FEDERAL RESERVE BANK of ATLANTA

Liquidity Policies and Systemic Risk

By Tobias Adrian and Nina Boyarchenko

Comments by Larry D. Wall
Federal Reserve Bank of Atlanta

Motivation

- Crisis highlighted banks vulnerability to illiquidity
- Basel III imposes new liquidity requirements
- Beneficial to understand the impact of regulations earlier in the process
- Evaluation methods
  - Verbal models
  - Mathematical models
  - Historical experience

Model

- Model focuses on funding of a risky productive asset
  - Risk-based capital requirement for risky asset
  - Risky intermediary debt backed by risk free debt
- Key participants
  - Representative intermediary / productive firm
  - Representative household
  - Government supplies risk free debt
- One productive asset
- One risky bond for financing intermediaries

Model

New Investment by

Intermediary

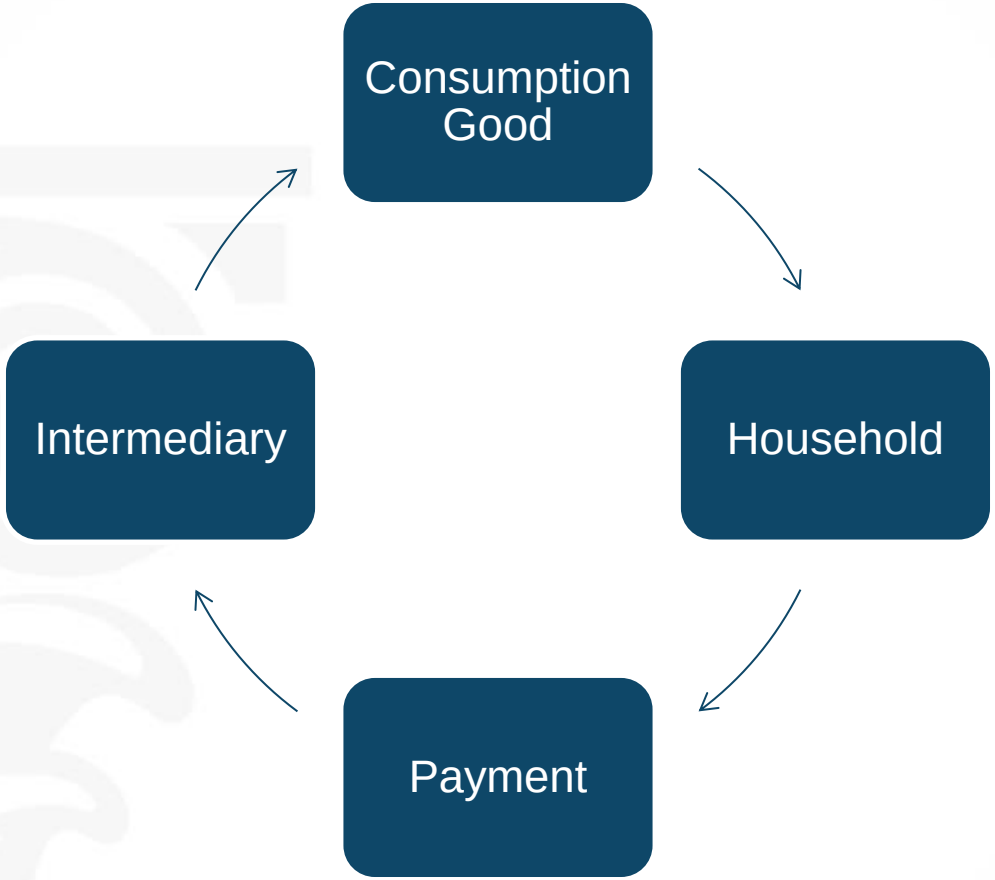
Household

Model

New Investment by

Intermediary

Model: Product Market



- **Random exogenous shocks to**
  - **Productivity of capital**
  - **Household time preference for consumption**

