

BANKING IN THE AFTERMATH OF SVB

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LARGEST BANK FAILURES IN U.S. HISTORY

Bank name	Bank failure date	Assets*
Washington Mutual Bank	Sept. 25, 2008	\$307 billion
First Republic Bank	May 1, 2023	\$212 billion**
Silicon Valley Bank	March 10, 2023	\$209 billion**
Signature Bank	March 12, 2023	\$110 billion**
IndyMac Bank, F.S.B.	July 11, 2008	\$31 billion
Colonial Bank	Aug. 14, 2009	\$26 billion
First Republic Bank-Dallas, N.A.	July 29, 1998	\$17 billion

OVERVIEW

- Some simple bank economics
- Why SVB was so vulnerable
- How bad is the problem elsewhere?
- The immediate policy response
- Going-forward regulatory implications

BASLINE EXAMPLE

- Bank assets = 100 book value of Treasuries; coupon is 2%; duration is 10 years.
- Market rate is 2%, so assets have market value $MVA = 100$.
- Bank has 90 of deposits that pay 1%.
- Bank has 10 of book equity.
- Market value of deposits $MVD = 90 * 1\% / 2\% = 45$. Or said differently, deposit franchise has value of $90 - 45 = 45$.
- So market value of equity $MVE = 100 - 45 = 55$.
- Reflects ability to pay sub-market rate on deposits.

RATES JUMP TO 5%, SLEEPY DEPOSITORS

- $MVA = 100 - 3\% \times 10 = 70$. (10-year duration \rightarrow 1% move in rates changes bond value by 10%)
- Assume depositors are so sleepy that they continue to accept 1% rate on deposits.
- Market value of deposits $MVD = 90 \times 1\% / 5\% = 18$. Or said differently, deposit franchise now has value of $90 - 18 = 72$.
- So market value of equity $MVE = 70 - 18 = 52$: virtually unchanged, in spite of large decline in MVA.
- Key intuition: deposits are effectively long duration liability, so act as a hedge against long duration assets.
- In this case, MTM losses on assets due to rate increases not a concern.

RATES JUMP TO 5%, DEPOSIT BETA = 2/3

- Assume deposit rate goes to 3% (an increase of 2%, or 2/3 of the change in market rates).
- Market value of deposits $MVD = 90 * 3\% / 5\% = 54$. Or said differently, deposit franchise has value of $90 - 54 = 36$.
- So market value of equity $MVE = 70 - 54 = 16$: ouch. Now a big decline in MVE, as more rate-sensitive deposits are no longer as good a hedge for long-duration assets.

RATES JUMP TO 5%, DEPOSITS REPRICE FULLY

- Assume deposits are stable (no runs), but rate goes to market rate of 5%.
- Market value of deposits $MVD = 90$. Or said differently, deposit franchise has no value.
- So market value of equity $MVE = 70 - 90 = -20$: bank is economically insolvent.
- If deposits are insured, there need be no run, but the bank would slowly bleed out over time, as net interest margin and income decline.

RATES JUMP TO 5%, DEPOSITORS RUN

- Assume depositors are uninsured, and they all run.
- Bank has assets with MVA = 70, deposit claims of 90: it fails immediately.
- Lack of insurance plus usual run dynamics turns what might have been a slow-burn solvency problem into a dramatic liquidity crisis.
- Run here is not caused by illiquidity of assets as in Diamond-Dybvig, but rather by loss of deposit franchise value in a run.

SOME LESSONS

- Conventional bank accounting and regulatory treatment—e.g., not flowing through MTM losses on securities into regulatory capital—only makes sense if depositor base is highly sticky *and* sleepy, i.e., if deposits don't reprice.
- Run vulnerability is driven by interaction of: (i) large MTM losses relative to capital; and (ii) high fraction of uninsured depositors.
 - SVB is poster child: at 90th percentile of unrecognized losses/assets; at 99th percentile of uninsured deposits.
 - 92.5% of deposits were uninsured (!)
- Even without runs, if deposit betas are higher than anticipated, this can be a significant long-run solvency problem for the banking sector.

