

## What is this paper about?

I analyze the banking equilibrium in a model with sovereign risk, and optimizing banks and depositors.

Banks optimally decide whether to gamble on domestic sovereign bonds. The optimal reaction by depositors to insolvency risk imposes market discipline, but leaves the economy susceptible to self-fulfilling shifts in sentiments. In adverse equilibria, sovereign bond purchases crowd out bank lending and sovereign default causes a banking crisis.

Policy interventions face a trade-off between alleviating funding constraints and strengthening incentives to gamble. Non-targeted interventions may eliminate the good equilibrium. Targeted interventions have the capacity to eliminate adverse equilibria.

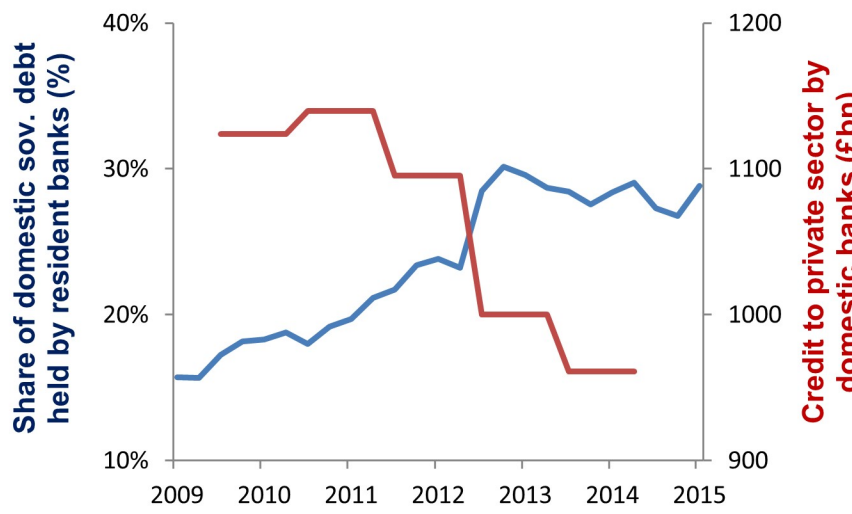
## Three Facts about the Sovereign Debt Crisis

**Fact 1.** Rise in share of domestic sovereign debt held by the national banking system

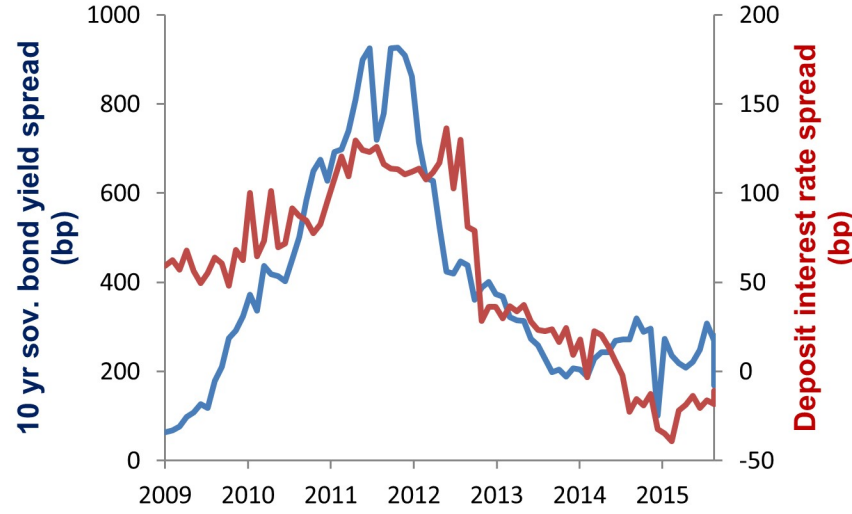
**Fact 2.** Decline in domestic bank lending to the private sector

