Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?

By Jiang, Matvos, Piskorski, and Seru

Discussion by
Rebecca Zarutskie*
Federal Reserve Board

Financial Stability in Times of Macroeconomic Uncertainty
Federal Reserve Bank of Cleveland
November 16, 2023

* The content reflects the discussant’s views and not necessarily those of the Board of Governors of the Federal Reserve System or other members of its staff.

Paper Recap

What does the paper ask?

- How might unrealized losses on banks’ assets related to the rise in longer-term interest rates associated with monetary policy tightening increase the probability of bank runs?

- How large and prevalent are these unrealized losses within the banking sector and which banks (and geographies) appear most vulnerable to the type of bank run experienced by Silicon Valley Bank in March 2023?

Paper Recap (2)

What does the paper find?

- Banks with large unrealized losses on assets combined with lower deposit franchise values are more vulnerable to bank runs.

$$e_{run}(r_f) = e_b + \underbrace{(1-c)\Delta a(r_f)}_{Assets\ Gain/Loss} + \underbrace{(l_i + (1-s)l_u)\Delta f(r_f)}_{Deposit\ Franchise\ of\ Sleepy\ Deposits} < 0$$

1) Unique no-run equilibrium: $e_b + (1-c)\Delta a(r_f) + (l_i + l_u)\Delta f(r_f) > s l_u \Delta f(r_f)$
2) Multiple equilibria: when $0 < e_b + (1-c)\Delta a(r_f) + (l_i + l_u)\Delta f(r_f) < s l_u \Delta f(r_f)$
3) Unique equilibrium with bank insolvency: $0 > e_b + (1-c)\Delta a(r_f) + (l_i + l_u)\Delta f(r_f)$

Paper Recap (3)

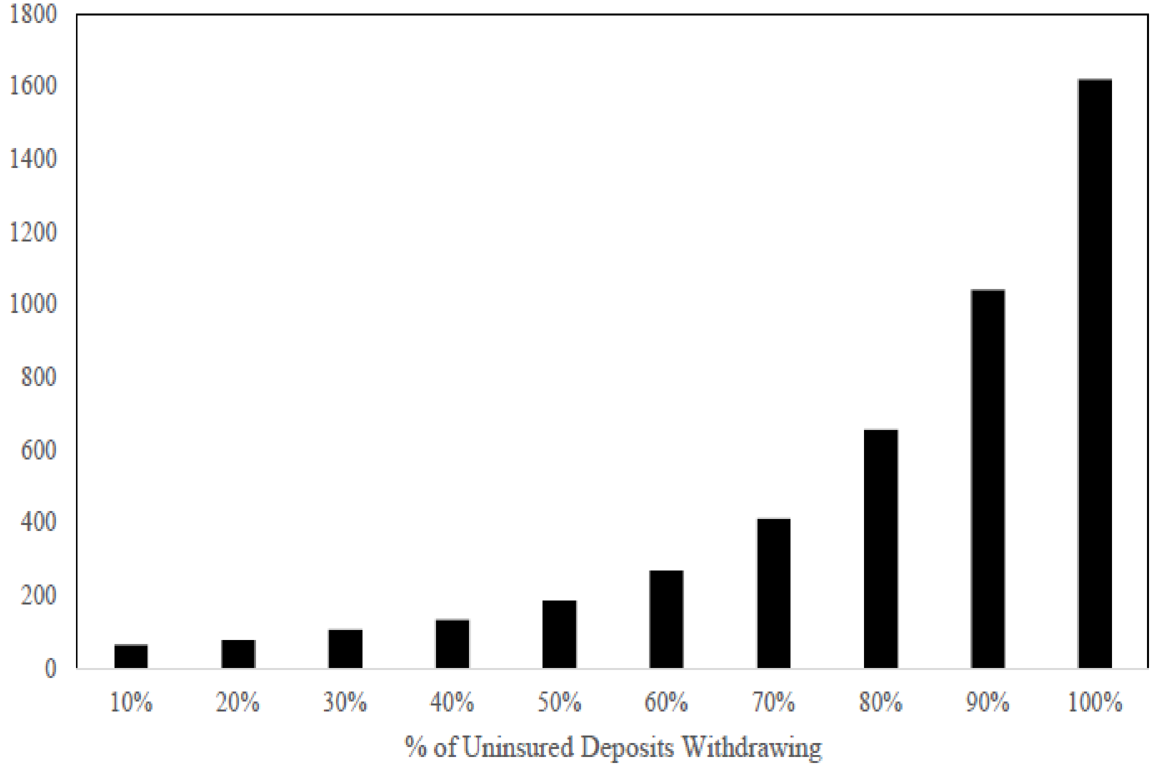
What does the paper find?

- Using market prices for Treasury securities and RMBS combined with maturity and pricing information from Call Reports, marks banks assets to market.
  - Estimate that asset values declined on average by 10% for total $2.2 trillion dollar decline.