SVB BALANCE SHEETS

Assets (\$000)	12/31/18	12/31/19	12/31/20	12/31/21	12/31/22
Cash & Noninterest-bearing Deps					
Interest-bearing Balances	517,613	658,563	704,209	2,040,000	1,192,000
Total Cash & Bal Due Dep Inst	2,890,855	5,520,226	16,265,592	11,085,000	11,319,000
Held-to-Maturity Securities	3,408,468	6,178,789	16,969,801	13,125,000	12,511,000
Total Available-for-sale Debt Securities (FV)	NA	13,842,946	16,592,153	98,195,000	91,321,000
Equity Securities FV not HFT	7,587,347	13,909,810	30,832,033	27,093,000	25,976,000
Total Securities	2,956	0	10,952	0	0
Fed Funds Sold	23,077,746	27,752,756	47,435,138	125,288,000	117,297,000
Reverse Repurch Agreements	0	0	0	0	0
Tot Fed Funds & Reverse Repos	115,272	281,123	213,325	599,000	707,000
Loans & Leases Held for Sale	115,272	281,123	213,325	599,000	707,000
Total Reserves	28,338,280	33,149,303	45,180,806	66,275,000	74,249,000
Net Loans & Leases (Excl HFS)	280,903	304,803	447,765	423,000	636,000
Total Trading Assets	28,057,377	32,844,500	44,733,041	65,852,000	73,613,000
Premises & Fixed Assets	104,134	167,341	284,526	141,000	127,000
Total OREO	59,296	143,397	123,786	190,000	170,000
Invest in Unconsolidated Subsid	0	0	1,179	1,000	0
Direct and Indirect Inv in Real Estate Ventures	76,413	74,190	115,232	162,000	153,000
Goodwill	0	0	0	972,000	1,341,000
Intangible Assts: Tot Intangible Excl Goodwill	0	0	0	201,000	201,000
Total Intangible Assets	0	0	0	97,000	84,000
Total Other Assets	0	0	0	298,000	285,000
	1,240,938	2,500,833	3,963,070	1,953,000	2,822,000
Total Assets	56,139,644	69,942,929	113,839,098	208,581,000	209,026,000
Liabilities					
Dep: U.S. Nonint-bear Deps					
Dep: U.S. Int-bear Deposits	38,467,612	40,272,759	65,066,953	121,685,000	79,394,000
Dep: Total Dom Deposits	6,789,042	16,322,389	29,701,301	53,693,000	82,085,000
Dep: non-U.S. Nonint-bear Deps	45,256,654	56,595,148	94,768,254	175,378,000	161,479,000
Dep: non-U.S. Int-bear Deps	1,298,850	1,754,756	2,664,586	6,394,000	3,626,000
Total Non U.S. Deposits	3,436,435	4,593,848	5,761,267	9,659,000	10,273,000
Total Deposits (Incl Dom & For)	4,735,285	6,348,604	8,425,853	16,053,000	13,899,000
Fed Funds Purchased	49,991,939	62,943,752	103,194,107	191,431,000	175,378,000
Repurchase Agreements	0	0	0	0	0
Total Fed Funds & Repos	319,414	0	0	61,000	524,000
Total Trading Liabilities	319,414	0	0	61,000	524,000
Total Other Borrowed Money	96,956	135,830	216,912	236,000	332,000
Subordinated Notes & Debentures	312,380	105,180	21,459	60,000	15,040,000
Oth Liabilities (Excl Min Int)	0	0	0	0	0
	864,142	1,724,072	3,337,656	1,998,000	2,296,000
Tot Liabilities (Excl Min Int)	51,584,831	64,908,834	106,770,134	193,786,000	193,570,000
Equity					
Common Stock	4,750	4,750	4,750	5,000	5,000
Common Stock Surplus	1,403,843	1,442,680	2,198,737	9,260,000	10,087,000
Retained Earnings	3,198,747	3,501,782	4,243,054	5,537,000	7,267,000
Accumulated Oth Comp Inc	(52,527)	84,883	622,423	(7,000)	(1,999,000)
Total Equity Capital	4,554,813	5,034,095	7,068,964	14,795,000	15,456,000
Total Liab, Min Int & Equity	56,139,644	69,942,929	113,839,098	208,581,000	209,026,000

