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Liquidity Management:

Prudent Practices

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Silicon Valley Bank (SVB)

A Scary Story

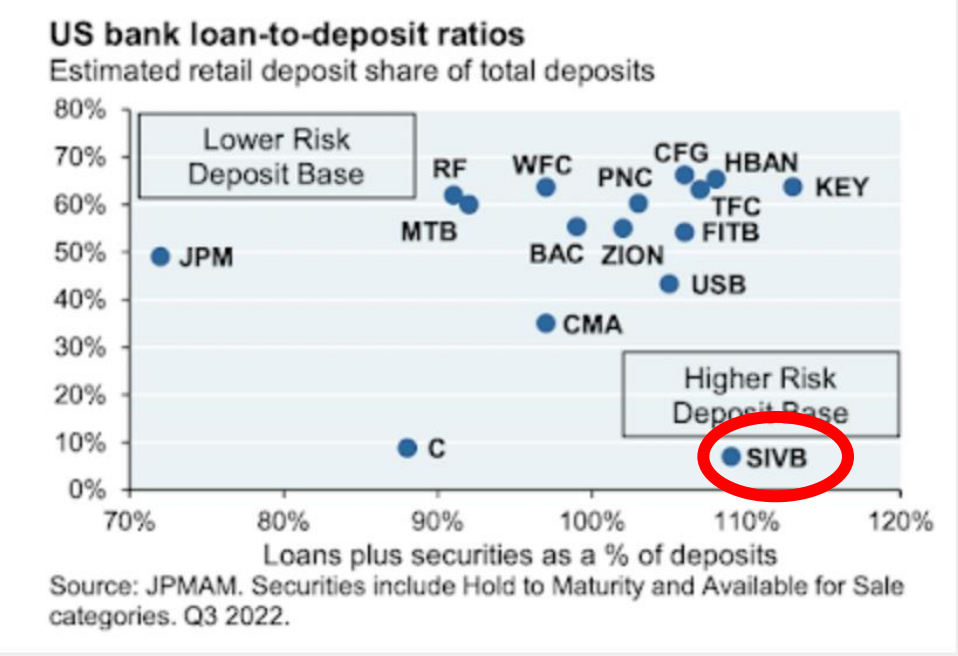
As of December 31, 2022, SVB was the 16th largest bank by asset size ($211 billion) in U.S.

Closed by the Regulators on Friday, March 10, 2023

Silicon Valley Bank

Let's Look at Liabilities

- $175 billion deposits (83% of Total Assets)
- Less than 10% consumer (retail) deposits. Consumer deposits are more "sticky" as up to $250,000 is insured.
- Corporate deposits are a higher risk deposit base.



