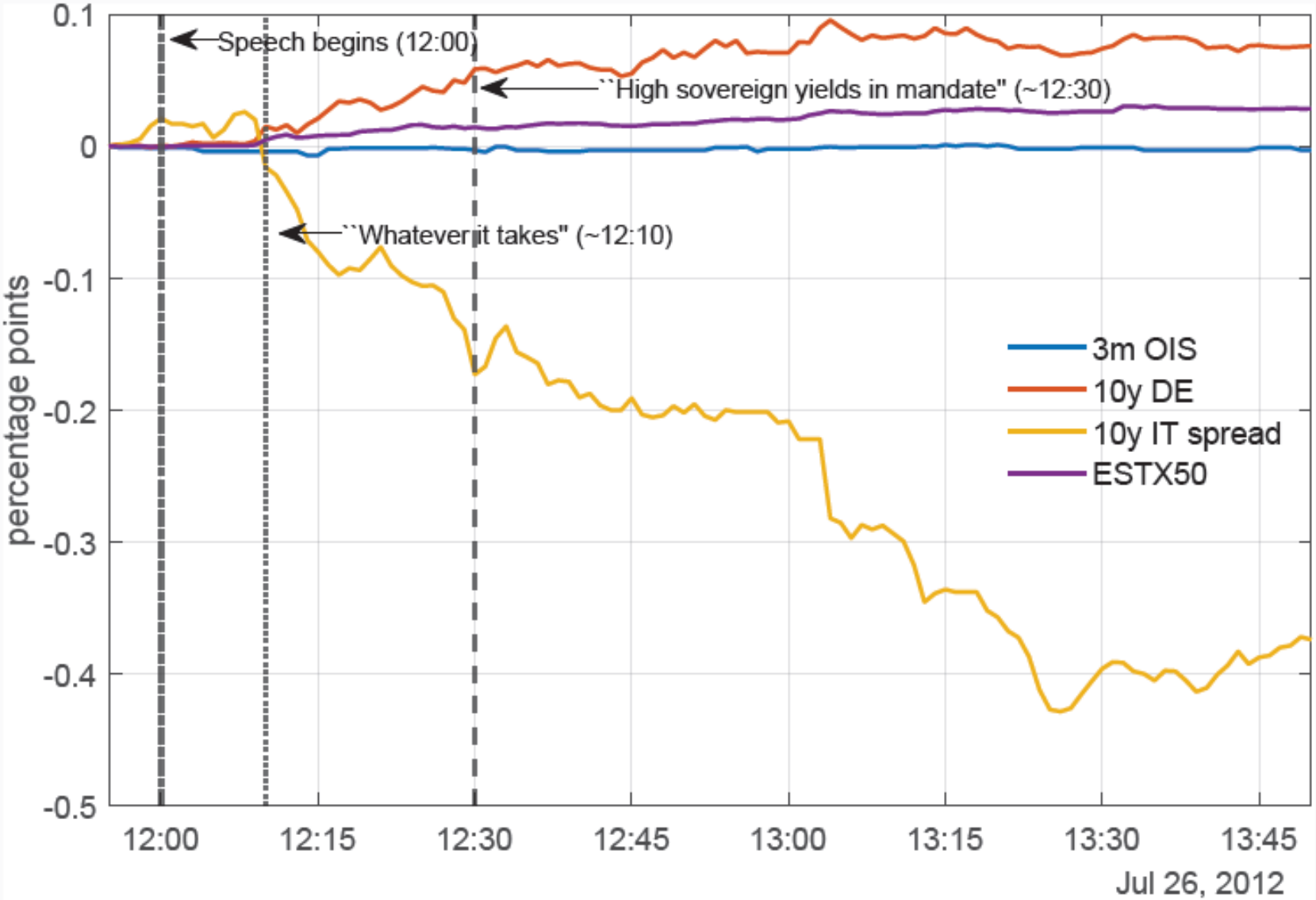
Resolution: ruling out the bad equilibrium

- Spring 2012: coordinated government interventions keep failing
- July 2012 — Mario Draghi:

"Within our mandates, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough."

- ECB commits to unlimited sovereign bond purchases (OMT)
- Never needs to implement it $\Rightarrow$ an effective commitment device

$\Rightarrow$ Theory predicts exactly this: a credible backstop eliminates the bad equilibrium without requiring actual purchases


0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
percentage points
Speech begins (12:00)
``High sovereign yields in mandate" (~12:30)
``Whatever it takes" (~12:10)
3m OIS
10y DE
10y IT spread
ESTX50
12:00
12:15
12:30
12:45
13:00
13:15
13:30
13:45
Jul 26, 2012

4. The Diabolic Loop

"We must break the vicious cycle of banks hurting sovereigns and sovereigns hurting banks. This works both ways."

