

Open to All Comers: How Unsought Deposit Inflows Affect Banks

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Motivation

Deposits are an important source of capital in the economy and the main form of bank financing.

- ▶ Benefit: Source of cheap funding for banks.
- ▶ Cost: Introduce uncertainty regarding the bank's leverage.
- ▶ Can be driven by depositor decisions that are unrelated to the bank, rather than banks actively seeking them.
 - ▶ Dynamic models of deposits by Bolton, Li, Wang and Yang (2023); Drechsler, Savov and Schnabl (2021); Jermann and Xiang (2023).
- ▶ We term these deposits **supply-driven**.

Our focus: How does the marginal supply-driven deposit inflow affect bank behavior?

This Paper

Hypothesis:

- ▶ Supply-driven deposit inflows increase bank's leverage uncertainty.
- ▶ *Equity issuance concerns*: Banks more likely to issue equity, which is costly to current shareholders (Myers and Majluf, 1984).
- ▶ To compensate shareholders, banks reach for yield and increase risk.

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What we do:

- ▶ Develop a novel measure to estimate supply-driven deposits.
- ▶ Find that banks with supply-driven deposit **inflows** increase **profitability**, **interest rate risk**, and **credit risk**.
- ▶ Provide empirical evidence that equity issuance concerns drive the rise in risk.
- ▶ Find that when monetary policy tightens, these banks experience higher losses and increased deposit **outflows**.

This Paper

Also show the results:

- ▶ Cannot be explained by various alternative stories.
- ▶ Remain consistent across different robustness tests.
- ▶ Hold in a difference-in-differences setting.

This Paper

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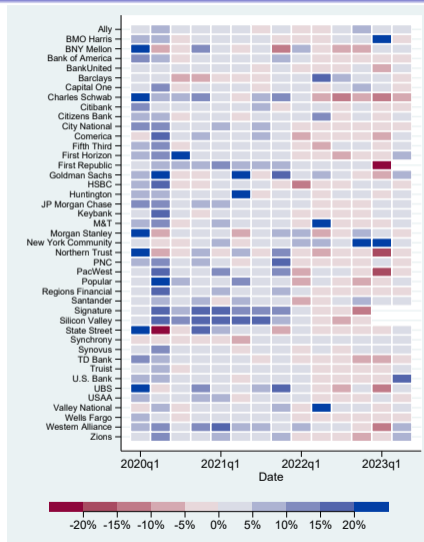
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Key role in understanding the 2022-2023 US bank fragility episode:

- ▶ Bank risk exposures amplified following deposit **inflows** in 2020-2021 \Rightarrow Larger losses and deposit **outflows** following rise in Fed funds rate in 2022-2023.

High supply-driven deposit inflows can serve as an early indicator for changes in bank risk, its deposit franchise, and future deposit outflows.

Deposit Flows in the US Banking System 2020–2023



Supply-Driven Deposits

Main challenge for studying effect of deposit inflows on bank risk:

- ▶ Disentangling the effect of inflows from the bank's ex-ante decision to increase risk and collect deposits to achieve this goal.

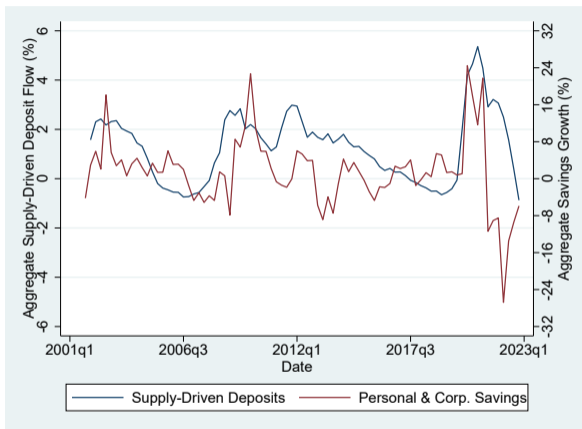
Main measure: Supply-driven deposits.

- ▶ Follow identification strategy used by Cohen, Diether and Malloy (2007).
- ▶ **Main idea:** For deposits to increase without a concurrent rise in deposits rate, an outward shift in the supply of capital from depositors must have occurred.

Estimation:

- ▶ Exclude inflows when a bank increases deposit rates in quarter t or $t - 1$.
- ▶ Supply-driven deposits inflows measure: Quarterly growth rate of *non-excluded* bank-quarter deposits.

