



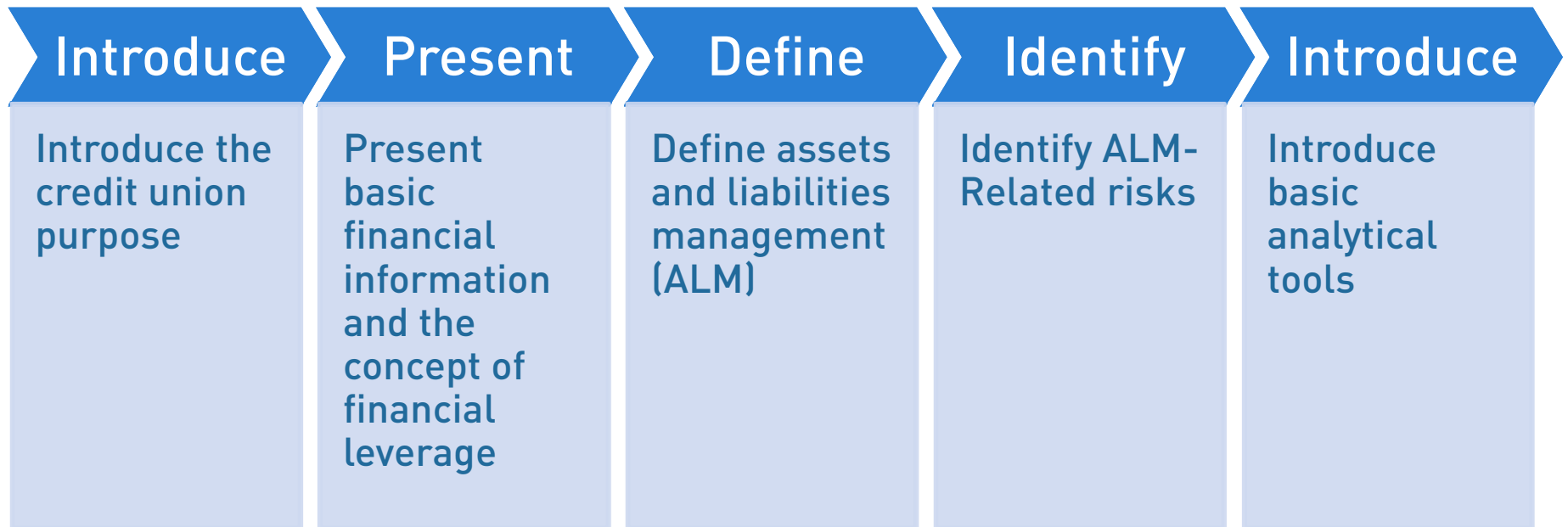
Mark H. Smith
I N C O R P O R A T E D

**BASIC
INTEREST RATE RISK
TRAINING FOR BOARD AND
ALCO**

PRESENTED BY CYNTHIA WALKER, CEO

MARK H. SMITH, INC

TODAY'S AGENDA



CREDIT UNION PURPOSE

Full service
financial
institution

Must be
profitable

Success depends
on managing the
balance sheet

The balance
sheet is
leveraged

BALANCE SHEET

- Statement of Financial Position
- Point in time
- Balance sheet equation
 - Assets \$100
 - =
 - Liabilities \$90
 - Net worth \$10

Loan yields typically are better than investments

Certificates are the most expensive

Assets	\$ Millions	Liabilities	\$ Millions
Loans	60	Miscellaneous	1
Investments	30	Notes payable	5
Fixed assets	7	Nonmaturity Shares (NMS)	64
Miscellaneous	3	Share certificates	20
		Total Liabilities	90
		Owner's Equity / Net Worth	10
Total Assets	\$100	Total Liabilities & Net Worth	\$100



INTEREST RATE RISK FOCUS
Net Worth for NEV

INCOME STATEMENT

Results over a period of time

- + Interest income
- Interest expense

= **Net interest income**

NII

- + Other income
- Operating expenses

= **Net income**

INCOME STATEMENT	
LOAN & INVESTMENT INT INCOME	\$440
INTEREST EXPENSE	(\$90)
NET INTEREST INCOME	\$350
NON-INTEREST INCOME	\$125
PROVISION FOR LOAN LOSS	(\$100)
OPERATING EXPENSES	(\$325)
NET INCOME	\$50

INTEREST RATE RISK FOCUS
Income simulation



Balance Sheet as of 12/31/2022

ASSETS		LIABILITIES & NET WORTH	
LOANS	\$6,000	BORROWED FUNDS	
		CORPORATE	\$1,000
INVESTMENTS	\$3,000	MEMBER DEPOSITS	\$7,000
		NON MEMBER	\$1,000
OTHER ASSETS	\$1,000	TOTAL BORROWED	\$9,000
		NET WORTH	\$1,000
TOTAL ASSETS	\$10,000	TOTAL LIAB & NET WORTH	\$10,000

Income Statement 12 months ending 12/31/2023

INCOME STATEMENT	
LOAN & INVESTMENT INT INCOME	\$440
INTEREST EXPENSE	(\$90)
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NET INCOME	\$50



MANAGING NII IS A CRITICAL GOAL

Ending Balance Sheet as of 12/31/2023

ASSETS		LIABILITIES & NET WORTH	
LOANS	\$6,000	BORROWED FUNDS	
		CORPORATE	\$1,000
INVESTMENTS	\$3,050	MEMBER DEPOSITS	\$7,000
		NON MEMBER	\$1,000
OTHER ASSETS	\$1,000	TOTAL BORROWED	\$9,000
		NET WORTH	\$1,050
TOTAL ASSETS	\$10,050	TOTAL LIAB & NET WORTH	\$10,050

FINANCIAL LEVERAGE



- Utilize borrowed funds from counterparties to produce profits
 - Members or retail funding
 - Financial Institutions, Corp. FHLB, Fed or wholesale funding