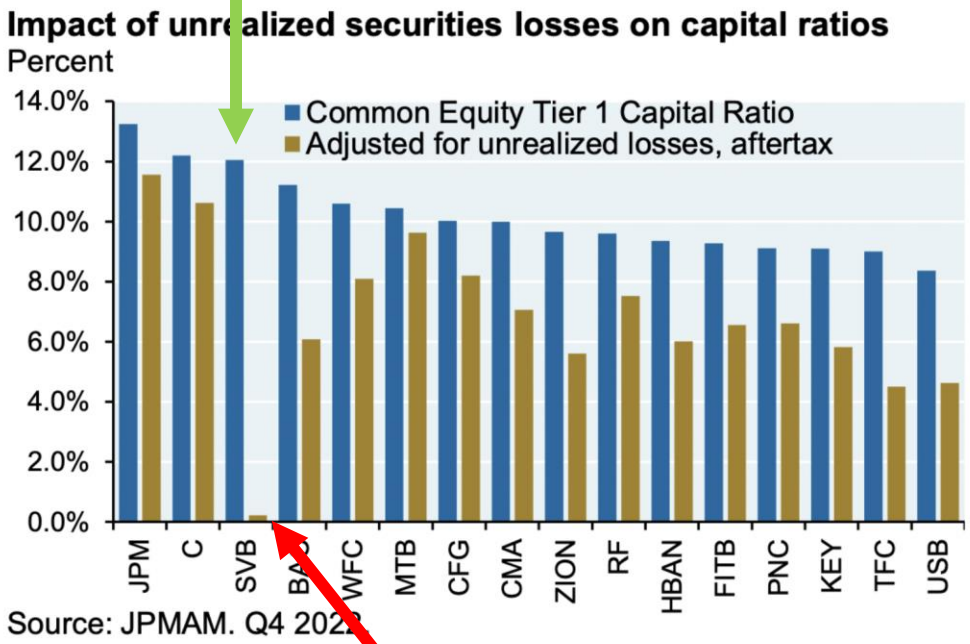
Silicon Valley Bank

- **55% of total assets (TA) in investments: $91 billion (43% of TA) – held to maturity investments and $26 billion (12% of TA)in available for sale investments.**
- **SVB did not adjust Held to Maturity portfolio for portfolio losses on its financial statements. Let's see what that means on Capital Ratios**

Capital Ratio Looks Good 12%

As interest rates decreased— Investment Portfolio decreased in value (including unrealized losses).

Can be ok if the bank does not need to sell investments….



Including unrealized losses– Less than 1%

Silicon Valley Bank

But they needed to sell…

- In March 2023, VCB tried to raise $2.25 billion of capital while it sold securities for sale ($21 Billion) and took $1.8 billion loss!
- Corporate depositors heard the news and got scared—and tried to withdraw $42 billion of deposits (20% of total assets) on Thursday, March 9.
- Regulators took over bank on Friday, March 10
- Lesson Learned:
  - Know and understand your depositors behaviors!
  - Stress test interest rate risk inclusive unrealized investment losses
  - Have a liquidity crisis plan in place!

A Run on the Bank

Bank of Ghana

Risk Management Guidelines for Rural and Community Banks (RCBs) – May 2021

- Ensure the RCB has satisfactory structures and systems in place for liquidity risk management including the **identification, measurement, mitigation and monitoring of liquidity risk.**
- **Set liquidity risk tolerable limits** to guide management in its operations.
- Ensure the RCB has **documented policies and procedures**.
- **Understand the nature of liquidity risk** that confronts the RCB and the wider Rural Bank industry so as to exercise effective oversight.
- Ensure RCB managers and staff with responsibility for liquidity risk management have the requisite background and **competence to perform the assigned tasks.**
- Ensure RCB has a **functioning and effective Management Information System** in place to facilitate data management, analysis, forecasting, tracking and reporting on liquidity management.

Liquidity Management

What is Liquidity Management?

- **Measures an organization's ability to meet its maturing obligations and to fund future growth.**

What are the objectives of Liquidity Management?

- **Honor all cash outflow commitments on a daily basis**
- **Minimize the cost of foregone earnings on idle liquidity**
- **Satisfy minimum reserve requirements and other regulatory liquidity standards**
- **Avoid additional cost of emergency borrowing and forced liquidation of assets**

Liquidity management should always be proactive.

Liquidity Monitoring and Planning

- Liquidity Management Tools
  - Cash Flows Projections
  - Ratios
  - Maturity Gap Analysis
- Other Items to Consider
  - Liquidity Crisis (Need a Plan)

Short Term Liquidity Monitoring

Cash Flow Forecasts

- Detailed cash flow forecasts should be maintained on a daily or weekly basis.
- Forecast should
  - capture all sources of liquidity available.
  - capture all the uses and potential uses of liquidity
  - Be conservative and factor in any uncertainty in the cash flows, such as probability of reduced repayment rate by clients.
  - Include any deposit reserves required (for institutions that mobilize deposits)
  - Include liquidity ratios (with benchmarks/triggers) to understand if any ratio will be breached.
  - Include stress scenarios

Liquidity Risk

Cash Flow – Stress Testing

The pro forma cash flow analysis will incorporate multiple scenarios, including the following:

