Mark H. Smith
INCORPORATED

INCOME SIMULATION TRAINING FOR CREDIT UNION LEADERS, BOARDS, AND ALCO

PRESENTED BY: CYNTHIA R. WALKER, CEO

(Webinar will begin on the hour)

AGENDA

- Basic credit union financial concepts
- Definitions
- Interest rate risk
- Balance sheet behaviors
- Income simulation
- Board responsibility and policy limits

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CREDIT UNION AS A BUSINESS

Full-service primary financial institution

Must be profitable

Manage the balance sheet for success

Leveraged balance sheet

Capital or net worth growth limited to earnings

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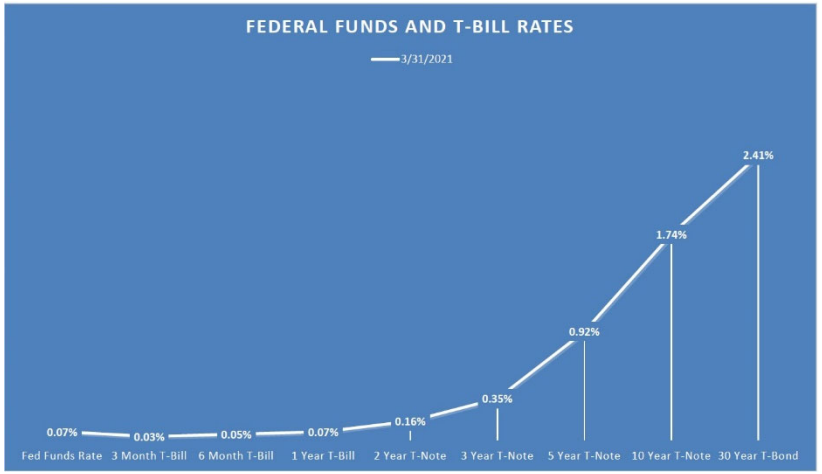
DEFINITIONS

- **Basis point – 1/100 of 1%, 3% = 300 basis points**
- **Net interest margin (NII) –** interest income from loans and investments less cost of funds
- **Non-maturity deposits –** all deposits that are not certificates
- **Prepayment/repayment speeds –** loan payment speeds faster than contractual
- **Repricing mismatch –** interest earnings and expenses do not change at the same time
- **Yield Curve –** the difference between short and long-term rates



Example of a yield curve

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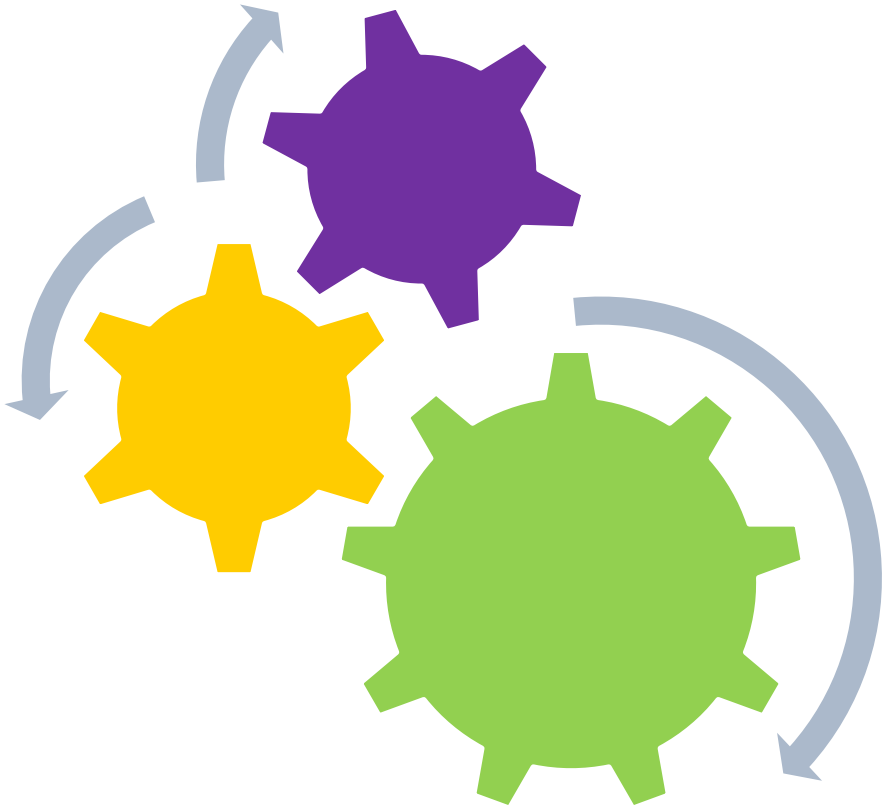
INTEREST RATE RISK