FINANCIAL LEVERAGE



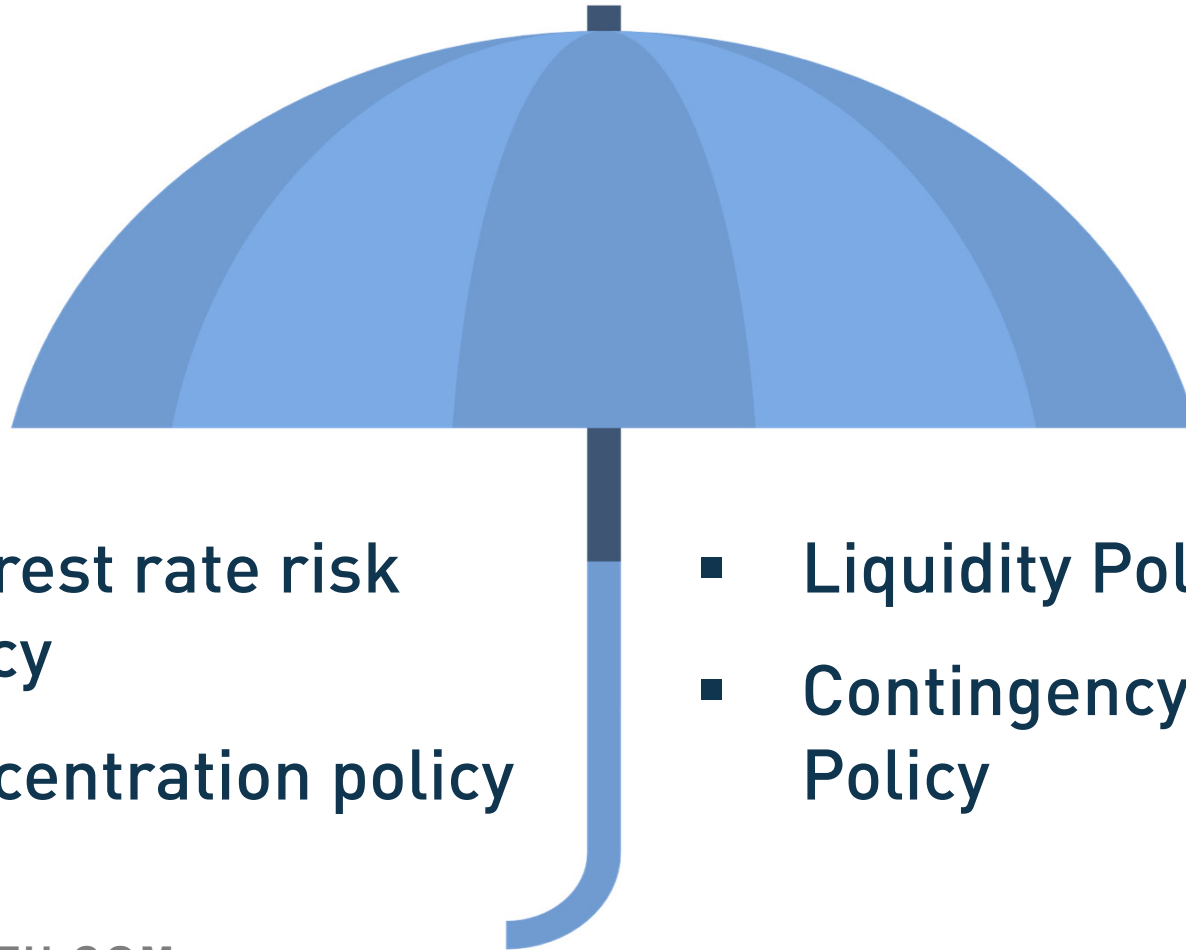
Leverage will turn small changes in balance sheet into large changes in net worth

$3,000,000/100,000,000= 3\%$ of total assets

$3,000,000/30,000,000 = 10\%$ of total investments

$3,000,000/10,000,000= 30\%$ of net worth

ASSET LIABILITY MANAGEMENT - ALM MANAGING THE ASSETS, LIABILITIES, AND CAPITAL OF THE CREDIT UNION



- Interest rate risk policy
- Concentration policy
- Liquidity Policy
- Contingency Funding Policy

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POLL QUESTION #1

THE BALANCE SHEET MISMATCH

LOANS & INVESTMENTS

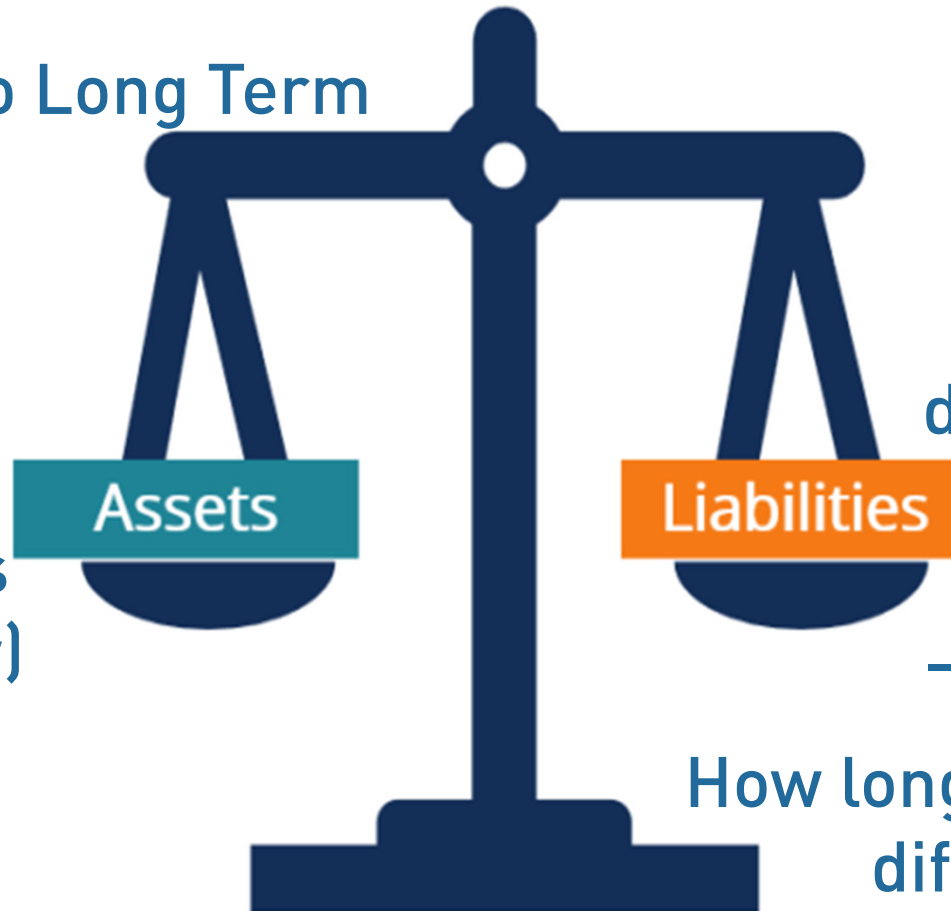
Intermediate to Long Term

1 to 30 Years

Fixed Rate

Variable Rate

Loan payments
Vary (cash flow)



