

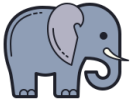
ASSET LIABILITY MANAGEMENT WEBINAR

Lesson Learned from Silicon Valley

Armél Romeo Kouassi
Senior Vice President, Northern Trust
Global Head of Asset Liability Management



AGENDA



❑ MY JOURNEY (p3)



❑ NORTHERN TRUST CORPORATION (p4-6)



❑ OVERVIEW OF INTEGRATED ASSET LIABILITY MANAGEMENT (p7-9)



❑ KEY STRATEGIC CONSIDERATIONS IN MANAGING BANK's ALM (p10-11)



❑ DRIVING THE BANK STRATEGY (p12-17)

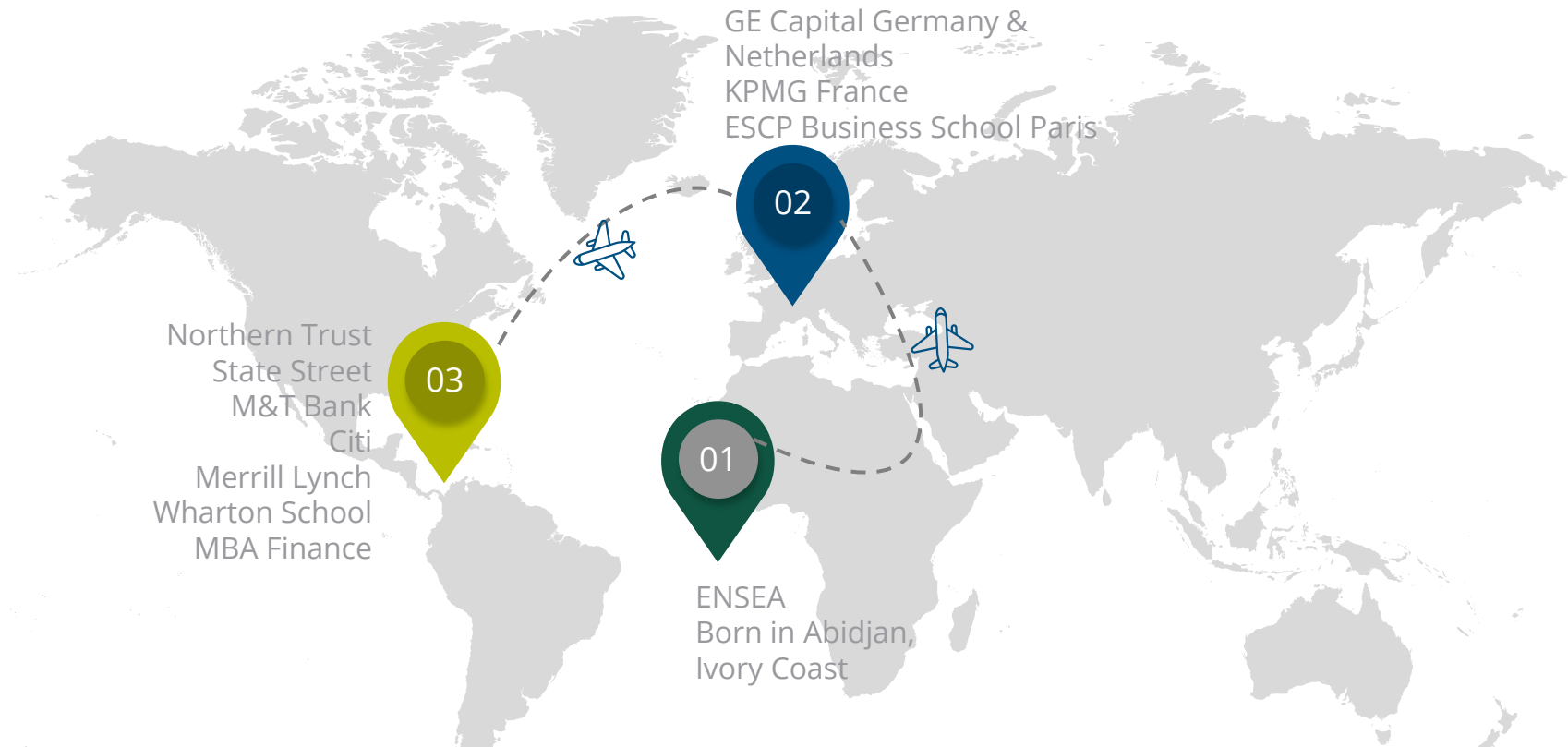


❑ SILICON VALLEY FAILURE (p18-23)



❑ THE FUTURE (p24-p25)

MY JOURNEY IN BANKING



Serve on the board of multiple non-profit organization
Board of Directors Scholars of Finance USA
Board of Directors Ridgefield Symphony Orchestra, Connecticut
Board of Manager of Edmond Town Hall, Connecticut
Advisory Board of the Center For Financial professional, Fintech, UK

Presidential Leadership Scholars Class of 2023, USA

My interest: Boating, Art & Music, Private Pilot, Leadership Development

NORTHERN TRUST CORPORATION ~ 133 YEARS OLD INSTITUTION

Northern Trust Corporation is a Global Financial Services Company headquartered in Chicago, Illinois that caters to corporations, institutional investors, and ultra high net worth individuals. Northern Trust is one of the largest banking institutions in the United States and one of the oldest banks in continuous operation. ~\$1.7 trillion in assets under management and \$17 trillions in assets under custody, ~\$155 billions balance sheet. Offices in 20 US States and 23 countries including Africa