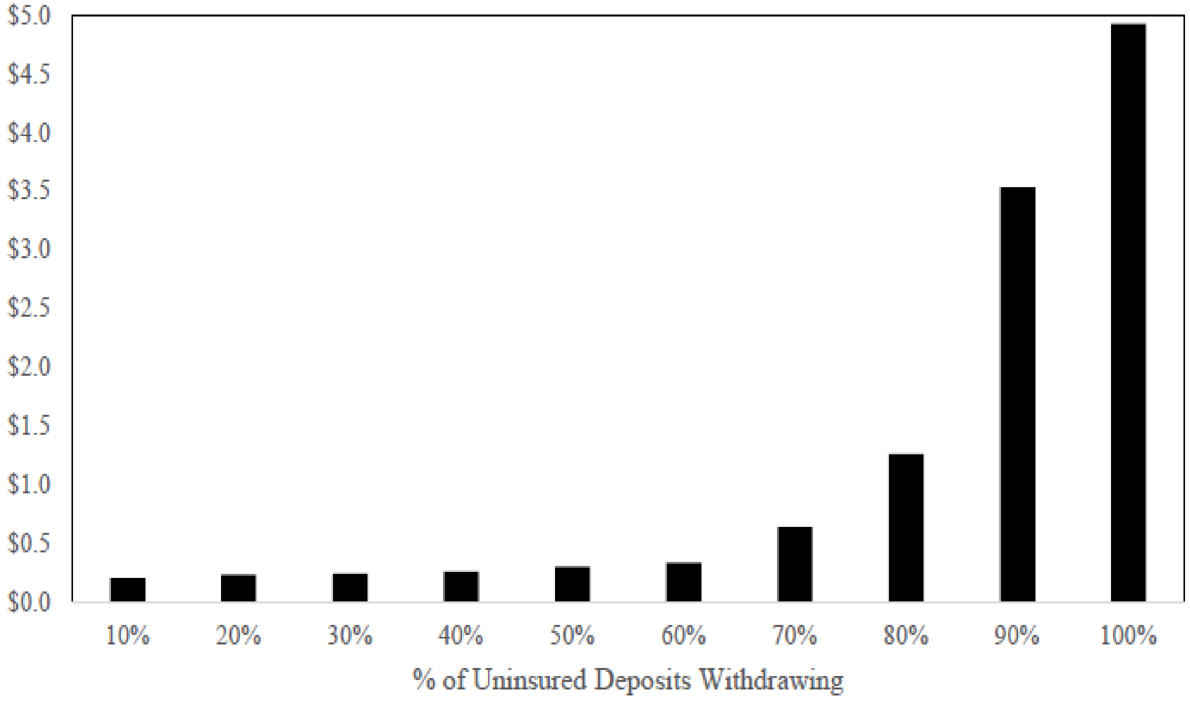
- Compute measures of solvency using the formula:

$$\text{Insured Deposit Coverage ratio} = \frac{\text{Mark-to-Market Assets} - s \times \text{Uninsured Deposits} - \text{Insured Deposits}}{\text{Insured Deposits}}$$

Paper Recap (4)



(a) Number of Insolvent Banks



(b) Aggregate Assets of Insolvent Banks (in $ Trillions)

My take…

- Main contribution of the paper is in the quantification of unrealized losses on longer-dated bank assets and in identifying which banks may be most vulnerable to funding risks (in the extreme, a bank run) based on deposit composition.

- Paper has evolved and improved since it first was written in March 2023
  - <u>But</u> the quantification exercise could be further improved.
  - My discussion will focus on this aspect of the paper.

Calculating mark-to-market asset values

- Securities
  - Call Reports provide the fair value of their securities holdings in the Call Report.
  - Are the authors using these fair values instead of using authors' own valuation method?

- Loans
  - Methodology seems sound.   Of course there will be "fire sale" discounts if banks were forced to sell these assets.

- Should update using 2023 Q2 Call Report data

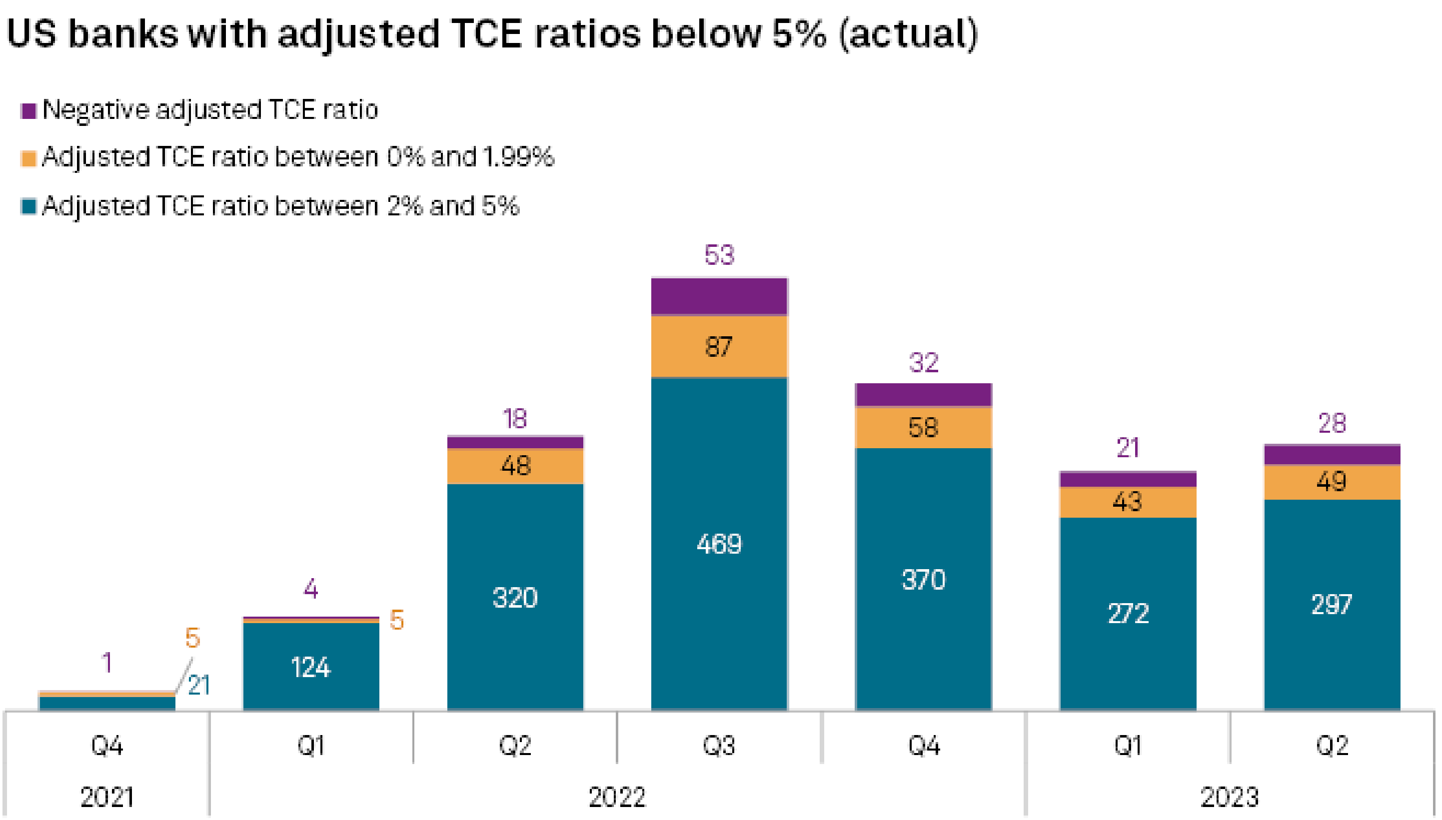
Suggestions – Computing measures of bank insolvency