DEPOSITS

Short -Term

Variable rate
non-maturity
deposits (NMD)

Fixed rate
- member CD's

How long deposits stay
difficult to define

MEMBER OPTIONALITY RISKS

Loans

Prepayment risk

- borrower pay off loans sooner than loan terms

Extension risk

- borrower chooses not to prepay

Deposits

Non-maturity NMD

- Rate sensitivity - beta
- Lag – response time
- Decay - time

Member CD's

- Maturity schedule
- Early withdrawal

Account holders can withdraw funds at any time

Liquidity can be an issue if there are too many withdrawals at the same time

Silicone Valley Bank and Signature Bank

INTEREST RATE RISK (PART OF ALM)



Rate risk occurs when Net Interest Income (NII) is **detrimentally** impacted by a rate change



Rate increase may cause the cost of short-term funding to increase rapidly while the yield on fixed-rate loans remains static.



Loan payment behaviors may change as interest rates increase or decrease



Market risk is when the value of an asset or liability changes when interest rates change

METHODOLOGIES TO ESTIMATE IRR

- **GAP:** Measures mismatch between repricing terms of assets and liabilities
- **Income simulation:** Forecasts change in net interest income and net income
- **Net Economic Value:** Estimates change in market values of the balance sheet and the resulting impact on capital as interest rates change