Model: Intermediary financing

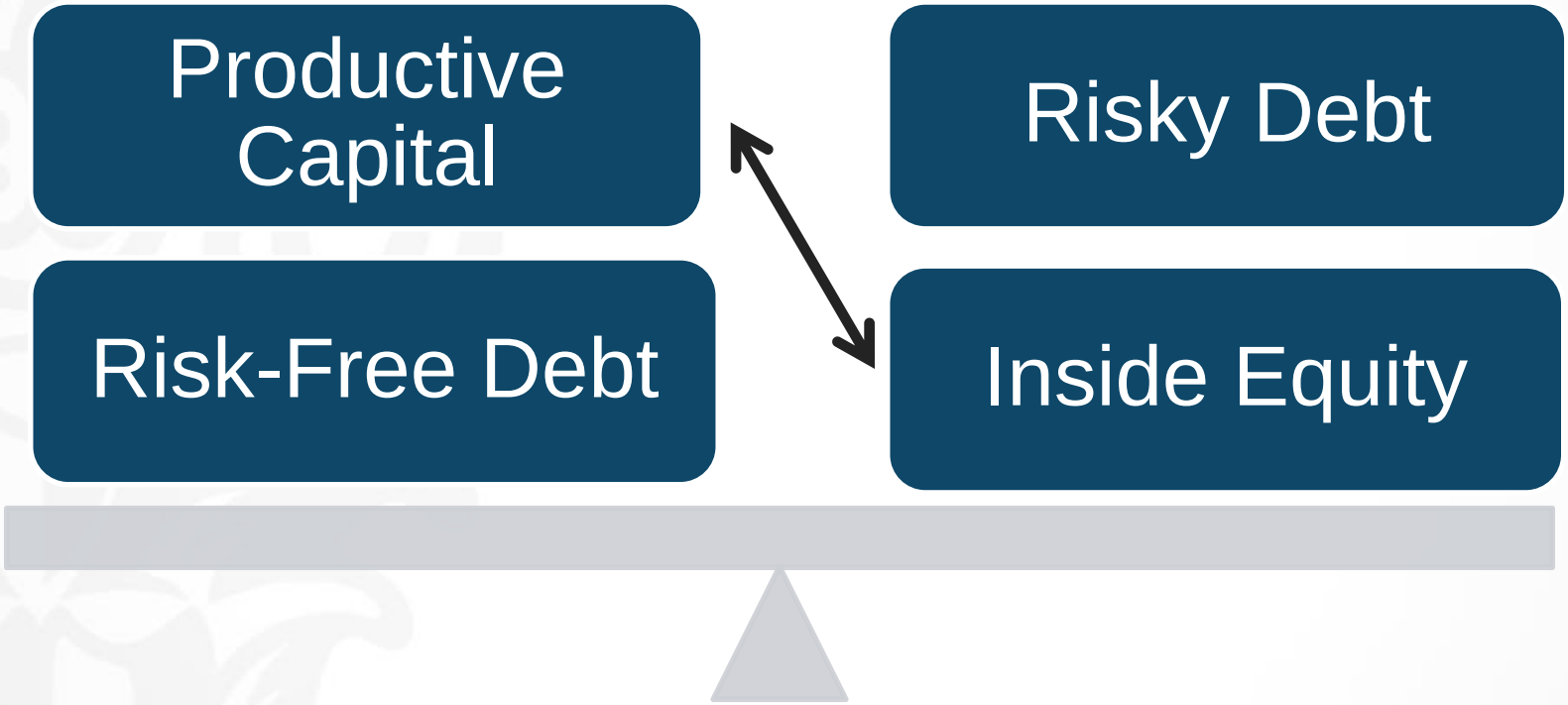
- Internally generated equity
- Issuance of risky debt
  - With a fixed amortization schedule
  - Firm is reorganized when its equity falls below some exogenously given distress boundary
  - New management defaults on part of the debt to rebuild its capital ratio
  - Sale of physical capital to households
    - “Old” capital equally productive in households
    - Price varies with discounted value of future revenue

Model: Government

- Government issues riskless debt
  - Intermediaries and households must hold net supply
  - Gross supply ≥ Net supply
    - Households can go short this debt
    - In effect households borrow from intermediaries creating additional riskless debt
- Government set minimum liquidity requirements
- Government sets minimum capital requirements