- **Base Case Scenario / Current Conditions.** This scenario assumes current market and organization's financial conditions. The cash flow projections reflect monthly cash flows for a 12-month period.
- **Short-Term Moderate Stress Event.** This scenario will describe a short-term stress event (typically 90 days) consistent with the triggers and definitions for a moderate level stress. The moderate stress level scenario should locate liquidity sources for an additional funding demand of at least 10% of total assets.
- **Long-Term High Stress Event.** This scenario will describe a long-term stress event (typically 365 days) and will be consistent with the triggers and definitions for a moderate level stress. The high stress level scenario should locate liquidity sources for an additional funding demand of at least 20% of total assets.

	Assets and liabilities, and new business cash flows distributed by remaining maturity									
	1m	2m	3m	6m	9m	12m	18m	24m	36m	TOTAL
	Mar-20	Apr-20	May-20	Aug-20	Nov-20	Feb-21	Aug-21	Feb-22	Feb-23	
Static Maturity Gap										
Assets	25,000	10,000	15,000	40,000	30,000	45,000	60,000	30,000	15,000	300,000
Liabilities	5,000	7,500	10,000	30,000	25,000	30,000	45,000	45,000	30,000	250,000
Period maturity gap	20,000	2,500	5,000	10,000	5,000	15,000	15,000	(15,000)	(15,000)	
Cumulative maturity gap	20,000	22,500	27,500	37,500	42,500	57,500	72,500	57,500	42,500	
% total assets	6.7%	7.5%	9.2%	12.5%	14.2%	19.2%	24.2%	19.2%	14.2%	
Dynamic Maturity Gap										
Budget cash inflows	2,778	2,431	3,125	8,333	8,681	9,028	17,361	20,833	31,597	125,000
Budget cash outflows	4,000	3,500	4,500	12,000	12,500	13,000	25,000	30,000	45,500	180,000
Period maturity gap	18,778	1,431	3,625	6,333	1,181	11,028	7,361	(24,167)	(28,903)	
Cumulative maturity gap	18,778	20,208	23,833	30,167	31,347	42,375	49,736	25,569	(3,333)	
% total assets	6.3%	6.7%	7.9%	10.1%	10.4%	14.1%	16.6%	8.5%	-1.1%	
% of Stress										
Inflows	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	
OutFlows	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	110.0%	
Stressed Maturity Gap										
Stressed cash inflows	25,000	11,188	16,313	43,500	34,813	48,625	69,625	45,750	41,938	425,000
Stressed cash outflows	9,900	12,100	15,950	46,200	41,250	47,300	77,000	82,500	83,050	430,000
Period maturity gap	15,100	(913)	362	(2,700)	(6,438)	1,325	(7,375)	(36,750)	(41,113)	
Cumulative maturity gap	15,100	14,188	14,550	11,850	5,412	6,737	(638)	(37,388)	(78,500)	
% total assets	5.0%	4.7%	4.9%	4.0%	1.8%	2.2%	-0.2%	-12.5%	-26.2%	
Stressed Limit Breaches										
Limit amount	15,000	15,000	15,000	15,000	15,000	15,000				
Limit breach status	NO BREACH	BREACH	BREACH	BREACH	BREACH	BREACH				
Limit breach amount	0	813	450	3,150	9,588	8,263				
Cash to lend amount	100	0	0	0	0	0				

Stress Scenarios

Limit: 5% of Total Assets

Stressed liquidity mismatch will go below stressed limit amount starting from April 2020. Liquidity requirement can by covered by overdraft facilty.

A firm shall postpone disbursement to evaluate the situations for next 30 days.

Short Term Liquidity Monitoring Example

Surplus Ratio: Surplus is liquid assets minus short term liabilities

Indicator	March 2019	March 2020	March 2021
Basic Surplus - 30 days	10,099,000	14,198,000	17,248,000
Basic Surplus – 90 days	8,736,000	15,283,000	15,838,000
Average Total Assets	43,311,000	72,093,000	88,517,000
% Basic Surplus - 30 days	23.3%	19.7%	19.5%
% Basic Surplus – 90 days	20.2%	21.2%	17.9%
External Unused Lines of Credit	2,450,000	2,500,000	2,500,000

Acceptable Surplus Range is 10% to 20%.