**Fact 3.** Diabolic loop between banks and sovereigns

Facts 1 & 2



Fact 3: Spreads between core & periphery



## MODEL

### 1. Key Premises

#### A. Gambling on domestic sovereign debt

- Limited liability
- Spillover of sovereign default to domestic asset returns

#### B. Optimal response of depositors to insolvency risk

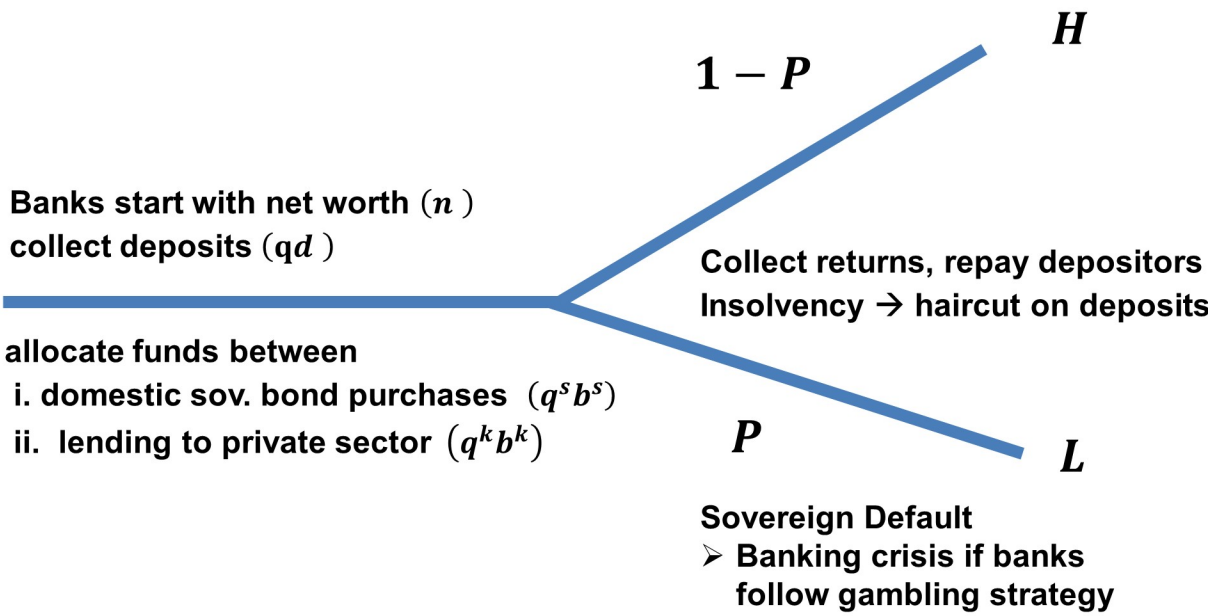
- Incomplete (or non-credible) deposit insurance
- Bank balance sheets are intransparent

#### C. Core contributions

- Endogenous determination of gambling
- Optimal behaviour by banks & depositors leads to multiple equilibria
- Non-targeted policy interventions may rule out the good equilibrium