Caused by repricing mismatch when interest rates change – fixed rate and variable rate loans, investment and deposits all play a part

Expenses go up faster than earnings



Earnings come down faster than expenses

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BALANCE SHEET BEHAVIORS

MEMBER OPTIONALITY – THEY WILL ACT IN THEIR OWN BEST INTEREST

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

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BALANCE SHEET BEHAVIORS
DEPOSITS – INDUSTRY STUDIES

Regular shares have low interest rate sensitivities

Checking accounts have little to no rate sensitivity

Money Market rate sensitivity increases as balances increase

Certificate balances increase when interest rates go up and decrease when rates come down

Increasing interest rates may be positive for net income

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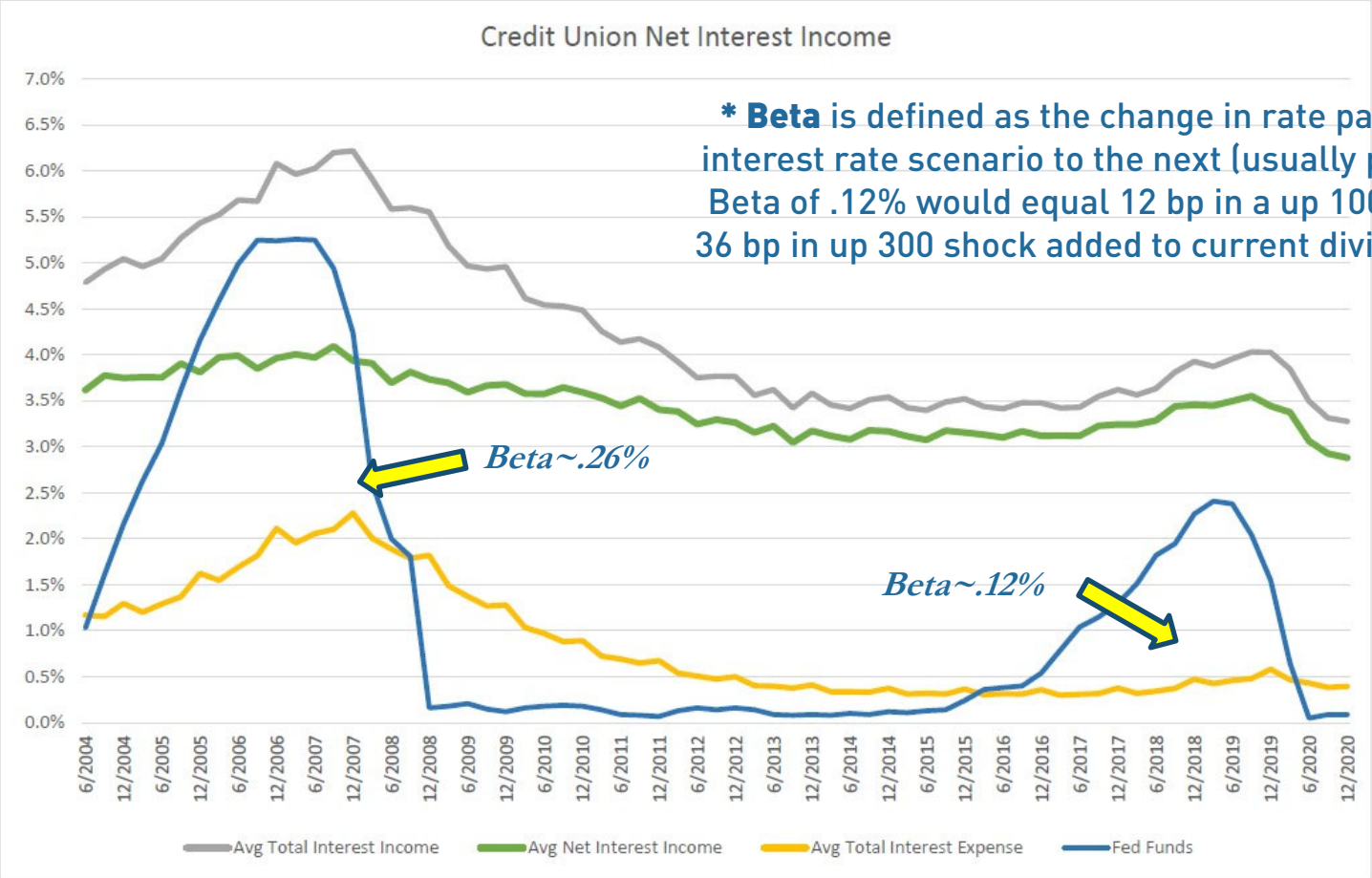
CREDIT UNION NET INTEREST INCOME COMPARED TO FED FUNDS



*** Beta** is defined as the change in rate paid from one interest rate scenario to the next (usually per 100 bp). Beta of .12% would equal 12 bp in a up 100 shock and 36 bp in up 300 shock added to current dividend rates.

