



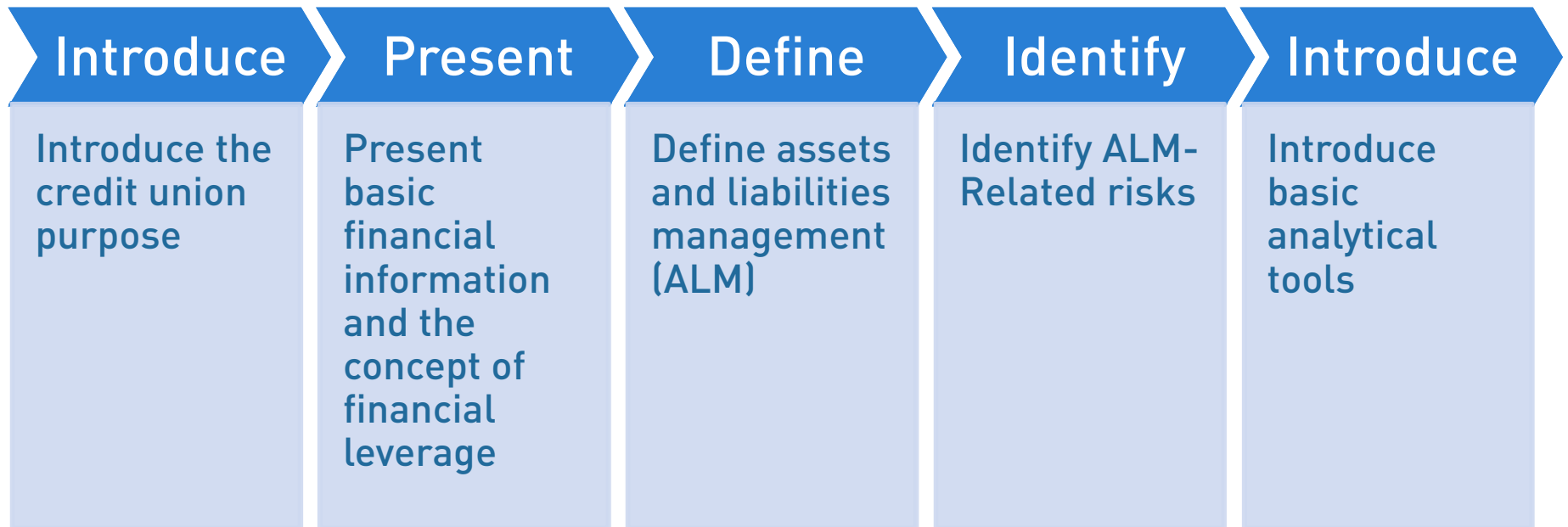
Mark H. Smith
I N C O R P O R A T E D

**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 12/31/2019

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 12/31/2020

INCOME STATEMENT	
LOAN & INVESMENT 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



MANAGING NII IS A CRITICAL GOAL

Ending Balance Sheet as of 12/31/2020

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



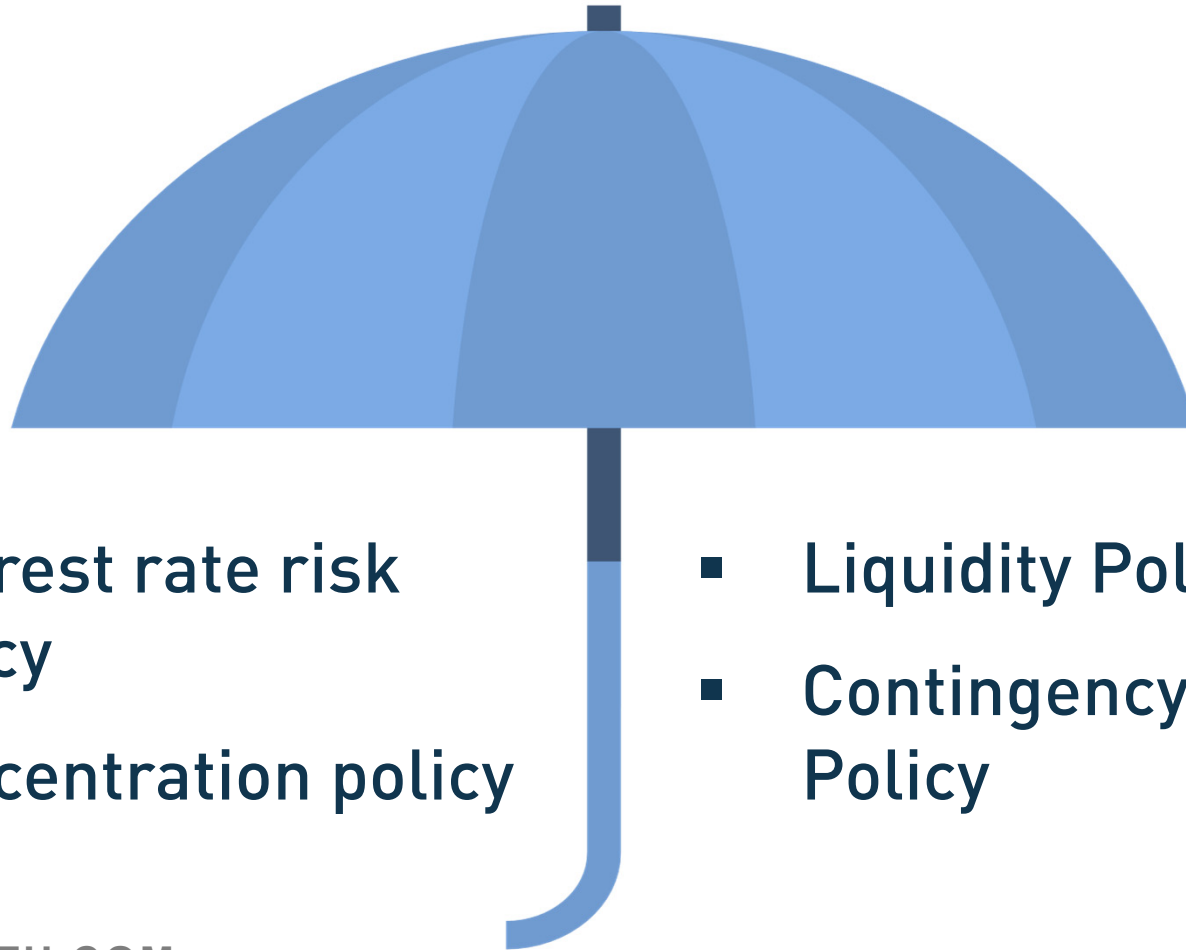
- Utilize borrowed funds from counterparties to produce profits
 - Members or retail funding
 - Financial Institutions, Corp. FHLB, Fed or wholesale funding
- Leverage will turn small changes in balance sheet into large changes in net worth