— Christine Lagarde, April 2012

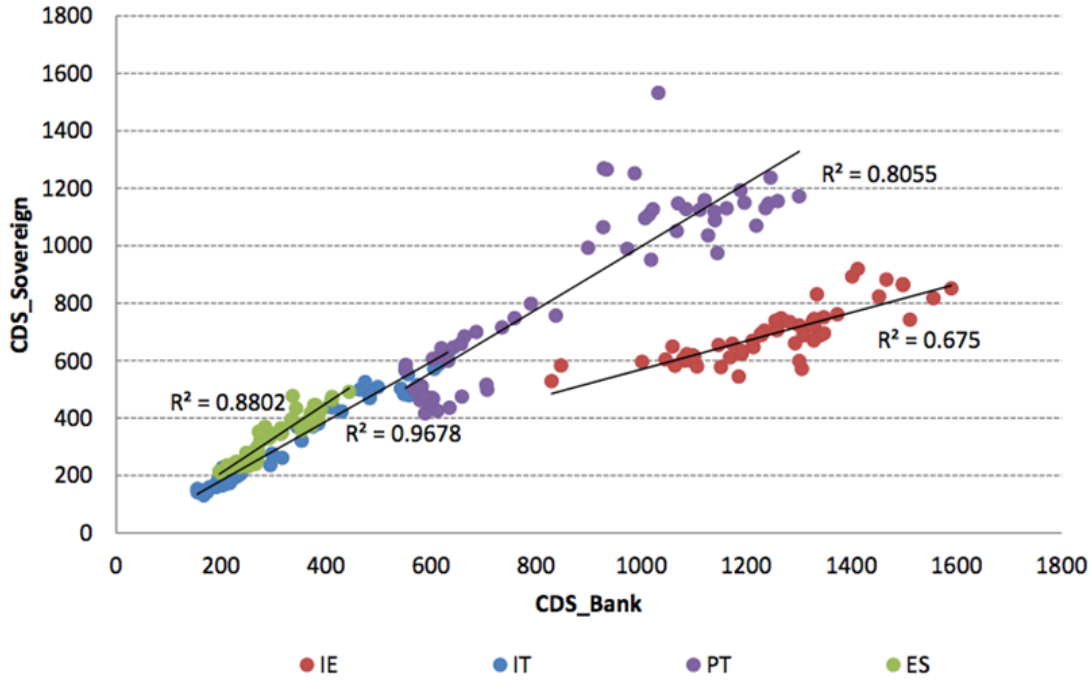
"Rarely does an economic idea gather so wide a consensus as the evilness of the "deadly embrace". The feedback loop between weak bank balance sheets and sovereign fragility now faces almost universal opprobrium (...) providing a major impetus to build the European banking union."

— Farhi & Tirole (2014)

4. The Diabolic Loop

Bank–sovereign credit risk: correlation during the crisis

Correlation of bank and sovereign CDS — Jan 2011 to Feb 2012



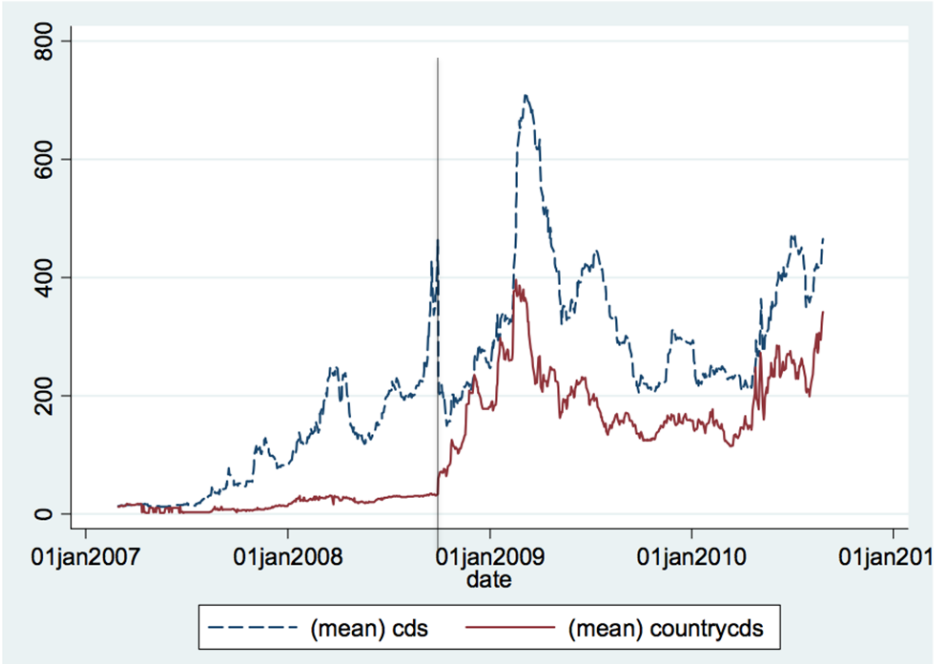
Correlation was near zero before 2011. During the crisis: strongly positive, both directions.