AWARDS & ACCOLADES

COMPOSITION OF NORTHERN TRUST'S GLOBAL WORKFORCE*

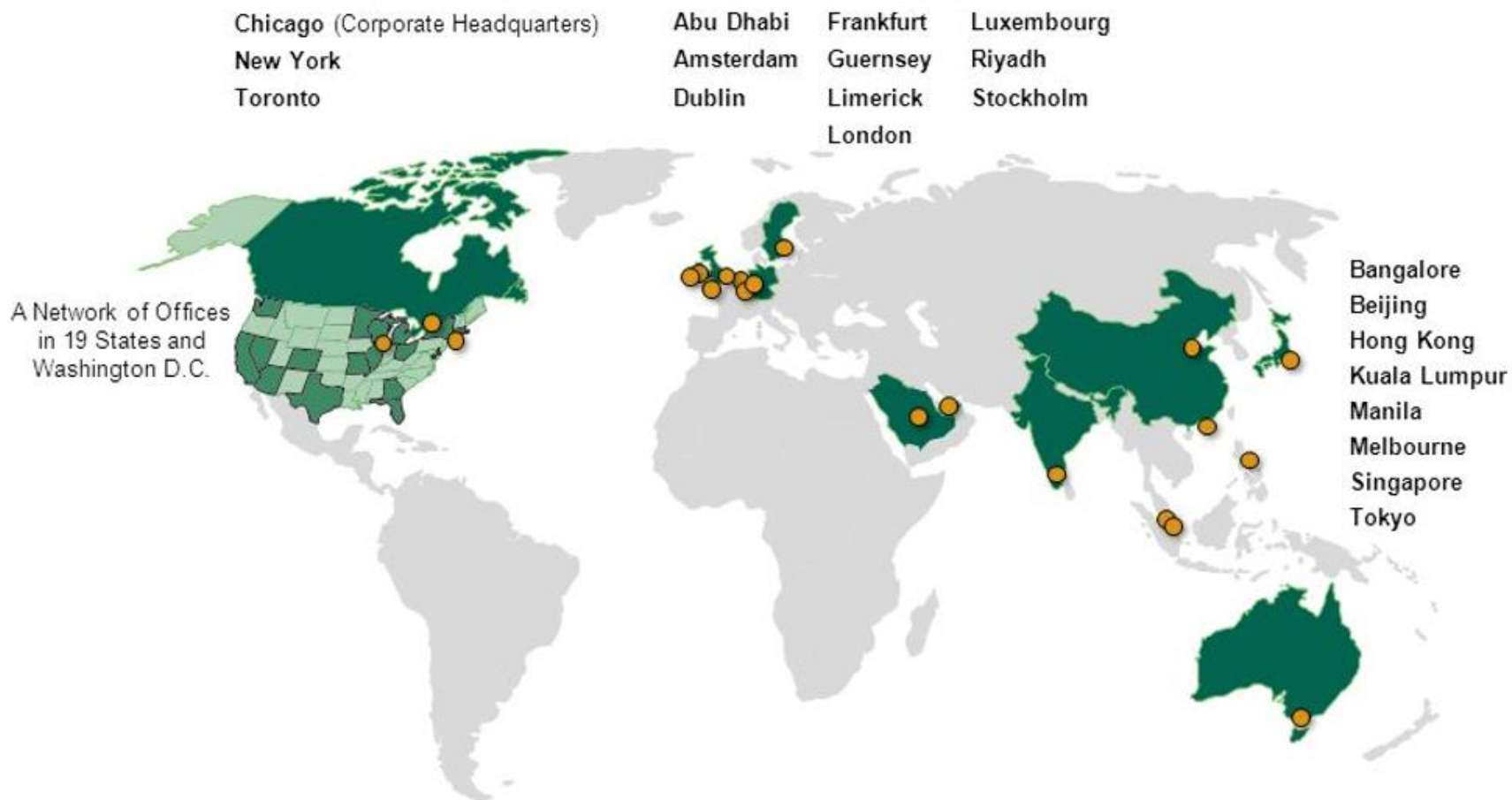


- ❑ **Worldwide Institutional Assets 13th Largest** (worldwide Institutional AUM)
- ❑ **Sovereign Wealth Funds 9th Largest** (total worldwide AUM)
- ❑ **Endowment/Foundation Assets 4th Largest** (total worldwide AUM)
- ❑ **Indexed (U.S.) Equity 4th Largest** (U.S. Institutional, tax exempt, managed internally)
- ❑ **Indexed (U.S.) Fixed Income 5th Largest** (U.S. Institutional, tax exempt, managed internally)
- ❑ **Factor-Based Strategies 7th Largest** (Total worldwide AUM)
- ❑ **Retirement Solutions 8th Largest Defined Benefit Manager U.S. Institutional**, (U.S. Institutional, tax exempt)
- ❑ **Multi-Manager 9th Largest Outsourcing Manager** "Outsourcing Report," P&I, 7/4/2022.
- ❑ **ETF Sponsor 20th Largest in the U.S.** Source: Morningstar & NTAM

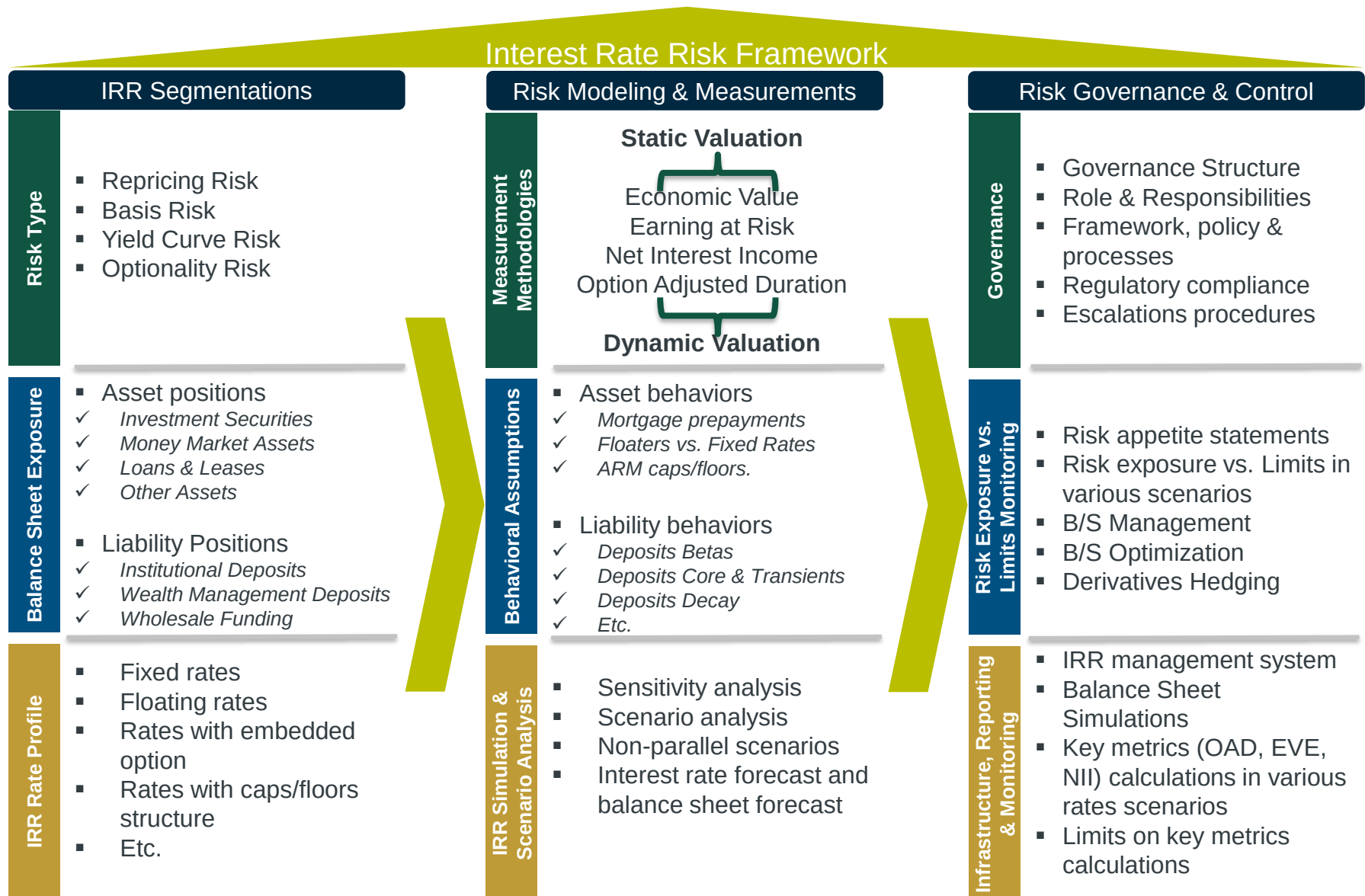




Northern Trust's Global Presence



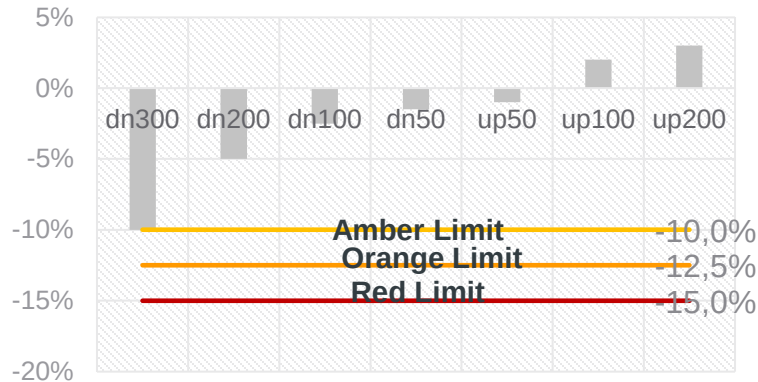
INTEGRATED ASSET LIABILITY MANAGEMENT



MANAGING INTEREST RATE RISK (IRR) AND LIQUIDITY (LIQUIDITY COVERAGE RATIO – LCR) ILLUSTRATIVE EXAMPLE.