Other Liquidity Ratios

Name of Ratio	Equation	Benchmark
Cash Reserve	(Cash or Cash Equivalents) divided by Total Assets	3-5%
Liquidity Assets	Liquid Assets divided by Deposits	10-20%
Quick Ratio	(Cash + Marketable Securities + Accounts Receivables) divided by Current Liabilities	Minimum 1.2
Quick Ratio Adjusted	(Cash + Marketable Securities + Accounts Receivables+ Loans Receivable>1 year)divided by Current Liabilities	Minimum 1.2
Loans to Deposits	Total Loan Portfolio divided by Total Client Deposits	60-80%
Broader Liquidity Ratio	(Current Assets + Availability Under Committed Credit Lines) divided by (Current Liabilities + (# of Buffer Months*(Liquidity Cushion)))	Minimum 1.0

Maturity Risk – Gap Analysis

Measures

- Difference between the value of its risk sensitive assets that *mature* during that period and the value of its risk sensitive liabilities that *mature* during that period.
- Potential impact of
  - "Refunding" Risk (Debt will not be renewed)
  - "Run" on Deposits and other Core Funds
  - Unutilized Funds (lots of cash on Balance sheet)

Scenario Analysis

- Evaluate impact on maturity mismatch by changing to asset- liability profile.
- Need to analyze *behavioral* asset and liability movements

Policy Implications

- Set Limits on Ratio of Gap and Cumulative Gap to Capital
  - Less than 20% on a cumulative basis
- Consider Off balance sheet tools (Lines of Credit)

Maturity Gap Report as of:	31-Dec-10									
Contractually Available Within:	1-7 days	8-30 days	1-3 mths	3-6 mths	6-9 mths	9-12 mths	1-2 yrs	2-5 yrs	> 5 yrs	TOTAL
ASSETS										
Vault Cash	32,000	-	-	-	-	-	-	-	-	32,000
Current Accounts at Central Bank	13,000	-	-	-	-	-	-	-	-	13,000
Mandatory Reserve at Central Bank	11,700	-	-	-	-	-	-	-	-	11,700
Deposit Accounts at Central Bank	5,000	-	-	-	-	-	-	-	-	5,000
Treasury Bills and Bonds	2,500	2,500	5,000	10,000	10,000	5,000	7,000	7,950		49,950
Current Accounts at Commercial Banks	4,000	-	-	-	-	-	-	-	-	4,000
Deposits at Banks and Financial Institutions	5,100	15,000	7,500	-	-	-	-	-	-	27,600
Guarantee Deposits at Banks	-	-	-	-	-	-	2,000	-	-	2,000
Net Customer Loans	2,300	18,500	59,000	69,500	78,000	38,500	50,700	-	-	316,500
Fixed Assets	-	-	-	-	-	-	-	-	20,172	20,172
Other Assets	-	-	3,500	-	-	-	-	-	3,000	6,500
Total Assets Available:	**75,600**	**36,000**	**75,000**	**79,500**	**88,000**	**43,500**	**59,700**	**7,950**	**23,172**	**488,422**
Contractually Maturing Within:	1-7 days	8-30 days	1-3 mths	3-6 mths	6-9 mths	9-12 mths	1-2 yrs	2-5 yrs	> 5 yrs	TOTAL
LIABILITIES										
Current Accounts of Financial Institutions	-	-	-	-	-	-	-	-	-	-
Bank Overdraft Borrowings	3,000	-	-	-	-	-	-	-	-	3,000
Repo Borrowings	2,500	7,500	5,000	-	-	-	-	-	-	15,000
Financial Institution Term Deposits	2,000	10,000	5,000	-	-	-	-	-	-	17,000
Client Current and Transaction Accounts	29,600									29,600
Savings Deposits	26,000	-	-	-	-	-	-	-	-	26,000
Retail Term Deposits	24,000	35,000	15,000	20,000	10,000	9,000	16,000	-	-	129,000
Pledged Collateral Deposits	-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10,000	-	-	21,052
Senior Medium & Long Term Borrowing	3,800	4,000	5,000	4,000	5,500	3,500	58,000	60,000	42,720	186,520
Other Liabilities	150	2,000	4,600	-	-	-	-	-	-	6,750
EQUITY										-
Paid-In Common Shares	-	-	-	-	-	-	-	-	18,500	18,500
Share Premium & Other Capital Reserves	-	-	-	-	-	-	-	-	10,500	10,500
Retained Income	-	-	-	-	-	-	-	-	25,500	25,500
Liabilities Payable & Equity	**91,050**	**59,552**	**37,100**	**26,500**	**18,000**	**15,000**	**84,000**	**60,000**	**97,220**	**488,422**
Period Maturity Gap	**(15,450)**	**(23,552)**	**37,900**	**53,000**	**70,000**	**28,500**	**(24,300)**	**(52,050)**	**(74,048)**	
Period Gap as % of Equity	**-28%**	**-43%**	**70%**	**97%**	**128%**	**52%**	**-45%**	**-96%**	**-136%**	
Cumulative Maturity Gap	**(15,450)**	**(39,002)**	**(1,102)**	**51,898**	**121,898**	**150,398**	**126,098**	**74,048**	**-**	
Cumulative Maturity Gap	**-28%**	**-72%**	**-2%**	**95%**	**224%**	**276%**	**231%**	**136%**	**0%**	