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POLL QUESTION #1

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INCOME SIMULATION

- Estimates future NII and net income
- Simpler in concept
- Uses familiar terms
- Complex in application due to unpredictable member behavior for loans and deposits
- Short-term (1 to 3 years)
- Misses the risk of holding assets beyond the three-year forecast
- Very effective and realistic analysis

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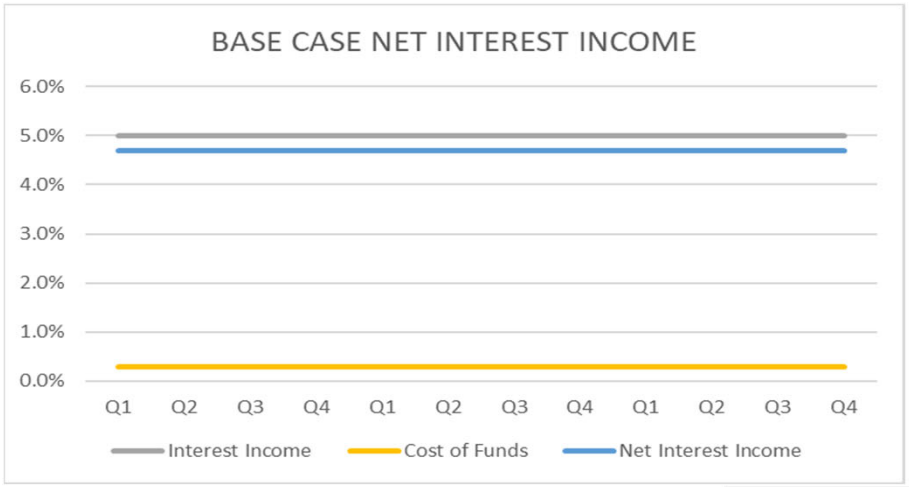
EXAMPLE 3% INSTANTENOUS AND PARALLEL UP SHOCK 36 MONTH REPRICING OF ASSETS