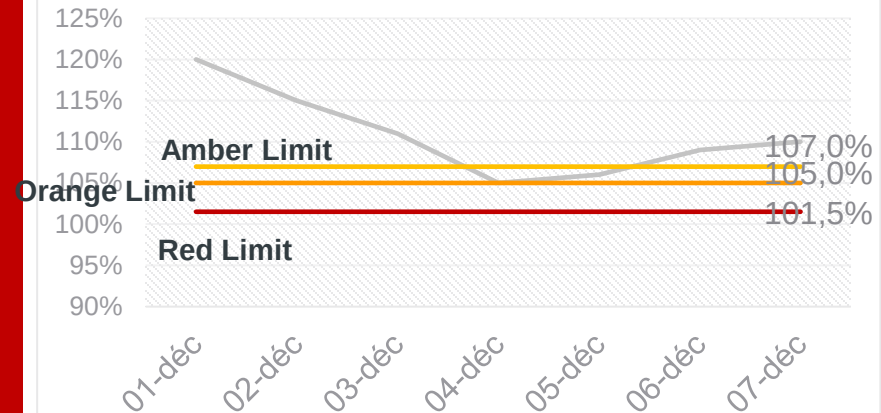
EVE %

EVE up200 % Tier 1



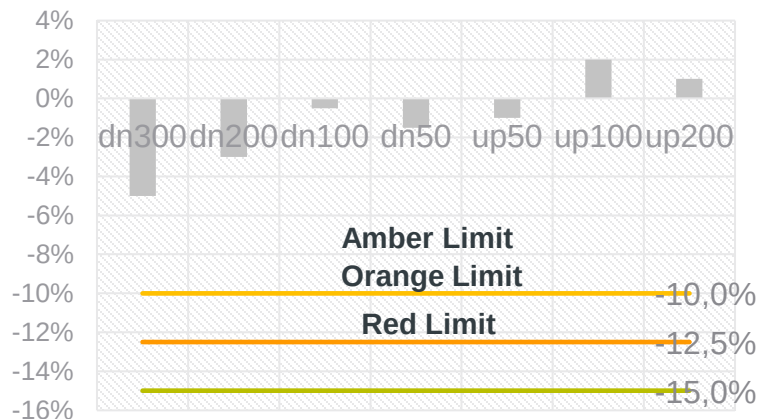
LCR %

LCR%



NII %

NII % Base NII



- ❑ Calculate Liquidity Risk tolerance and impact on IRR
- ❑ IRR Dictate duration profile of asset and liability
- ❑ LCR drivers and level will dictate the HQLA/Non-HQLA composition
- ❑ LCR is the constraining driver for liquid assets requirements
- ❑ Due to HQLA buffer, the bank can handle severe runoffs

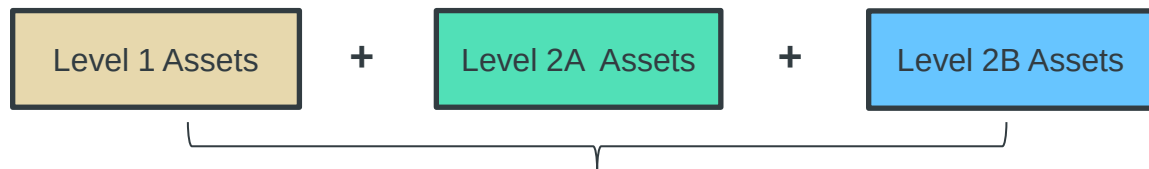
The linkage?

LIQUIDITY COVERAGE RATIO (LCR) KEY FACTOR TO CONSIDER

- The Liquidity Coverage Ratio enhances the banking industry's ability to absorb shocks resulting from financial and economic stress.
- Regulators require an institution's LCR to be at least 100%. The LCR calculation considers Bank's entire balance sheet (assets, liabilities and off-balance sheet)



- The Liquidity Coverage Ratio aims to ensure an institution has an adequate stock of unencumbered high-quality liquid assets (HQLA) which can be converted into cash to meet its liquidity needs over a 30-calendar daytime period under stress
- LCR impact is targeted at the banks but your banking relationships, your clients — and as a result your business will be affected

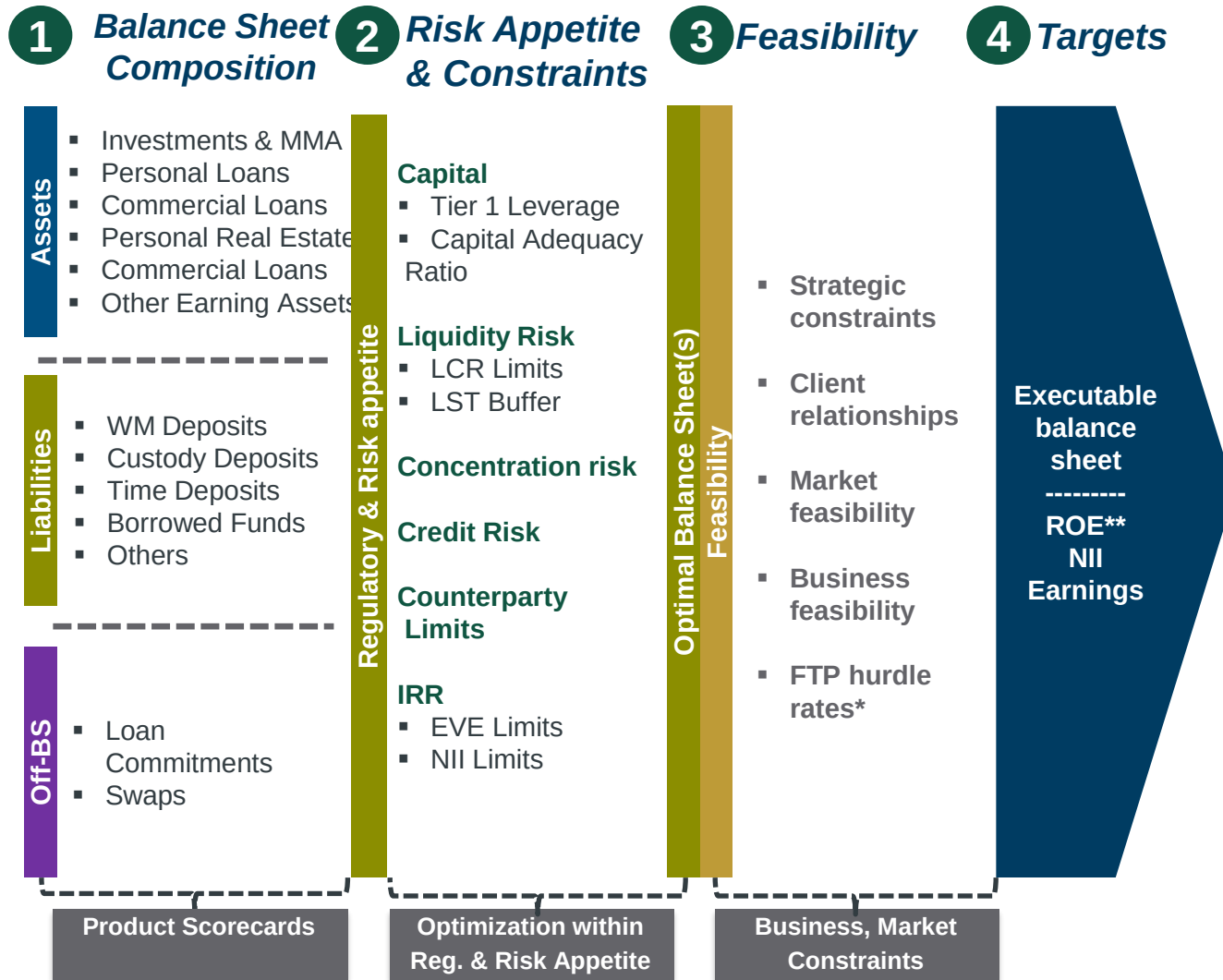


$$\text{LCR} = \frac{\text{High Quality Liquid Assets}}{\text{30-Day Cumulative Cash Outflows}}$$