INCOME SIMULATION



Estimates future net interest income (NII) and net income



Simple in concept



Uses familiar terms



Member behavior for loans and deposits difficult to predict

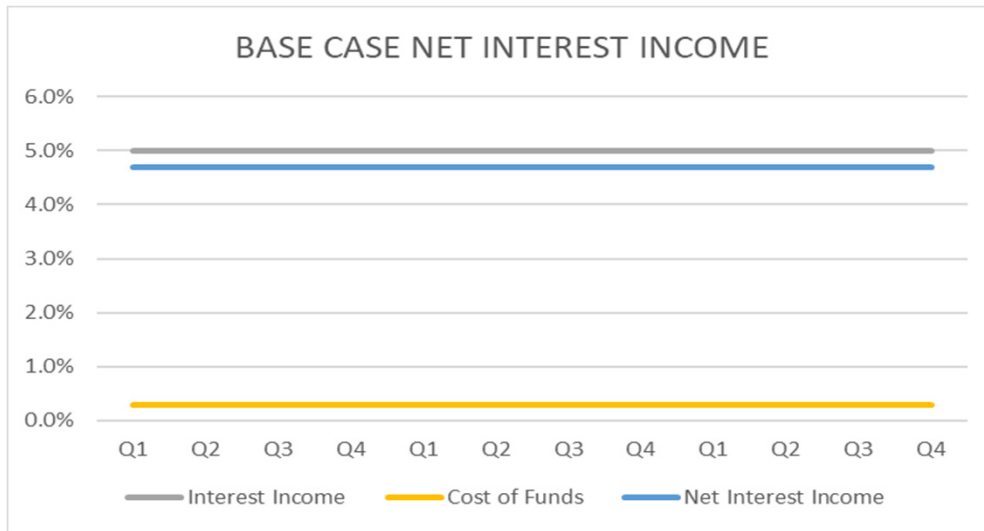
3

Short-term (1 to 3 years) and will miss risk of longer-term assets



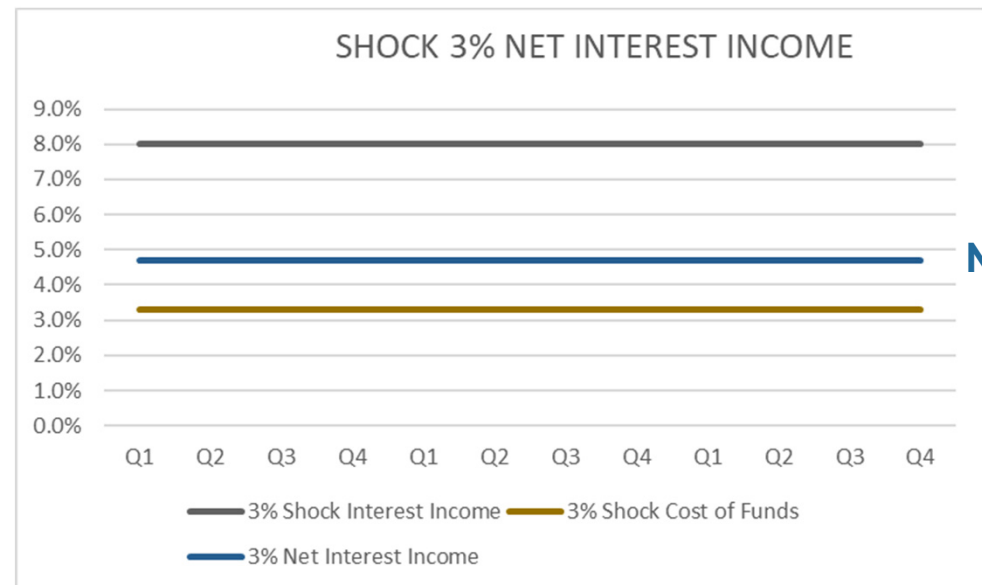
Very effective estimate of risk to NII

EXAMPLE 3% INSTANTENOUS AND PARALLEL



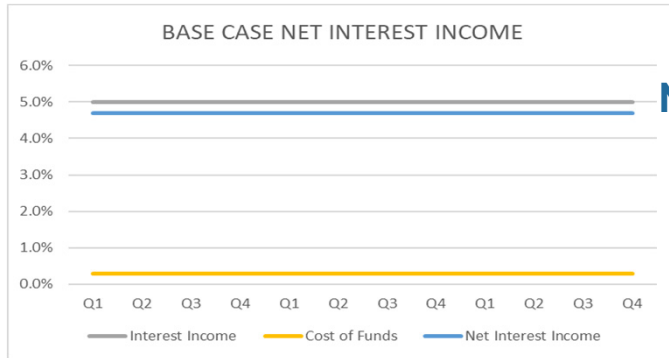
NII 4.7

**PERFECT WORLD –
Everything
reprices at the
same time**



NII 4.7

EXAMPLE 3% INSTANTENOUS AND PARALLEL 36 MONTH REPRICING OF ASSETS

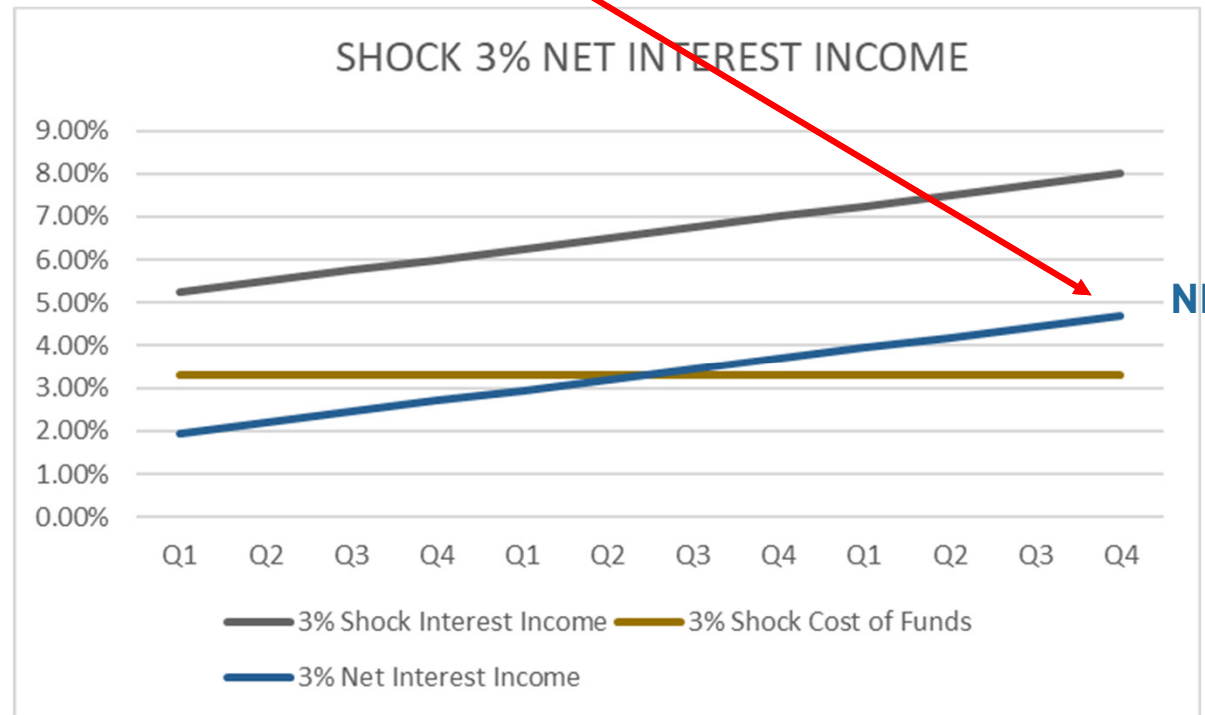


NII 4.7

LOAN YIELDS AND INVESTMENT YIELDS TAKE 36 MONTHS TO REPRICE

