

Dynamic Deposits: The Role of Inflows on Future Outflows

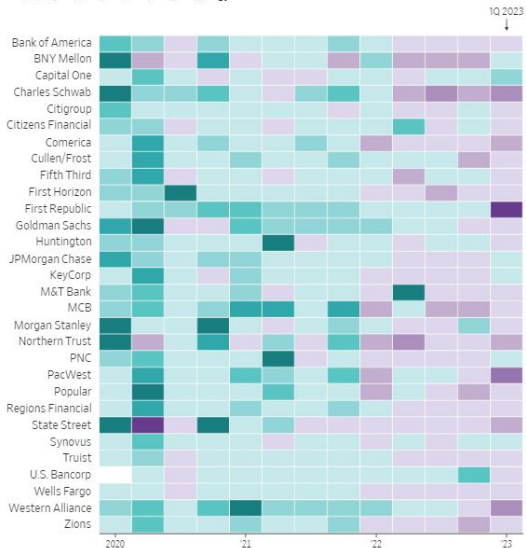
Michael Gelman
University of Delaware

Andrew MacKinlay
Virginia Tech

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An Example from the 2023 Fragility in the U.S. Banking System

Deposits, change from a quarter earlier



Motivation

- ▶ Deposits are an important source of capital in the economy and the main form of bank financing.
- ▶ Depositors can choose the timing and the amount of money they deposit in the bank.
- ▶ Banks' funding structure is affected by deposit inflows stemming from depositor decisions that are unrelated to the bank, rather than banks actively seeking them.
 - ▶ Bolton et al. (2023); Drechsler et al. (2021); Jermann and Xiang (2023).
- ▶ We term these deposits **supply-driven** – account for 43% of all deposit flows.

This Paper

- ▶ **How does marginal supply-driven deposit inflow affect banks?**
- ▶ Analyzing the U.S. banking system from 2001-2022, we find that banks that experience supply-driven deposit *inflows*:
 - ▶ Reach for yield & increase risk.
 - ▶ When the fed funds rate rises, they face higher losses and deposit *outflows*.
- ▶ Mechanism:
 - ▶ Supply-driven deposit inflows lead banks to compensate shareholders for more frequent costly *equity issuance concerns*.
 - ▶ Equity issuance is accompanied by adverse selection costs, negatively affecting the value of the firm (Myers and Majluf, 1984).
 - ▶ An ingredient in banking models (Bolton et al., 2023; Brunnermeier and Sannikov, 2014; Hugonnier and Morellec, 2017).
 - ▶ We find a stronger effect for:
 - ▶ Less-capitalized banks – close to the regulatory capital requirement.
 - ▶ Uninsured deposit inflows – represent the major source of deposit volatility.

Our Contribution

- ▶ This mechanism also plays a key role in understanding the 2022-2023 U.S. bank fragility episode:
 - ▶ Risk exposures of banks were amplified following deposit inflows in 2020-2021 ⇒ Larger losses and deposit outflows following the rise in the fed funds rate in 2022-2023.
 - ▶ This underlying mechanism helps explain the observed results documented in recent papers, and the media coverage of the current fragility episode.
- ▶ Equity issuance concerns lead banks to increase risk despite the monitoring conducted by uninsured depositors.
- ▶ High supply-driven deposit inflows can serve as an early indicator for understanding changes in bank risk, its deposit franchise and future deposit outflows.
 - ▶ Could become a component of bank stress tests.

Supply-Driven Deposits

- ▶ The main challenge studying the effect of deposit inflows on bank risk: Disentangling the effect of deposit inflows from the ex-ante decision of the bank to increase risk and collect deposits to achieve this goal.
- ▶ Main measure: Supply-driven deposits.
 - ▶ Follow identification strategy used by Cohen et al. (2007).
 - ▶ The idea: For deposits to increase without a concurrent rise in the interest rate paid on the deposits, an outward shift in the supply of capital from depositors must have occurred.
 - ▶ Estimation:
 - ▶ Exclude deposit inflows when bank increases deposit rates in quarter t or $t - 1$.
 - ▶ Supply-driven deposits inflows measure: Quarterly growth rate of non-excluded bank-quarter deposits.

Reaching for Yield

	Reaching for Yield		Interest Rate Risk		Credit Risk	
	Δ Gross Income to Assets (1)	Δ ROA (2)	Δ Maturity Gap (3)	Long-Maturity Assets Growth (4)	Δ Risk-Weighted Assets (5)	Risky Securities Growth (6)
Supply-Driven Deposit Flow	0.0123*** (0.000410)	0.00824*** (0.000412)	0.0513*** (0.00852)	0.523*** (0.0250)	0.223*** (0.00934)	0.373*** (0.100)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	431,657	431,657	431,657	431,393	431,657	137,851
R^2	0.120	0.351	0.069	0.073	0.078	0.060

- ▶ Although the marginal supply-driven deposit inflow does not necessarily lead banks to take more risk, we show:
 - ▶ **Higher supply-driven deposit inflows \Rightarrow Larger increase in reaching for yield & bank risk.**
- ▶ A one standard deviation higher supply-driven deposit inflow leads to:
 - ▶ Gross income and ROA \uparrow comparable to their sample means.
 - ▶ Maturity gap \uparrow 15% of its sample mean.
 - ▶ Risk-weighted assets/total assets \uparrow 2x its sample mean.