Deposit outflows during stress + Wholesale funding run-off + Estimated drawdowns of commitments - Cash Inflows

EXAMPLE OF BALANCE SHEET/ALM OPTIMIZATION FRAMEWORK

B/S optimization provides the optimum balance sheet and identifies and evaluates a wide array of strategically feasible options



*Note that FTP serves as a cost allocation mechanism at the BU level. The optimization framework looks across the entire balance sheet to drive top of house results

** Firm Level ROE

STRATEGIC BANK BALANCE SHEET MANAGEMENT

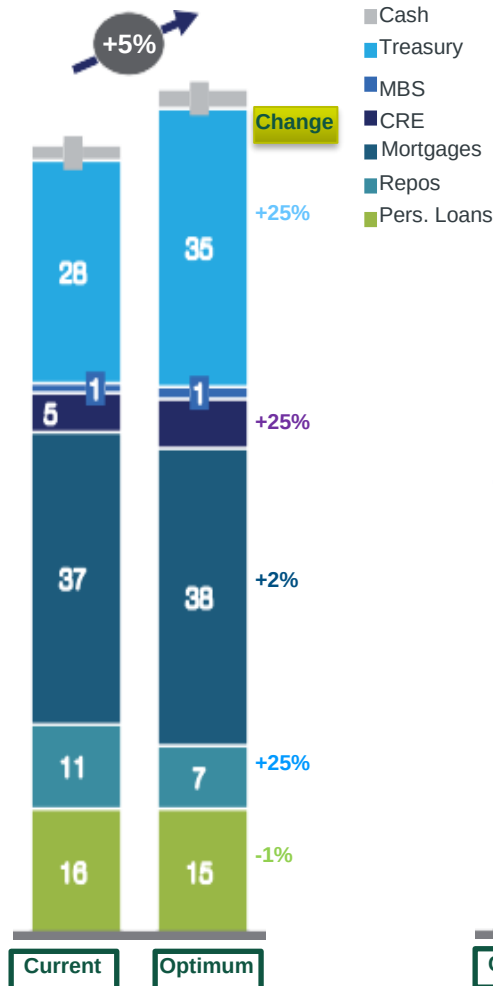
Facilitate understanding of connections between the balance sheet and KPIs/KRIs.

Allow simulation and evaluation of strategic options. Provide for integrated analysis of products.

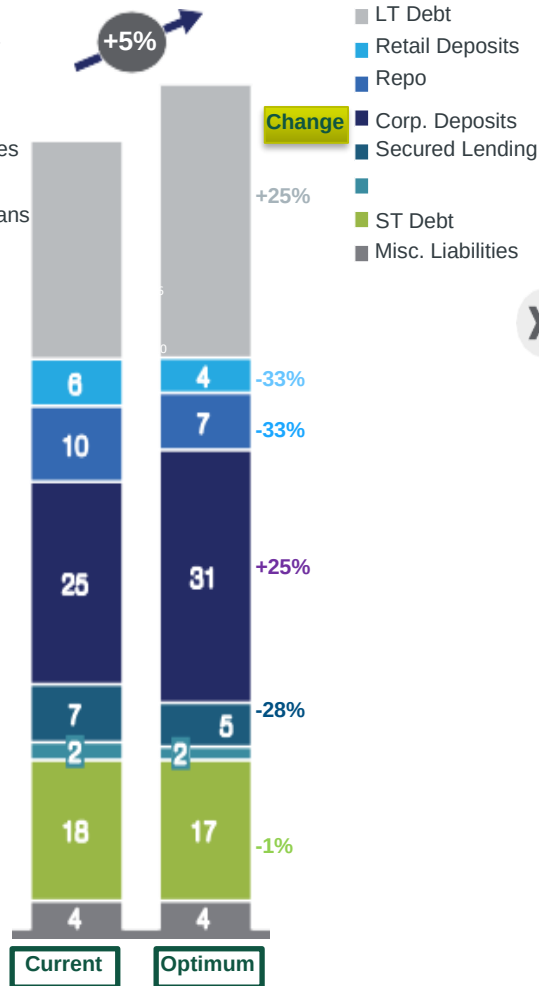
Results of sample balance-sheet optimization