Supply-Driven Deposits



- ▶ When HHs and firms have more savings, we expect some to be directed to banks, separate from the banks' demand for deposits.
- ▶ Positive correlation between supply-driven deposit flows and aggregate savings growth.

Reaching for Yield

Quarterly panel of US banks from 2001-2022:

	Δ Gross Income to Assets	Δ ROA	Δ Maturity Gap	Δ Risk-Weighted Assets
Supply-Driven Deposit Flow	0.0123*** (0.000409)	0.00825*** (0.000412)	0.0506*** (0.00853)	0.223*** (0.00936)
Controls	Yes	Yes	Yes	Yes
Bank FEs	Yes	Yes	Yes	Yes
Year-Qtr FEs	Yes	Yes	Yes	Yes
Observations	431,984	431,984	431,984	431,984
R^2	0.120	0.351	0.069	0.078

Controls: Log Assets, NIM, Loan Growth, ROA, Deposits Ratio, Equity Ratio

More supply-driven inflows \Rightarrow Increase in reaching for yield and risk.

One standard deviation higher supply-driven deposit inflow leads to:

- ▶ Gross income and ROA \uparrow comparable to their sample means.
- ▶ Maturity gap \uparrow 13% of its sample mean.
- ▶ Risk-weighted assets \uparrow 9x of sample mean.

Alternative Explanations

Rise in advertising and promotions offerings

- ▶ Use measure of supply-driven deposits only in quarters without increase in advertising costs (and without increase in deposit rates).

Non-price factors that affect deposit flows (e.g., market power)

- ▶ Use measure of supply-driven deposits with county-level data.

Depositors increase deposits following changes in bank characteristics

- ▶ Conduct nearest neighbor matching.

Heterogeneity in bank investment opportunities

- ▶ Match banks based on physical footprint.

Alternative Explanations

Changes in bank spreads relative to peers or Fed funds rate

- ▶ Use measure of supply-driven deposits using changes in spread, rather than changes in deposit rates.

Credit line withdrawals or loan commitments mechanically increase deposits

- ▶ Control for changes in these factors.

Results robust to excluding:

- ▶ QE periods, low interest rate periods, COVID period, Temporary Liquidity Guarantee Program period.

Other unobserved time-varying factors

- ▶ Use Bartik-type instruments based on historical deposit shares.

Equity Issuance Concerns

Having established that supply-driven deposits lead to higher bank risk, we turn to show the mechanism - *equity issuance concerns*.

Example (anecdotal evidence):

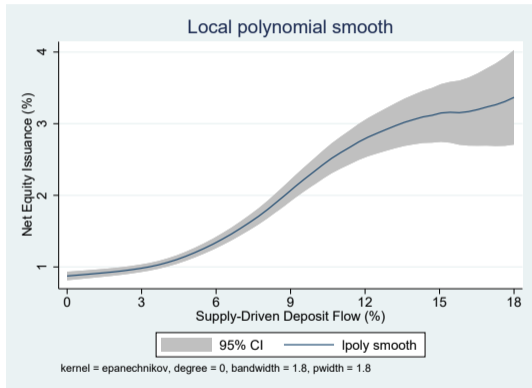
- ▶ In 2020, banks experienced large supply-driven deposit inflows ⇒ Raised substantial equity in 2021.
- ▶ S&P Global (March 15, 2021):

US banks raise \$1.33B in common equity in the first 2 months of 2021

*“Banks issued \$1.33 billion in common equity in the first two months of 2021. On March 2, San Francisco-based **First Republic Bank** completed a \$291.4 million capital raise...Phoenix-based **Western Alliance Bancorp.** closed a \$209.3 million common equity offering on Feb. 28, and New York City-based **Signature Bank** closed a \$709.0 million offering Feb. 5.”*

Equity Issuance Concerns

Conducting a formal analysis:



	Equity Issuance Indicator	Net Equity Issuance (%)
Supply-Driven Deposit Flow	0.00408*** (0.00128)	0.132*** (0.0255)
Additional Controls	Yes	Yes
Bank FEs	Yes	Yes
Year-Quarter FEs	Yes	Yes
Observations	88,002	88,002
R^2	0.605	0.217

- ▶ Banks are more likely to issue equity following higher supply-driven deposit inflows.
- ▶ This concern is a valid shareholder consideration.

Equity Issuance Concerns

Higher equity issuance concerns \Rightarrow Larger increase in reaching for yield and bank risk.

▶ We find larger increase in risk among:

1. *Less-capitalized banks*: closer to regulatory requirement, more likely to issue equity.