- Traditional measure of bank solvency is Tangible Common Equity (TCE)
  - TCE subtracts intangible assets from common equity

- Can adjust TCE for unrealized losses on HTM securities

- Can adjust also TCE for losses on HTM securities
  - Check if bank already reduces TCE for HTM securities losses– otherwise double count these losses
  - These are the measures markets seem to pay attention to.
  - They suggest some solvency issues, but not as large as the authors' calculations.
  - Could also use TCE in the insured deposit coverage ratio calculation.

An example of adjusted TCE (using only securities unrealized losses)



Data compiled Sept. 13, 2023.

TCE = tangible common equity.

Analysis limited to historical and operating US commercial banks, savings banks, and savings and loan associations. Nondepository trusts and companies with a foreign banking organization charter are excluded.

Adjusted TCE ratio is calculated as tangible common equity + unrealized gain or loss from held-to-maturity securities, tax-adjusted at the 21% corporate rate (except for subchapter S corporations which are exempt from paying corporate taxes) + loss reserves - nonperforming assets - loans 90 or more days delinquent but still accruing interest divided by tangible assets.

Data based on regulatory filings.

Source: S&P Global Market Intelligence.

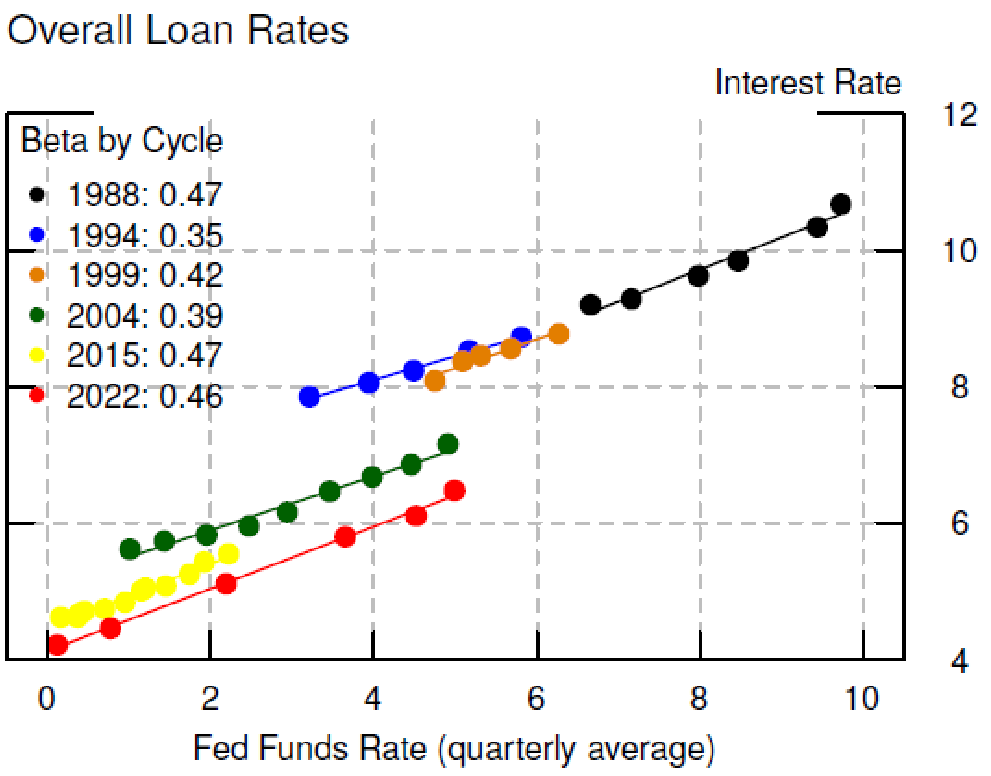
Take deposit franchise seriously when identifying vulnerable banks

