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

$$\underbrace{\theta}_{\text{NPV}} \geq \underbrace{\frac{\kappa}{2}}_{\text{coordination}}$$

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- Nuanced version in this paper

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

Implications of a net worth shock

- Flight to safety via M_t
- Amplification via N_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

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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

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

Implications

- Flight to safety M_t
- Amplification via N_t
- Fire sale happens in equilibrium + generates externality
  Lorenzoni 2008, Walther 2016, Davila-Korinek 2018

Relationship to Basel III

Model constraint

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

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Liquidity Coverage Ratio

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

- Model tells us the correct scenario/weighting

Spreads

Spreads in equilibrium

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

Spreads

Spreads in equilibrium

$$\underbrace{\lambda K_t + M_t}_{\text{illiquid + liquid}} \geq \left(1 - \frac{1}{1 + \frac{(1+\rho_t)\theta}{\underbrace{j_t - \rho_t}_{\text{funding spread}}}}\right) \underbrace{D_t}_{\text{debt}}$$

- Increase funding spread to ease constraint

Competing theories of distress

- Here: $\uparrow j_t$ to *avoid* distress
- Standard model: $\uparrow j_t$ *anticipating* distress
- Testable?

Contributions

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?