$$300/10000 = 3\%$$

$$300/3000 = 10\%$$

$$300/1000 = 30\%$$

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

WWW.MARKHSMITH.COM

POLL QUESTION #1

THE BALANCE SHEET MISMATCH

LOANS & INVESTMENTS

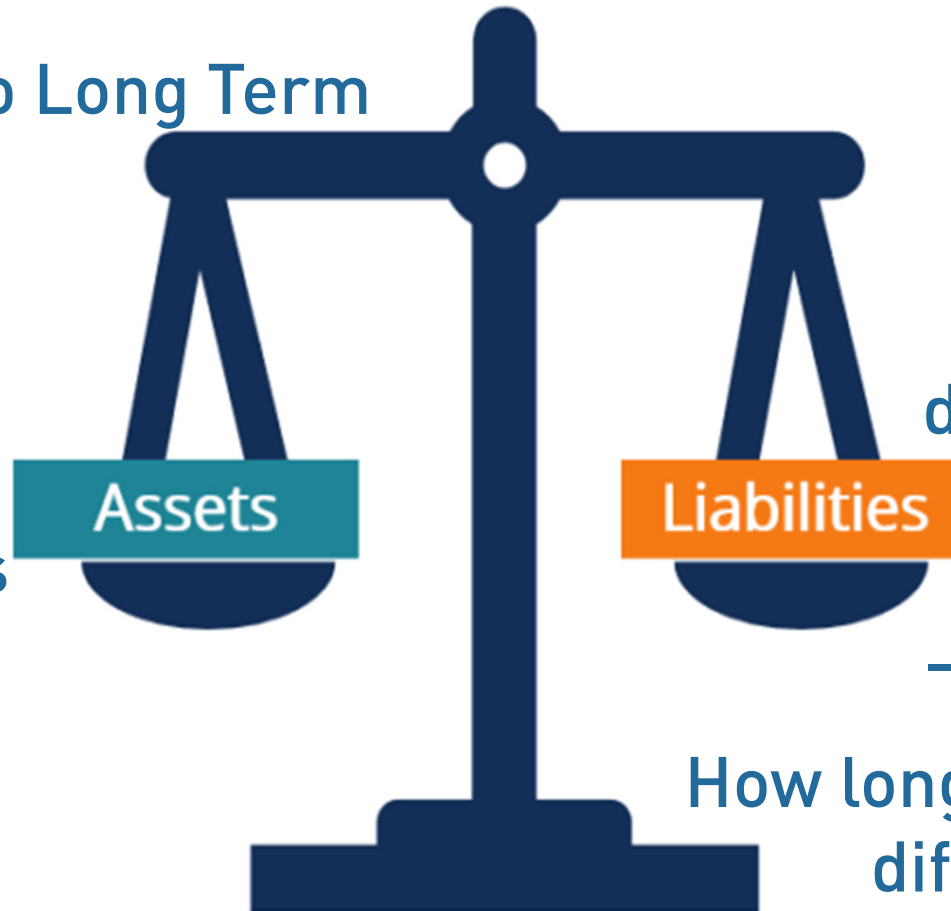
Intermediate to Long Term

1 to 30 Years

Fixed Rate

Variable Rate

Loan payments vary



DEPOSITS

Short -Term

Variable rate non-maturity deposits (NMD)

Fixed rate - member CD's

How long deposits stay difficult to define

INTEREST RATE RISK (PART OF ALM)



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

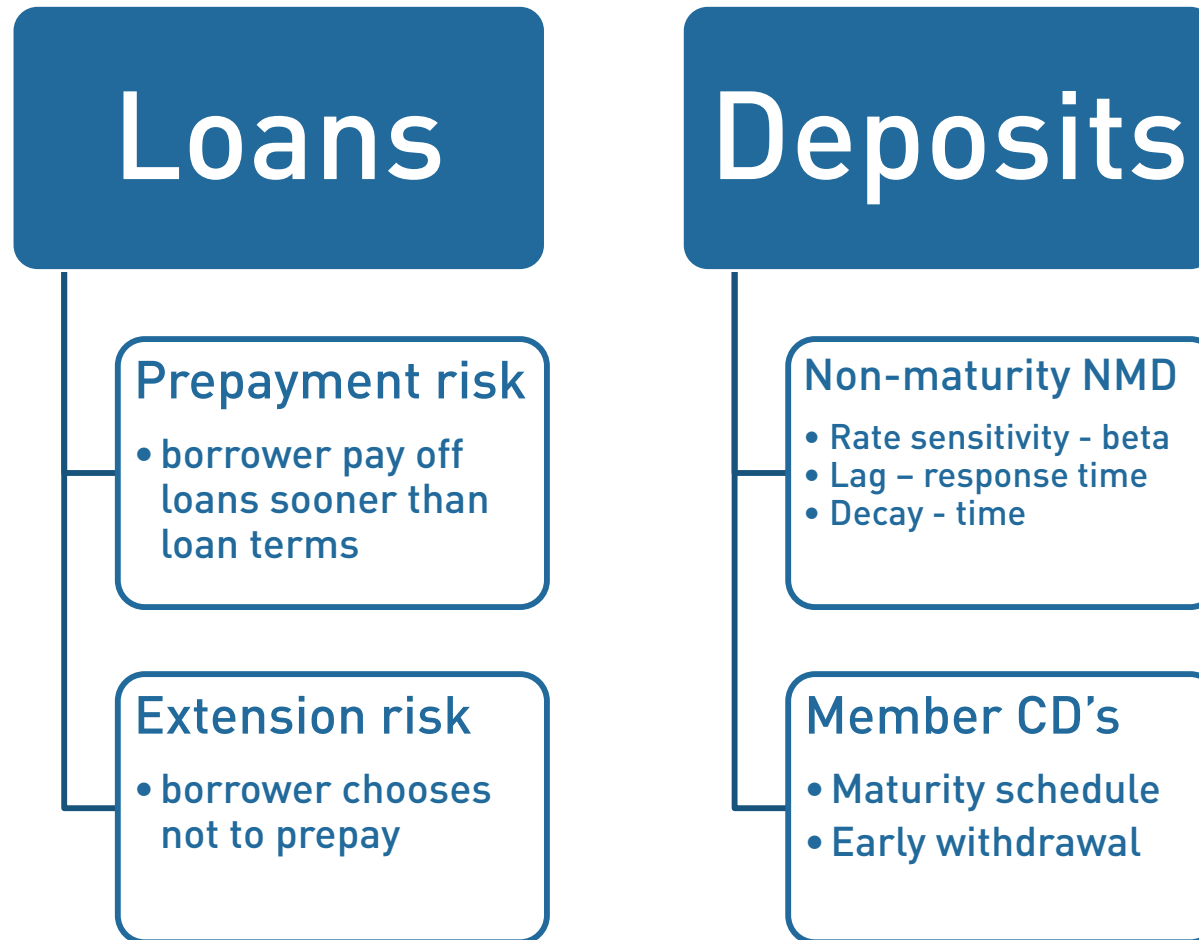


Rates may increase over time causing cost of short-term funding to increase rapidly while the yield on fixed rate loans remains static.