SVB SECURITIES: BOOK AND MARKET VALUES

Cost Basis of Securities (\$000)	<u>12/31/18</u>	<u>12/31/19</u>	<u>12/31/20</u>	<u>12/31/21</u>	<u>12/31/22</u>
U.S. Treasury Secs	4,557,844	6,711,432	4,118,191	15,669,000	17,106,000
U.S. Agency and GSA Debt Securities	1,731,416	618,728	635,992	809,000	606,000
St & Pol: Total Securities	1,575,421	1,785,951	3,635,194	7,158,000	7,417,000
Total RMBS Issues or Guaranteed by FNMA, FHLMC or GNM	12,505,214	14,408,437	30,960,441	84,538,000	76,708,000
Total CMBS	2,769,706	4,099,266	7,383,464	16,495,000	16,075,000
CB: Tot Other Debt Securities	5,815	9,037	24,491	772,000	1,917,000
 CB: Total Securities (Net)	 23,145,416	 27,632,851	 46,757,773	 125,441,000	 119,829,000

Fair Value of Securities					
U.S. Treasury Secs	4,535,563	6,788,902	4,389,322	15,722,000	16,043,000
U.S. Agency and GSA Debt Securities	1,722,405	624,247	658,534	811,000	535,000
State and Political Subdiv Secs	1,550,756	1,867,831	3,855,555	7,315,000	6,149,000
Total RMBS Guaranteed by FNMA, FHLMC or GNMA	12,248,747	14,597,854	31,483,530	83,437,000	64,289,000
Total CMBS	2,712,301	4,137,211	7,637,470	16,264,000	13,440,000
Tot of All MBS	14,961,048	18,735,065	39,121,000	99,701,000	77,729,000
Tot Other Debt Securities	5,811	9,038	24,492	770,000	1,688,000
 Total Fair Value of Securities	 22,775,583	 28,025,083	 48,048,903	 124,319,000	 102,144,000

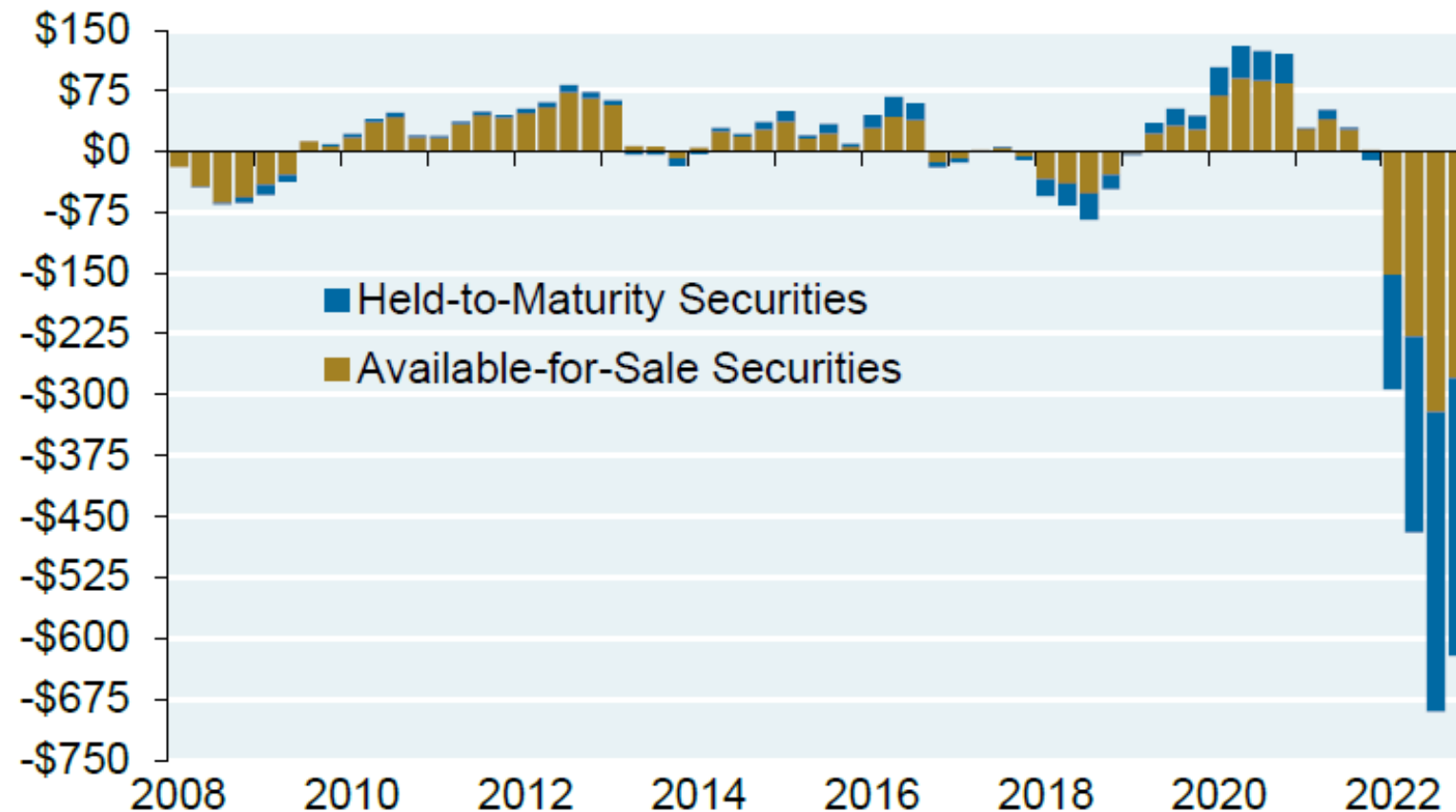
HOW BAD IS IT ELSEWHERE?