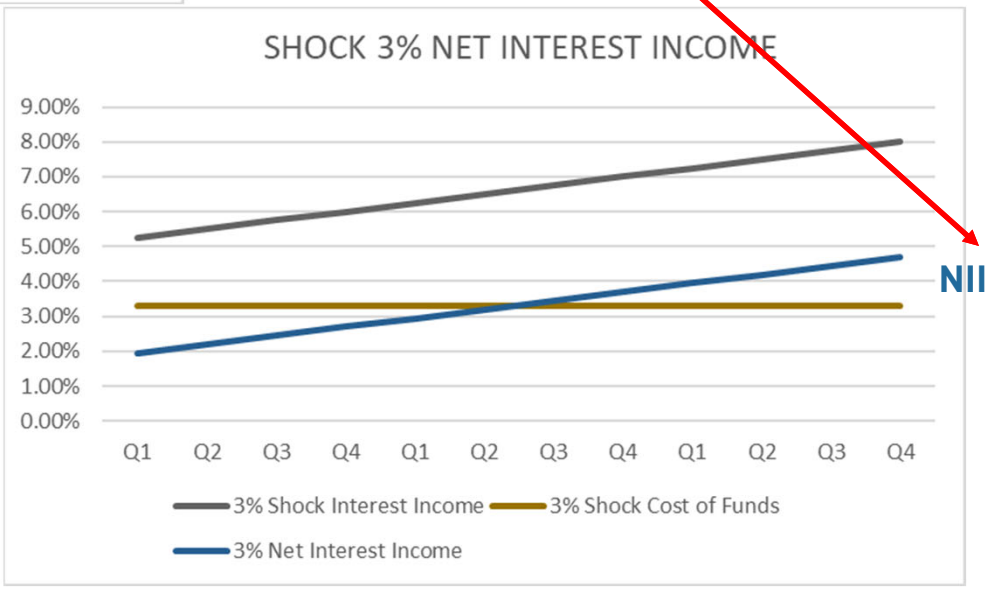


Loan yield 5%
Cost of funds .30%
NII 4.7%

NII 4.7

LOAN YIELDS AND INVESMENT YIELDS TAKE 36 MONTHS TO REPRICE

COST OF FUNDS GO UP IMMEDIATELY



NII 4.7

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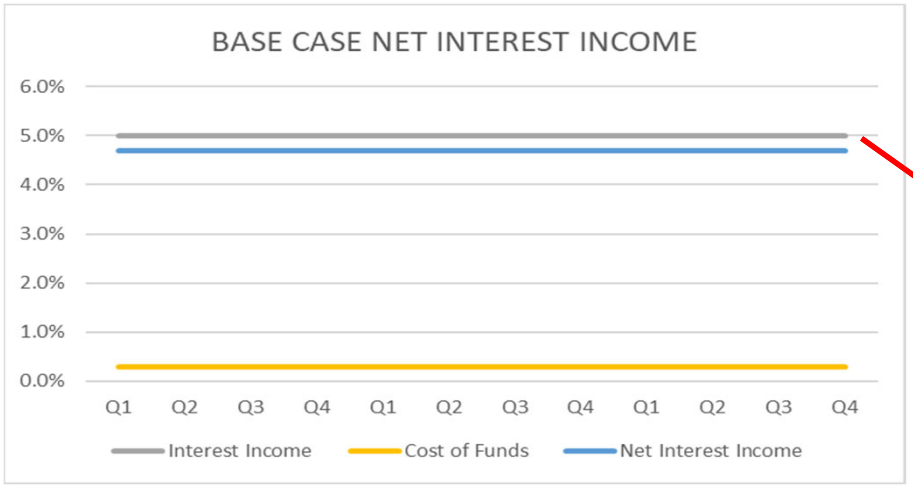
EXAMPLE 3% INSTANTENOUS AND PARALLEL UP SHOCK 60 MONTH REPRICING OF ASSETS



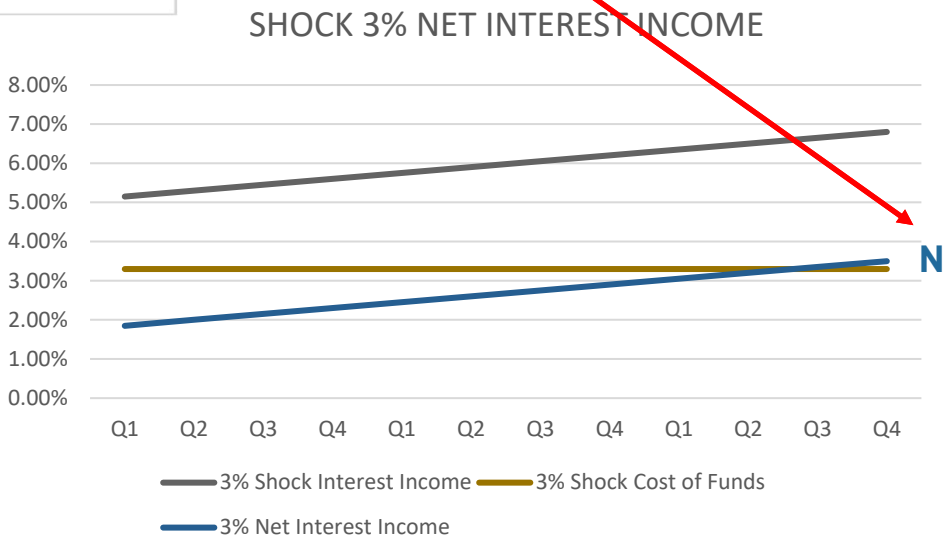
NII 4.7%

Loan yield 5%
Cost of funds .30%
NII 4.7%

LOAN YIELDS AND INVESMENT YIELDS TAKE 60 MONTHS TO REPRICE

COST OF FUNDS GO UP IMMEDIATELY

NII OF 4.7% NOT REALIZED



NII 3.5%

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INCOME SIMULATION LOAN ASSUMPTIONS

- Focus on long term fixed rate loans like mortgages – Identify the % of total assets
- Loan with the largest balances
- The estimated repayment speeds for consumer loans is typically 24-36 moths
- Repayment speeds change as rates change for mortgages but not as much for consumer loans

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INCOME SIMULATION LOAN ASSUMPTIONS