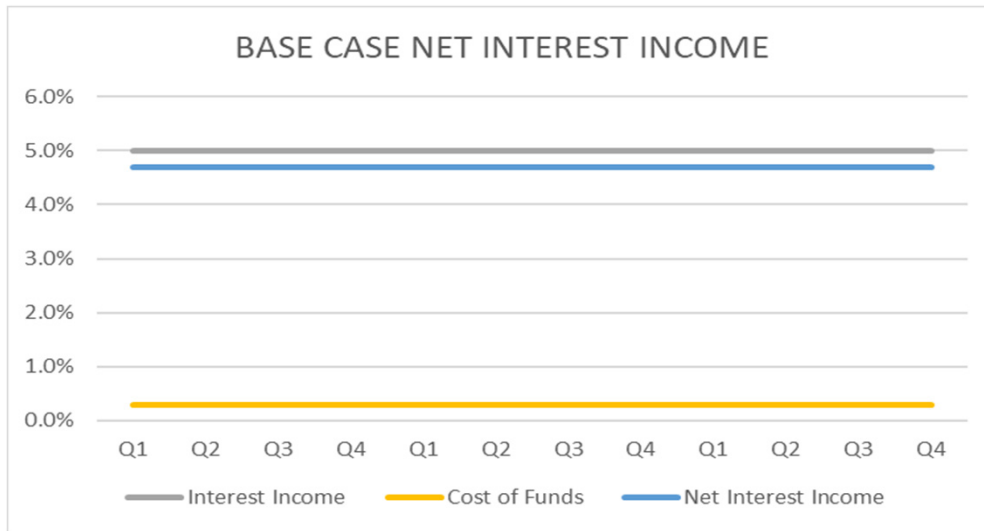


Rates may decrease over time causing borrowers to reset loan rates by refinancing.