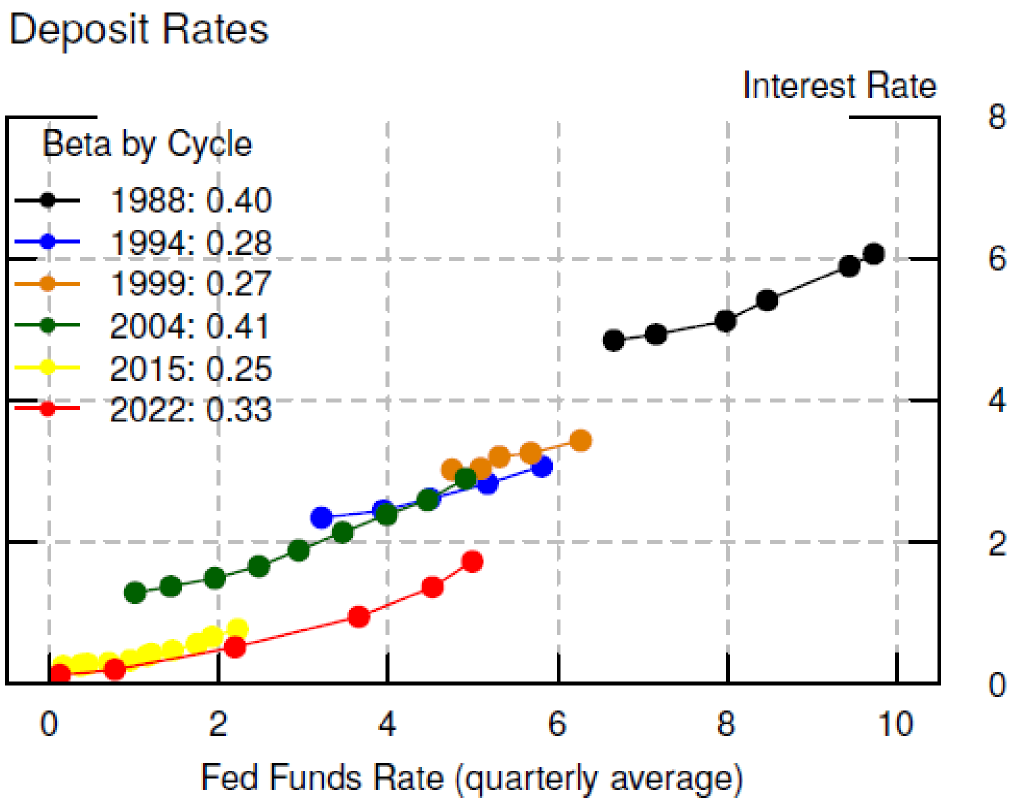
- The authors acknowledge the importance of deposit franchise value in their theoretical motivation.

- The Call Report data allow for a calculation of insured/unisured deposits (as well as other categories) and deposit betas
  - Authors could calculate franchise value for each bank in their sample.
  - Use these calculations to better refine vulnerable banks.

$$Deposit\ Franchise\ Value = \left[\sum_{k \in DepTypes} D_k \left(1 - \beta_k - \frac{c}{r}\right)\right]\left[1 - \frac{1}{(1+r)^T}\right]$$

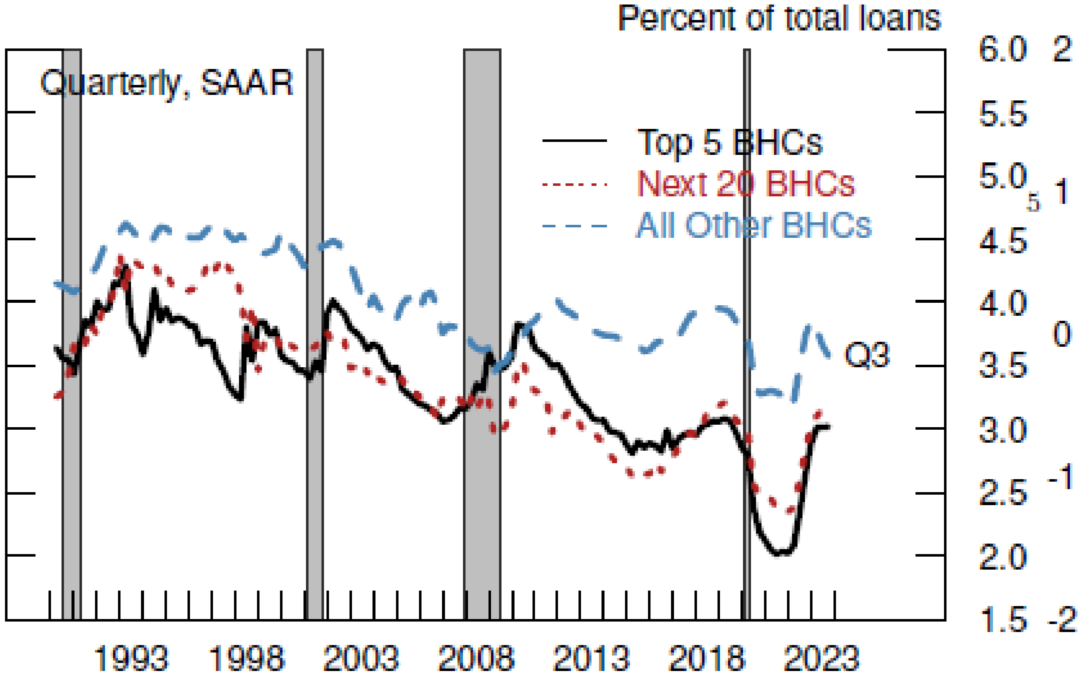
Deposit and Loan Betas during MP tightening