	Balance in Thousands	% of Total Assets	Current Yield	New money rate	Repricing Term In Months for Income Simulation and NEV: Shock Down -100 BP	Bench mark	Shock Up 100 BP	Shock Up 200 BP	Shock Up 300 BP	Repricing Criteria
New vehicle loans	18,888	8.2%	2.97%	2.38%	29	29	29	29	29	Fixed-rate consumer collateral
Used vehicle loans	38,530	16.8%	5.08%	4.44%	27	27	27	27	27	Fixed-rate consumer collateral
Recreational vehicle loans	18,376	8.0%	4.22%	3.70%	33	33	33	33	33	Fixed-rate consumer collateral
Share secured loans	287	0.1%	3.00%	3.00%	24	24	24	24	24	Fixed-rate deposit secured
Signature loans	6,040	2.6%	8.40%	8.22%	16	16	16	16	16	Fixed-rate consumer unsecured
Lines of credit	1,530	0.7%	12.14%	12.14%	36	36	36	36	36	Revolving credit
First mtg - 10 yr fixed rate	263	0.1%	3.77%	3.77%	31	40	49	58	67	10 years fixed rate
First mtg - 15 yr fixed rate	5,132	2.2%	3.75%	3.75%	57	66	75	84	93	15 years fixed rate
First mtg - 30 yr fixed rate	2,221	1.0%	6.00%	6.00%	78	90	102	114	126	30 years fixed rate
Business First mtg - 3 yr balloons	386	0.2%	5.25%	5.25%	25	27	29	31	33	3 year balloons
Bus Other Collateral - Closed End	607	0.3%	3.63%	2.67%	29	29	29	29	29	Up to 84 months fixed rate
First mtg - 5 yr balloons	6,434	2.8%	5.65%	5.65%	30	34	38	42	46	5 year balloons
First mtg - other	224	0.1%	6.26%	6.26%	6	6	6	6	6	Short term construction loans
Home equity lines of credit	8,070	3.5%	4.53%	4.53%	3	3	3	3	3	Variable rate - adjust every January
Visa loans	7,381	3.2%	8.24%	8.24%	36	36	36	36	36	Revolving credit
Misc. loans	32	0.0%	8.00%	8.00%	3	3	3	3	3	Excluded from interest rate risk analysis
First mtg - 5 yr ARM	9,861	4.3%	5.43%	5.43%	49	49	49	49	49	5 year ARM
	0	0.0%	0.00%	0.00%	0	0	0	0	0	0
	0	0.0%	0.00%	0.00%	0	0	0	0	0	0
Allowance for loan losses	(565)	-0.2%	0.00%		0	0	0	0	0	
Net Loans	**123,695**	**54.0%**	**5.04%**		31	32	33	33	34	**Weighted Average**

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Credit Union 12 Month Historical Average **32**

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INCOME SIMULATION INVESTMENT ASSUMPTIONS

- More $ in overnight accounts = less interest rate risk but lower earnings
- Mortgage-backed investments should be weighted with mortgage loans
- Understand the average maturities of the investment portfolio
- Identify steps or calls and how cash flows change as interest rates change

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INCOME SIMULATION
INVESTMENT ASSUMPTIONS

	Balance in Thousands	% of Total Assets	Current Yield	New money rate	Shock Down -100 BP	Bench mark	Shock Up 100 BP	Shock Up 200 BP	Shock Up 300 BP	Repricing Criteria
Daily accounts										
EBA account	5,419	2.4%	0.05%	0.05%	1	1	1	1	1	Adjusts daily
Investment CDs - non callable	36,980	16.1%	0.10%	0.10%	1	1	1	1	1	Adjusts daily
Investment CDs - callable	1,935	0.8%	2.27%	0.15%	10	10	10	10	10	Defined by maturity date
Securities - non callable	0	0.0%	0.00%	0.00%	0	0	0	0	0	Defined by maturity date
Securities - callable	3,017	1.3%	1.31%	0.24%	5	5	5	5	5	Defined by maturity date
Corporate bond	15,513	6.8%	1.00%	0.53%	7	86	86	86	86	Defined by maturity date
Muni bond	848	0.4%	2.27%	2.26%	23	24	24	24	24	Defined by maturity date
NCUA guaranteed note	14,208	6.2%	2.30%	1.06%	45	45	45	45	45	Defined by maturity date
CMOs	507	0.2%	1.72%	0.13%	5	5	5	5	5	Defined by maturity date
COLI	8,487	3.7%	1.46%	0.94%	39	48	60	72	84	Average life
Membership shares	2,821	1.2%	2.95%	2.95%	0	0	0	0	0	Not rate sensitive
Total Investments	482	0.2%	1.00%	1.00%	1	1	1	1	1	Adjusts monthly
	90,218	39.4%	0.94%							

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POLL QUESTION #2

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INCOME SIMULATION DEPOSIT ASSUMPTIONS