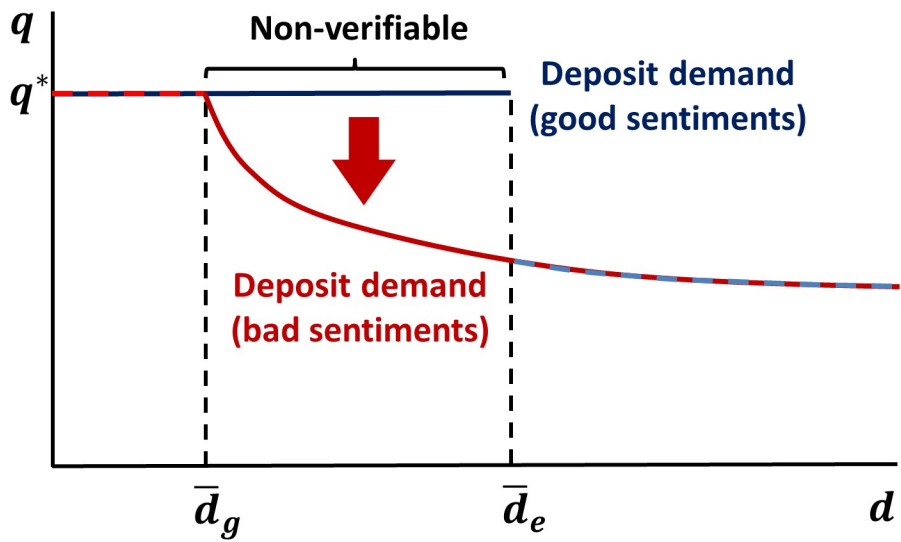


### 2. Timeline



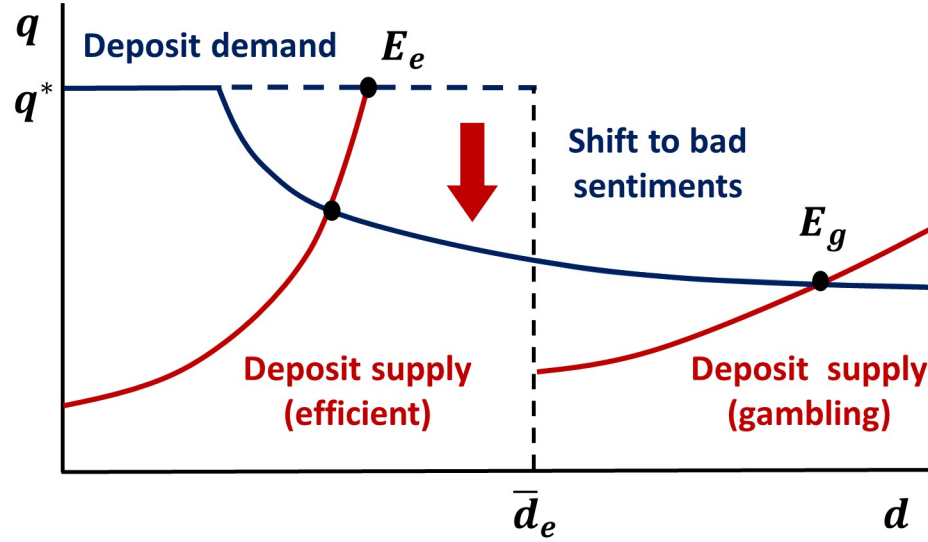
### 3. Household's Optimal Strategy & Sentiments

- Price deposits at expected return
- Can observe leverage but not exposure to sovereign bonds
- Form "sentiments" about bank strategy



### 4. Multiple Equilibria

- Rational expectations equilibrium
- Expectation that banks gamble → greater incentive to gamble
- Sentiments may become self-fulfilling



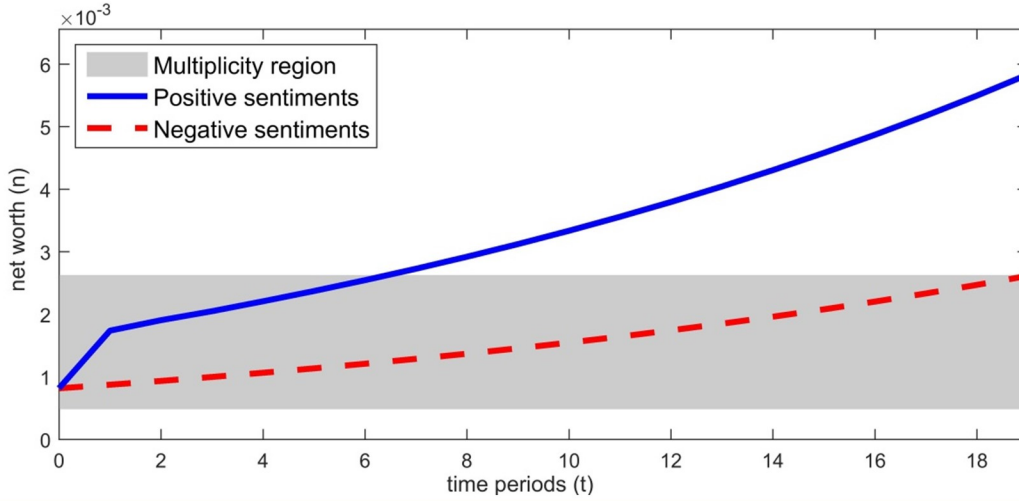
### 5. Bank's Optimal Strategies

- **Gambling strategy:** Sovereign bond purchases crowd out bank lending. Banks become insolvent after sovereign default.
- **Efficient strategy:** Low leverage and sov. bond exposure. Banks are safe.
- **Adopt gambling strategy if it yields higher expected payoff  $v_g > v_e$**