» Main changes

Assets, %



Liabilities, %



Assets

- ☒ Cash
- ☒ Treasury
- ☒ MBS
- ☒ Commercial Loans
- ☒ Interbank Loans
- ☒ Repos

Liabilities

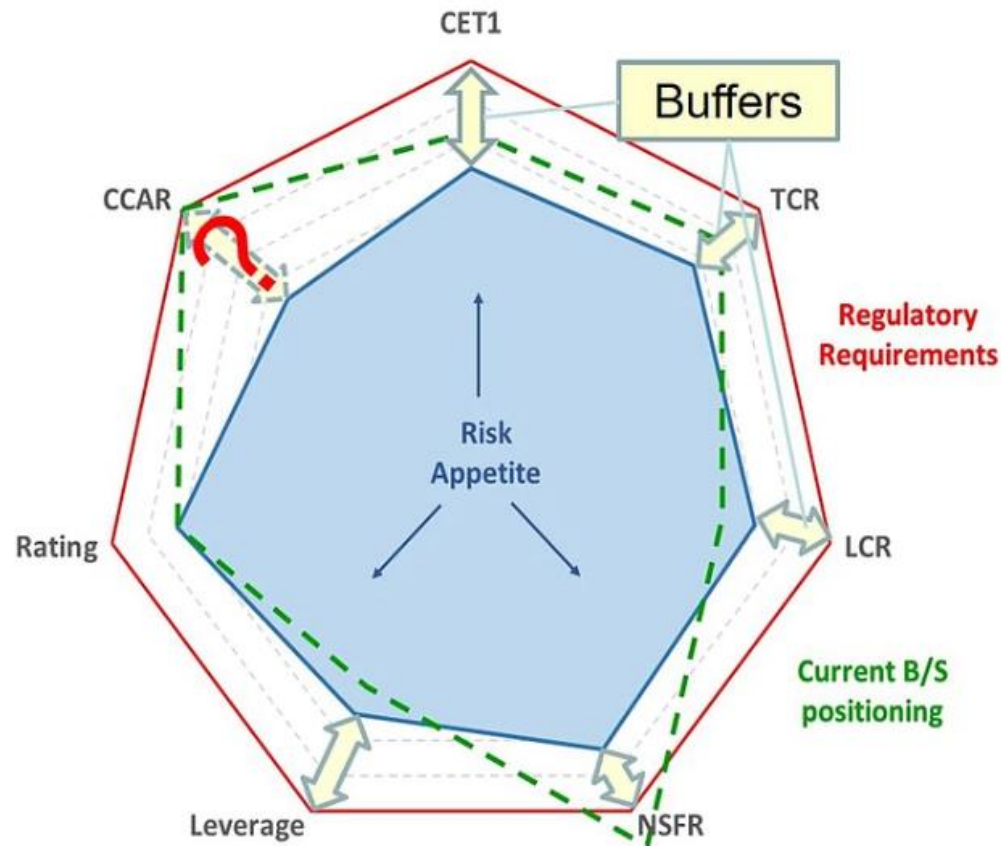
- ☒ LT Debt
- ☒ Corp. deposits

- ☒ Personal Loans
- ☒ Retail Deposits
- ☒ Repo
- ☒ Secured Lending

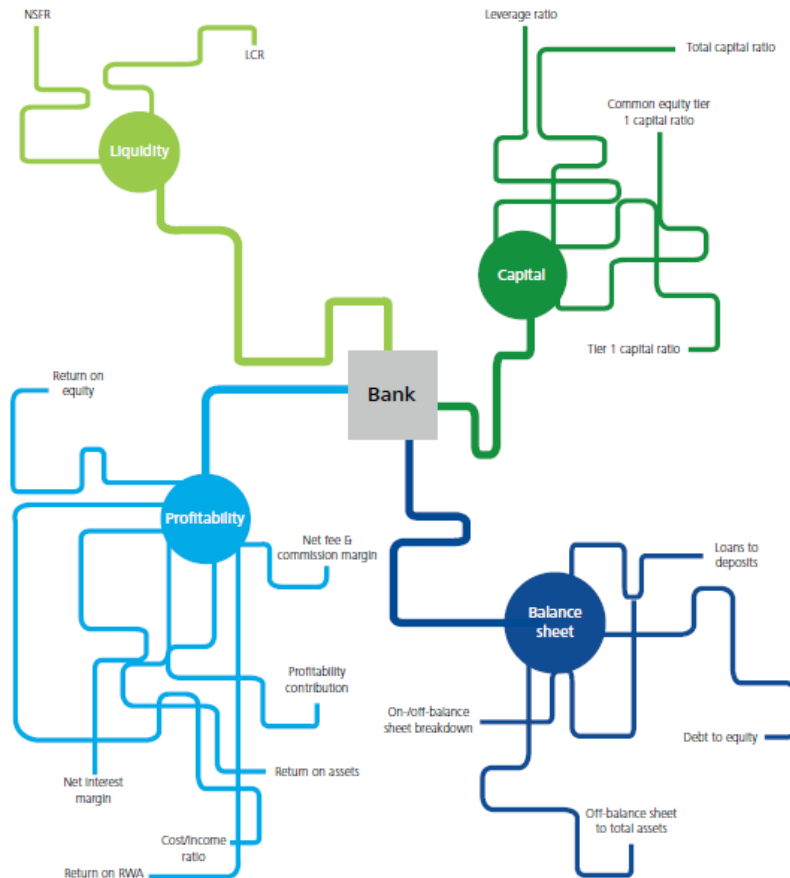
Best constraint outcome

Target metrics,%	Current	Optimum
Return on Equity	9.5%	12.0%
Constraints,%	Current	Optimum
CET1 ratio (min =15)	14.7%	15.5%
T1 Ratio (min = 16)	15.5%	16.1%
T 1 Leverage (op=7)	7.9%	7.2%
LCR (min = 109)	107	113
EVE % (max= 8%)	2.5%	7.5%
OAD % (band=1%)	0.5%	1.0%
NII % (max 8%)	3.2%	7.0%

DEVELOP ROBUST RISK APPETITE FRAMEWORK: CREATE A LINKAGE BETWEEN INTEREST RATE RISK, LIQUIDITY, CAPITAL AND OTHER RISKS



MULTIPLE CONSIDERATIONS IN MANAGING A BANK



- ❑ The financial services industry has reached an inflection point of important structural change . In an effort to avoid the possibility of a repeat of the financial crisis of 2008, global regulators and lawmakers have embarked on the most substantial regulatory overhaul of the financial industry since the Great Depression
- ❑ Capital, liquidity, funding, and leverage ratios, as well as recovery and resolution planning, are forcing banks to construct balance sheets and businesses that comply with all constraints while aiming to fully utilize the capacity under the ratios. This limits banks' strategic degrees of freedom and demands a new, highly analytical business-optimization and strategy-setting process.
- ❑ Establishing a proactive balance sheet management will facilitate the alignment of liquidity and IRR.

DEVELOPING STRATEGY & WEAPONIZING YOUR ASSET LIABILITY MANAGEMENT COMMITTEE (ALCO)

STRATEGY:

- Understand your exposure to develop sound strategies.
- Establish the part of the yield curve that impact your institution the most
- Pick 2-3 realistic scenarios (yield curve shift, deposits run-off, liquidity event, etc..)
- Consider macro uncertainty,

BEHAVIORAL MODELING:

- Realistic modeling should create the roadmap to strategy development.
- Don't wait to develop strategy. Be proactive

ALCO:

- Create a 3–5-page actionable ALCO summary deck
- Equate sensitivity to rate changes to something that will get your committee's attention
- NIM, ROE, EPS, CET1, etc....

PRO-ACTIVE MANAGEMENT:

- Periodic review of opportunities keep everyone ready
- Relative value opportunities do not conflict with big picture view, they enhance efficiency
- There are many asset classes that fit within each investment plan
- Monitoring investment portfolio and balance sheet products: “one size fits all” is not enough

ASSET LIABILITY MANAGEMENT WILL ALWAYS BE A TRADE-OFF



- **Risk profile:** What are the top risks of the organization and the controls to mitigate those risks?

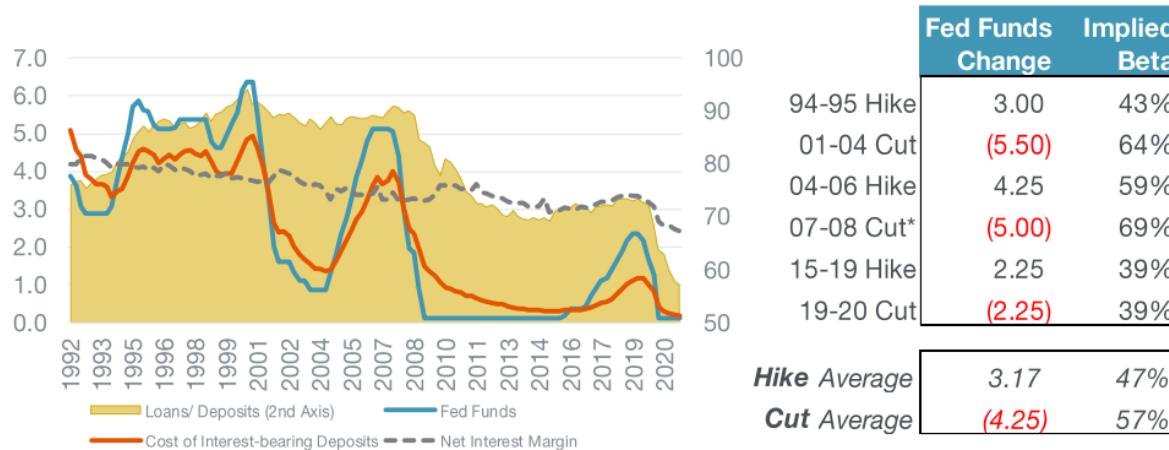
- **Risk capacity:** How much risk can the organization absorb?

- **Quantitative risk analysis:** What types of analysis establishes boundaries within which management can operate?

- **Qualitative risk assessment:** What is the ranking and categorization of the company's risk, taking into account controls and risk/reward relationships?

DEPOSITS COST IN SPOTLIGHT WHILE PREPARING FOR INCREASE IN FUNDING COST

Historical deposits betas



... roughly 50% average beta in last 3 hiking cycles... will this time be different?

Source: Piper Sandler

Average Beta by 100bps Increment			
+100	+200	+300	+400
23%	48%	62%	87%

Funding cost considerations

- **Stickiness of deposits: understand deposits attrition and repricing (Betas) as rate rise**
- **Unprecedented excess liquidity**
 - ✓ Extra \$4 trillions in Bank deposits
 - ✓ Direct stimulus of \$3trillions including \$1 trillion of PPP
 - ✓ Fed Balance Sheet double to \$8 trillions.
- **Nonbanks (Fintechs)**
 - ✓ Accounts for nearly 70% of loans origination and, ~50% of unsecured personal loans

EXAMPLE OF ALTERNATIVE INVESTMENT SCENARIO DEPENDING ON BALANCE SHEET

Purchases – Asset-Sensitive Balance Sheet: Agency MBS

If looking for defensive, straightforward cash flow alternatives

10yr Final	- Defensive - Amortization schedule delivers cash flow - A front end anchor for barbell strategies ~1.10% yield [3-4yr]
20yr Final	20 is the new 15 - Buy what the Fed isn't purchasing 1.55% - 1.70% yields [5-7yr]
"Story" Bonds	- Particular collateral characteristics viewed as mitigating prepayment risk - Examples include bank serviced, specific geography, low loan balance pools
Other	- Conforming Jumbo - Current coupons vs high coupons / premium risk considerations - Prepayment models

Purchases – Asset-Sensitive Balance Sheet: CMBS

If looking for agency alternative to residential MBS with call protection...

