



Variable Deposit Betas and Bank Interest Rate Risk Exposure

Mustafa Emin

University of Alabama

Christopher James

University of Florida

Tao Li

University of Florida

October 2, 2024 – St Louis MO





Motivation

Interest rate risk for banks has gained **attention** in recent years due to the tightening of monetary policy following the pandemic.

WSJ | OPINION

OPINION | INSIDE VIEW

Who Killed Silicon Valley Bank?

Apparently no one at the firm perceived any risk from the Fed raising interest rates.



By Andy Kessler [Follow](#)

March 12, 2023 3:04 pm ET

US banks [+ Add to myFT](#)

SVB failure highlights the need to manage interest rate risk carefully

After rapid deposit outflows at several US lenders, banks need to review their business models

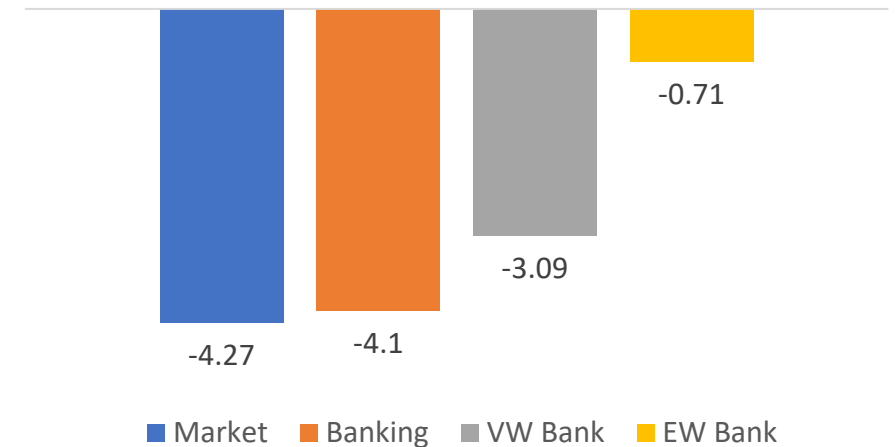




Motivation

- Conventional wisdom:
 - Banks engage in **maturity transformation**, financing long-term assets with short-term deposits.
- This exposes banks to interest rate risk:
 - A **rise** in short-term rates raises interest expenses, reducing net interest margins.
- Consistent with this view, prior studies document
 - A **negative** relationship between interest rate changes and bank equity returns on FOMC meeting dates.

FOMC Beta (pre-GFC)

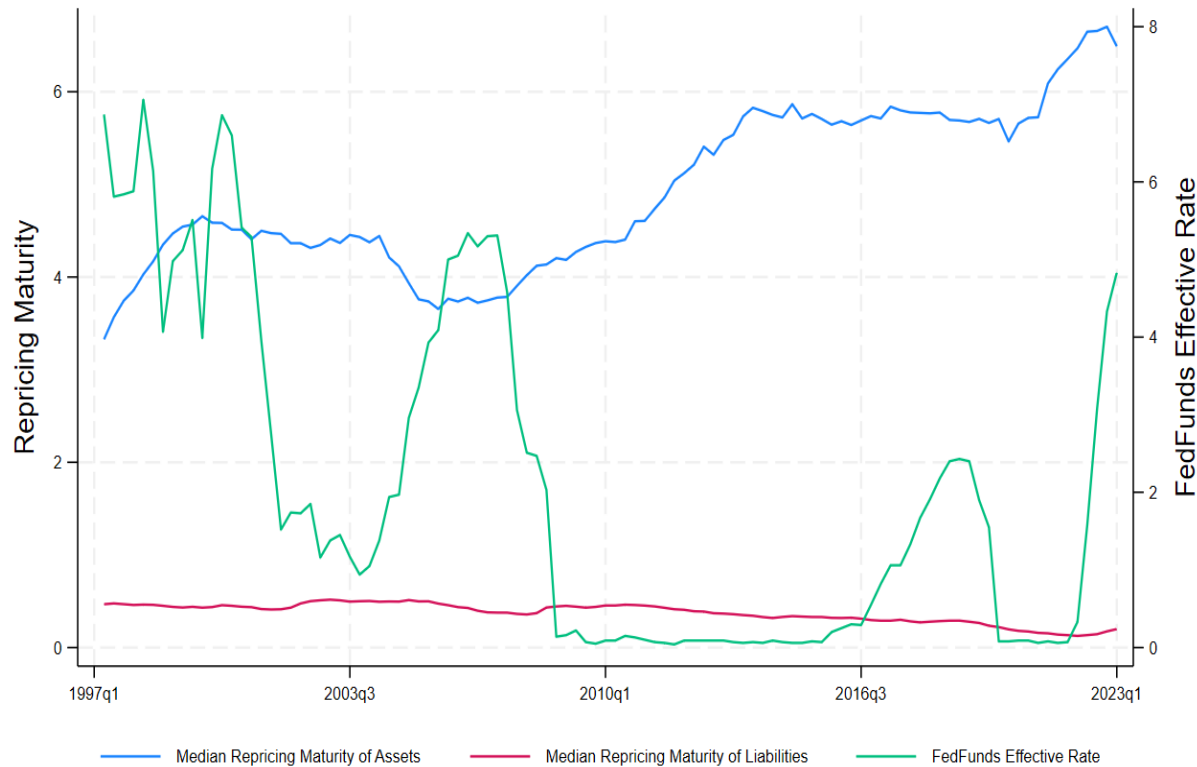


Positive Duration of Bank Equity!