▶ Similar pattern in a Diff-in-Diff setting: 2019 regulatory change in the capital requirements of community banks.

2. *Banks with higher share of uninsured deposits*: 3x more volatile than insured deposits, exacerbating concerns that the bank will need to issue equity.

The Effect of Monetary Policy Tightening

Periods of monetary tightening typically lead to losses on banks' security exposures and hampers borrowers' ability to repay their debts.

We find:

- ▶ Monetary tightening leads to **losses on security exposures** and **more NPLs** for banks that received supply-driven deposit inflows.
- ▶ Losses concentrated in banks with highest equity issuance concerns.

	Δ NPL to Lag Assets		
	Full Sample	Low Equity	High Equity
Supply-Driven Deposit Flow \times Δ FF Rate	0.00642*** (0.00181)	0.00670** (0.00292)	0.00157 (0.00323)
Additional Controls	Yes	Yes	Yes
Additional Controls \times Δ FF Rate	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes
Observations	455,818	151,607	151,468
R^2	0.040	0.080	0.046

The Effect of Monetary Policy Tightening

	Total Deposit Growth		
	Full Sample	Low Equity	High Equity
Supply-Driven Deposit Flow \times Δ FF Rate	-0.187*** (0.0285)	-0.223*** (0.0428)	-0.184*** (0.0536)
Additional Controls	Yes	Yes	Yes
Additional Controls \times Δ FF Rate	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes
Observations	441,726	146,900	146,799
R^2	0.161	0.217	0.189

Higher supply-driven inflows \Rightarrow Higher deposit outflows during tightening.

- ▶ Driven by higher risk and negative outcomes when Fed funds rate rises.
- ▶ Larger effect for banks with higher equity issuance concerns.

Recent U.S. Bank Fragility

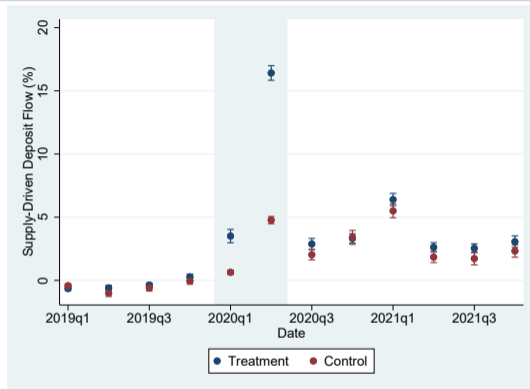
This episode followed substantial deposit inflows during the COVID period.

- ▶ Following a rise in risk-aversion of firms/households and government stimulus policies.

Conduct difference-in-differences analysis:

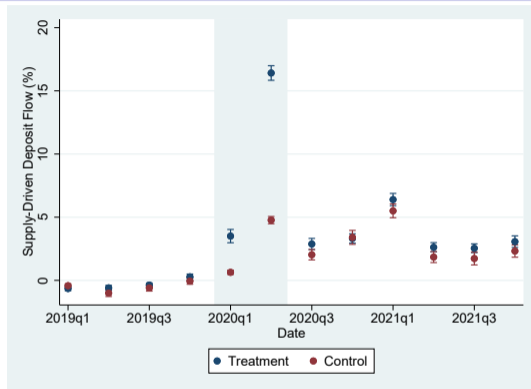
- ▶ Focus only on supply-driven deposit inflows in 2020Q1-2020Q2.
- ▶ Compare two similar banks, but only one experiences significant supply-driven deposit inflows in first part of 2020.
 - ▶ Conduct nearest neighbor matching between banks at the end of 2019.
- ▶ Treated group: Banks that exhibited largest 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 positive growth rate.

Recent U.S. Bank Fragility



- ▶ Prior to COVID: Parallel trends in supply-driven deposit inflows.

Recent U.S. Bank Fragility



- ▶ Prior to COVID: Parallel trends in supply-driven deposit inflows.
- ▶ 2020Q3-2021Q4: Treated banks engaged more in **reaching for yield behavior**, increased **interest rate risk** and **credit risk**.
- ▶ 2022: Treated banks experienced 2.5pp **higher deposit outflows** during monetary tightening
 - ▶ Bigger outflows among banks with higher equity issuance concerns.

Conclusion

- ▶ Banks that experience 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 costly equity issuance concerns.
- ▶ Helps explain observed results documented in recent papers, and media coverage of the recent fragility episode.
- ▶ Can serve as an early indicator for changes in bank risk, its deposit franchise, and future deposit outflows.