Min: 20% Cum Gap

Gap Analysis

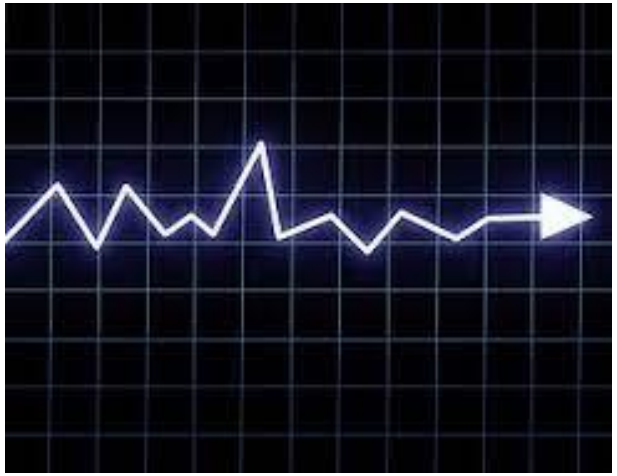
Sticky or Core Deposits

- Those deposits that are expected to remain with a savings institution for a relatively long period of time. Refers conceptually to the "stable" level of deposits maintained at a financial institution over time
- Such deposits are attracted by the convenience and service offered by the institution rather than from interest rates paid.

Gap Analysis

Sticky or Core Deposits Calculation

- Big Institution: Review at least one year of historical data by 1) first calculate the average daily balance of these core deposits [short term savings and demand deposit accounts) - (one off deposits and withdrawals)], then 2) calculate the natural log of the daily changes in these balances, and then 3) the 2 standard deviation % change in these daily net deposits (which is the "non-core" deposits).
- Smaller Institution: Core deposits can be estimated by plotting the value of total deposits over time and drawing a line through the low points of the graph.