Motivation: Maturity Mismatch after the GFC



The maturity of Bank Assets increased by 40% from 2009 to 2023.

The maturity of Bank Liabilities declined slightly.

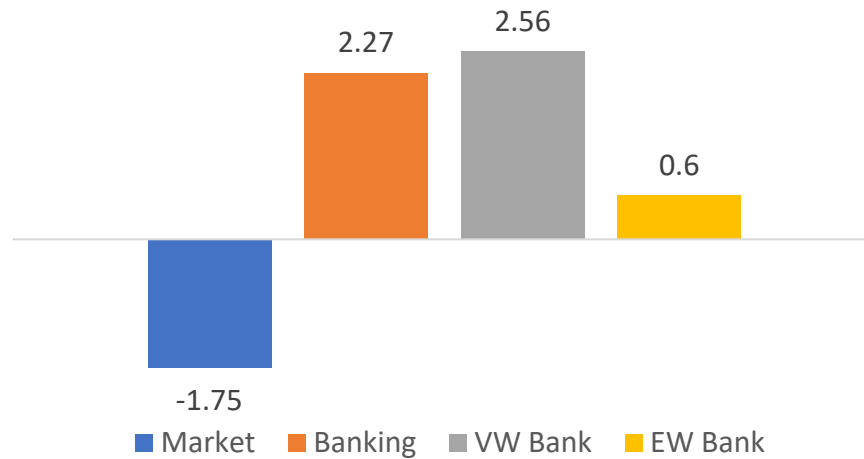
One would expect interest rate risk exposure of bank stocks to increase as well...





Introduction

FOMC Beta (post-GFC)



Negative Duration of Bank Equity!

Research question:

What explains the **shortening** of bank equity duration (reduction in rate sensitivity of bank stocks) post-crisis?





Introduction

Our explanation:

- The increase in asset duration was more than offset by an increase in the **duration of the deposit franchise**.
 - Deposit franchise serves as an important **hedge** against interest rate risk exposure created by maturity transformation (Drechsler et al., 2021; Wang et al., 2022).
 - Allows banks to pay below-market rates on deposits.
 - Makes deposits relatively insensitive to rate changes.
- We study whether the interest rate sensitivity of the **deposit franchise** varies with the level of interest rates.
 - The sensitivity depends on **deposit beta** (deposit pass-through rate).
 - When rates increase, **deposit beta** is likely to increase and deposit growth is likely to decrease.





Data

- Call Reports for 1997-2023Q4.
 - Balance sheet and income statement items.
 - Repricing maturities of assets and liabilities.
- Stock returns from CRSP.
 - Merge Call Report data and returns using the CRSP-FRB link.
- Daily effective Fed Funds rate from FRED.
- Daily Treasury yields from the U.S. Treasury.
- Fama-French industry returns from Ken French's data library.
- Manually gathered FOMC meeting dates from the Fed's website.
- Final sample includes 1,121 publicly listed banks.





Measuring Deposit Beta

- Deposit beta is Δ deposit rate from [t-1] to [t] divided by Δ FFR.
 - Does not incorporate potential lags in deposit-rate response to changes in FFR.
 - May understate the pass-through rate for deposits.
- An alternative measure from relating changes in deposit yields and contemporaneous and lagged changes in FFR.

$$\Delta DepYield_{i,t} = \sum_{j=0}^3 \beta_{i,j}^D \Delta FFR_{t-j} + X_{i,t-1} + \delta_i + \tau_t + \varepsilon_{i,t}$$

where $\Delta DepYield_{i,t}$ is the change in deposit yield between quarter [t-1] and [t] for bank i.





Summary Statistics

	Full Sample	High-Rate Environment	Low-Rate Environment	Mean Difference
Deposit Rate (%)	2.184	2.832	1.245	1.587***
Deposit Gap (FFR-DR)	0.794	1.752	-0.414	2.166***
Deposit Beta	0.304	0.492	0.267	0.225***
Time Deposits Beta	0.362	0.638	0.306	0.333***
Savings Deposits Beta	0.237	0.458	0.109	0.349***
Transactional Deposits Beta	0.082	0.133	0.055	0.078***
Deposit Growth	0.036	0.036	0.034	0.002

- Pass-through rates of about 30%.
- The change in deposit beta between high- and low-rate environments is largely due to changes in betas for different types of deposits but not their weights.





Findings: Time-Varying Deposit Beta

- A one ppt increase in FFR translates into over a **10%** increase in deposit beta.
- Sensitivity of deposit beta to rate changes is concave:
The effect peaks at **3.4%**.