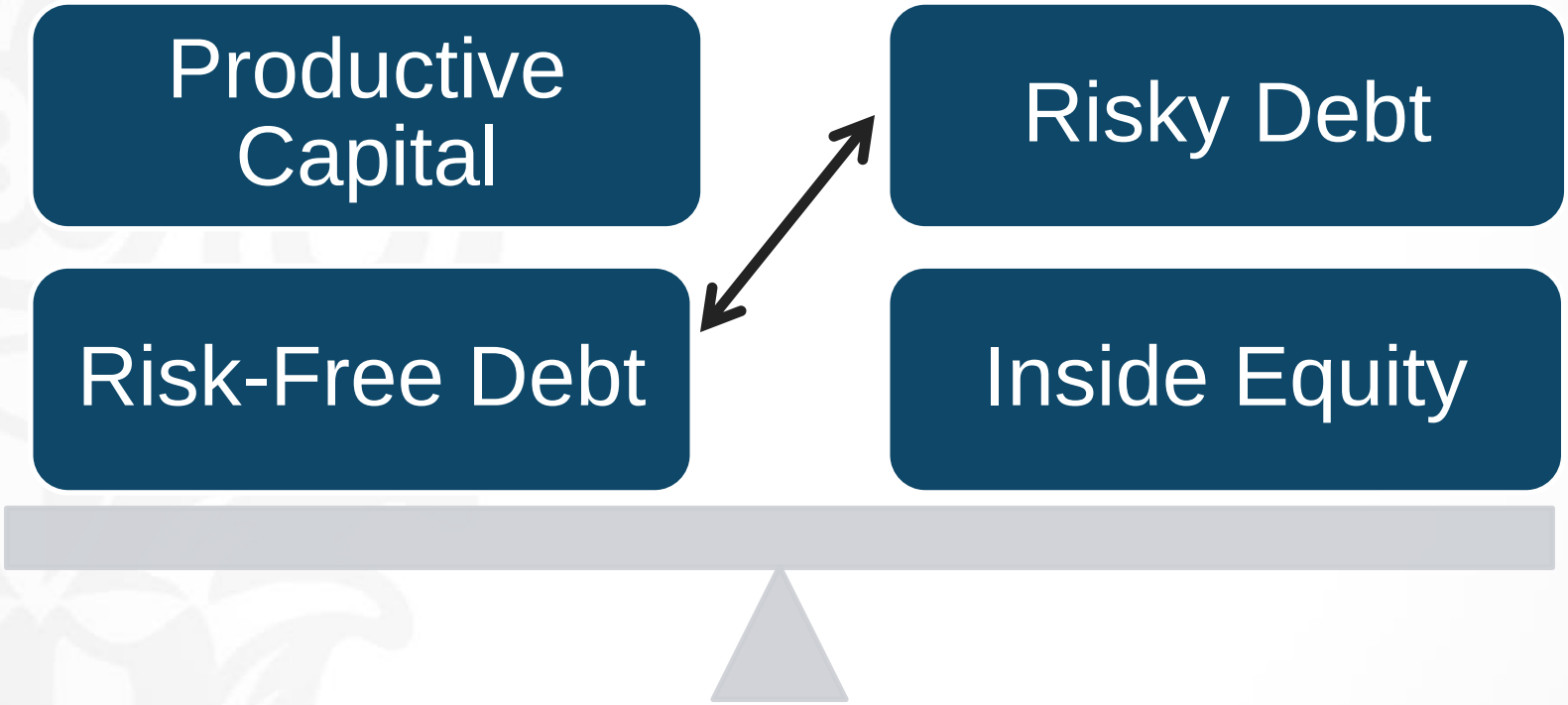
Model: Intermediary Balance Sheet

Model: Capital requirement



Inside Equity ≥ Risk(*Productive Capital*)

Model: Liquidity requirement



$$\textit{Risk-Free Debt} \geq \tilde{\Lambda}\,(\textit{Risky Debt})$$

Model: Household Wealth

Risk Free Asset	• Risk Free Return
Risky Debt	• Dividend Price ratio + • Capital Gain (Loss)
Productive Capital	• Dividend Price ratio + • Capital Gain (Loss)
	• Consumption Expenditures