Alternative Explanations

- ▶ Non-price factors that affect deposit flows (e.g., market power) ⇒ Alternative measure of supply-driven deposits using county-level deposit and rates data.
- ▶ Depositors' choice to increase deposits following changes in bank characteristics ⇒ Conduct nearest-neighbor matching.
- ▶ Unused credit line withdrawals or employed loan commitments mechanically increase deposits ⇒ Control for changes in these factors.
- ▶ Exclusion of:
 - ▶ QE periods ⇒ could affect the rise in bank reserves (Acharya et al., 2023; Acharya and Naqvi, 2012).
 - ▶ Low interest periods ⇒ might drive reaching for yield behavior.
 - ▶ COVID period with large deposit inflows.
 - ▶ Temporary Liquidity Guarantee Program (TLGP) following the global financial crisis.

Equity Issuance Concerns

- ▶ **Higher equity issuance concerns \Rightarrow Larger increase in reaching for yield and bank risk.**
 - ▶ Less-capitalized banks – closer to the regulatory capital ratio and more likely to issue equity.

	Δ Risk-Weighted Assets	
	Low Equity	High Equity
Supply-Driven Deposit Flow	0.228*** (0.0150)	0.179*** (0.0186)
Controls	Yes	Yes
Bank Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Observations	143,558	143,447
R^2	0.120	0.085

- ▶ Banks with ex-ante higher share of uninsured deposits – 3x more volatile than insured deposit flows, exacerbating the concern that the bank will cross the boundary and need to issue equity.
- ▶ Uninsured supply-driven deposit inflows.

Bank Performance in Periods of Monetary Policy Tightening

- ▶ Monetary tightening typically leads to losses on security exposures & more non-performing loans \Rightarrow Analyze implications of bank's actions after receiving supply-driven deposit inflows.

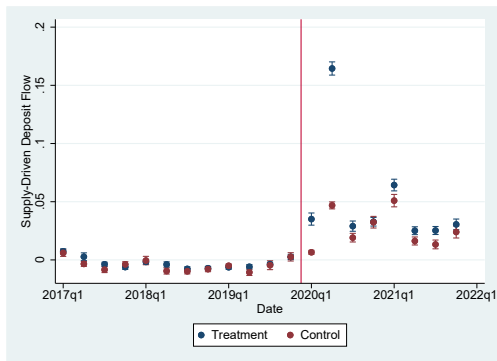
	Total Deposit Growth		
	Full Sample	Low Equity	High Equity
Supply-Driven Deposit Flow \times Δ FF Rate	-0.0842*** (0.0121)	-0.0938*** (0.0175)	-0.0766*** (0.0219)
Controls	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes
Observations	467,190	146,866	146,771
R^2	0.155	0.216	0.189

- ▶ **Higher supply-driven inflows \Rightarrow Higher outflows during monetary tightening.**
- ▶ Driven by higher risk & negative outcomes when fed fund rates rise.
- ▶ Larger effect larger for banks with higher equity issuance concerns.

2023 U.S. Bank Fragility

- ▶ This episode followed significant deposit inflows during the COVID period.
 - ▶ Banks exhibited substantial deposit inflows following a rise in risk-aversion of firms and households & government stimulus policies.
- ▶ Conduct Difference-in-Differences analysis:
 - ▶ Focus only on supply-driven deposit inflows in 2020Q1-2020Q2.
 - ▶ Conduct nearest neighbor matching between banks at the end of 2019.
 - ▶ This allows us to compare two similar banks, but only one of them experiences significant supply-driven deposit inflows in first part of 2020.
 - ▶ Treated group: Banks that exhibited largest supply-driven inflow growth.
 - ▶ Included: Silicon Valley Bank & Signature Bank.
 - ▶ Treated banks had higher presence in California and other areas with relatively dominant high-tech industry.
 - ▶ Control group: Banks with the lowest growth rate.

2023 U.S. Bank Fragility



- ▶ Parallel trends in supply-driven deposit inflows prior to COVID.
- ▶ Treated banks:
 - ▶ Engaged more in reaching for yield behavior, increased their interest rate risk & credit risk in 2020Q3-2021Q4.
 - ▶ Experienced higher deposit outflows in 2022, especially banks with higher equity issuance concerns.

Conclusion

- ▶ Banks that experienced supply-driven deposit *inflows* \Rightarrow Reach for yield and increase bank risk \Rightarrow When fed funds rate rises, they face higher losses and deposit *outflows*.
- ▶ Mechanism: Supply-driven deposit inflows lead banks to compensate shareholders for more frequent costly equity issuance concerns.
- ▶ Our results point to an underlying mechanism that helps explain the observed results documented in recent papers, and the media coverage of the current fragility episode.
- ▶ High supply-driven deposit inflows can serve as a new early indicator for understanding changes in bank risk, its deposit franchise and future deposit outflows.
- ▶ Equity issuance concerns lead banks to increase risk despite the monitoring conducted by uninsured depositors.