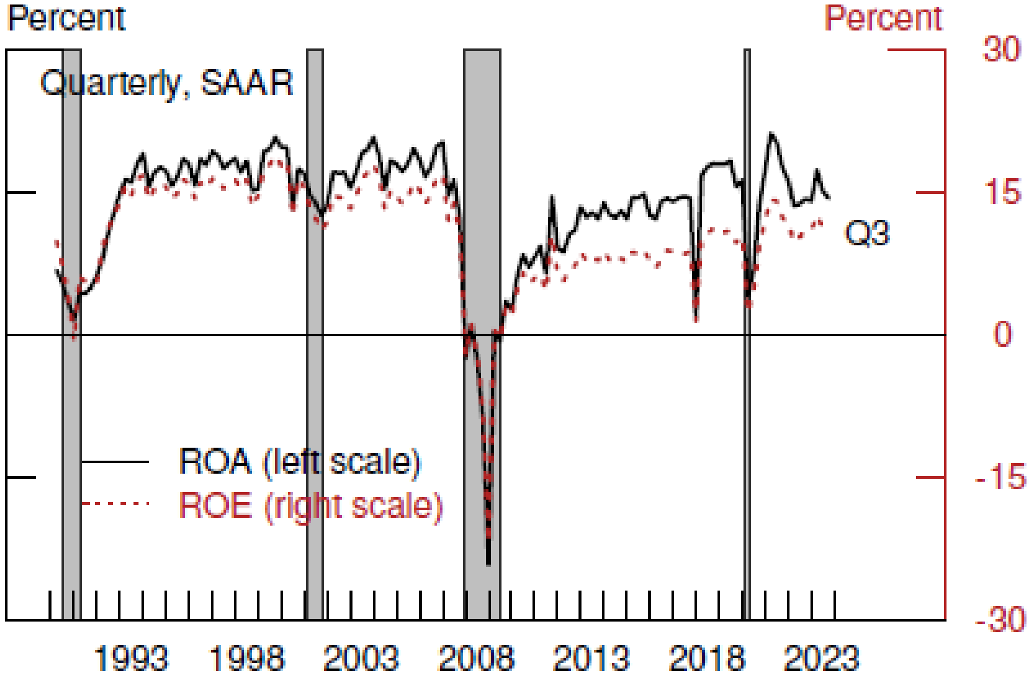
An aggregate look at the banking sector

Net interest margin, by bank size



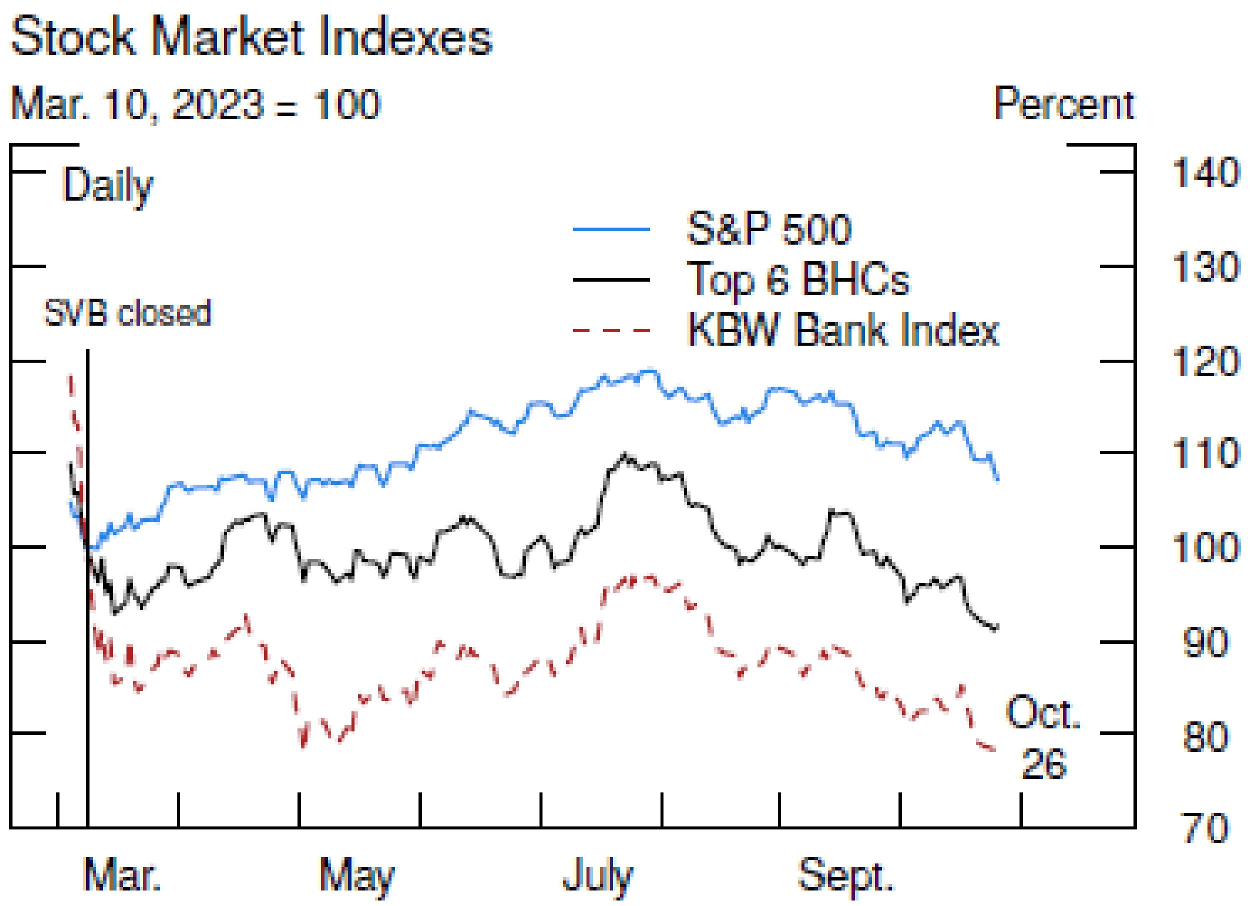
Note: Standard LCR BHCs are large (>$250B) BHCs.
Source: FR Y-9C, FR 2900.