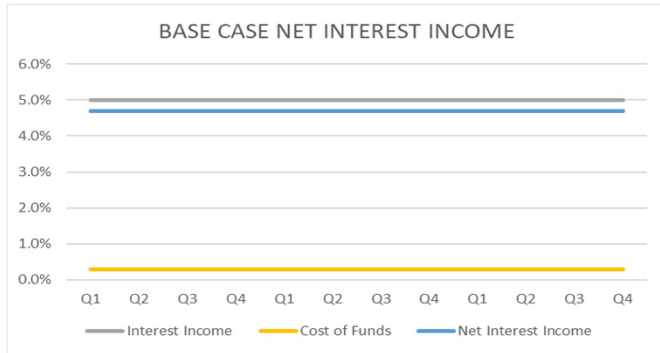
COST OF FUNDS GO UP IMMEDIATELY

NII DECLINES AND TAKES 36 MONTHS TO FULLY RECOVER

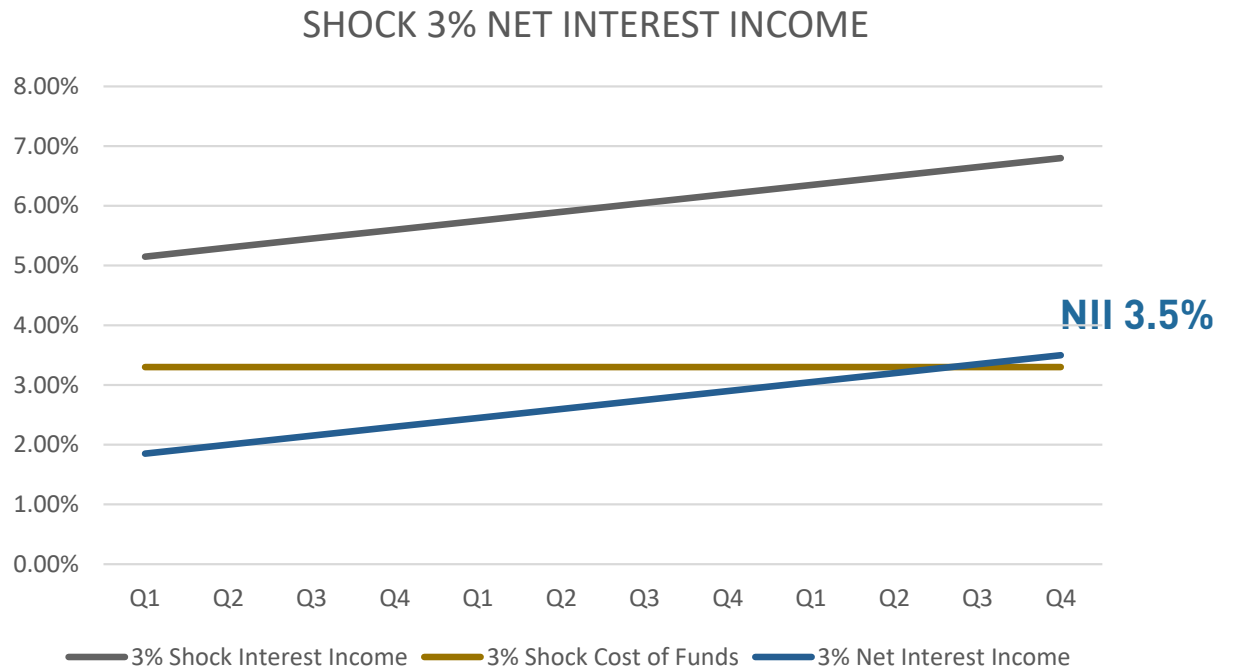


NII 4.7

EXAMPLE 3% INSTANTONS AND PARALLEL 60 MONTH REPRICING OF ASSETS -



NII 4.7%



LOAN YIELDS TAKE 60 MONTHS TO REPRICE TOTAL RATE INCREASE

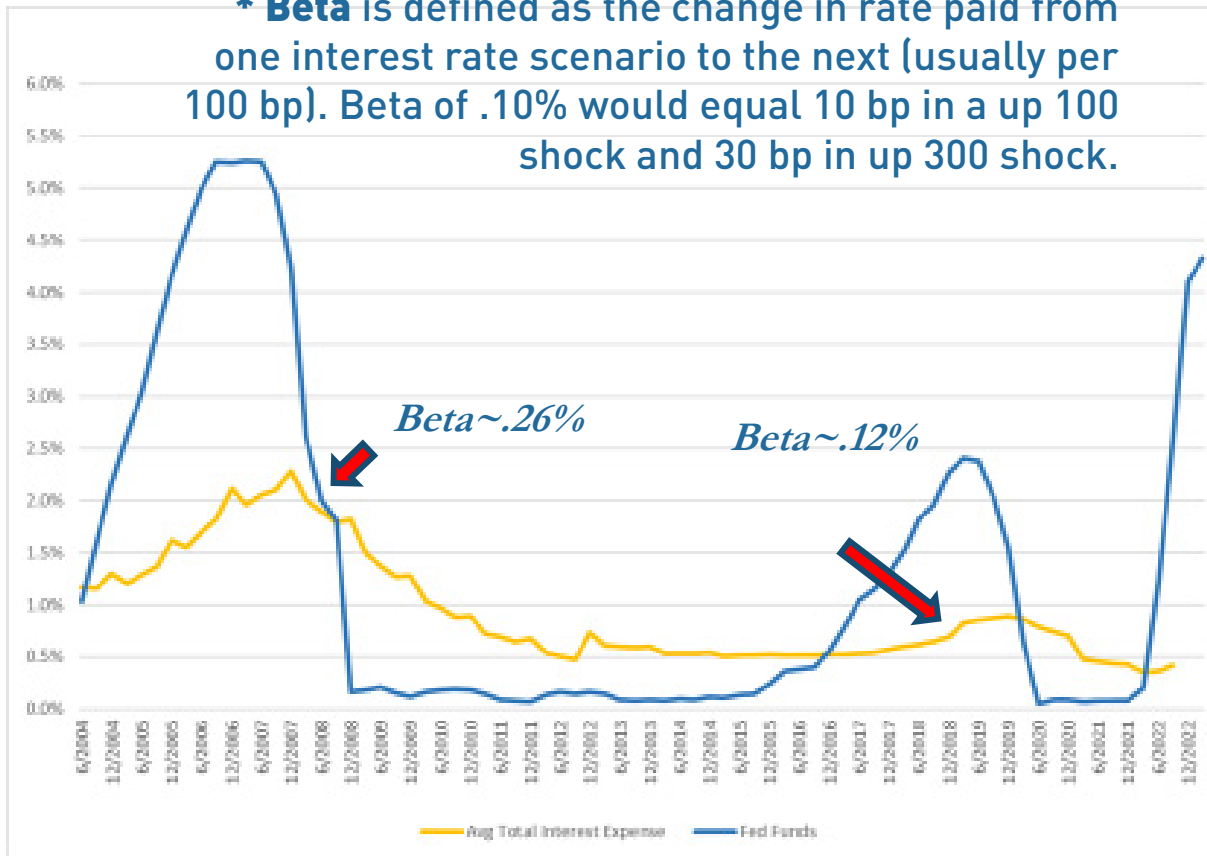
INVESTMENT YIELDS INCREASE FULL SHOCK OVER 60 MONTHS

COST OF FUNDS GO UP IMMEDIATELY BY FULL SHOCK

NII 3.5% BELOW BASE CASE

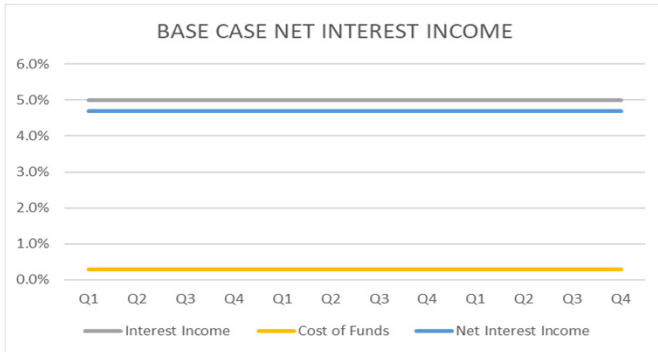
TREASURY RATES TO COST OF FUNDS

* **Beta** is defined as the change in rate paid from one interest rate scenario to the next (usually per 100 bp). Beta of .10% would equal 10 bp in a up 100 shock and 30 bp in up 300 shock.