	Deposit Beta[t]	
	(1)	(2)
FFR[t-1]	0.060*** (0.006)	0.361*** (0.013)
FFR[t-1] ²		-0.051*** (0.006)
Controls	Yes	Yes
Bank Fes	Yes	Yes
N Obs	37,951	37,951
R-Sq.	0.03	0.04



Findings: Deposit Beta and Reliance on Uninsured Deposits

As rates rise, the value of the deposit franchise also increases (assuming a constant pass-through rate).

- Whether this increase in value can offset the decline in asset value depends on the retention of deposits (Drechsler et al. 2023).
- One way to mitigate deposit withdrawals is to increase deposit rates.
- Sensitivity of changes in deposit beta to rate changes should vary with the **reliance on uninsured deposits**.

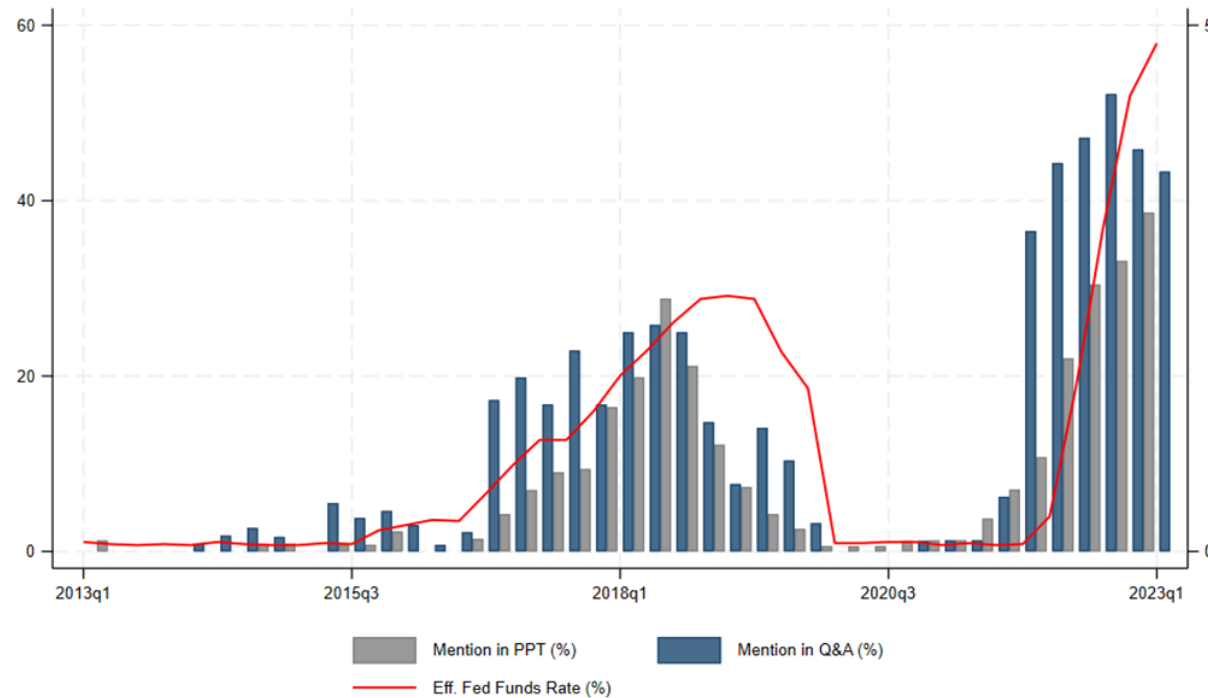
	Deposit Beta[t]	
	(1)	(2)
FFR[t-1]	0.033*** (0.006)	0.021*** (0.007)
FFR[t-1] x I[Uninsured Deposit]	0.056*** (0.008)	
FFR[t-1] x Uninsured Deposit/Asset		0.223*** (0.030)
Controls	Yes	Yes
Bank Fes	Yes	Yes
N Obs	37,951	37,951
R-Sq.	0.03	0.03





Findings: Deposit Betas and Earnings Calls

- “Deposit Beta” discussion during the earnings calls.





Findings: Deposit Betas and Bank Equity Duration

- Estimate equity duration based on relation between bank stock returns and interest rate shocks.
- Banks do not fully adjust asset maturity in response to changes in deposit beta.

	Yield Beta	FOMC Beta
	(1)	(2)
Deposit Beta	-0.195*** (0.021)	
Average Deposit Beta		-0.622*** (0.255)
Controls	Yes	Yes
Bank Fes	Yes	No
N Obs	32,711	1,893
R-Sq.	0.18	0.01





Takeaways

- Value of the deposit franchise **depends on** pass-through rates.
 - We find a positive relationship between deposit betas and the Fed Funds rate (FFR).
 - Effect is much larger for banks that rely heavily on uninsured deposits.
 - Deposit beta is often discussed in earnings calls when rates increase.
- Banks **do not fully adjust** asset maturity in response to changes in deposit beta.
 - Positive relation between equity duration and deposit beta.
- Deposit franchise is a **poor** hedge against banks' interest rate risk exposure when interest rates change significantly.
 - Deposit betas increase and deposit growth slows.





Thank you!



imgflip.com