- Jiang et al (2023) estimate unrecognized losses of \$2T for aggregate banking system due to increased rates.
 - Not only in securities that can be marked-to-market, but also imputed for illiquid loans like mortgages.
- Drechsler et (2023) estimate is similar: \$1.7T.
- These numbers are close to aggregate bank equity capital of \$2.1T.
- How scary? Will depend on extent of deposit repricing.
- Seems plausible that—especially given recent events—depositors will be more rate-sensitive than usual.

SECURITIES LOSSES ALONE ARE SIGNIFICANT

FDIC Q4 unrealized bank losses on investment securities

US\$, billions



Source: FDIC. Q4 2022.

POLICY RESPONSE: THE MISSING BAZOOKA

- In October 2008, FDIC implements Temporary Liquidity Guarantee Program (TLGP).
- TLGP has two parts: (1) Transaction Account Guarantee Program, for all noninterest-bearing transaction accounts; and (2) Debt Guarantee Program, for certain newly issued senior unsecured debt.
- TLGP a powerful tool to take run risk off the table.
- But Dodd-Frank Act now prevents FDIC from doing this again without explicit approval of Congress.

POLICY RESPONSE: FDIC AND FED

- FDIC invokes systemic risk exemption to bail out uninsured depositors of SVB and Signature Bank.
- First Republic is sold to JP Morgan; FDIC provides loss-sharing agreement.
- Fed invokes 13(3) authority to create Bank Term Funding Program (BTFP): lend up to one year against Treasury and agency collateral.
 - Crucially, value collateral at *par, not market value*.
 - Facility is backstopped with \$25B from Treasury Exchange Stabilization Fund.