Return on Assets/Return on Equity, All BHCs

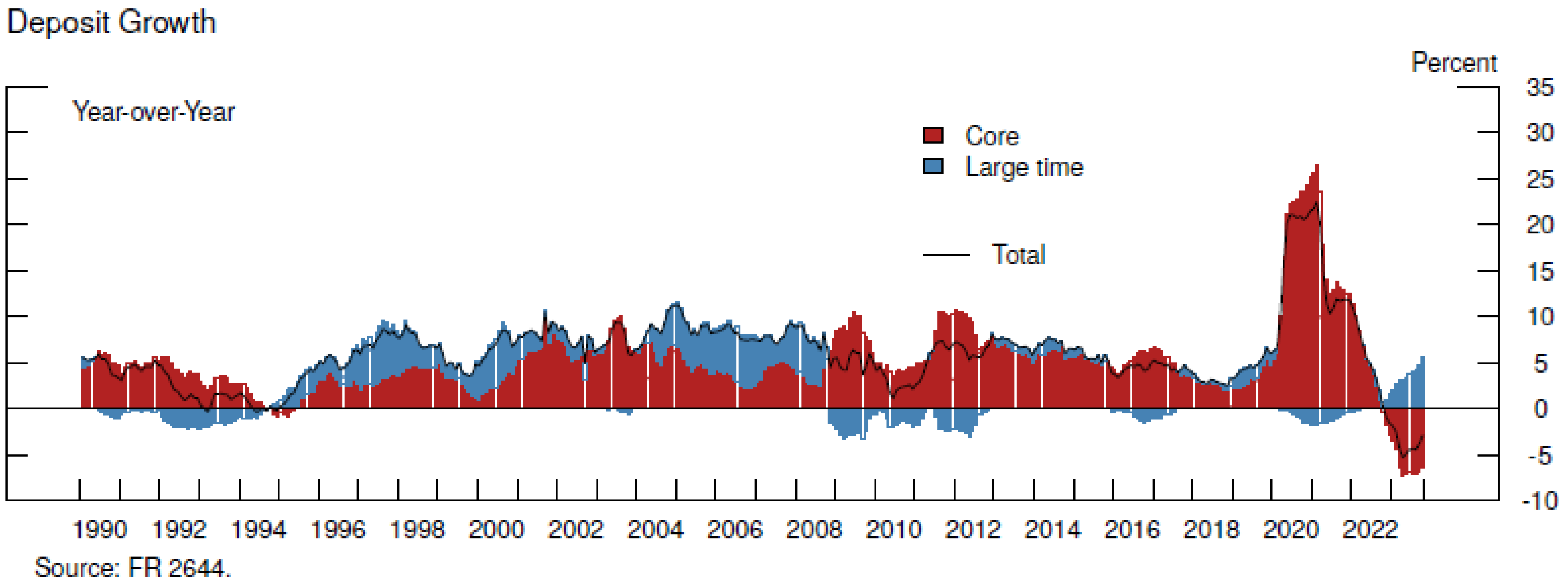


Source: Y-9C

An aggregate look at the banking sector



An aggregate look at the banking sector



FEDERAL RESERVE statistical release

H.8 ASSETS AND LIABILITIES OF COMMERCIAL BANKS IN THE UNITED STATES

For release at 4:15 p.m. Eastern Time
November 9, 2023

Table 1. Selected Assets and Liabilities of Commercial Banks in the United States[1]

