Interdependence of Bank Run Risk and Interest Rate Risk

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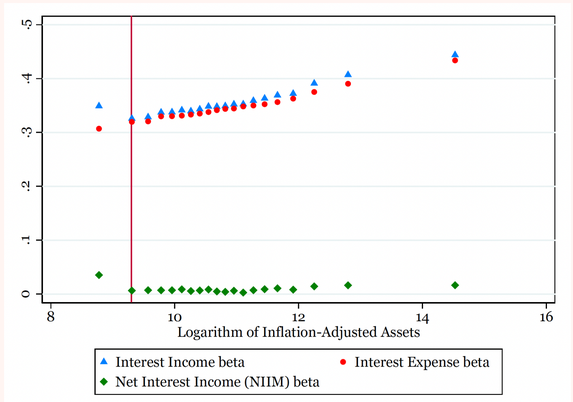
Abstract

I study how strategising to mitigate liquidity risk in stress periods exposes banks to interest rate risk in normal times. Building on (**?**), I show that small banks in the bottom quintile are not able to perform interest sensitivity matching and hence, are exposed to interest rate risk. These banks are primarily funded by retail deposits which results in low interest expense beta. Despite being funded by retail deposits, I show that stress periods trigger a relative reallocation of deposits from small banks to large banks, exposing these banks to higher funding instability in stress periods. To mitigate the anticipated bank-run risk, small banks hold shorter-duration assets to maintain liquidity in stress periods. Shorter-duration assets reprice quickly to changes in monetary policy rates. Holding shorter-duration assets results in increasing their interest income beta. As a consequence, they end up pairing low-interest expense beta with high-interest income beta, leading to an interest sensitivity mismatch.

I also conduct additional tests using the variation in banks' presence on the reciprocal deposit network to show that, since small banks on the network experience lower bank-run risk in stress periods, they can perform interest sensitivity matching to mitigate interest rate risk. The results show that the fragility of the deposits impacts banks' asset portfolio choices. These results also demonstrate the interdependence of liquidity risk and interest risk management and emphasise the importance of the stability of the deposits in a bank's ability to provide long-term credit.

Motivating Evidence



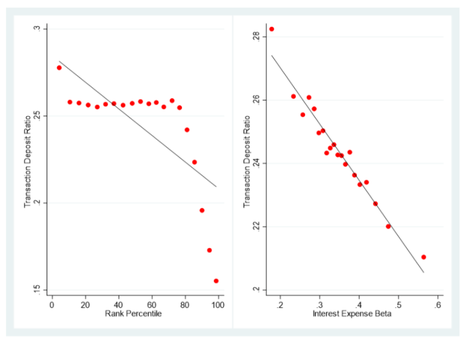
DSS, 2021

- Small banks are not performing this interest sensitivity matching.
- RQ - Why do small banks not perform interest sensitivity matching?

This Paper

1. Small banks face higher bank run risk during crises
   - Flight to safety - In crises, deposits reallocate from small banks to large banks.
2. Higher bank run risk in crises affects their lending choices
   - To mitigate bank run risk, they preserve liquidity by reducing the duration of their assets ex-ante.
3. In an attempt to mitigate the anticipated bank run risk during stress periods, small banks pair their low-interest expense beta with high-interest income beta. Resulting, in interest sensitivity mismatch and thus, higher interest risk in normal times.

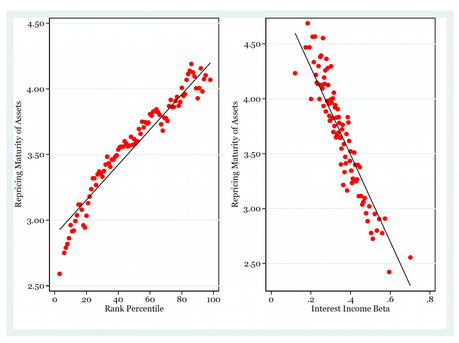
Why Low Interest Expense Beta?



Small banks have low-interest expense beta owing to their funding structure.

- Deposit franchise → keep rates low and insensitive to market rates (DSS, 2021)
- Moreover, 87% of their assets are funded by retail deposits. Out of which 26% is non-interest-bearing deposits.

Why High Interest Income beta?



- Maturity of Assets ↓ Interest Income Beta ↑
- Primarily financed by retail deposits but maturity of assets is low.
- This is inconsistent with extensive banking literature.