- Control balance sheet growth to focus on interest rate changes
- Certificate renewal rate .85%
- Assume early redemption of CDs in up rate scenarios

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INCOME SIMULATION DEPOSIT ASSUMPTIONS

Liability & Share Classification	Balance in Thousands	% to Total Assets	Current Yield	Income Simulation Beta (rate sensitivity) and Lag for NMS: Shock Down -100 BP Beta	Shock Down -100 BP Lag	Benchmark Beta	Benchmark Lag	Shock Up 300 BP Beta	Shock Up 300 BP Lag	Rate Sensitivity
Notes payable	0	0.0%	0.00%	1.00%	1	1.00%	1	1.00%	1	Adjusts daily
Liabilities	1,724	0.8%								
Shares $0 to $49,999.99	54,771	23.9%	0.05%	0.16%	1	0.16%	1	0.16%	1	Core shares-low by definition
Shares $50,000 and over	34,412	15.0%	0.05%	0.16%	1	0.16%	1	0.16%	1	Moderate by analysis/definition
Share drafts	42,329	18.5%	0.05%	0.10%	1	0.10%	1	0.10%	1	Low by definition
IRA shares	1,788	0.8%	0.10%	0.43%	1	0.43%	1	0.43%	1	High by definition
Health savings accounts	182	0.1%	0.10%	0.59%	1	0.59%	1	0.59%	1	Moderate by analysis/definition
Member certificates	28,340	12.4%	1.55%	1.00%	26	1.00%	26	1.00%	12	Defined by maturity date
Money market $.01 to $9,999.99	513	0.2%	0.05%	0.29%	1	0.29%	1	0.29%	1	Moderate by analysis/definition
Money market $10,000.00 - $99,999.99	11,800	5.2%	0.14%	0.53%	1	0.53%	1	0.53%	1	High by definition
Money market $100,000.00- over	24,223	10.6%	0.20%	0.59%	1	0.59%	1	0.59%	1	High by definition
Money market checking	542	0.2%	0.18%	0.53%	1	0.53%	1	0.53%	1	High by definition
Money Plus accounts	99	0.0%	0.15%	0.53%	1	0.53%	1	0.53%	1	Moderate by analysis/definition
	0	0.0%	0.00%	0.00%	0	0.00%	0	0.00%	0	
	0	0.0%	0.00%	0.00%	0	0.00%	0	0.00%	0	
Total Shares & Deposits	**199,000**	**86.9%**	**0.29%**							

* **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.

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INCOME SIMULATION EXAMPLE

In Thousands of Dollars

Shock Criteria: Instantaneous and Parallel	BENCHMARK	UP RATE 3%				
Assumptions: See index pages 2 and 3	FORECASTED INCOME	FORECASTED INCOME	Change	% Chng from Benchmark	Maximum Allowed % Change from Benchmark NII	Variance
YEAR 1						
Loan Interest Income	6,127	7,212	1,085	17.7%		
Investment Interest Income	783	2,251	1,468	187.5%		
Total Interest Income	6,910	9,463	2,553	36.9%		
Dividends & Interest Paid	531	2,123	1,592	300.0%		
Net Interest Income	6,379	7,340	961	15.1%	-15.0%	30.1%
Total Fees & Misc. Income	2,305	3,305				
Operating Expenses	7,930	7,930				
Forecasted Net Income Year 1	1,753	2,714	961	54.8%		
YEAR 2						
Loan Interest Income	5,929	8,311	2,382	40.2%		
Investment Interest Income	703	2,459	1,756	249.7%		
Total Interest Income	6,632	10,770	4,138	62.4%		
Dividends & Interest Paid	489	2,384	1,894	387.2%		
Net Interest Income	6,143	8,386	2,243	36.5%	-15.0%	51.5%
Total Fees & Misc. Income	3,405	3,405				
Operating Expenses	8,171	8,171				
Forecasted Net Income Year 2	1,377	3,620	2,243	163.0%		
YEAR 3						
Loan Interest Income	5,791	9,111	3,320	57.3%		
Investment Interest Income	670	2,647	1,977	294.9%		
Total Interest Income	6,461	11,758	5,297	82.0%		
Dividends & Interest Paid	456	2,431	1,975	433.2%		
Net Interest Income	6,006	9,327	3,322	55.3%	-15.0%	70.3%
Total Fees & Misc. Income	3,508	3,508				
Operating Expenses	8,419	8,419				
Forecasted Net Income Year 3	1,095	4,417	3,322	303.3%		

The greatest risk is usually in the first year

Why is the net interest income better?