FED BALANCE SHEET 8/30/2023

1. Factors Affecting Reserve Balances of Depository Institutions

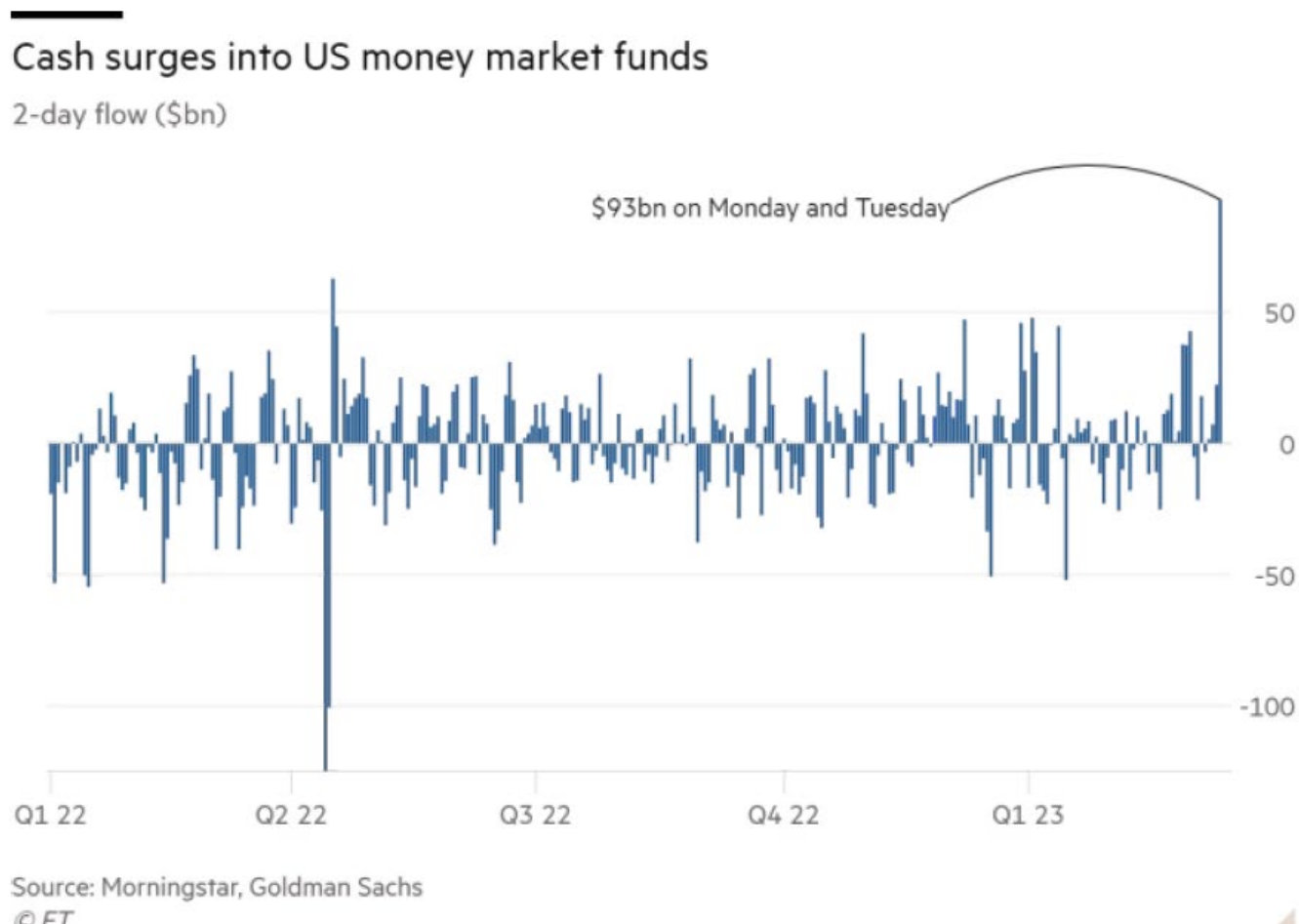
Millions of dollars

Reserve Bank credit, related items, and reserve balances of depository institutions at Federal Reserve Banks	Averages of daily figures			Wednesday Aug 30, 2023
	Week ended Aug 30, 2023	Change from week ended		
		Aug 23, 2023	Aug 31, 2022	
Reserve Bank credit	8,087,436	- 19,854	- 709,489	8,084,524
Securities held outright ¹	7,509,968	- 14,304	- 902,182	7,508,057
U.S. Treasury securities	5,006,713	+ 409	- 693,822	5,006,839
Bills ²	259,422	0	- 66,622	259,422
Notes and bonds, nominal ²	4,273,034	+ 64	- 627,063	4,273,034
Notes and bonds, inflation-indexed ²	364,549	0	- 10,319	364,549
Inflation compensation ³	109,708	+ 345	+ 10,181	109,835
Federal agency debt securities ²	2,347	0	0	2,347
Mortgage-backed securities ⁴	2,500,909	- 14,713	- 208,359	2,498,870
Unamortized premiums on securities held outright ⁵	290,449	- 916	- 37,018	290,201
Unamortized discounts on securities held outright ⁵	-27,517	+ 74	- 957	-27,422
Repurchase agreements ⁵	1	- 3	+ 1	1
Foreign official	1	- 3	+ 1	1
Others	0	0	0	0
Loans	251,356	- 3,826	+ 231,650	250,565
Primary credit	2,204	+ 267	- 2,390	2,907
Secondary credit	0	0	0	0
Seasonal credit	67	+ 6	+ 18	70
Paycheck Protection Program Liquidity Facility	5,750	- 250	- 9,313	5,693
Bank Term Funding Program	107,301	+ 33	+ 107,301	107,527
Other credit extensions ⁷	136,034	- 3,882	+ 136,034	134,369
Net portfolio holdings of MS Facilities LLC (Main Street Lending Program) ⁸	19,515	+ 16	- 6,404	19,534
Net portfolio holdings of Municipal Liquidity Facility LLC ⁸	5,615	+ 2	+ 61	5,618
Net portfolio holdings of TALF II LLC ⁸	1,581	+ 1	- 576	1,583