⇒ **Causality runs both ways.**

4. The Diabolic Loop

Channel 1: banks hurting sovereigns (bailout channel)

Ireland — September 2008

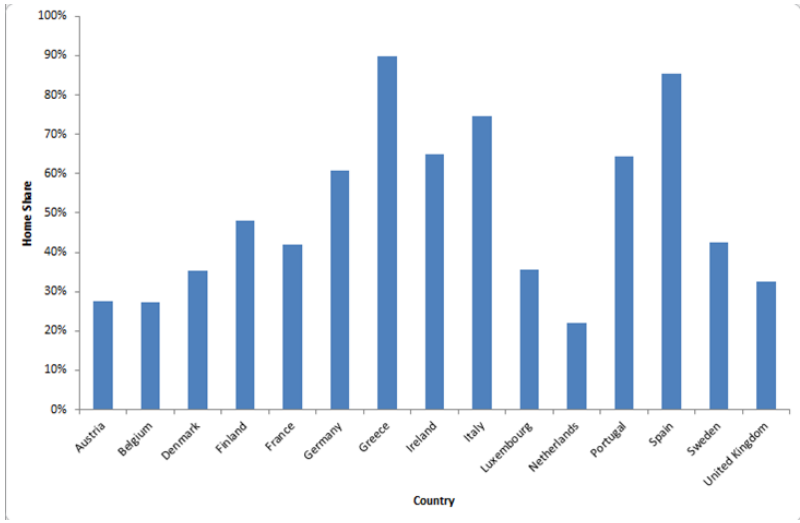


Acharya, Drechsler & Schnabl (VoxEU, 2012)

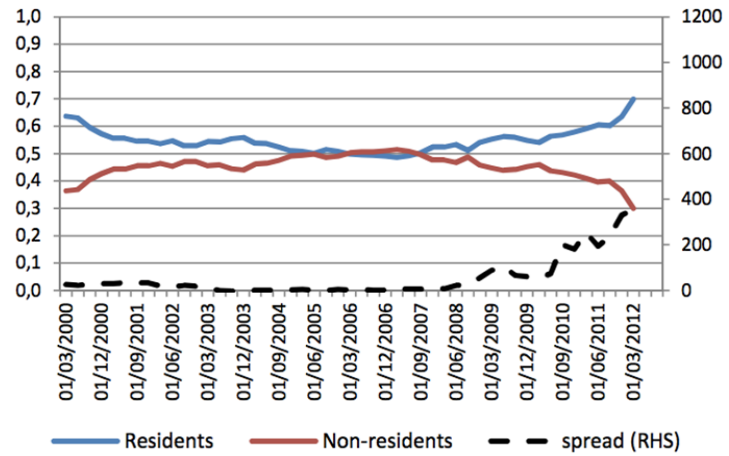
$\Rightarrow$ Bank credit risk $\uparrow \rightarrow$ implied probability of government bailout $\uparrow \rightarrow$ sovereign credit risk $\uparrow$

4. The Diabolic Loop

Channel 2: sovereigns hurting banks (domestic holdings)



Home bias in sovereign bond holdings (March 2010). Banks held disproportionate shares of domestic debt.
Acharya et al. (2012)



Spain: domestic holding of sovereign debt *increased* during the crisis.
Broner, Erce, Martin & Ventura (VoxEU, 2014)

$\Rightarrow$ Sovereign impairment directly damages bank balance sheets — and exposure *rose* as risk rose. Why?

4. The Diabolic Loop

Why do banks hold (and accumulate) domestic sovereign debt?

i. Financial repression: sovereigns use cheap ECB liquidity to fund bond purchases

   ↪ *"This [LTRO] means that each state can turn to its banks, which will have liquidity to buy the bonds"* (Sarkozy)