MEMBER OPTIONALITY RISKS

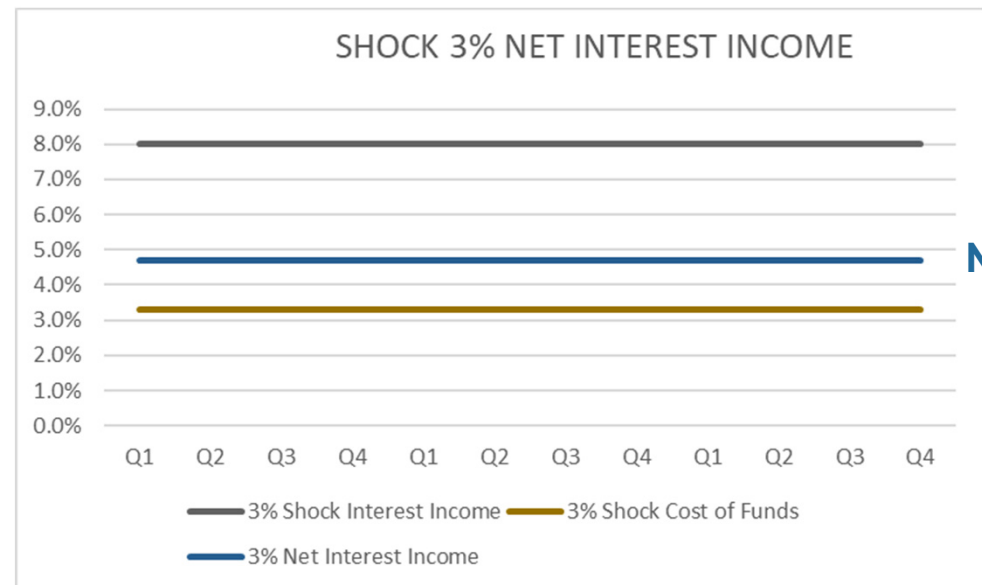


EXAMPLE 3% INSTANTENOUS AND PARALLEL



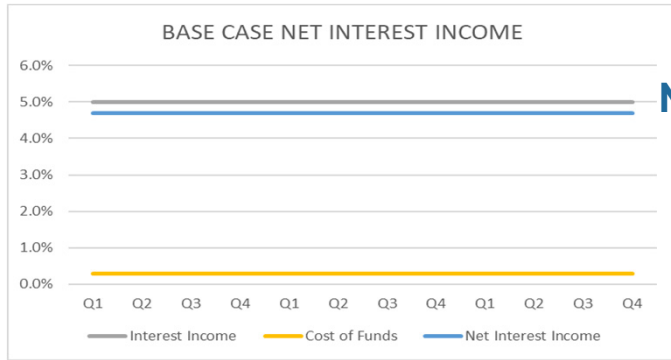
NII 4.7

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



NII 4.7

EXAMPLE 3% INSTANTENOUS AND PARALLEL 36 MONTH REPRICING OF ASSETS

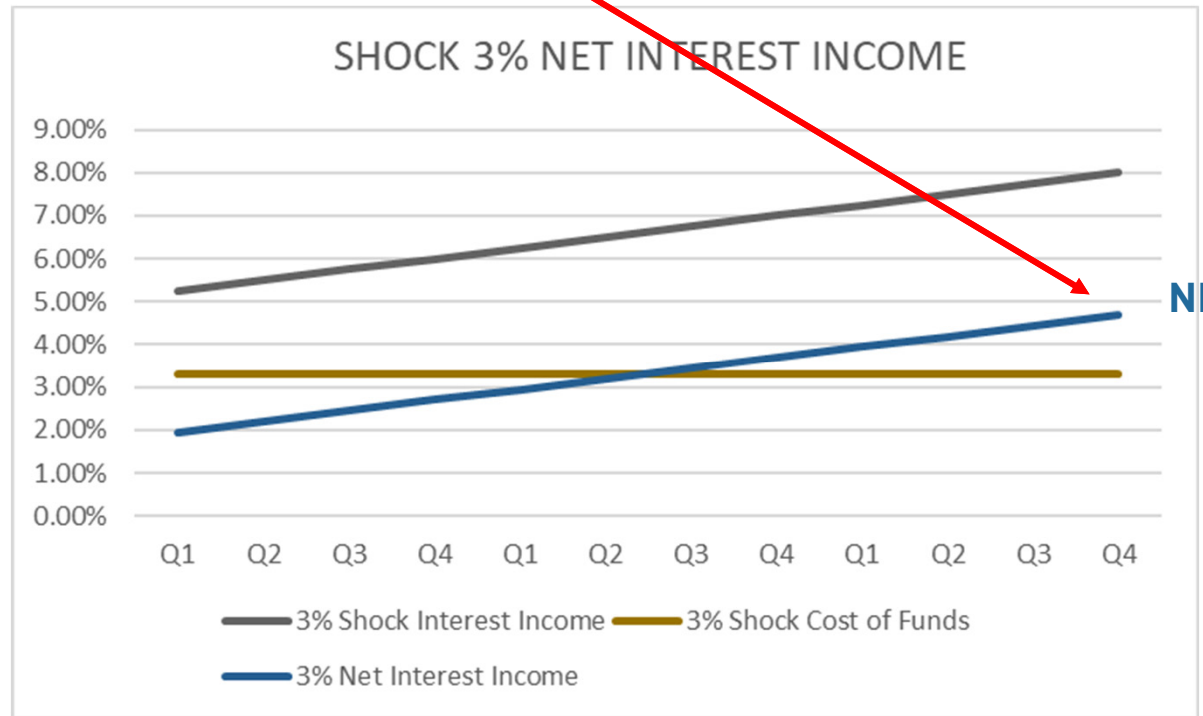


NII 4.7

LOAN YIELDS AND INVESTMENT YIELDS TAKE 36 MONTHS TO REPRICE