GNMA Multifamily (Project Loan REMICs)	- Lockout & penalties mitigate refi risk - Collateral diversification 1.70% -1.90% yield; 0% risk weight [4-6yr] - Be mindful of extension risk – know your spot on the curve
"FRESB" Freddie Mac Multifamily SBL	- Enhanced CF stability / call protection via PP & YM - Collateral diversification, new issue pricing, CRA eligibility - Spreads range +5bps to +30 bps [4-7yr] - Note: newer program, smaller LBs, default & prepay impact

If like the CRE sector and can take credit risk and looking for relative value...

Non-Agency CMBS	- Relative yield. Pick-up ~30bps yield vs. Agency CMBS - No historic principal loss with AAAs (30% support) 2.0 Credit enhancement and risk retention rules; 20% RW - Principal not guaranteed by a government agency
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Purchases – Asset-Sensitive Balance Sheet: Bank Subordinate Debt

If looking for loan-type yields and replacing loan-type credit

Description	- Debt qualifying as Tier 2 capital for the issuer at the holding company (can be down-streamed to bank as common) - Structure: 10nc5 fixed-to-floating rate 100% risk weight
Benefits	- Competitive yield for understandable credits - Back end floater mitigates extension risk 3% - low 4% coupons for "clean", traditional bank credits
Considerations	- Public vs. private, rated vs. non-rated - Liquidity factors - Regulatory guidance, policy and review process

Purchases – Liability-Sensitive Balance Sheet

If looking for floating rate exposure and comfortable with credit...

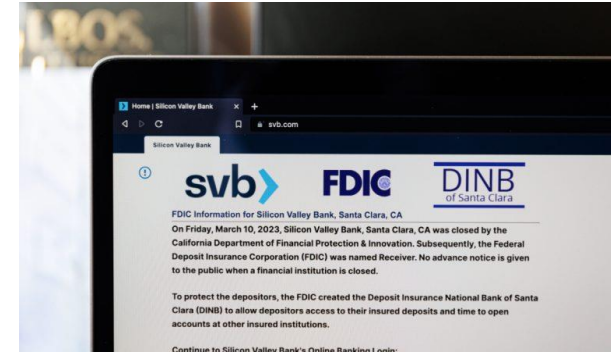
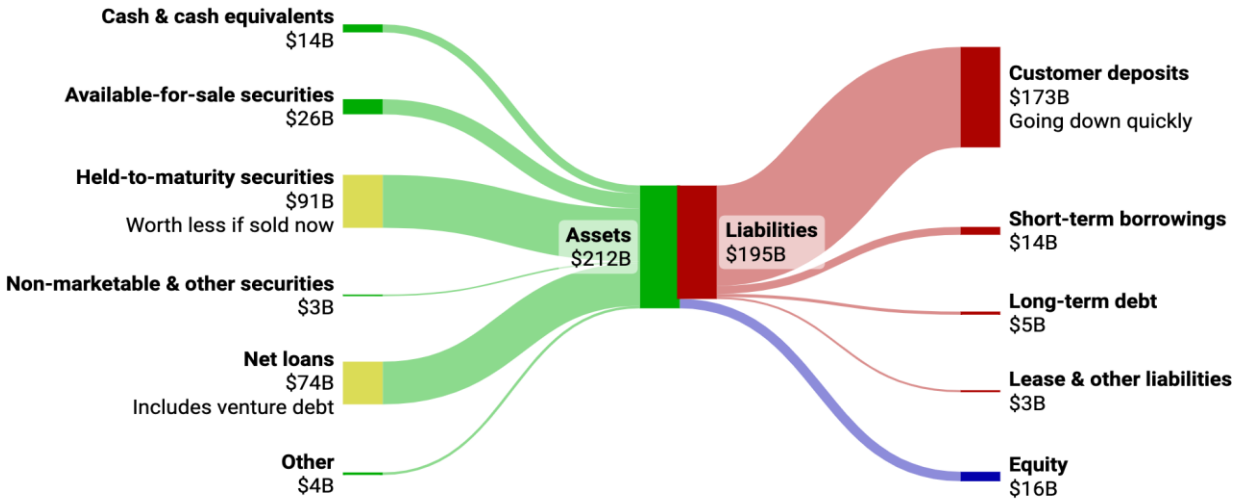
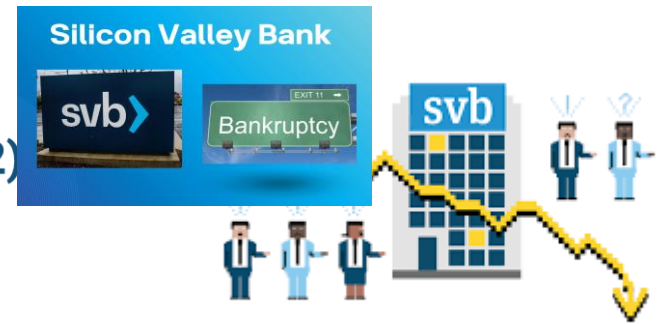
Corporate SOFR Floaters	- Relative spread: +70bps to +80bps in large cap Financials - No Libor transition issues - Adds to credit exposure
CLOs	- Not the CLOs of old, more credit support and safety - AAAs and AAs never had losses through Financial Crisis +135 bps spread @AA, 20% RW, typically around par

If you don't like bonds at all...

LOANS	- Higher yielding opportunities vs. investments - Secondary market packages, but loan flow programs becoming more accepted (Consumer and C&I) - Partner diligence and underwriting parameters are key
BOLI	- Tax shielded earnings up to 25% of capital - Insure individuals or groups; add-on for benefit packages - Yield ~ 3.25% pre-tax, 4.10%-4.50% @21%-28% tax rate - Can be 0% - 100% risk weight depending on structure

LA SILICON VALLEY BANK

Silicon Valley Bank Balance Sheet (Dec 31 2022)



Silicon Valley Bank failure

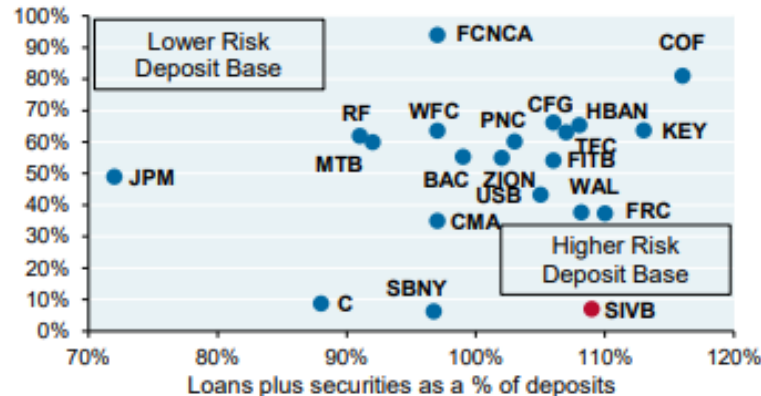
Silicon Valley Bank (SIVB) has been shut down by regulators who cited both inadequate liquidity and insolvency. According to the FDIC, insured SIVB depositors will have access to their funds no later than Monday morning. SIVB's \$209 bn in assets are roughly 2/3 of Washington Mutual (not adjusted for inflation), which failed in 2008. The mid-day closure of the bank was unusual, and is something we are still evaluating.