ii. Financial dominance: banks accumulate domestic bonds to guarantee bailout

   ↪ "Strength through weakness" — too systemically exposed to be allowed to fail

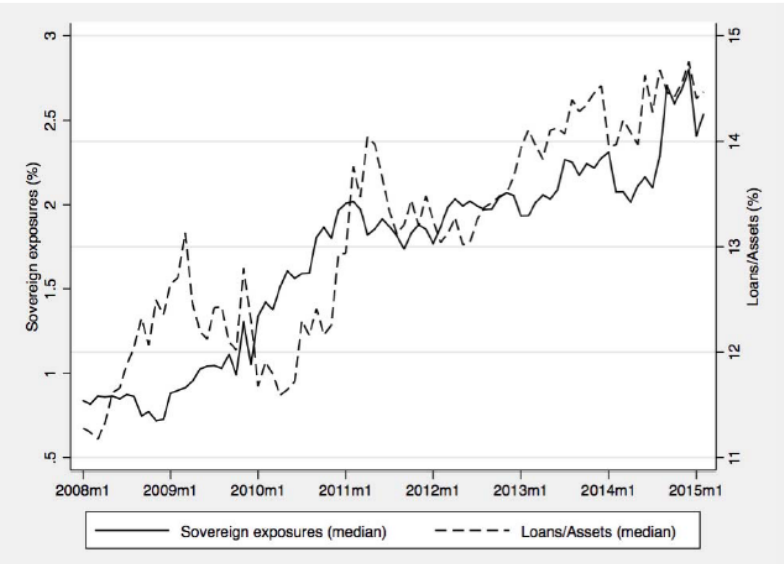
iii. Creditor discrimination: domestic holders expect preferential treatment in default

   ↪ Spain would compensate domestic banks to limit contagion costs

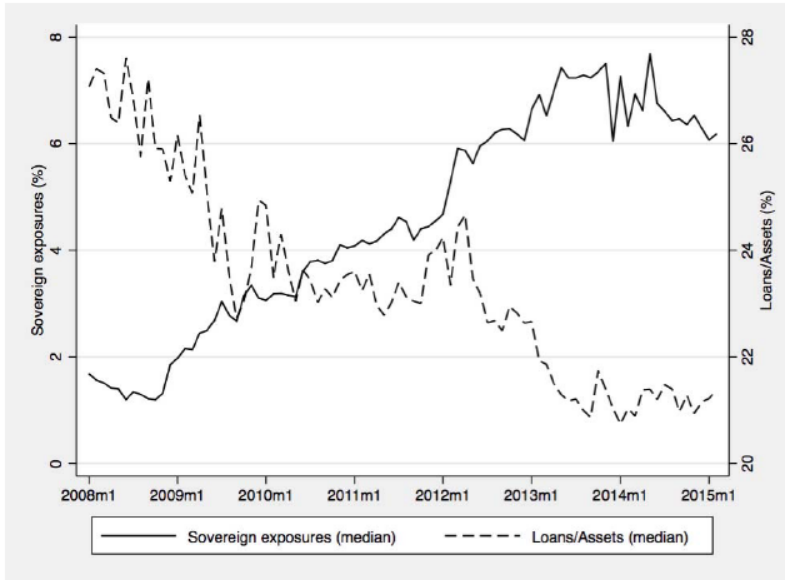
iv. Risk shifting: concentrate risk domestically to arm-twist an ECB/European bailout

4. The Diabolic Loop

Transmission to the real economy: credit crowding-out



Non-stressed countries



Stressed countries (PT, IR, GR, IT, ES)

Domestic holding of sovereign debt vs. loans to non-financial corporations.
In stressed countries: rising sovereign exposure crowds out bank lending to the private sector.

$\Rightarrow$ The diabolic loop is not merely financial — it produced the real recession.

Source: ECB Working Paper 1969 — Bank exposures and sovereign stress transmission

4. The Diabolic Loop

Resolution: breaking the loop through banking union

- The loop exists because banks and sovereigns are *national*:
  - National supervision, national guarantees, national bailout
  - Sovereign distress $\Leftrightarrow$ bank distress
- **Banking union**: Europeanise the banking system
  - **SSM**: common supervisor (ECB)
  - **SRM**: common resolution mechanism — from bail-out to bail-in
  - **DGS**: harmonised deposit guarantees
- From national banks to European banks

$\Rightarrow$ Banking union is the structural institutional response to the missing integration that made the loop possible

Key Takeaways

1. A **sudden stop** did occur inside the euro area — the single currency changed its *form* (public flows absorbed what private flows fled) but not its *nature*.
2. **Self-fulfilling dynamics** were quantitatively significant, especially in 2011–12. The EZ was special: no lender of last resort for sovereigns made the bad equilibrium viable.
3. **OMT worked** because it changed the game — not by purchasing bonds, but by making the bad equilibrium non-credible. Theory predicts exactly this.
4. The **diabolic loop** shows why incomplete monetary union amplified every shock: national banks and national guarantees made sovereign and bank risk inseparable.
5. **Banking union** is the structural institutional fix — the response to the same missing integration that made the loop possible.

References

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- Acharya, Drechsler & Schnabl (2012, VoxEU) — Hazardous tango
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- ECB WP 1969 — Bank exposures and sovereign stress transmission
- Farhi & Tirole (2014) — Deadly embrace: sovereign and financial balance sheets
- Veron (2015, Bruegel) — Europe's radical banking union
- Eichengreen & Wyplosz (VoxEU) — How the euro crisis was successfully resolved