Model: Market Clearing

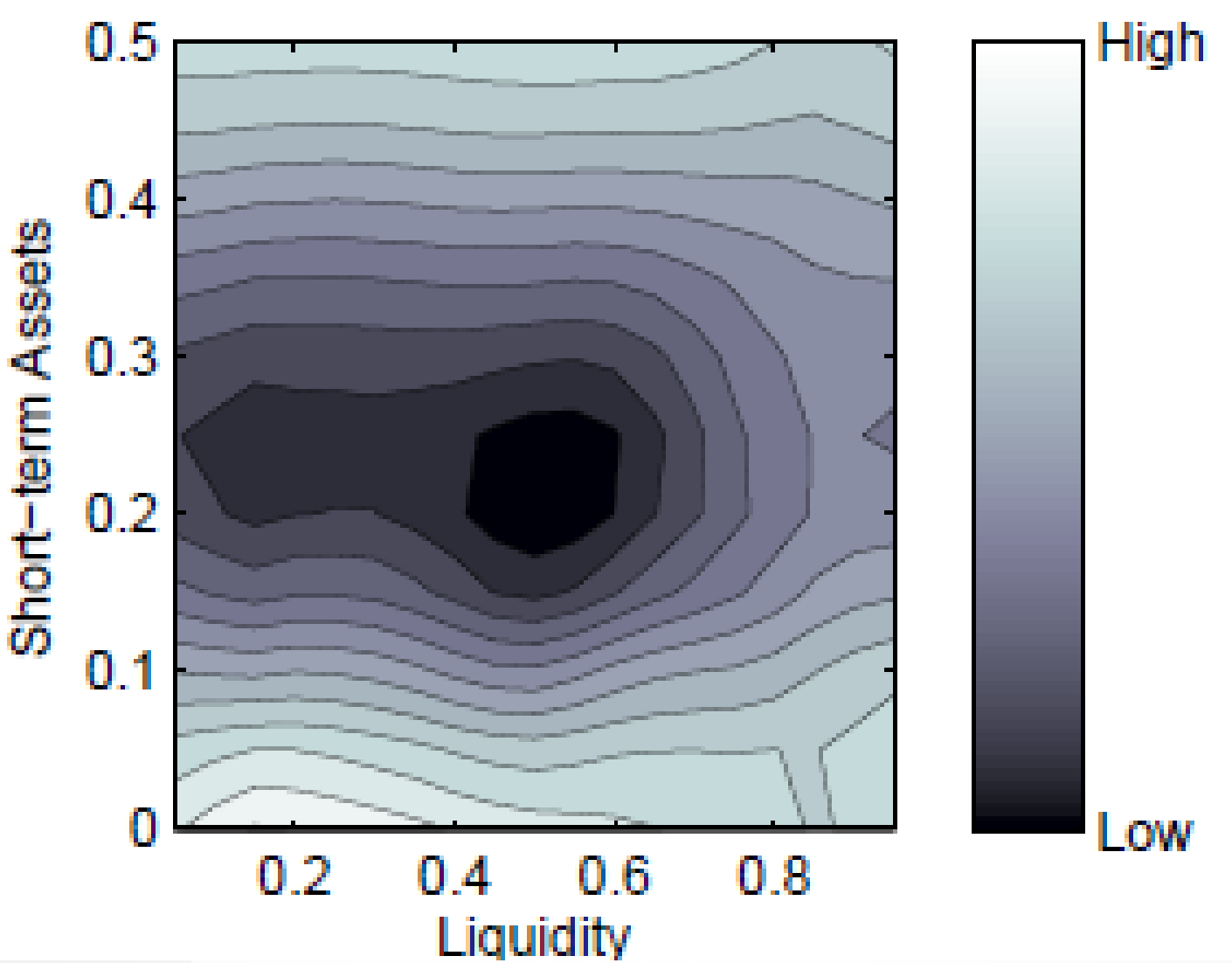
- Prices and quantities set so that markets clear

Market	Intermediaries	Households	Total
Capital	k_t	k_{ht}	K_t
Consumption	$i_t k_t A_t$	c_t	$A_t K_t$
Risky Debt	$-b_t$	b_{ht}	0
Risk-Free Debt	$\mathcal{T}_t A_t$	$\mathcal{T}_{ht} A_t$	$\mathcal{B} A_t$