Descriptive statistics

Key Takeaways

1. Asset size < $44 million
2. Primarily funded by retail deposits (87%).
3. 69% of assets funded by interest-bearing deposits. This represents their medium-term financing.
4. Well Capitalised (11%) → Higher than other groups.
5. Maturity of assets (2.8 yrs) → Much lower than other groups.

Research Methodology

$$y_{i,t} = \alpha + \Sigma_{j=1}^{5}\beta_j Size_j + \Sigma_{i=1}^{5}\beta_j Size_j \times Stress_t + Stress_t + \eta_i + \epsilon_{i,t} \quad (1)$$

Results and discussion

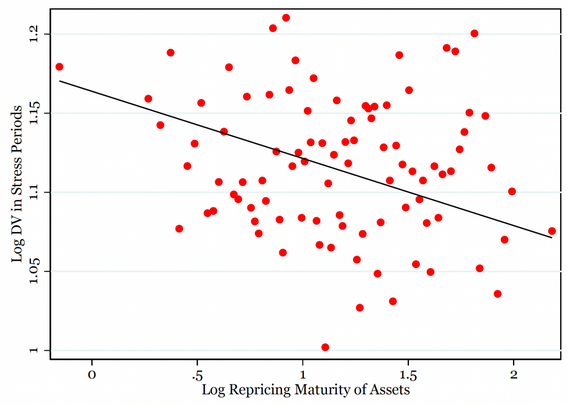
Model estimates

- In stress periods, small banks' cost of financing increases by about 2.25 pp more than comparable banks.
- Stress periods- small banks' deposits declined by about 0.20% & 0.13pp. Economically Significant - In quiet times, the average deposit growth rate is 2.20%.
- Small banks' deposit variability index increases by 0.161 pp in stress periods, whereas, the deposit variability index for all the other groups of banks decreases during stress periods.
- The run is primarily in interest-bearing deposits which comprise 69% of the total funding of these banks.
- Small banks experience an average rate of decline in their assets by approximately 0.08 pp relative to the comparable banks in the stress periods, whereas, all the other groups of banks expand their balance sheet during stress periods.
- To ease their funding stress, small banks liquidate their securities resulting in balance sheet contraction during stress periods which exposes them to higher solvency risk. Thus, heightened funding stress during stress periods exposes these small banks simultaneously to liquidity and solvency risk. Possibly, this is one of the reasons why small banks fail more often during bank crises.

Deposit Variability and Asset Duration

$$DV_{Stress} = \gamma HHI_i + u_i$$

$$D_N^A = \hat{DV_{Stress}} + u_i \quad (2)$$



	DV_{Stress} (1)	Repricing Maturity of Assets (2)
HHI Score	-33.6035***	
	(8.9952)	
$\widehat{DV_{Stress}}$		-0.0299***
		(0.0008)
Constant	11.0375***	3.8260***
	(2.5025)	(0.0047)
Observations	74,488	553,230
R-squared	0.0001	0.0023

Bootstrapped Standard Errors up to 1000 iterations in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Additional Tests - Reciprocal Deposits

1. Banks on the reciprocal deposit network were able to effectively retain and expand their deposit base during the 2023 Regional banking crisis (Kim et.al.,2024)
2. Network Small banks experience lower bank run risk during stress periods and thus, were able to effectively perform interest sensitivity matching. They had a high interest sensitivity matching coefficient of 0.957. While, not network small banks had a matching coefficient of 0.605.
3. There is not much difference in the interest sensitivity matching coefficient of network large banks and non-network large banks. Since large banks are not exposed to bank run risk in stress periods, being on the reciprocal deposit network is immaterial to their ability to perform interest sensitivity matching.
4. Placebo Test - In the Pre-2018 FDIC ruling period, small banks on the network did not perform interest sensitivity matching.

Conclusion

1. Small banks strategise to mitigate bank run risk during a crisis, but this choice also exposes them to interest rate risk in normal times.
2. Deposit stickiness varies based on bank size - so does the use of deposit franchise as a natural hedge for interest risk!
3. Fragility of the deposits impacts banks' asset choices.
4. Strong interdependence between interest rate risk and liquidity risk management.

Policy implications

Monetary Policy Implications :

- Cognisance of the fact that small banks, on average, have higher exposure to interest rate risk than large banks do.

Financial Stability Implications -

1. Policies promoting market-based solutions like reciprocal deposit can help preserve financial stability.
2. Design of deposit insurance matters!
   - Exemption for reciprocal deposit, but only up to a certain cap.
3. Encourage interbank deposit transfers from large banks to small banks during stress periods (**?**).

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