COST OF FUNDS WILL BE INCREASING

3% SHOCK 84 MONTH REPRICING OF ASSETS – .25% BETA ON DEPOSITS



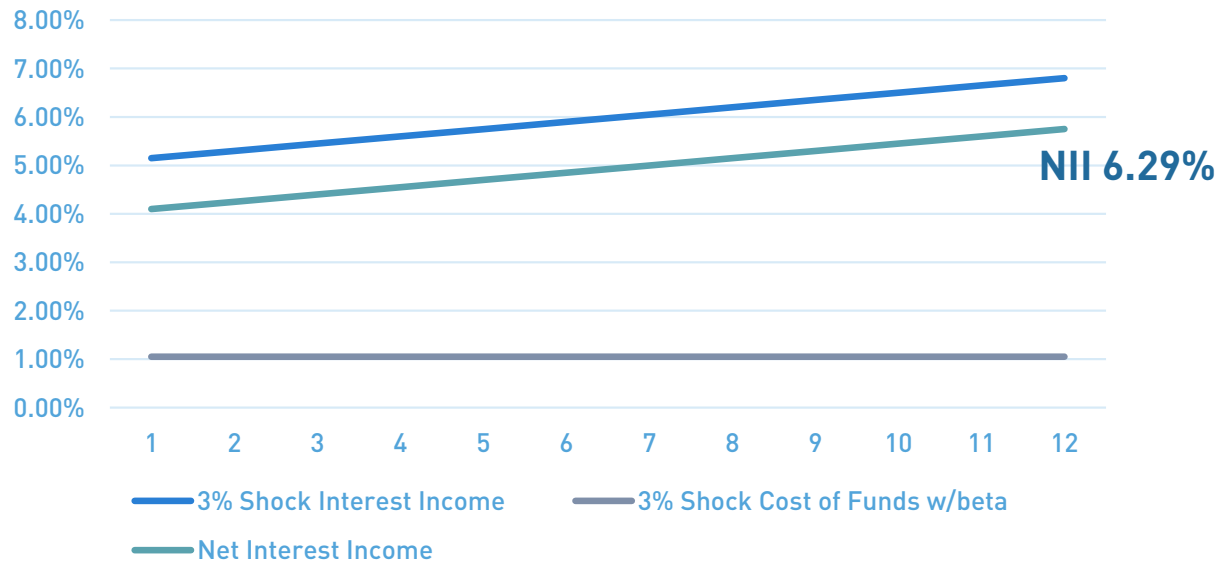
NII 4.7%

LOANS AND INVESTMENT YIELDS
TAKE 84 MONTHS TO REPRICE

COST OF FUNDS GO UP IMMEDIATELY
A BETA OF .25%

NII EXCEEDS BASE CASE ~1.5%

SHOCK 3% NII WITH BETA ON COST OF FUNDS



NII 6.29%

POLL QUESTION #2

INCOME SIMULATION EXAMPLE

Example Credit Union cost of funds is still low and below 1%.

When cost of funds are low the down shocks may not be helpful

PANEL 1 INCOME SIMULATION

3-Year Cumulative (\$000)	SHOCK DOWN -300 BP	SHOCK DOWN -200 BP	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Net Interest Income (NII)	\$13,225	\$16,156	\$19,371	\$22,482	\$24,041	\$25,570	\$27,080
\$ Change from benchmark NII	(9,257)	(6,326)	(3,112)		1,559	3,087	4,598
% Change from benchmark NII	-41.2%	-28.1%	-13.8%		6.9%	13.7%	20.4%
Maximum Allowed % Change from Benchmark NII	-30.0%	-22.5%	-15.0%		-15.0%	-22.5%	-30.0%
Net income:	\$92	\$3,023	\$6,238	\$9,349	\$10,908	\$12,436	\$13,947
ROA:	0.01%	0.41%	0.85%	1.28%	1.49%	1.70%	1.91%

- Compare benchmark (base case) net interest income to shock rate net interest income.
- If NII declines there is risk.
- Presented as a % decrease from base case.
- **Compare to policy limits**

INCOME SIMULATION POLICY LIMIT CONSIDERATIONS

Net interest income base case = \$22,483

Net income base case = \$9,349

Shock up 300 bps policy limit -30% or willingness to accept a NII decline of \$ 6,745

1. Is the limit reasonable and realistic?
2. Does the limit accurately reflect board risk appetite?
3. Is net worth exposed?
4. Can the net worth ratio absorb the risk?

NET ECONOMIC VALUE - NEV



Uses economic value to estimate interest rate risk



Captures long-term IRR



Point in time estimate (like a balance sheet vs income statement)



All terms and all cashflows – best for longer term assets



Conceptually difficult


KEY ASSUMPTIONS

- Long-term loans, 5 years +, repricing
- Long-term investments, repricing
- Non maturity shares (NMS)
 - Beta—Magnitude
 - Lag—Delay
 - Decay speed—How long
- Member Certificates –maturity

**THESE
ASSUMPTIONS
HAVE THE MOST
IMPACT ON THE
NEV RESULTS**


NET ECONOMIC VALUE

RATE UP SHOCK 3%

Assets loose value 
Loans book yield 5.25%
Loan market yield 7.25%
Loan shock market yield 10.25%
Investments book yield = 2%
Investment market yield = 5%
Shock market yield = 8%

Regular shares & Share drafts
Book all in cost 1.25%
Wholesale market rate 4.75%
Shock market 7.75% 

RATE DOWN SHOCK 2%

Assets gain value 
Loans book yield 5.25%
Loan market yield 7.25%
Loan shock market yield 5.25%
Investments book yield = 2%
Investment market yield = 5%
Shock market yield = 3%

Regular shares & Share drafts
Book all in cost .85%
Wholesale market rate 2.75%
Shock market .75% 

NET ECONOMIC VALUE EXAMPLE

Step 1 - Change in capital from book to current market rates
(base case)