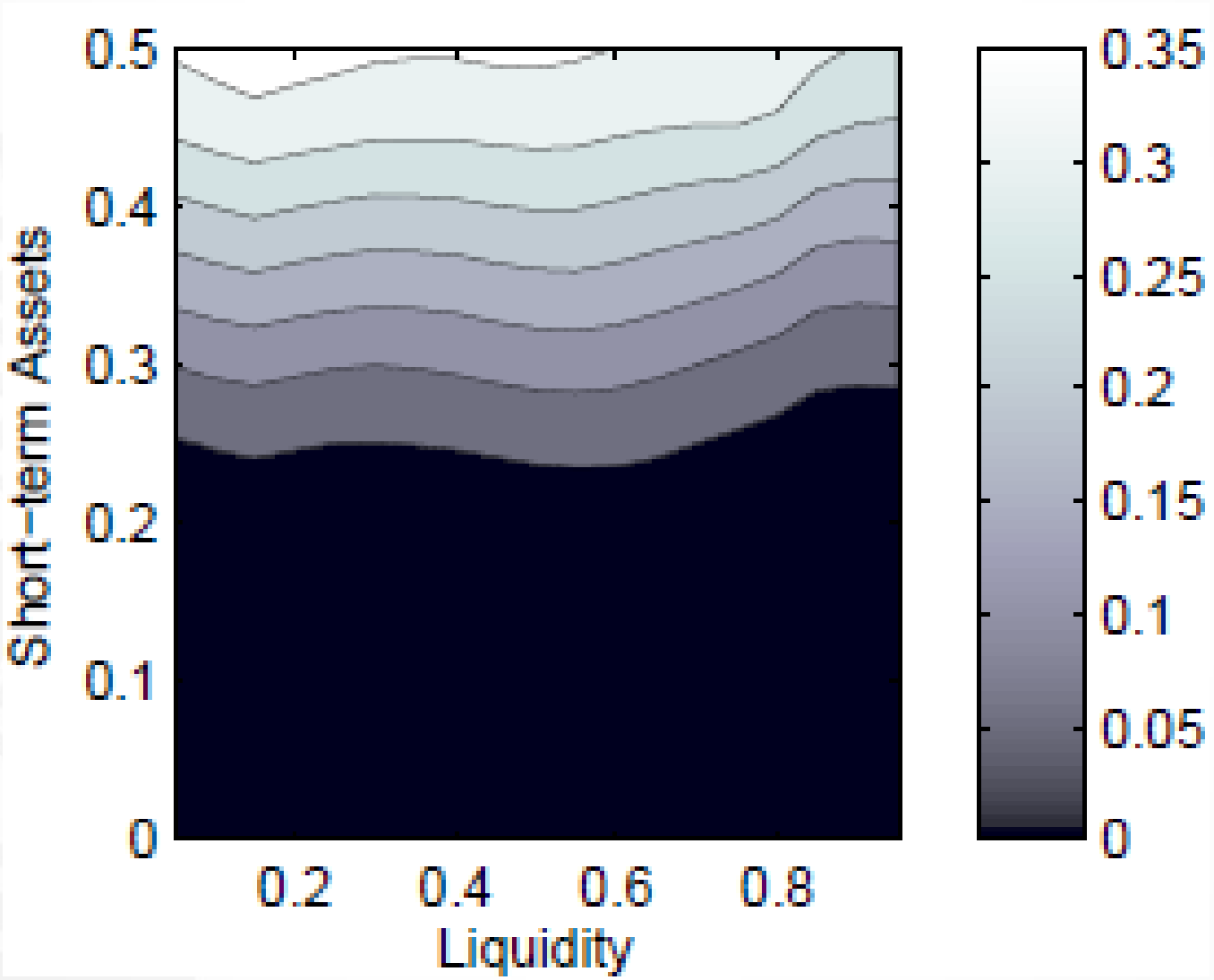
Results: Solution Method

- Start with a given set of parameters that describe the economy
- Simulate the impact for a given capital requirement, liquidity requirement, and government issuance of the risk-free bond
  - Simulate evolution of the economy given random shocks over 80 years
  - Repeat process 1000 times