THE LIABILITY ISSUE: RELIANCE ON INSTITUTIONAL/VC FUNDING VS. TRADITIONAL RETAIL DEPOSITS

US bank loan-to-deposit ratios

Estimated retail deposit share of total deposits



Source: Autonomous Research, JPMAM. Securities include Hold to Maturity and Available for Sale categories. Q3 2022.

- ❑ High level of loans plus securities as a percentage of deposits, and very low reliance on stickier retail deposits as a share of total deposits.
- ❑ Bottom line: SVB carved out a distinct and riskier niche than other banks, setting itself up for large potential capital shortfalls in case of rising interest rates, deposit outflows and forced asset sales.
- ❑ SVB and the Tech Sector SVB's customer base was heavily **concentrated in VC-backed technology and life sciences companies**. VC-backed companies accounted for more than half of SVB's deposits at year-end 2022.
- ❑ This concentration linked SVB's funding growth directly to VC deal activity. As VC deal activity boomed in 2021 and early 2022, SVB's clients received investment proceeds, which were then deposited at SVB, increasing SVB's deposit levels

Figure 4. SVBFG client funds by client type

Total client funds by client niche¹

Early stage technology

Technology

Early stage life science/healthcare

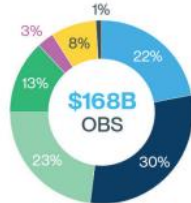
Life science/healthcare

International²

U.S. Global Fund Banking

Private Bank

Other



Note: All figures as of December 31, 2022 unless otherwise noted.

1. Represents management view of client niches.

2. International balances do not represent foreign exposure as disclosed in regulatory reports. Includes clients across all client niches and life stages, with International Global Fund Banking representing 3% of total client funds.

3. Based on deposit rates and total deposit balances at December 31, 2022.



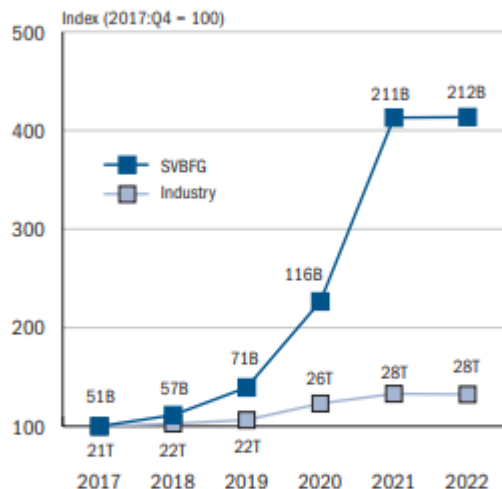
Source: SVBFG 2022:Q4 financial highlights, January 19, 2023.

EXPONENTIAL GROWTH

SVBFG's Rapid Growth

- At year-end 1983, **SVB's assets were approximately ~\$18 million**, and SVB grew gradually through 2019.
- Between 2019 and 2021, SVB tripled in size** driven by outstanding client liquidity with low interest rates an amplifying factor.
- SVB attributed its deposit growth to clients “obtaining liquidity through liquidity events, such as IPOs, secondary offerings, SPAC fundraising, venture capital investments, acquisitions, and other fundraising activities—which during 2021 and early 2022 were at notably high levels.
- While low interest rates and more-frequent client funding events affected all financial institutions and their clients, SVB saw an outsized impact because of its concentration in venture capital and start-up clients, and SVB invested these deposits in long-dated securities.

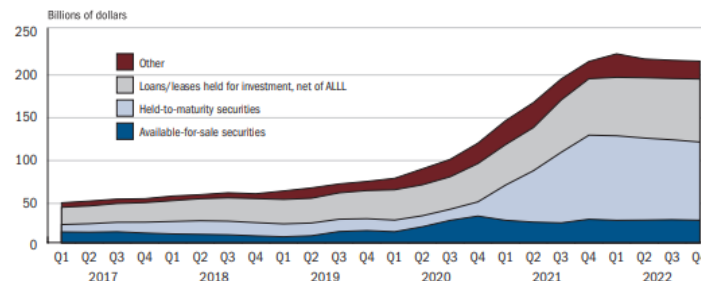
Figure 3. SVBFG and banking industry total assets



Note: The key identifies lines in order from top to bottom. All values indexed to 100 at year-end 2017. Values are as of year-end. Values are in billions of dollars for SVBFG and in trillions of dollars for the industry. Industry aggregate includes all top-holder firms.

Source: FR Y-9C and Call Report.

Figure 8. Composition of SVBFG assets

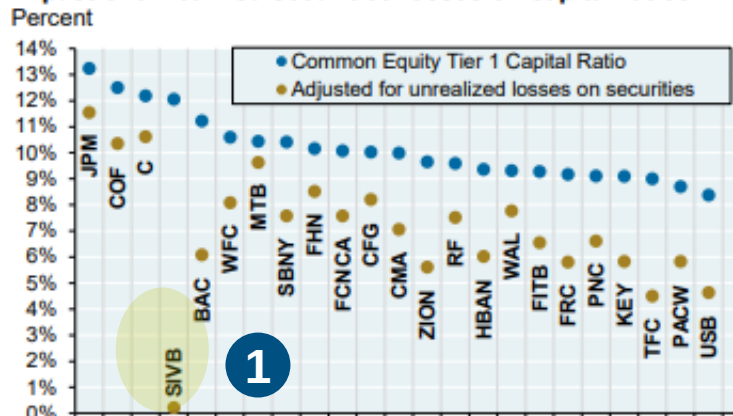


Note: The key identifies areas in order from top to bottom. ALLL is allowance for loan and lease losses.

Source: FR Y-9C.

DURATION RISK

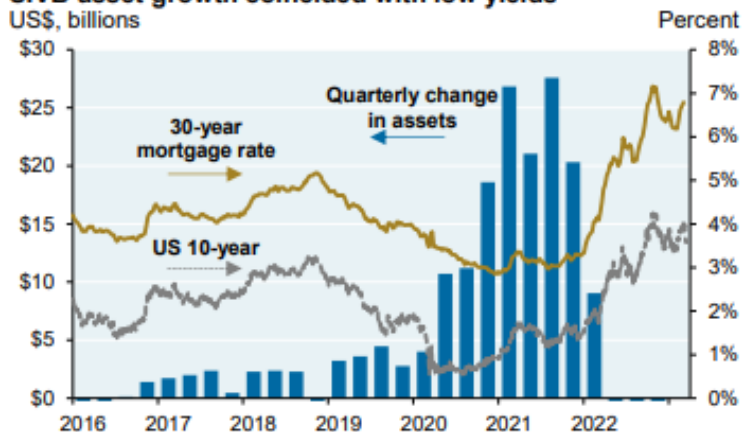
Impact of unrealized securities losses on capital ratios



Source: JPMAM, Q4 2022. See page 3 for methodology

- ❑ The question for investors/depositors: how much duration risk did each bank take in its investment portfolio during the deposit surge, and how much was invested at the lows in yields?
- 1
- ❑ Impact on capital ratios from an assumed immediate realization of unrealized securities losses.
- ❑ SVB's widening duration gap has built up over time against the background of aggressive balance sheet growth.

SVB asset growth coincided with low yields



Source: Bloomberg, JPMAM. March 14, 2023.