Float	-273	- 105	+ 104	-753
Central bank liquidity swaps ⁹	232	+ 2	+ 61	232
Other Federal Reserve assets ¹⁰	36,507	- 797	+ 5,769	36,910
Foreign currency denominated assets ¹¹	18,195	- 75	+ 650	18,316
Gold stock	11,041	0	0	11,041
Special drawing rights certificate account	5,200	0	0	5,200
Treasury currency outstanding ¹²	52,364	+ 14	+ 1,407	52,364
Total factors supplying reserve funds	8,174,235	- 19,916	- 707,433	8,171,445

Note: Components may not sum to totals because of rounding. Footnotes appear at the end of the table.

- BTFP usage at \$108B.
- \$134B loan to FDIC bridge banks for SVB and Signature.

BIG FLOWS FROM BANKS TO MONEY FUNDS



- \$384B flows into money funds from March 1 to April 12, closely mirroring decline in bank deposits.
- Almost entirely into Treasury-only funds.

REGULATORY AND SUPERVISORY MISTAKES?

- 2013: Fed exempts non-GSIB banks from flowing through losses on AFS securities to regulatory capital.
- 2018 legislation: raises ceiling from \$50B to \$250B for banks to be exempt from enhanced prudential standards.
 - E.g., stress tests, liquidity coverage ratio.
- On-site supervision: seems clear that supervisors were too slow to act on glaring concerns with SVB.
 - General over-bureaucratization of process, or hands-off signals sent by Board Vice-Chair for supervision?

BANK REGULATION GOING FORWARD

- May need to accept reality that all deposits will be de facto insured, whether this is explicitly codified or not.
- And perhaps all non-deposit sources of short-term funding.
- If so, how to respond?
- More equity capital in regional and smaller banks?
- More long-term debt that can safely be allowed to take losses, and that may have some incentive to pay attention to bank health?