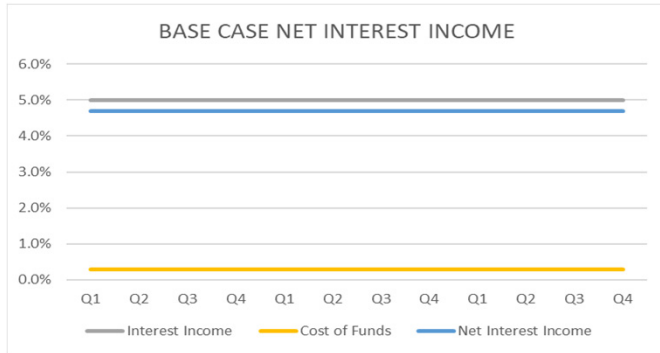
COST OF FUNDS GO UP IMMEDIATELY

NII DECLINES AND TAKES 36 MONTHS TO FULLY RECOVER

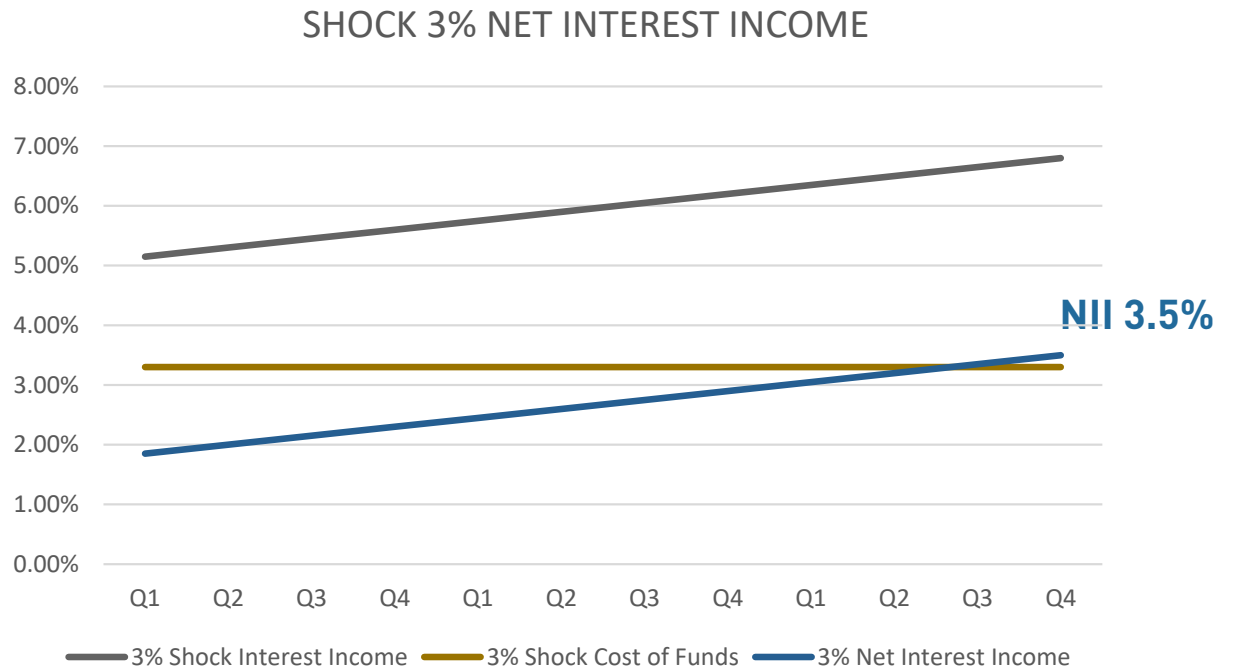


NII 4.7

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



NII 4.7%



NII 3.5%

LOAN YIELDS TAKE 60 MONTHS TO REPRICE TOTAL RATE INCREASE

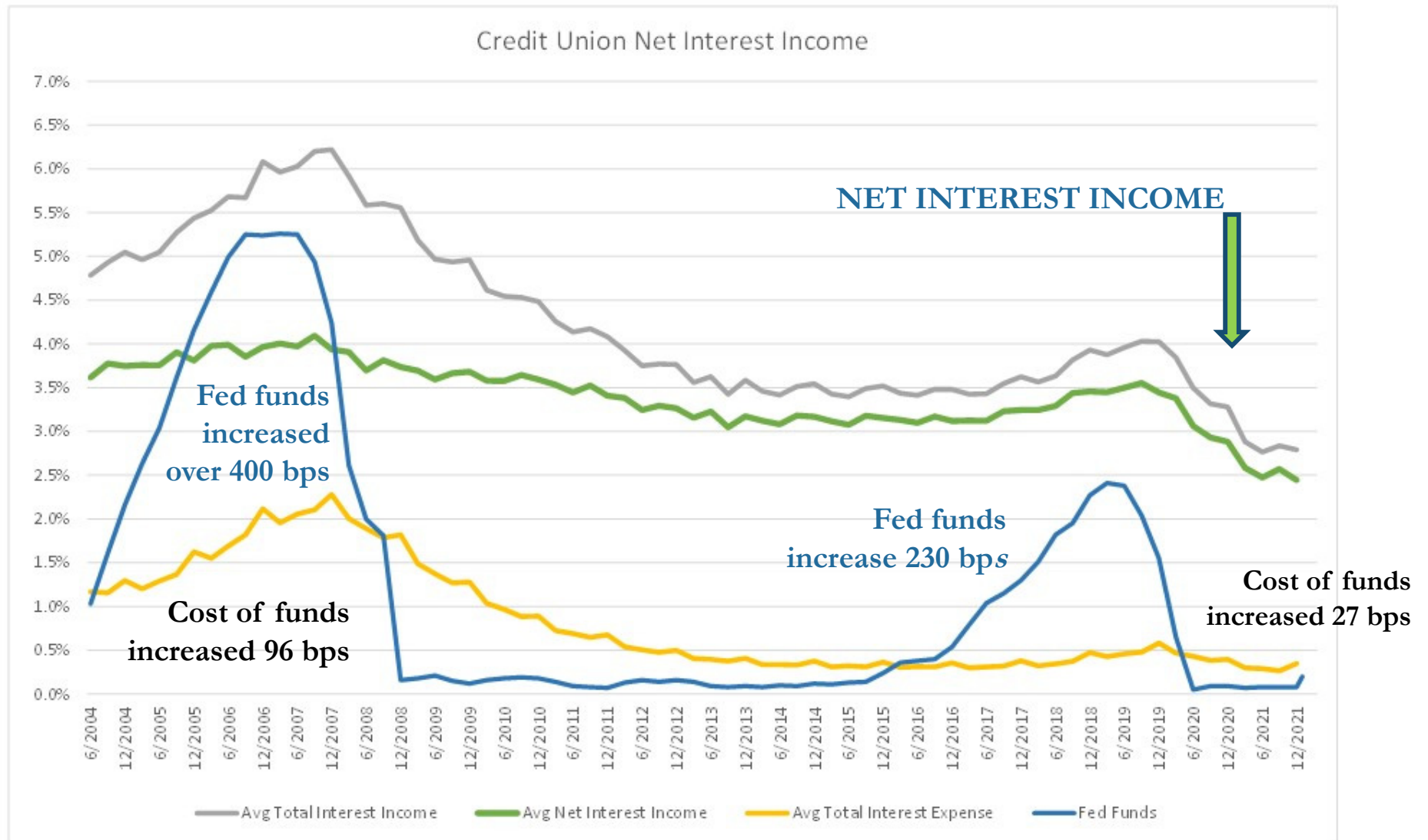
INVESTMENT YIELDS INCREASE FULL SHOCK OVER 60 MONTHS

