# Endogenous Bank Fragility in a Macroeconomic Model

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# Background

#### **Financial crisis facts**

- Dramatic increases in credit spreads
- Large + persistent real effects

#### Explanations

- Credit/distress risk Bernanke-Gertler 1989, Campbell-Hilsher-Szilyagi 2008
- Countercyclical risk premia, fire sales Campbell-Cochrane 1997, Lorenzoni 2008, He-Krishnamurthy 2012

#### Amplification + flight to quality Bernanke-Gertler-Gilchrist 1996, 1998, Kiyotaki-Moore 1997, Brunnermeier-Sannikov 2014, Gertler-Kiyotaki 2014, Caballero-Farhi 2017

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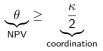
#### Here: Threat of debt runs

### Model Overview

#### Runs + global games

• Fundamentals select the "good" equilibrium in Diamond-Dybvig

Morris-Shin 2001, Goldstein-Pauzner 2005, Quigley-Walther 2023



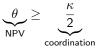
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Nuanced version in this paper

$$\underbrace{\lambda K_t + M_t}_{\text{illiquid} + \text{liquid}} \geq (1 - F_t^{\star}) \underbrace{D_t}_{\text{debt}}$$

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#### Implications of a net worth shock

- Flight to safety via  $M_t$
- Amplification via N<sub>t</sub>

### Comparison to Fire Sales

### **Example:** Need to roll over $(1 - F_t) D_t$ next period

• Can borrow  $D_{t+1} \leq \lambda K_t$ , liquid assets  $M_t$ 

### Comparison to Fire Sales

### **Example:** Need to roll over $(1 - F_t) D_t$ next period

- Can borrow  $D_{t+1} \leq \lambda K_t$ , liquid assets  $M_t$
- Fire sale is avoided if

$$\lambda K_t + M_t \ge (1 - F_t) D_t$$

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#### Implications

- Flight to safety M<sub>t</sub>
- Amplification via N<sub>t</sub>
- Fire sale happens in equilibrium + generates externality Lorenzoni 2008, Walther 2016, Davila-Korinek 2018

## Relationship to Basel III

Model constraint

 $\lambda_t K_t + M_t \ge (1 - F_t) D_t$ 



### Relationship to Basel III

Model constraint

$$\lambda_t K_t + M_t \ge (1 - F_t) D_t$$

Liquidity Coverage Ratio

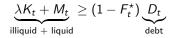
$$\underbrace{\omega * \text{illiquid assets} + \text{cash}}_{\text{HQLA}} \geq \underbrace{\nu * \text{short term debt}}_{\text{Net Outflows}}$$

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• Model tells us the correct scenario/weighting

## Spreads

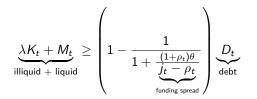
#### Spreads in equilibrium



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# Spreads

#### Spreads in equilibrium



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Increase funding spread to ease constraint

#### **Competing theories of distress**

- Here:  $\uparrow j_t$  to *avoid* distress
- Standard model: 
  <sup>†</sup> j<sub>t</sub> anticipating distress
- Testable?

# Contributions

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#### Theory of spreads + amplification

- IRF vs. vanilla RBC model
- Crowded!
- Increased investment after negative shock?

### Timing and nature of debt runs

- Elegant global game solution
- Liquidity and leverage choice
- Equilibrium runs and sudden stops?