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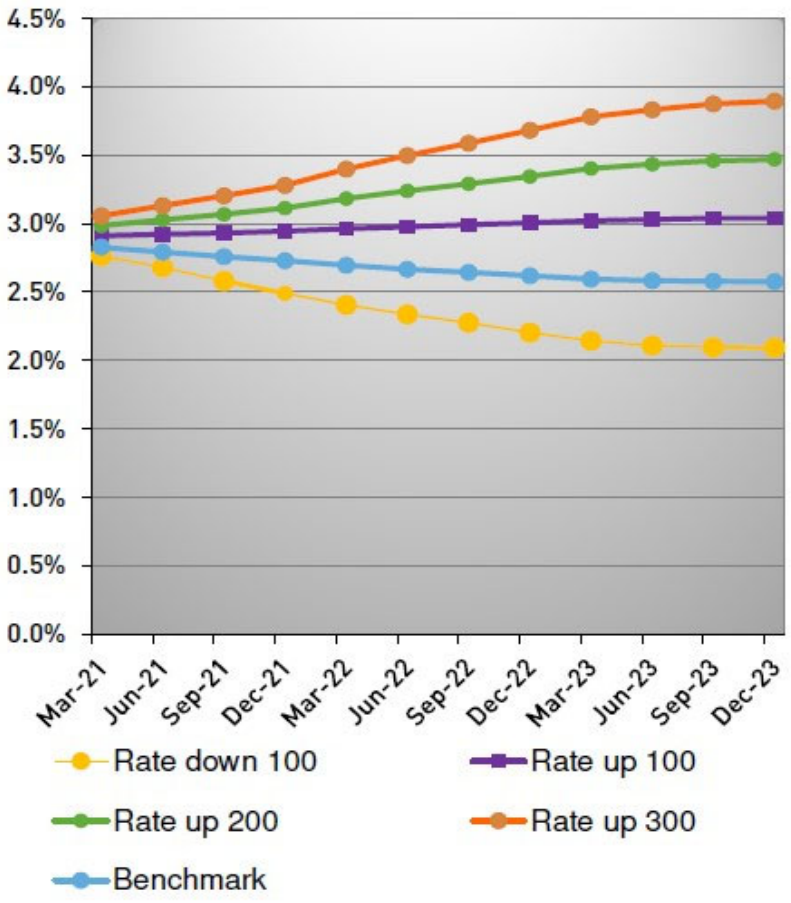
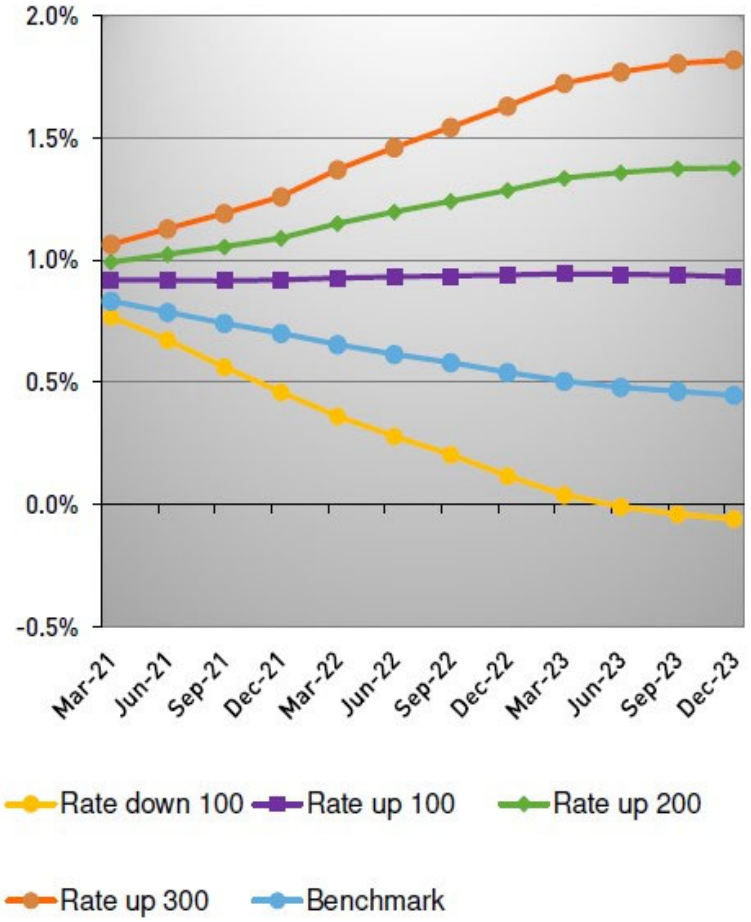
FORECASTED NET INTEREST MARGIN