COST OF FUNDS GO UP IMMEDIATELY BY FULL SHOCK

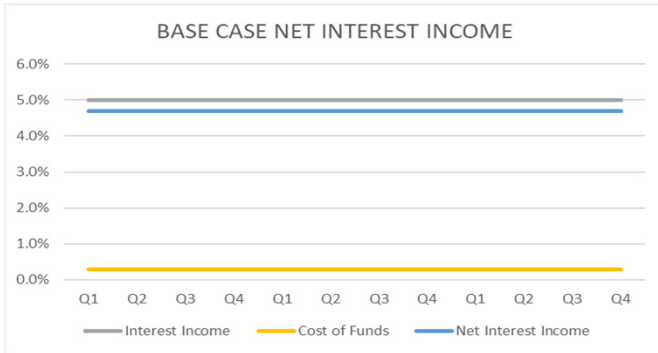
NII 3.5% BELOW BASE CASE

96/400=.24% beta

27/230= .12% beta



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



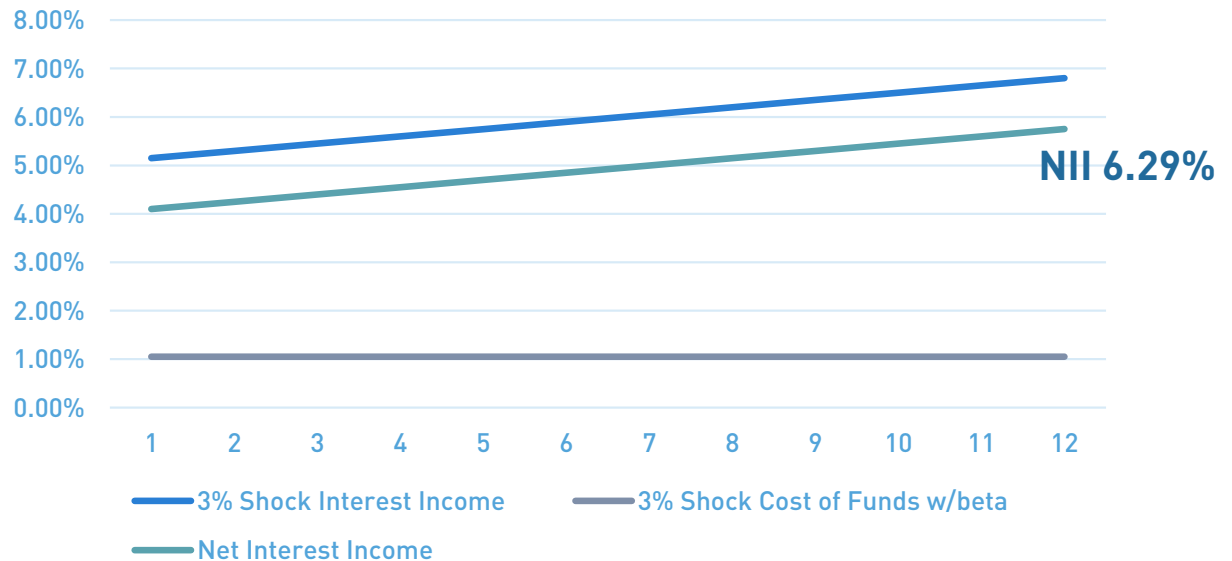
NII 4.7%

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



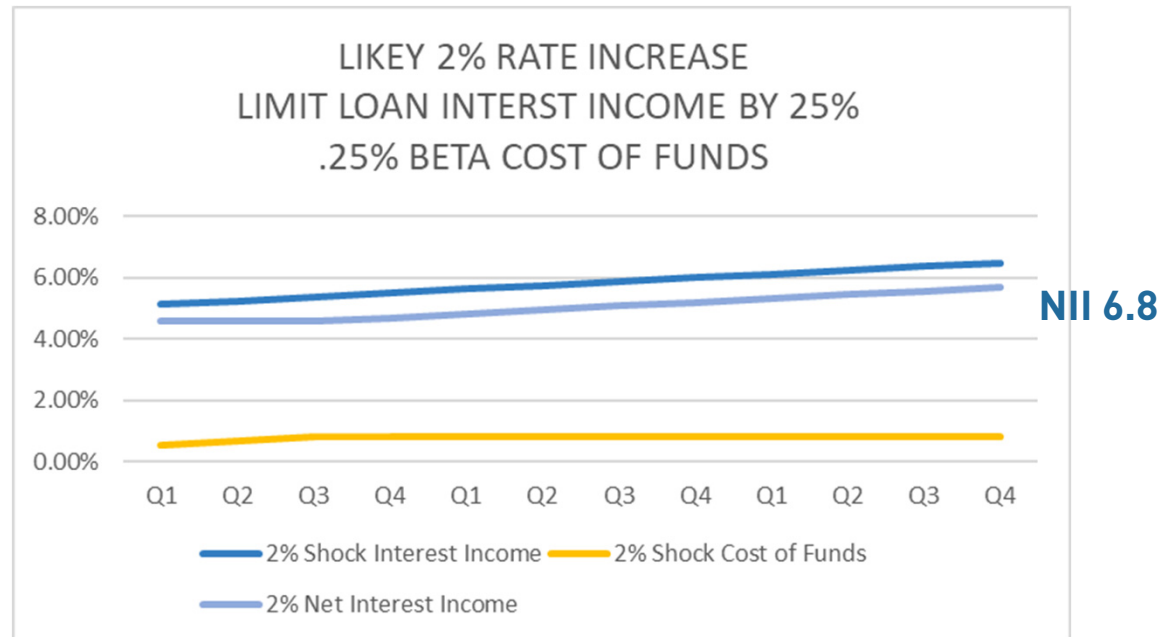
LIKELY 2% SHOCK 60 MONTH REPRICING OF ASSETS AND LIMIT LOAN INCREASE LIMITED BY 25% - .25% BETA ON DEPOSITS

LOANS YIELDS TAKE 60 MONTHS TO REPRICE WITH A LIMIT OF .25%

INVESTMENT TERMS 60 MONTHS

COST OF FUNDS LAG 6 MONTHS WITH A BETA OF .25%

NII EXCEEDS BASE CASE ~2.1%



POLL QUESTION #2

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)-will miss risk of longer-term assets



Very effective estimate of risk to NII

INCOME SIMULATION EXAMPLE

PANEL 1 INCOME SIMULATION

3-Year Cumulative (\$000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 300 BP
Net Interest Income	8,369	10,310	12,254
\$ Change from benchmark NII	-1,941		1,945
% Change from benchmark NII	-18.8%		18.9%
Operational Guideline	-20.0%		-25.0%
Net income:	-\$371	\$1,570	\$3,515
ROA:	-0.10%	0.41%	0.92%

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

INCOME SIMULATION EXAMPLE

PANEL 1 INCOME SIMULATION

3-Year Cumulative (\$000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 300 BP
Net Interest Income	8,369	10,310	12,254
\$ Change from benchmark NII	-1,941		1,945
% Change from benchmark NII	-18.8%		18.9%
Operational Guideline	-20.0%		-25.0%
Net income:	-\$371	\$1,570	\$3,515
ROA:	-0.10%	0.41%	0.92%

- POLICY LIMIT CONSIDERATIONS**

10310 × 0.25 =

2,577.5

- HOW MUCH RISK CAN THIS CREDIT UNION TAKE?
- 1570/10310 = 15% DECLINE BEFORE NET INCOME ELIMINATED
- WHAT IS THE CURRENT NET WORTH RATIO?
- CAN THE NET WORTH RATIO ABSORB MORE RISK?