IT'S NOT JUST CAPITAL

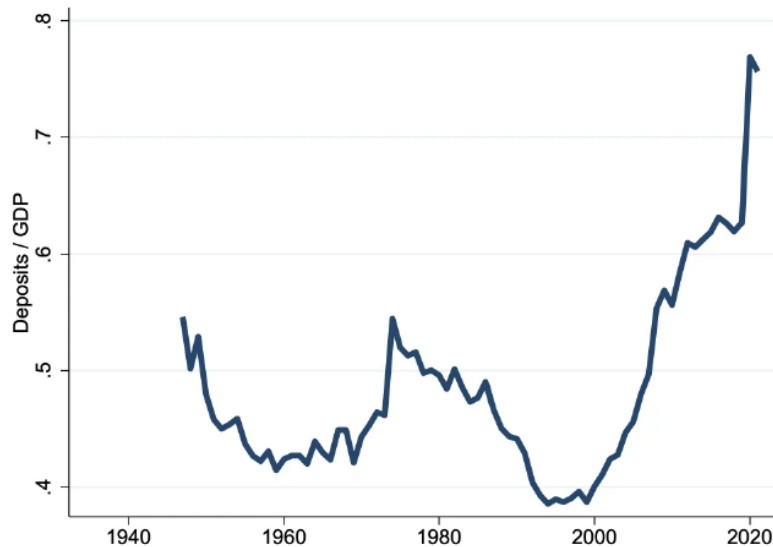
- Banks have seen huge growth in uninsured deposits.
- And we've learned that technology and social media can dramatically accelerate speed of runs.
- The key policy question: how to deal with this increased run risk?

TWO POSSIBLE APPROACHES

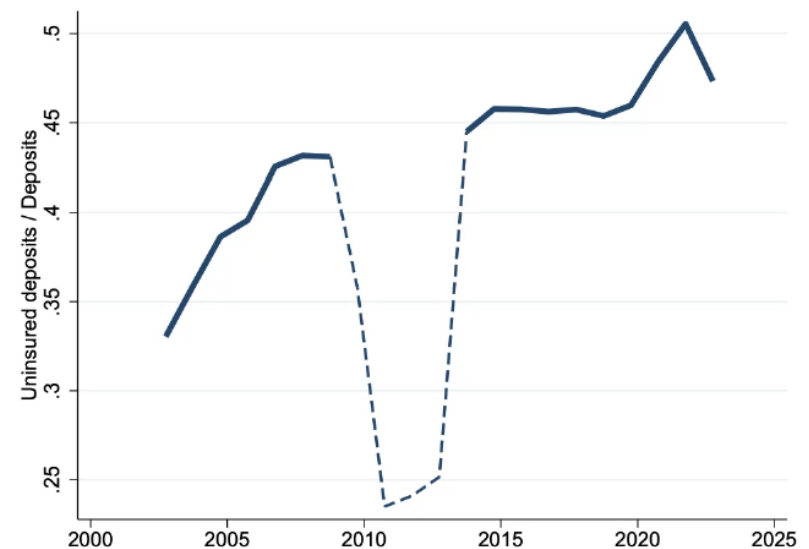
- (1) Make the world safe for large volumes of (currently) uninsured deposits.
 - Premise: they are crucial for traditional bank intermediation, e.g., funding loans to small business.
 - Some argue for significant expansion of insurance safety net.
- (2) More skepticism re uninsured deposits; may want policy to lean against them in some way.
 - Are these deposits really funding intermediation-intensive loans?
 - There are potential risks/costs to extending blanket deposit insurance.