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Mandatory Reserve at Central Bank	11,700	-	-	-	-	-	-	-	-	11,700
Deposit Accounts at Central Bank	9,000	-	-	-	-	-	-	-	-	9,000
Treasury Bills and Bonds	2,500	2,500	5,000	10,000	10,000	5,000	9,000	7,950		51,950
Deposits at Banks and Financial Institutions	5,100	15,000	7,500	-	-	-	-	-	-	27,600
Net Customer Loans	2,300	18,500	59,000	69,500	78,000	38,500	50,700	-	-	316,500
Fixed Assets	-	-	-	-	-	-	-	-	20,172	20,172
Other Assets	-	-	3,500	-	-	-	-	-	6,948	10,448
Total Assets Available:	**75,600**	**36,000**	**75,000**	**79,500**	**88,000**	**43,500**	**59,700**	**7,950**	**27,120**	**492,370**

Behavioral Maturing Within:	1-7 days	8-30 days	1-3 mths	3-6 mths	6-9 mths	9-12 mths	1-2 yrs	2-5 yrs	> 5 yrs	TOTAL
LIABILITIES										
Bank Overdraft Borrowings	3,000	-	-	-	-	-	-	-	-	3,000
Repo Borrowings	2,500	7,500	5,000	-	-	-	-	-	-	15,000
Financial Institution Term Deposits	2,000	10,000	5,000	-	-	-	-	-	-	17,000
Client Current and Transaction Accounts	1,480	1,480	2,960	5,920	5,920	11,840	-	-	-	29,600
-- Clients % withdrawl	**5%**	**5%**	**10%**	**20%**	**20%**	**40%**				
Retail Term Deposits	25,800	25,800	19,350	19,350	12,900	12,900	12,900	-	-	129,000
	20%	**20%**	**15%**	**15%**	**10%**	**10%**	**10%**			
Pledged Collateral Deposits	2,500	2,500	2,500	2,500	2,500	2,500	10,000		-	25,000
Senior Medium & Long Term Borrowing	3,800	4,000	5,000	4,000	5,500	3,500	58,000	60,000	42,720	186,520
Other Liabilities	150	2,000	4,600	-	-	-	-	-	-	6,750
EQUITY										
Paid-In Common Shares	-	-	-	-	-	-	-	-	18,500	18,500
Share Premium & Other Capital Reserves	-	-	-	-	-	-	-	-	10,500	10,500
Retained Income	-	-	-	-	-	-	-	-	51,500	51,500
Liabilities Payable & Equity	**41,230**	**53,280**	**44,410**	**31,770**	**26,820**	**30,740**	**80,900**	**60,000**	**112,720**	**492,370**

Period Maturity Gap	**34,370**	**(17,280)**	**[illegible],590**	**47,730**	**61,180**	**12,760**	**(21,200)**	**(52,050)**	**(85,600)**
Period Gap as % of Equity	**43%**	**-21%**	**38%**	**59%**	**76%**	**16%**	**-26%**	**-65%**	**-106%**
Cumulative Maturity Gap	**34,370**	**17,090**	**47,680**	**95,410**	**156,590**	**169,350**	**148,150**	**96,100**	**10,500**
Cumulative Maturity Gap	**43%**	**21%**	**59%**	**119%**	**195%**	**210%**	**184%**	**119%**	**13%**

Liquidity Risk

Contingency Plan

- Identify Liquidity Stress events
  - Run on deposits
- Early Warning Indicators
  - Monthly core deposit withdrawals exceeding 7% of deposits for a period of 3 consecutive months or 3-month aggregate decrease of over 20%
- Stress Levels Defined (low/medium/high)
- Sources of Funding
- Funding Sources Concentrations and Limits
- Funding Strategies
- Contingency Funding Plan Team

Liquidity Risk
Checklist

- ✓ Policies and procedures for managing liquidity documented
- ✓ Risk assessment and projections completed according to approved methodology
- ✓ Framework of liquidity risk limits and their controls outlined
- ✓ Regular liquidity risk reports prepared
- ✓ Cash flow analysis by maturity buckets conducted
- ✓ Core deposits analyzed for making liquidity projections
- ✓ Updated Contingency Plan documented including early warning signals for contingency situations determined

THANK YOU!!

Upcoming Events

Date	Event
28 Mar, 1:00pm	**Strategic Risk Management (Webinar)**
4 Apr, 1:00pm	**Effective Risk Management (Webinar)**

mastercard foundation

CapPlus
CapitalPlus Exchange

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