POLL QUESTION #3

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



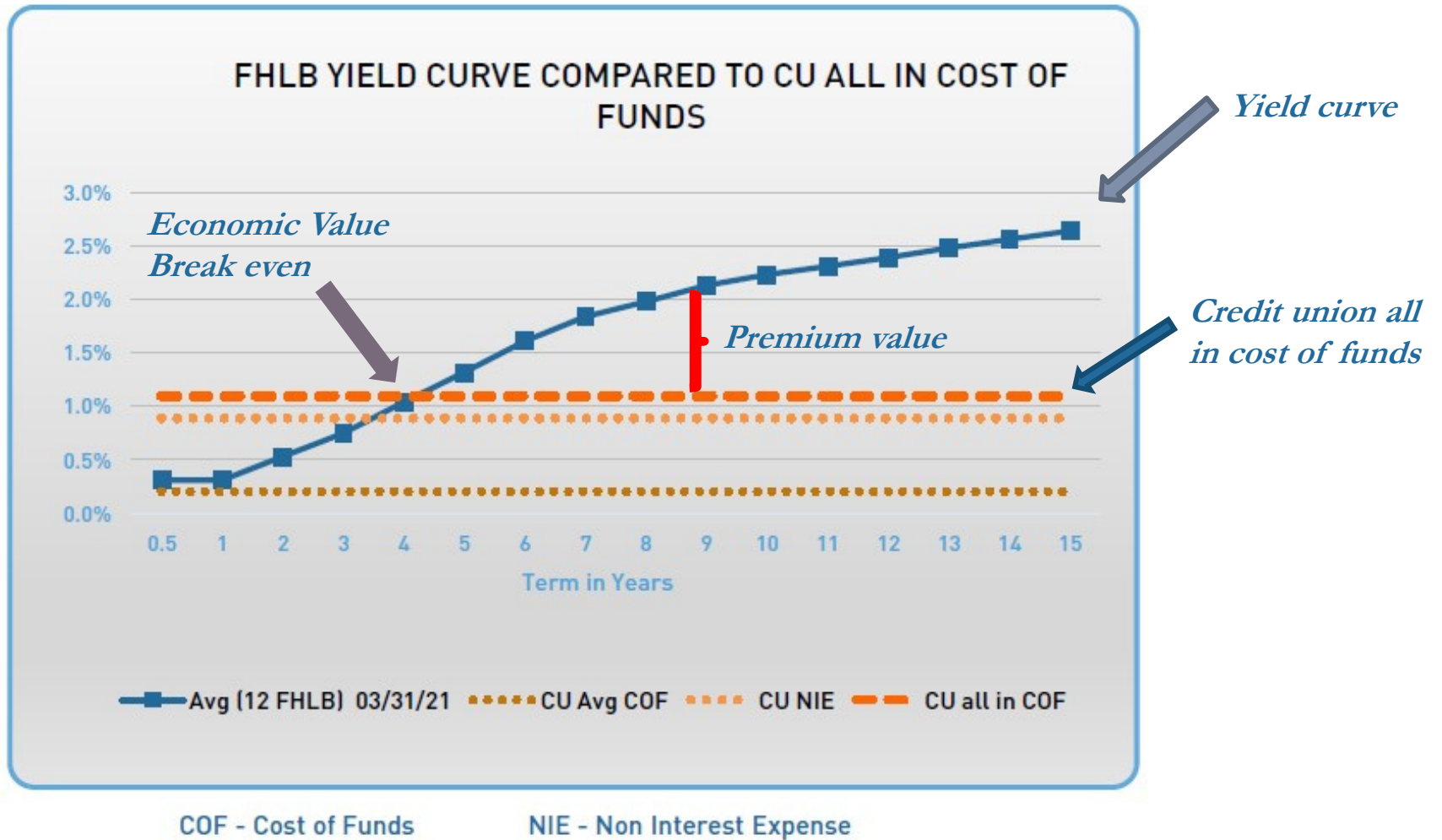
Conceptually difficult

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**

NMD PREMIUM ACCUMULATION AND HOW THEY EFFECT THE NEV RESULTS



NET ECONOMIC VALUE

RATE UP SHOCK 3%

Assets loose value

Book yield = 4%

Current market yield = 4%

Shock market yield = 7%



Regular shares

Share drafts gain value

Book cost $.10\% + \text{beta } .15\% = .55\%$

Current rate 1.5%

Shock market 4.5%



RATE DOWN SHOCK 1%

Assets gain value

Book yield = 4%

Current market yield = 4%

Shock market yield = 3%



Regular shares

Share drafts loose value

Book cost $.10\% - \text{beta } .15\% = 0\%$

Current rate 1.5%

Shock market .5%



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

	SHOCK DOWN -100 BP	CURRENT NET WORTH RATIO	SHOCK UP 300 BP
Book Value Net Worth (\$000)		\$14,764	
Market Net Worth (\$000)	\$15,629	\$19,898	\$22,782
Net Worth at Risk from Market (\$000)	-\$4,269	\$5,133	\$2,884
% Net Worth Change	-21.5%		14.5%
Operation Guideline	-40.0%		-40.0%
Book Value of Net Worth Ratio		11.8%	
Market Risk Adjusted NW Ratio	12.6%	16.0%	19.1%
Minimum Net Worth Guideline	6.0%		6.0%

NET ECONOMIC VALUE EXAMPLE

PANEL 2 NET ECONOMIC VALUE

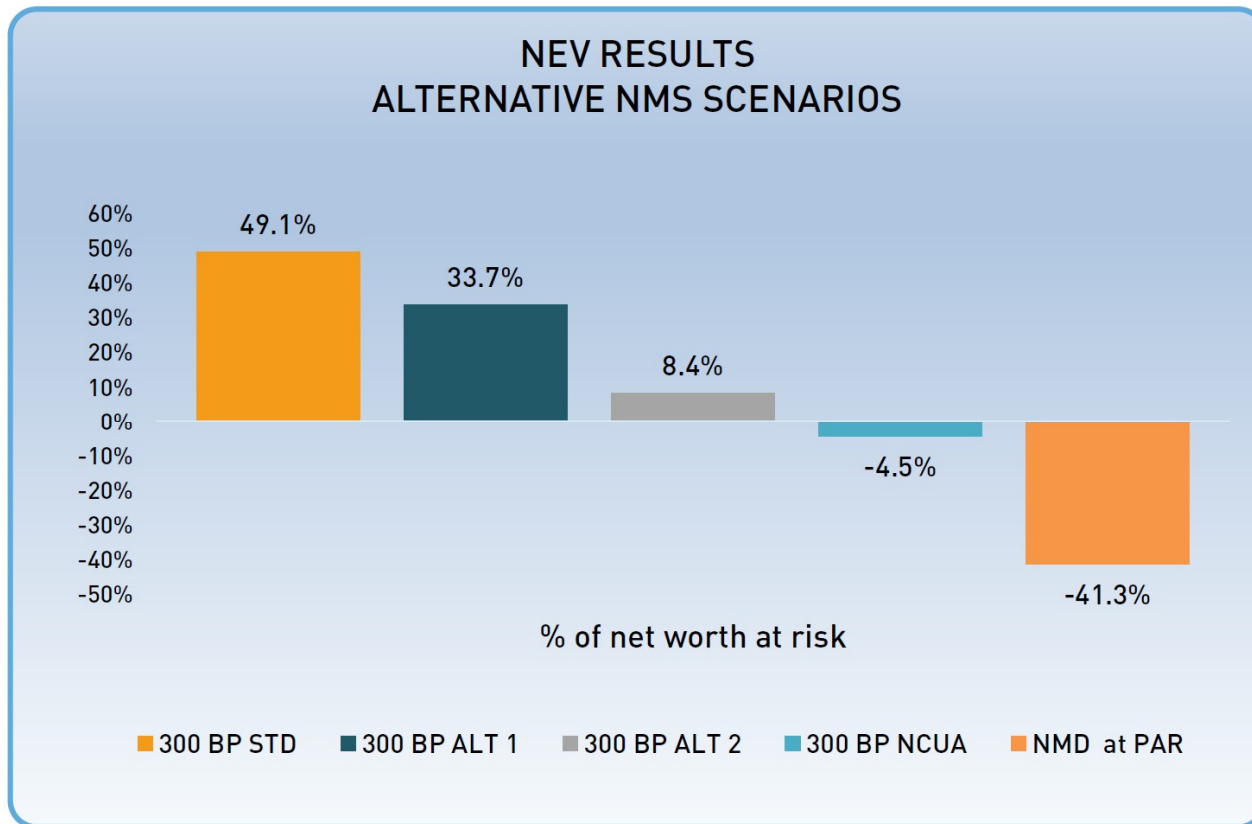
	SHOCK DOWN -100 BP	CURRENT NET WORTH RATIO	SHOCK UP 300 BP
Book Value Net Worth (\$000)		\$14,764	
Market Net Worth (\$000)	\$15,629	\$19,898	\$22,782
Net Worth at Risk from Market (\$000)	-\$4,269	\$5,133	\$2,884
% Net Worth Change	-21.5%		14.5%
Operation Guideline	-40.0%		-40.0%
Book Value of Net Worth Ratio		11.8%	
Market Risk Adjusted NW Ratio	12.6%	16.0%	19.1%
Minimum Net Worth Guideline	6.0%		6.0%