Step 2 - Change in capital from base case to shock scenario

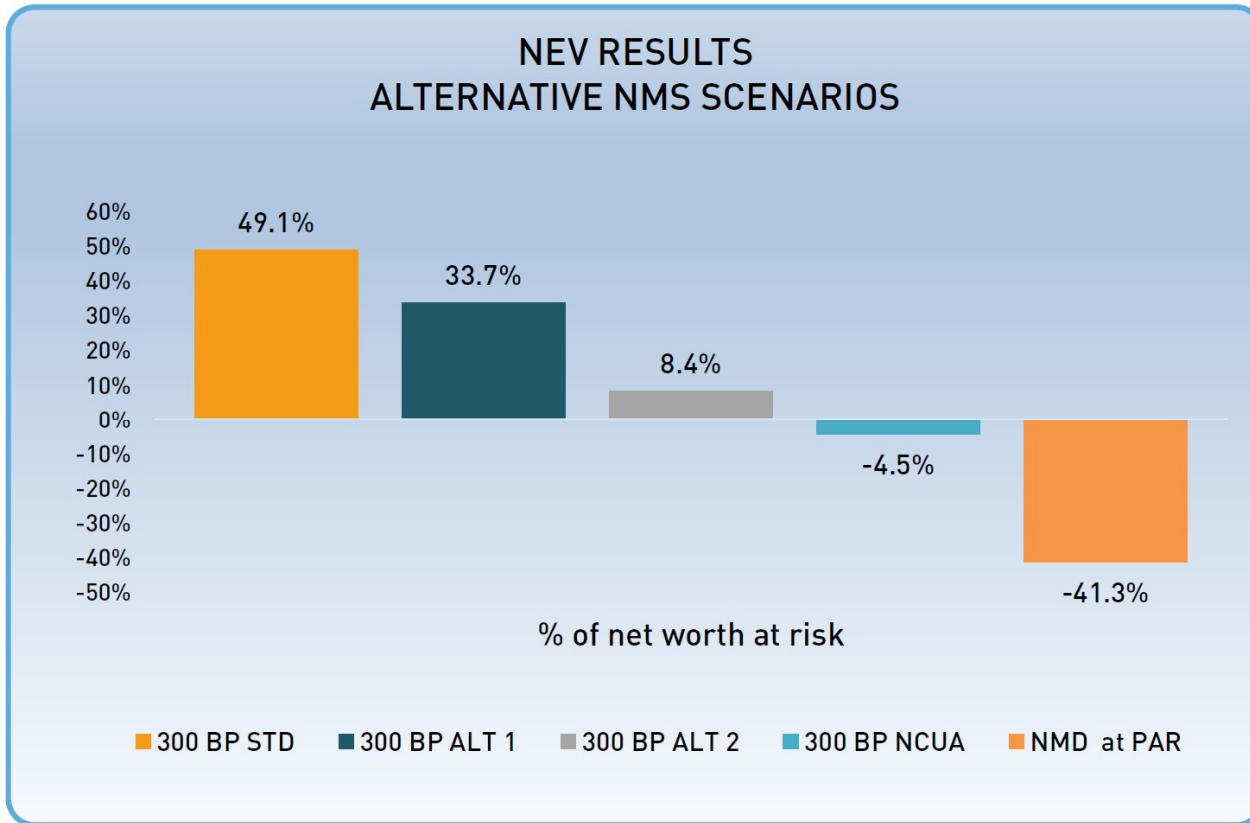
Step 3 - Calculate resulting Market Risk Adjusted NW Ratio

Step 4 – Compare to policy limits

PANEL 2 NET ECONOMIC VALUE (EV)

	SHOCK DOWN -300 BP	SHOCK DOWN -200 BP	SHOCK DOWN -100 BP	CURRENT NET WORTH	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Book Net Worth (\$000)				\$21,238			
EV of Net Worth (\$000) - Benchmark	\$33,285	\$39,762	\$45,011	\$48,810	\$49,723	\$49,931	\$49,437
\$ Change EV of Net Worth from Benchmark (\$000)	(\$15,525)	(\$9,048)	(\$3,799)	\$27,572	\$914	\$1,121	\$627
% Change in EV of Net Worth from Benchmark	-31.8%	-18.5%	-7.8%		1.9%	2.3%	1.3%
Maximum Allowed % Change in EV of Net Worth	-50.0%	-37.5%	-25.0%		-25.0%	-37.5%	-50.0%
Book Net Worth Ratio				8.9%			
Post Shock Net Economic Value Ratio	13.0%	15.9%	18.5%	20.6%	21.6%	22.4%	22.8%
Minimum Post Shock Net Economic Value Ratio	4.0%	5.0%	6.0%		6.0%	5.0%	4.0%