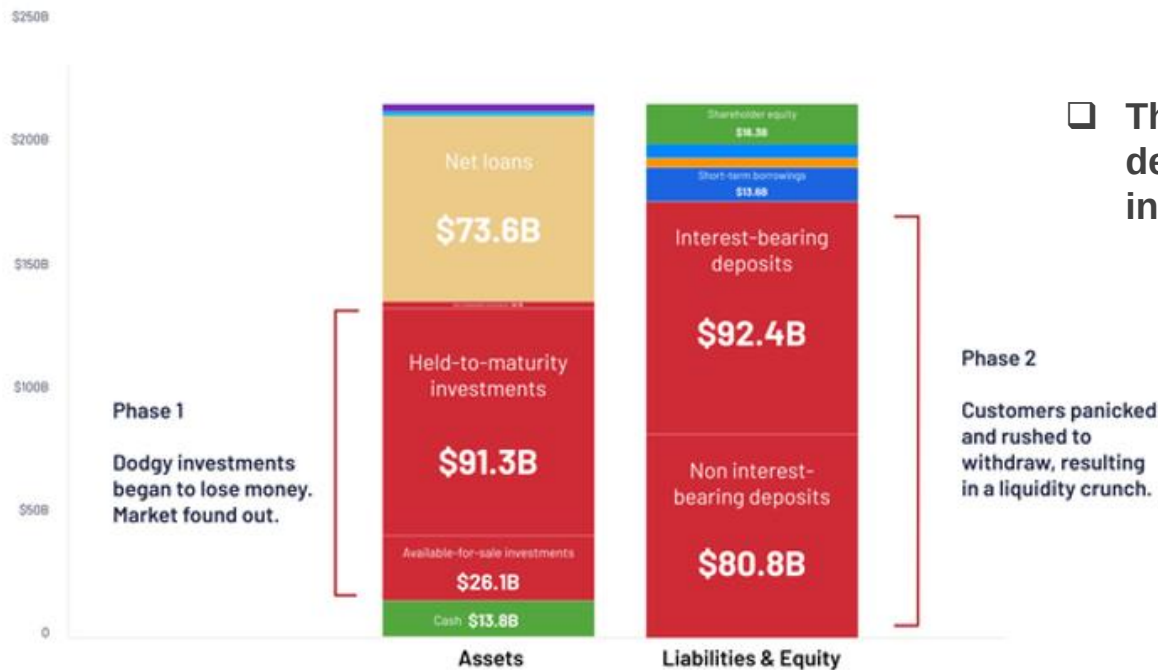
FDIC Q4 unrealized bank losses on investment securities



Source: FDIC. Q4 2022.

SVB'S BALANCE SHEET PROBLEM

Balance Sheet Problem at Silicon Valley Bank



- ❑ The collapse was triggered by a deposit run of a concentrated investor base

Source: Silicon Valley Bank 2022 December balance sheet

CHANGING RATES AND THE IMPACT ON MARKET VALUE

Two ways that regulators expect a well-managed financial institution to look at interest rate risk:

- ❑ *Earnings at risk (EAR): EAR measures short-term changes to the income statement from interest rate movements .*
- ❑ *Economic value of equity (EVE), considers a longer-term horizon and is a measure of changes to the market value of the institution's capital, rather than its margin.*

Figure 21. SVBFG EVE sensitivity in a +100bp shock scenario



Note: Data as of October 2022.

Source: SVBFG internal material, December 16, 2022.



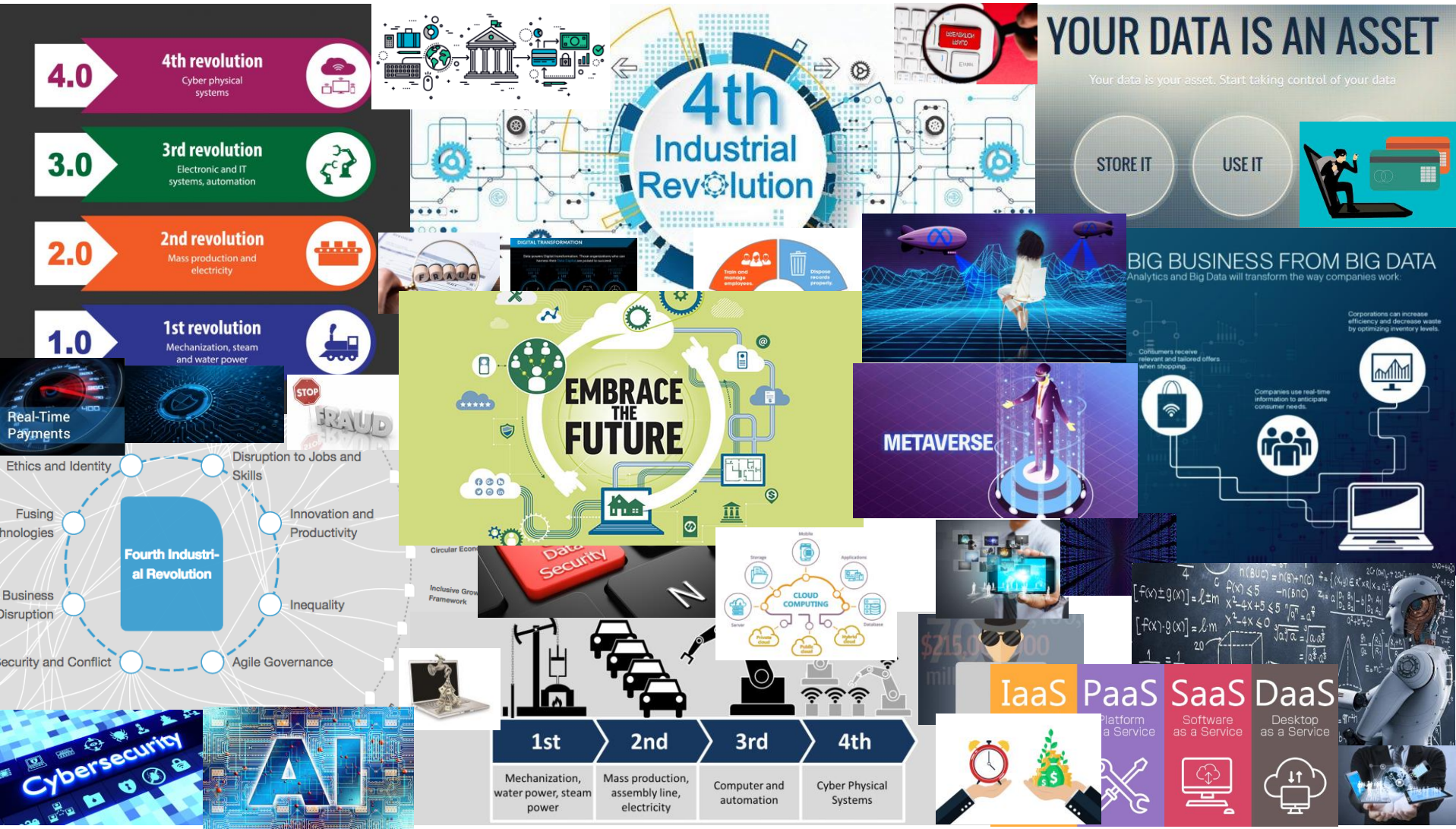
SVB's EVE was breaching for many years

- ❑ **Economic value of equity (EVE)** metric estimates the structural mismatches of a bank balance sheet relative to yield curve movements.
- ❑ A longer-term measure as it is a discounted cash flow approach that estimates the present value (PV) of balance sheet cashflows to estimate economic equity (PV of assets – PV of liabilities = economic value of equity).
- ❑ EVE is calculated for various rate shocks (e.g., +/- 100, 200, or more bps) to estimate exposures as cashflow paths change. Deposit assumptions are important in this exercise, so cashflows must be estimated based on customer characteristics.

BALANCE SHEET MANAGEMENT & DIGITAL ASSET?



THE IMPACT OF NEW TECHNOLOGY & ARTIFICIAL INTELLIGENCE



Thank you



Acknowledgements : JP Morgan Chase
Federal Reserve Bank
Oliver Wyman, COVID-19 series
Piper Sandler Balance Sheet Management
McKinsey, The Future of Bank Risk Management
KPMG, Balance sheet optimization the returns dilemma for banks
Optimization under regulatory constraints
Genuine Impact
Northern Trust
<https://erm.ncsu.edu/library/article/understanding-risk-appetite>