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BANKS AND THE MACROECONOMIC TRANSMISSION OF INTEREST-RATE RISK
Banks and the Macroeconomic Transmission of Interest-Rate Risk

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Motivation
Recent monetary tightening revealed significant exposure of US banks to interest-rate risk (IRR)
- balance-sheet losses, bank failures, credit slowdown
Balance-sheets increasingly sensitive to interest-rate changes
- average duration gap raised steadily over last decade

What are the implications and drivers of banks’ IRR exposures? How does bank regulation affect incentives to take-on IRR?

Model
GE model with endogenous interest-rate-risk exposure
A continuum of banks
- invest in short- and long-duration assets
- face financial frictions (no-equity issuance + default risk)
- are heterogeneous due to idiosyncratic risk

Bank net worth
\[ n = \left( R^k - \frac{1}{\frac{1}{k} + \frac{1}{k'}} \right) \left( \frac{1}{\frac{1}{k} + \frac{1}{k'}} \right) \left( \frac{1}{\frac{1}{k} + \frac{1}{k'}} \right) \left( \frac{1}{\frac{1}{k} + \frac{1}{k'}} \right) \]

- asset price fluctuates with level of interest rate
- portfolio share governs interest-rate-risk exposure

Optimal portfolio share given by
\[ n = \frac{k' \cdot S'}{k' + b'} \]

Testable implications
Aggregate: low interest rate → high long-term asset share
- banks experience capital gains, lower risk premium
- expect high asset value next period (if shock persistent)

Cross-section: low leverage → high long-term asset share
- low-leverage banks less constrained, lower risk premium

Duration and Interests Rates
Impulse response of duration gaps to monetary policy shocks
- estimate average and heterogenous effects w.r.t leverage

\[ \Delta \text{Duration Gap}_{t+1} = \frac{1}{\sum_{j=1}^{m} \text{Asset}_{jt}} \left( \sum_{j=1}^{m} \text{Liabilities}_{jt} \right) \]

FR-Y-9C (BHC quarterly filings) merged to CRSP
Monetary policy shocks
- series from Bu et al. 2021 and Nakamura-Steinsson 2014

Aggregate Implications
Calibrate model to fit aggregate and cross-sectional banking moments, then feed with sequence of interest rates from data starting in 2003
- reproduce untargeted increase in banks’ duration gaps prior to tightening
- generate asset-price contraction in line with empirical counterpart

What is the role of endogenous duration adjustments for macro dynamics?
- compute counterfactual where long-term asset share kept constant
- account for 30% of asset-price decline and 40% of equity losses

Duration and Leverage
Fact 1 – Surprise interest-rate cut increases duration gaps
Fact 2 – More leveraged banks less responsive
Fact 3 – Less leveraged banks have higher duration gaps

Policy Counterfactuals
Model features inefficiencies:
- pecuniary externality + deposit insurance
Use model to conduct two policy counterfactuals
Short-term liquidity requirement
\[ \frac{B^L}{B^L + B^H} \leq \theta \]
- limit ability of banks to invest in long-term assets
- effective in mitigating effects of interest-rate hike

Leverage requirement
\[ B^L \leq \xi \left( B^L + B^H \right) \]
- limit ability of banks to leverage
- worsens impact of tightening by redistributing risk

Heterogenous effects important to understand aggregate impact of policies

Data
Consolidated Reports of Condition and Income (Call Reports):
- assets and liabilities by maturity, \( M_j \) between 1997-2022

Duration Gap, \( n = \frac{1}{\sum_{j=1}^{m} \text{Asset}_{jt}} \left( \sum_{j=1}^{m} \text{Liabilities}_{jt} \right) \)

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