<p><b>Gambling Strategy</b></p> $v_g = \max_{b^k, b^s, d} (1 - P)(b^k + b^s - d)$ <p>subject to</p> $q^k b^k + q^s b^s = n + qd$ $q^k = f(b^k, B^k) \quad , \quad q = q(d)$ $d \leq \theta^k b^k + \theta^s b^s$	<p><b>Efficient Strategy</b></p> $v_e = \max_{b^k, b^s, d} (1 - P)(b^k + b^s) + P(\theta^k b^k + \theta^s b^s) - d$ <p>(Budget constraint)</p> <p>(Market power)</p> <p>(Solvency constraint, efficient strategy only)</p>
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### Dynamic Model: Gambling Traps

- Rise in funding costs in anticipation of gambling
- **Hinders recovery of net worth even when the gamble succeeds**

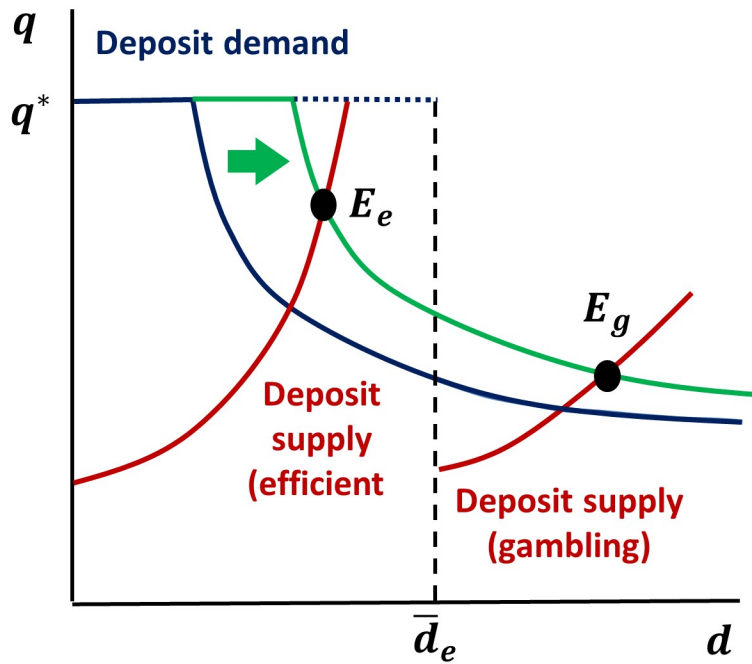
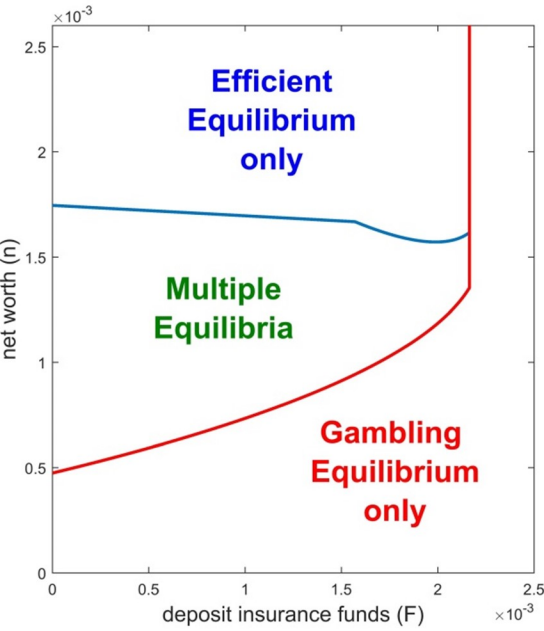


## POLICY ANALYSIS

### A. Deposit Insurance

- Funds  $F$  committed to reducing haircut on depositors in case of insolvency
- **Trade-off:** alleviate funding constraints vs. strengthen incentives to gamble
- **Excessive amount of funds eliminates good equilibrium**

#### Equilibrium Mapping



### B. Liquidity Provision (Non-targeted)

- Central bank allows banks to borrow up to  $L$  at risk-free interest rate
- **Without risk transfer: ineffective → offsetting shift in deposit demand**
- **With risk transfer: identical to deposit insurance**

### C. Targeted Liquidity Provision

- Provide schedule of funds  $L(n, d)$  conditional on bank's leverage
- **Overcomes trade-off: design to ensure non-participation under gambling**