Percent change at break adjusted, seasonally adjusted, annual rate

Account	2018	2019	2020	2021	2022	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Jul	2023 Aug	2023 Sep	2023 Oct
Assets															
1 Bank credit	3.5	6.0	8.2	8.0	6.9	9.0	7.0	1.1	1.6	-1.1	-1.1	0.1	-2.5	-0.7	-3.3
2 Securities in bank credit[2]	0.7	10.4	20.7	21.8	-2.4	0.2	-4.9	-14.5	-5.6	-10.3	-7.5	-5.3	-12.9	-8.2	-13.9
3 Treasury and agency securities[3]	3.6	14.5	23.0	22.8	-2.6	-1.1	-4.9	-14.3	-5.5	-10.0	-5.3	-6.2	-8.2	0.7	-13.0
6 Other securities	-7.0	-1.7	12.7	17.9	-1.4	5.4	-5.2	-15.4	-5.9	-11.6	-15.9	-2.0	-31.2	-43.7	-17.5
9 Loans and leases in bank credit[8]	4.5	4.4	3.5	2.0	11.7	13.5	13.1	8.7	4.8	3.0	1.7	2.5	1.9	2.5	1.1
10 Commercial and industrial loans	6.7	3.7	11.3	-7.5	14.3	17.8	17.3	9.1	2.2	-1.8	-1.0	-0.6	-0.4	0.0	1.7
11 Real estate loans	3.5	3.3	1.1	2.0	10.1	11.0	12.0	9.3	7.0	5.0	2.0	2.3	2.6	3.0	0.0
12 Residential real estate loans	2.2	2.0	-1.8	-0.4	8.9	10.6	10.4	8.4	6.5	4.2	0.1	0.1	2.8	5.2	-0.3
13 Revolving home equity loans	-8.2	-8.8	-11.7	-12.5	1.4	1.3	5.4	4.3	0.2	-1.9	-3.0	-4.7	-1.9	-1.9	3.3
14 Closed-end residential loans[9]	4.5	4.0	-0.2	1.4	9.9	11.7	11.0	8.9	7.3	4.9	0.5	0.7	3.3	6.0	-0.7
15 Commercial real estate loans	4.8	4.7	3.9	4.3	11.2	11.3	13.4	10.2	7.4	5.7	3.7	4.1	2.4	1.0	0.3
20 Consumer loans	4.1	5.2	-4.2	7.6	11.6	13.9	11.0	7.4	5.9	5.9	3.8	2.4	5.9	3.7	1.4
21 Credit cards and other revolving plans	4.2	3.5	-10.9	5.7	17.4	20.6	17.8	12.3	12.0	10.8	8.2	6.5	10.6	8.8	6.5
22 Other consumer loans	3.9	7.2	3.5	9.4	6.0	7.5	4.3	2.4	-0.5	0.7	-0.9	-2.3	0.8	-2.4	-4.3
25 All other loans and leases	5.0	8.6	7.3	12.3	12.7	14.0	12.1	7.5	1.8	1.3	2.6	7.3	-0.7	3.8	2.7
28 LESS: Allowance for loan and lease losses	-0.7	1.1	59.8	-23.6	-0.1	-9.1	5.6	17.2	18.9	17.1	10.7	28.2	0.0	5.8	14.0
29 Cash assets[21]	-19.3	-12.8	77.9	34.2	-23.2	-41.9	-6.2	-18.6	4.4	13.7	-1.4	-25.4	-1.9	27.3	26.3
30 Total federal funds sold and reverse RPs[22]	36.7	25.5	8.0	-25.9	-9.7	-3.5	-12.1	-10.5	25.1	29.3	-19.7	-27.8	-46.5	-4.4	12.6
31 Loans to commercial banks[23]	19.4	-52.9	41.2	-44.5	-39.7	48.8	8.7	-102.1	40.0	67.5	8.9	53.9	0.0	-25.8	13.2
32 Other assets including trading assets[24]	-1.1	1.5	9.4	6.0	10.0	24.6	1.0	7.3	-5.7	-2.8	5.7	17.3	-3.2	4.3	16.1
33 Total assets	**0.7**	**4.1**	**14.7**	**10.7**	**1.2**	**1.5**	**4.1**	**-1.7**	**1.8**	**1.5**	**-1.2**	**-3.2**	**-3.7**	**3.6**	**2.9**
Liabilities															
34 Deposits	2.8	6.1	20.8	11.7	-0.8	1.5	-2.1	-6.5	-4.6	-7.0	0.8	1.5	-2.9	1.0	0.1
35 Large time deposits	5.2	8.6	-16.9	-6.4	12.2	12.6	21.2	18.2	42.2	28.0	37.7	39.0	37.4	43.3	43.1
36 Other deposits	2.4	5.7	26.9	13.7	-1.9	0.6	-4.1	-8.8	-9.3	-10.9	-3.7	-3.2	-8.2	-4.8	-6.1
37 Borrowings	-5.2	-1.9	-13.2	-1.4	8.2	-3.0	22.6	26.4	50.1	63.9	-16.5	-40.4	-9.8	33.6	19.9
39 Other liabilities including trading liabilities[25]	2.7	2.8	12.6	4.2	15.9	28.8	12.8	23.3	-11.0	-6.4	22.8	9.2	-7.8	1.8	20.8
40 Total liabilities	**0.6**	**3.6**	**16.5**	**11.2**	**1.6**	**3.0**	**3.6**	**-2.1**	**1.3**	**-1.4**	**-0.7**	**-2.8**	**-3.7**	**4.3**	**1.8**

Percent changes are at a simple annual rate and have been adjusted to remove the effects of nonbank structure activity of $5 billion or more, as well as the estimated effects of the initial consolidation of certain variable interest entities (FIN 46) and off-balance-sheet vehicles (FAS 166/167). Figures reported in the H.8 Notes on the Data are generally used to make these adjustments. For information on how the data were constructed, see www.federalreserve.gov/releases/h8/about.htm. Line numbers on this page correspond to those used in the remainder of the release. Percent changes for other series shown on the release are available for customizable download through the Federal Reserve Board's Data Download Program (DDP). Footnotes appear on the last page of the release.

Table 2. Assets and Liabilities of Commercial Banks in the United States[1]