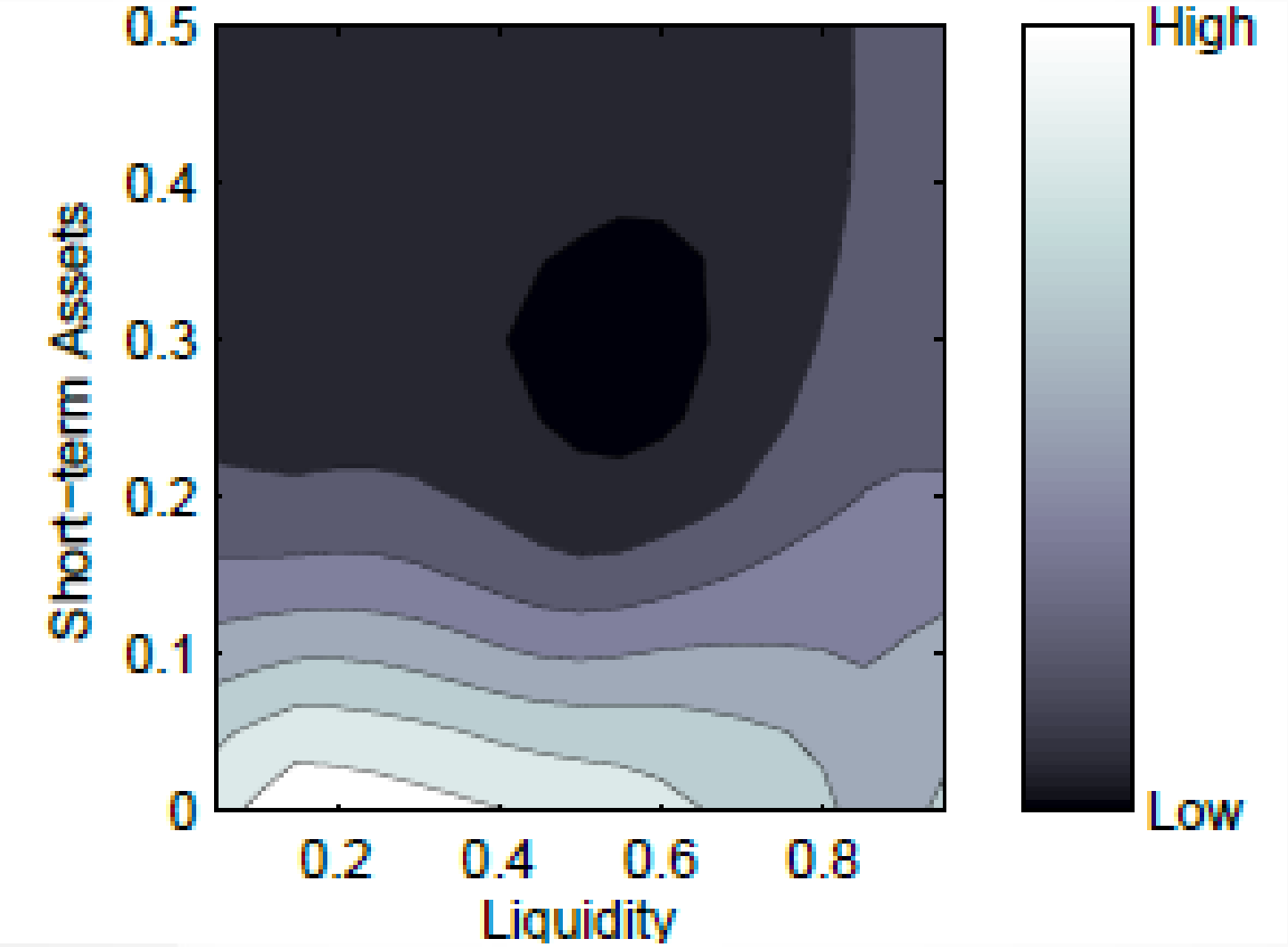
Results: Household Welfare



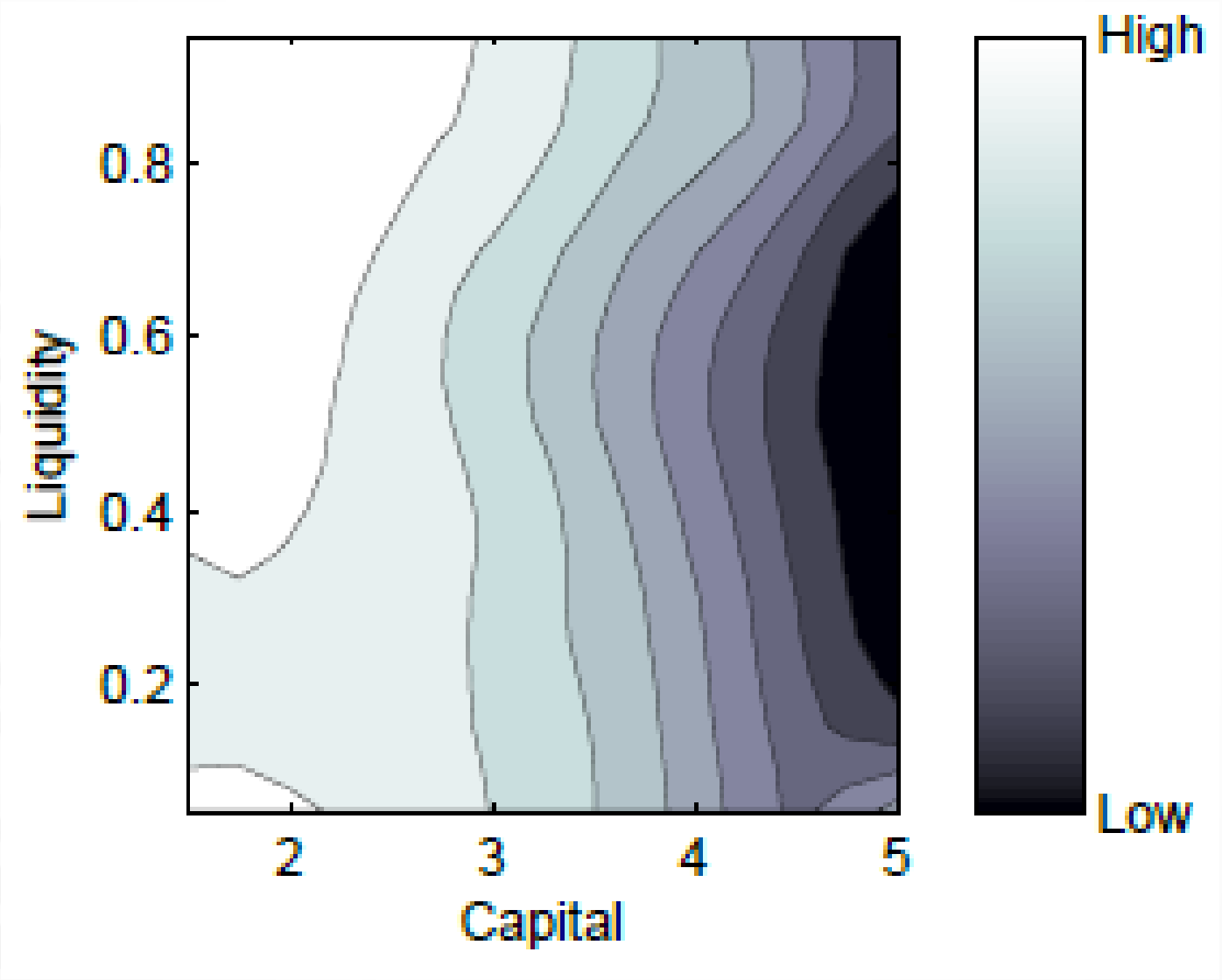
Results: Distress probability



Results: Consumption Growth



Results: Household Welfare



Strengths of the paper

1. The paper focuses on a less studied dimension of liquidity regulation
2. The paper allows for the interaction of different regulatory requirements
3. The paper allows other financial markets to respond to binding regulation

Wish list: Near term refinements

1. Impose some cost on:
   - The private creation of a safe, liquid asset and
   - On the sales of productive capital
2. Endogenize the reasons for capital regulation
3. Focus on those parameter values in which the regulation would be moderately binding

Wish list: Longer term extensions

- By these authors or someone else

1. Endogenize the reasons for liquidity regulation
   - Allow households to run on the risky bond
2. Allow intermediaries to chose between a lower return short-term, less productive asset and a longer term, more productive asset
   - This would better get at how banks borrowers may be impacted by liquidity requirements

Further discussion

Liquidity Policies and Systemic Risk

By

Tobias Adrian

Nina Boyarchenko