RAPID DEPOSIT GROWTH SINCE 2000, ESPECIALLY UNINSURED DEPOSITS

Panel A Total deposits to GDP



Panel B Uninsured deposits to total deposits



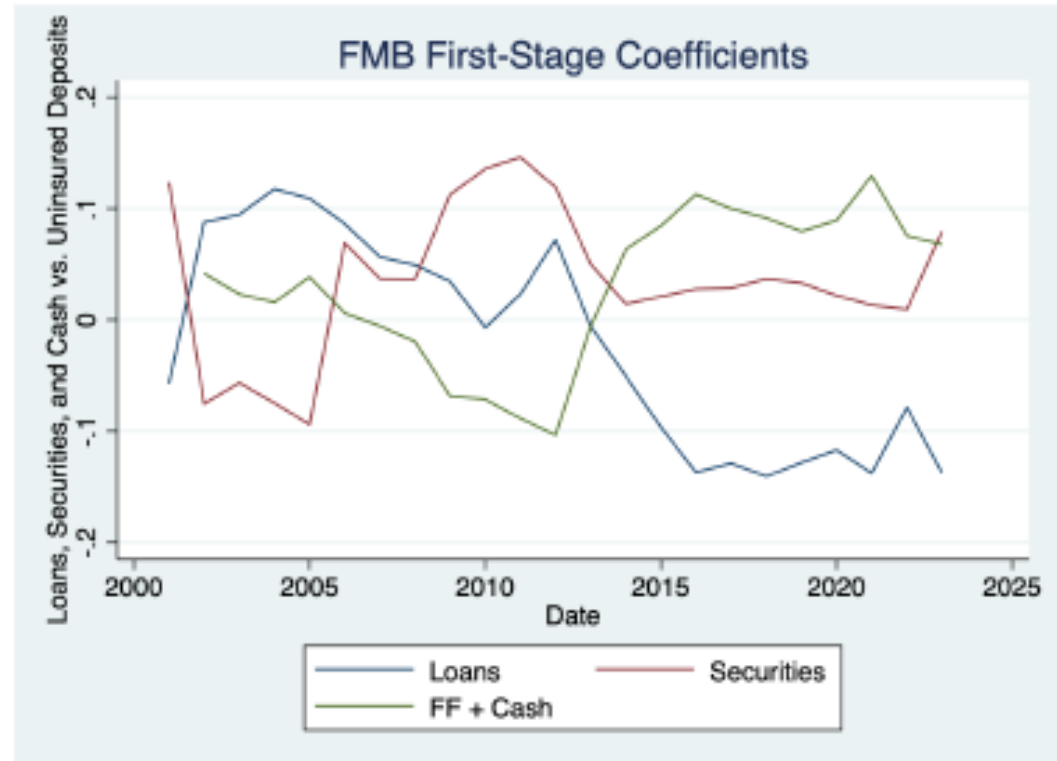
DEPOSIT GROWTH HAS NOT BEEN FUNDING LOANS



X-SECTION TELLS A SIMILAR STORY

- In recent years, uninsured deposits/assets is negatively correlated with loans/assets.
- And positively correlated with cash and securities to assets

3.1 Levels, Unweighted



X-SECTION TELLS A SIMILAR STORY

4 Loans vs. Uninsured Deposits Matrix

		Share of Total Assets by Group		
		Uninsured Deposits / Assets		
		Low	Medium	High
Loans / Assets	Low	1%	18%	37%
	Medium	2%	10%	17%
	High	7%	3%	4%

MY PREFERRED APPROACH: LEAN AGAINST

- Reality is that many banks are using uninsured deposits primarily to fund e.g., mortgage backed-securities holdings.
 - SVB is illustrative in this sense.
- This can be done with less systemic risk and taxpayer exposure outside the banking sector, say by bond funds.
- So may want to find ways to encourage this, while at the same time reducing the systemic risks associated with uninsured deposits.

A SPECIFIC IMPLEMENTATION

- Adapt Liquidity Coverage Ratio (LCR) so that banks are required to back uninsured deposits one-for-one with highly liquid short-term cash or securities (T-bills, reserves).
- And pre-position Treasuries with Fed so they can be monetized on demand.
- Like a narrow bank, but just for uninsured deposits.
- No need for any new legislation.

OTHER CONCERNS: COMMERCIAL REAL ESTATE

Newsletter

Wall Street's New Zombies May Well Be Regional Banks

Commercial real estate exposure is a growing concern for lenders

Bank Size	CRE as Average % of Total Assets
<\$100bn	14.40%
\$100-250bn	8.15%
\$250-700bn	5.10%
US GSIBs	2.91%

Source: Fitch Ratings

Data is through March and excludes construction loans for free-standing residential homes. GSIBs are globally systemically important banks.

OTHER CONCERNS: LOSS OF FRANCHISE VALUE

- Egan et al (2021) estimate that 2/3 of the median bank's value comes from its deposit franchise; may be even higher for regionals.
- If technology leads to increased deposit betas going forward, this may wreak havoc on many banks' core business models.
- Would imply a need for significant consolidation and wringing out of excess capacity.
- In a world with considerable hostility to bank mergers.