POLICY LIMIT TO THINK ABOUT

COMMON -40% NW AT RISK AND MARKET ADJUSTED NET WORTH RATIO OVER 7%

CURRENT NET WORTH ALWAYS A CONSIDERATION

NEV – ALTERNATIVE SCENARIOS



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

Std- Ave life of Regular shares 85 months

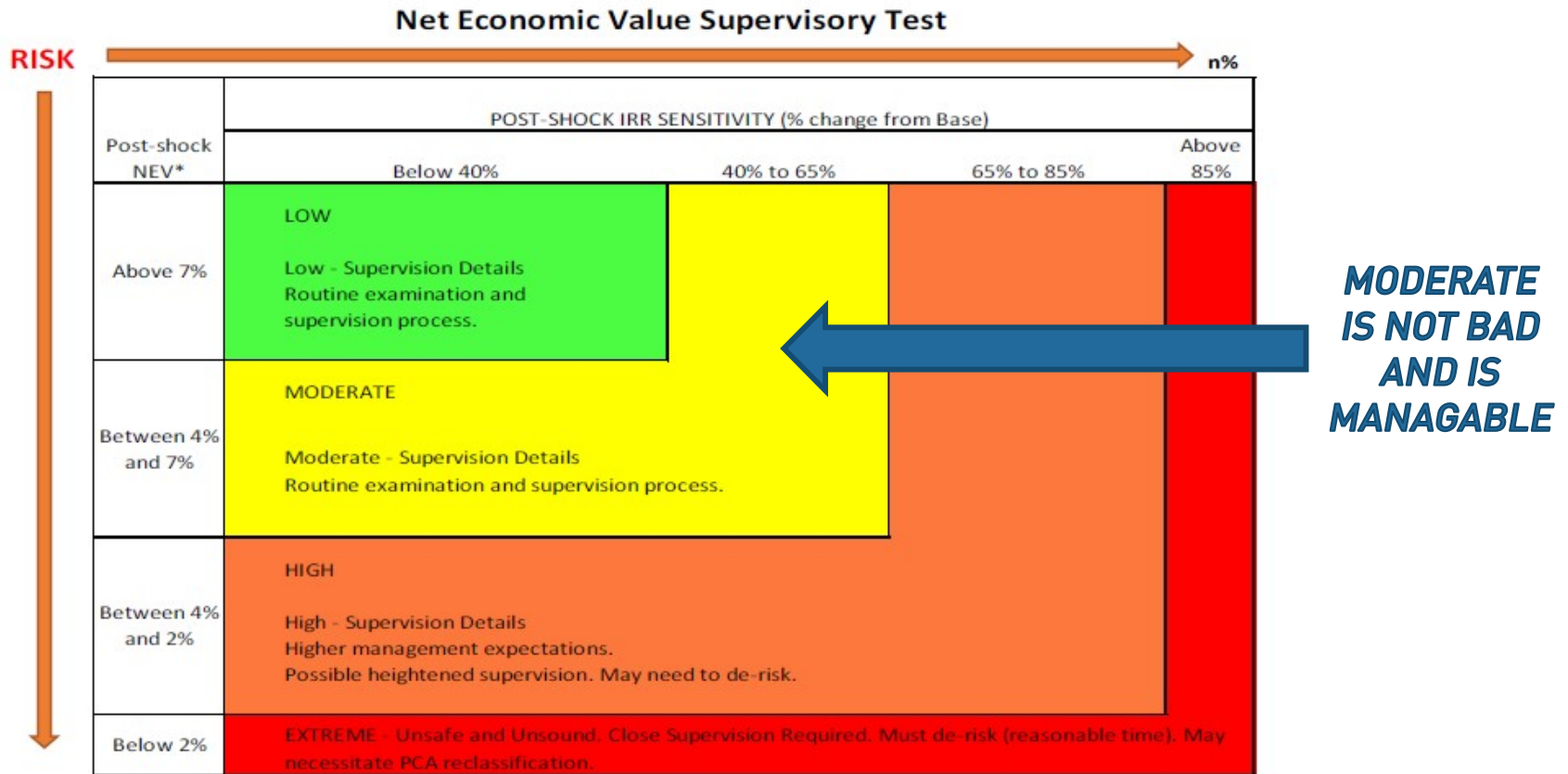
Alt 1 approximately 25% shorter

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 – NCUA SUPERVISORY MATRIX



*USING STANDARDIZED NMS VALUES OF 1% FOR THE BASE CASE THEN 4% IN UP 300 SHOCK. NET EFFECT 4.96%.

NCUA SUPERVISORY NON-MATURITY DEPOSIT VALUATION *(For examination purpose).*

For non-maturity deposits a 1% premium in the base case and a 4% premium in the up 300 shock scenario from the base. Resulting in a 4.96% economic value premium for NMDs. NCUA has also adjusted the post shock NEV limits and post shock % change from base to accommodate for the limitations used in the NMD valuation.

STRATEGIES AS RATES INCREASE AND LIQUIDITY FLUCTUATES

- Raise cost of funds as slow as possible
- Do not overpay for deposits you cannot utilize
- Increase loan yields and maintain loan production
- Maintain a disciplined investment ladder
- 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
- Identify risk
- Quantify risk
- Control—Policy or Risk Limits
- Monitor risk
- Respond accordingly

SUMMARY

- Medium to long-term loans funded with short-term deposits
- Leverage
- Management estimates and manages IRR
- Tools: Income Simulation and NEV
- Corrective action if necessary

BENEFITS OF USING MHSI SOLUTIONS

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





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

EASY AND AFFORDABLE CECL SOLUTION

**SPECIAL OFFER: ONE-TIME MHSI CECL
REPORT FOR A SMALL FEE AND A CURRENT
AIRES LOAN FILE TO TRY IT OUT**



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

PLEASE VISIT OUR WEBSITE

MARKHSMITH.COM

info@markhsmith.com

800 268-7795

CYNTHIA@MARKHSMITH.COM