NEV – ALTERNATIVE SCENARIOS



Only change is to shorten the average weighted lives of non-maturity deposits

Std- Ave life of Regular shares 85 months

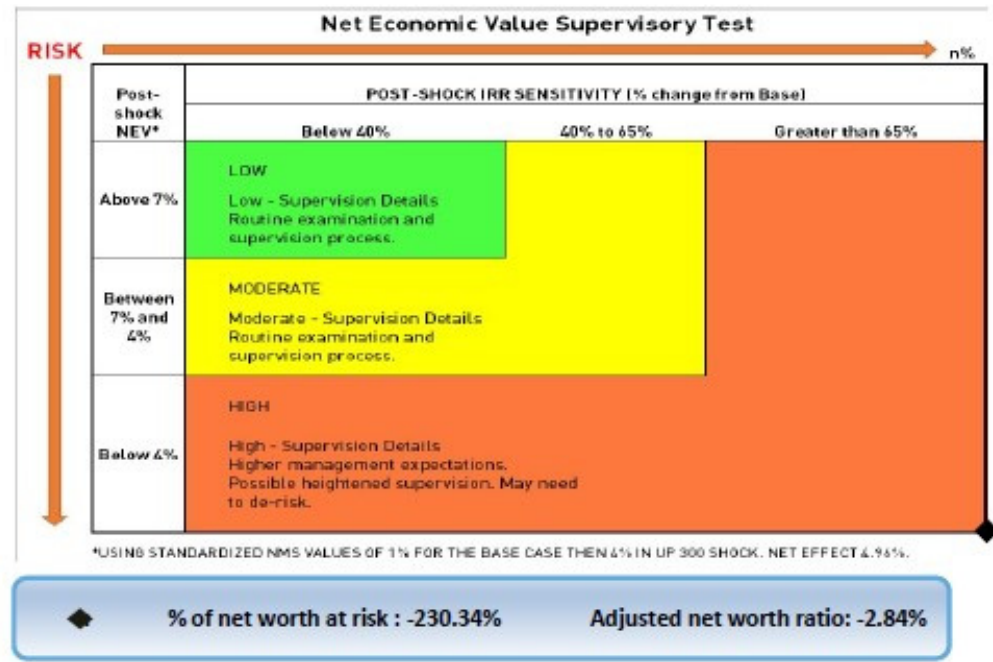
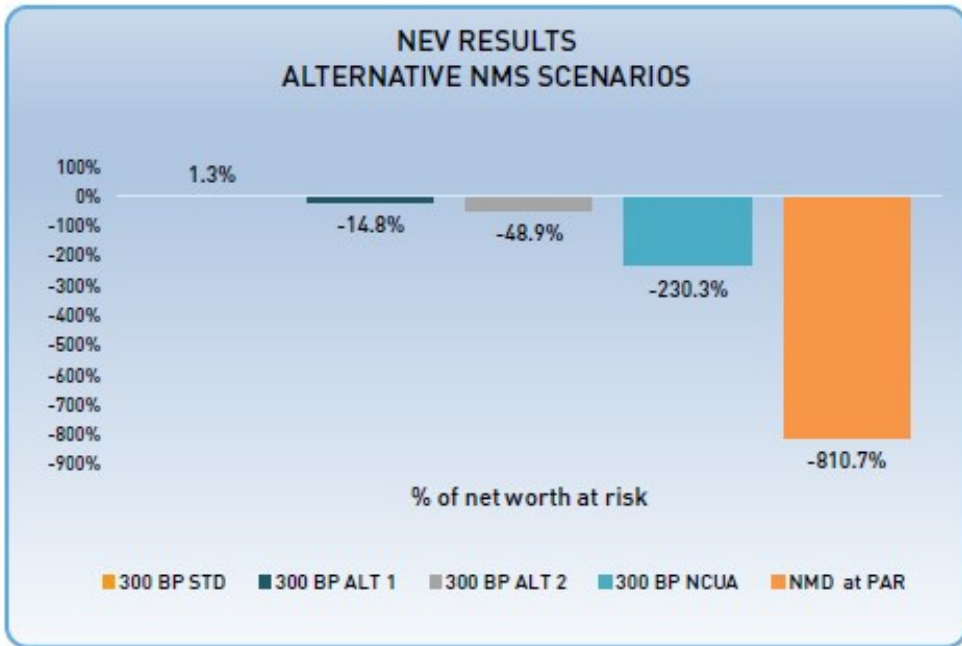
Alt 1 approximately 25% shorter

Alt 2 approximately 50% shorter

NCUA pre-defined premiums at 1% in the base and additional 4% in the up 300 scenario

NMD at par or book value

NEV - ALTERNATIVE SCENARIOS



NET ECONOMIC VALUE POLICY LIMIT CONSIDERATIONS

COMMON -40% NW AT RISK

MARKET ADJUSTED NET WORTH RATIO OVER 7%

CURRENT NET WORTH ALWAYS A CONSIDERATION

POLICY LIMIT ACCURATELY DEFINES THE BOARD'S APPETITE
FOR INTEREST RATE RISK

REVIEW ALTERNATIVE SCENARIOS AND DISCUSS THE
LIKELIHOOD OF THE SCENARIOS

POLL QUESTION #3

LIQUIDITY

INFORMAL CONCLUSION FROM CLIENTS

Deposits leaving to chase higher CD rates – 25%

Deposits leaving due to inflation and higher cost of living

Deposit outflows due to pent up response to covid restrictions such as travel

Supply constraints are lifting, and postponed purchases are occurring

NEV & INTEREST RATE RISK IN REAL LIFE SILICONE VALLEY BANK FAILURE

Becker and his leadership team revealed last Wednesday night a hope (but no firm **commitment**) to raise \$2.25 billion in capital as well as \$21 billion in asset sales that sparked a \$1.8 billion loss.

That news set off a wave of fear across Silicon Valley, where the bank serves as a key lender to tech startups. Many of them panicked, yanking \$42 billion last Thursday alone when Silicon Valley Bank's stock crashed by 60%, according to filings by California regulators.

By the close of business that day, Silicon Valley Bank had a negative cash balance of about \$958 million.

LIQUIDITY AND NET ECONOMIC VALUE

FEDS RESPONSE TO RECENT BANK FAILURES

The additional funding will be made available through the creation of a new Bank Term Funding Program (BTFP), offering loans of up to one year in length to banks, savings associations, credit unions, and other eligible depository institutions pledging U.S. Treasuries, agency debt and mortgage-backed securities, and other qualifying assets as collateral. These assets will be valued at par. The BTFP will be an additional source of liquidity against high-quality securities, eliminating an institution's need to quickly sell those securities in times of stress.

Federal Reserve Board - Federal Reserve Board announces it will make available additional funding to eligible depository institutions to help assure banks have the ability to meet the needs of all their depositors;

<https://www.federalreserve.gov/newsevents/pressreleases/monetary20230312a.htm>

STRATEGIES AS RATES INCREASE AND LIQUIDITY FLUCTUATES

Increase	Do not	Increase	Increase	Manage	Anticipate	Preserve
Increase deposit rates as slowly and controlled as possible to maintain NII (if possible)	Do not overpay for deposits you cannot utilize	Increase loan yields	Increase investment yields	Manage for liquidity for potential deposit runoff	Anticipate draws on unfunded LOC	Preserve funds for lending programs planned or developed for the current environment

MANAGEMENT AND BOARD RESPONSIBILITIES

- ALM Policy and Interest Rate Risk Policy
- Identify risk
- Quantify risk
- Control—Policy or Risk Limits
- Monitor risk
- Respond accordingly

SUMMARY

- Manage balance sheet composition
- Medium to long-term loans and investments funded with short-term deposits
- Leverage exaggerates balance sheet fluctuations
- Management should have a program in place to estimate and manages IRR
 - Tools: Income Simulation and NEV
- Board sets limits to define acceptable risk
- Policy defines corrective action if necessary

BENEFITS OF USING MHSI SOLUTIONS

Easy
Saves time
Delegate to the experts
Extensive experience
Regulator responses
Reliable
Reputable





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