Seasonally adjusted, billions of dollars

Account	2022 Oct	2023 Apr	2023 May	2023 Jun	2023 Jul	2023 Aug	2023 Sep	2023 Oct	Week ending Oct 11	Oct 18	Oct 25	Nov 01
Assets												
1 Bank credit	17,356.7	17,331.3	17,326.8	17,298.7	17,297.3	17,288.0	17,280.2	17,248.0	17,263.7	17,235.1	17,263.5	17,229.8
2 Securities in bank credit[2]	5,565.7	5,243.8	5,210.2	5,188.6	5,166.3	5,114.5	5,079.4	5,020.6	5,040.1	5,013.4	5,010.2	5,011.4
3 Treasury and agency securities[3]	4,474.9	4,170.9	4,146.3	4,135.2	4,114.5	4,089.1	4,091.4	4,047.0	4,060.5	4,037.9	4,039.3	4,044.7
4 Mortgage-backed securities (MBS)[4]	2,804.1	2,613.2	2,607.2	2,603.1	2,594.1	2,578.4	2,568.1	2,526.1	2,536.1	2,522.1	2,525.8	2,513.8
5 Non-MBS[5]	1,670.8	1,557.7	1,539.1	1,532.1	1,520.3	1,510.8	1,523.3	1,520.9	1,524.3	1,515.8	1,513.5	1,530.9
6 Other securities	1,090.9	1,072.8	1,063.9	1,053.4	1,051.8	1,025.3	988.0	973.6	979.6	975.5	970.9	966.6
7 Mortgage-backed securities (MBS)[6]	113.7	107.3	106.7	106.1	105.7	104.8	104.3	103.3	103.9	102.6	103.2	103.2
8 Non-MBS[7]	977.1	965.6	957.2	947.3	946.2	920.5	883.7	870.3	875.6	872.8	867.7	863.4
9 Loans and leases in bank credit[8]	11,791.0	12,087.6	12,116.6	12,110.1	12,131.0	12,173.6	12,200.8	12,227.5	12,223.6	12,221.6	12,253.3	12,218.4
10 Commercial and industrial loans	2,777.4	2,774.9	2,769.1	2,764.1	2,762.9	2,762.6	2,763.4	2,775.0	2,781.3	2,773.6	2,771.7	2,769.7
11 Real estate loans	5,209.1	5,421.1	5,448.7	5,442.8	5,456.0	5,483.0	5,496.5	5,496.7	5,488.5	5,499.9	5,501.6	5,501.3
12 Residential real estate loans	2,436.3	2,527.3	2,541.7	2,524.2	2,526.3	2,542.0	2,553.1	2,552.5	2,545.5	2,555.6	2,557.6	2,554.5
13 Revolving home equity loans	253.7	254.6	254.2	253.6	252.7	252.9	252.5	253.2	253.0	253.4	253.3	253.5
14 Closed-end residential loans[9]	2,182.6	2,272.7	2,287.5	2,270.6	2,273.6	2,289.1	2,300.6	2,299.3	2,292.5	2,302.3	2,304.2	2,301.1
15 Commercial real estate loans	2,772.7	2,893.8	2,907.0	2,918.6	2,929.7	2,941.0	2,943.4	2,944.2	2,942.9	2,944.2	2,944.1	2,946.7
16 Construction and land development loans[10]	435.0	467.1	471.5	475.7	480.2	482.9	486.2	487.9	487.2	488.1	488.3	488.7
17 Secured by farmland[11]	109.7	112.0	112.2	112.6	112.6	112.9	113.1	113.3	113.1	113.2	113.3	113.4
18 Secured by multifamily properties[12]	518.6	563.6	566.9	569.2	571.9	577.7	578.0	577.2	576.4	576.3	578.0	577.4
19 Secured by nonfarm nonresidential properties[13]	1,709.5	1,751.1	1,756.3	1,761.1	1,765.0	1,767.5	1,766.1	1,765.9	1,766.3	1,766.6	1,764.5	1,767.2
20 Consumer loans	1,821.6	1,876.7	1,886.1	1,890.2	1,885.3	1,894.6	1,900.4	1,902.6	1,902.4	1,902.7	1,907.0	1,899.0
21 Credit cards and other revolving plans	925.8	978.7	986.2	992.1	997.5	1,006.3	1,013.7	1,019.2	1,018.9	1,019.7	1,022.0	1,017.8
22 Other consumer loans	895.8	898.0	899.9	898.1	887.8	888.4	886.6	883.4	883.5	883.0	884.9	881.2
23 Automobile loans[14]	523.4	515.6	515.5	514.5	509.2	508.1	506.0	503.0	503.5	502.8	503.2	501.8
24 All other consumer loans[15, 16]	372.4	382.4	384.4	383.5	378.6	380.3	380.6	380.4	380.0	380.2	381.7	379.4
33 Total assets	**22,765.1**	**22,894.8**	**22,935.4**	**22,943.6**	**22,879.1**	**22,838.6**	**22,907.8**	**22,968.9**	**22,966.5**	**22,948.7**	**22,966.3**	**23,002.9**
Liabilities												
34 Deposits	17,776.3	17,248.9	17,275.7	17,317.8	17,344.1	17,323.2	17,337.7	17,338.9	17,364.0	17,281.0	17,332.0	17,362.5
35 Large time deposits	1,549.9	1,866.0	1,902.6	1,958.3	2,022.6	2,089.3	2,164.7	2,242.5	2,224.5	2,245.0	2,254.7	2,265.9
36 Other deposits	16,226.4	15,382.9	15,373.1	15,359.5	15,321.4	15,233.8	15,173.0	15,096.4	15,139.5	15,036.0	15,077.4	15,096.6
37 Borrowings	1,774.1	2,411.6	2,409.1	2,368.5	2,285.4	2,273.2	2,337.3	2,382.3	2,392.1	2,387.2	2,372.6	2,352.1
38 Net due to related foreign offices	303.5	316.4	282.0	274.3	276.5	278.7	272.8	250.2	224.8	269.0	242.4	307.8
39 Other liabilities including trading liabilities[25]	788.6	766.7	724.4	806.2	812.5	807.5	808.7	822.7	803.0	831.4	822.3	825.5
40 Total liabilities	**20,642.6**	**20,743.6**	**20,691.1**	**20,766.9**	**20,718.6**	**20,682.6**	**20,756.5**	**20,794.1**	**20,784.0**	**20,768.5**	**20,769.4**	**20,848.0**

What was unique about SVB?

- As authors note, according to their measures SVB “solvent” according to come of the authors calculations.

- SVB had other characteristics that aren’t measures by the authors
  - Concentration of depositors in certain industries
  - Rapid growth in deposits

- Any attempt to quantify these other aspects that can make banks vulnerable would be useful.

Conclusion

- Timely and provocative paper!
  - Useful empirical estimates of unrealized losses on bank's loan holdings (combined with banks' reported estimates of unrealized losses on their securities)
  - These estimates can be useful in empirical analysis which addresses a variety of questions about the banking sector.

- Would like to see more robust measures of solvency and funding risk/bank run risk.

- These measures should be useful in other studies evaluating the effectiveness of current and prospective policy responses:
  - E.g., Capital and liquidity management and regulations, deposit insurance, BTFP