FORECASTED RETURN ON ASSETS (ROA)



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INCOME SIMULATION SUMMARY

PANEL 1 INCOME SIMULATION

3-Year Cumulative ($000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Net Interest Income (NII)	$16,239	$18,557	$20,796	$22,764	$24,730
$ Change from benchmark NII	(2,318)		2,239	4,207	6,172
% Change from benchmark NII	-12.5%		12.1%	22.7%	33.3%
Maximum Allowed % Change from Benchmark NII	-15.0%		-15.0%	-15.0%	-15.0%
Net income:	$1,937	$4,255	$6,494	$8,462	$10,428
ROA:	0.28%	0.61%	0.94%	1.22%	1.50%

- 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
- Set limits to control risk

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FINANCIAL RECAP

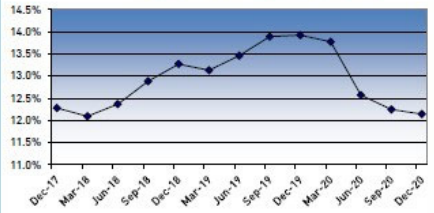
PANEL 4

NET WORTH

Expanded Analysis Begins at 4.1

Beg. Net Worth Ratio	December 31, 2019	13.9%
12 Month Change in Net Worth Ratio		-1.8%
Ending Net Worth Ratio	December 31, 2020	12.1%
Guideline		7.0%
NCUA Classification		Well Capitalized

NET WORTH TO TOTAL ASSETS RATIO *



* For this analysis the Net Worth to Total Assets Ratio is calculated using the total assets at the end of each period. It may exclude the unrealized gain/loss if the credit union has this allowance in the reserve.

PANEL 5

INTEREST MARGIN & NET INCOME ANALYSIS

Expanded Analysis Begins at 5.1

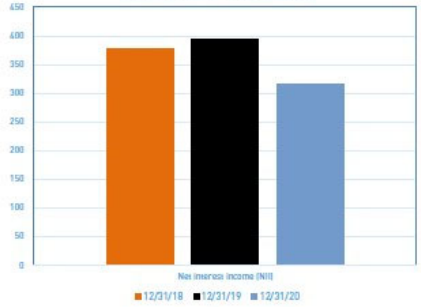
SPREAD ANALYSIS OF INCOME AND EXPENSES LAST 12 MONTHS

Divided by average assets	Basis Points	Guideline	Variance
Interest income	345		
Cost of funds	29		
Net interest income	316	335	(19)
Fees & misc income	153	170	(17)
Total margin	469	505	(36)
Provision for loan loss	1		
Operating expenses	366		
Total Operating Expenses	366	455	(89)
ROA - ongoing operation	103	50	53
NCUSIF recovery/(writeoff)	0		
Other gains(loss)	0		
Total Return on Assets (ROA)	103		

Possible variance due to rounding

Guidelines are in balance YES

NET INTEREST MARGIN TREND



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POLL QUESTION #3

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POLICY LIMITS

PANEL 1 INCOME SIMULATION

3-Year Cumulative ($000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Net Interest Income (NII)	$16,239	$18,557	$20,796	$22,764	$24,730
$ Change from benchmark NII	(2,318)		2,239	4,207	6,172
% Change from benchmark NII	-12.5%		12.1%	22.7%	33.3%
Maximum Allowed % Change from Benchmark NII	-15.0%		-15.0%	-15.0%	-15.0%
Net income:	$1,937	$4,255	$6,494	$8,462	$10,428
ROA:	0.28%	0.61%	0.94%	1.22%	1.50%

- How much can net interest income decrease before net income is reduced to unacceptable level?
- Net worth is part of the discussion
- Current net interest income also a consideration
- In this example NII can decrease 22% before net income is 0

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WHAT-IF SCENARIO

PANEL 1 INCOME SIMULATION

3-Year Cumulative ($000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Net Interest Income (NII)	$16,239	$18,557	$19,738	$20,620	$21,468
$ Change from benchmark NII	(2,318)		1,181	2,062	2,910
% Change from benchmark NII	-12.5%		6.4%	11.1%	15.7%
Maximum Allowed % Change from Benchmark NII	-15.0%		-15.0%	-15.0%	-15.0%
Net income:	$1,937	$4,255	$5,436	$6,318	$7,166
ROA:	0.28%	0.61%	0.78%	0.91%	1.03%

- Increase beta on regular shares from .16% to .59%

PANEL 1 INCOME SIMULATION

3-Year Cumulative ($000)	SHOCK DOWN -100 BP	Benchmark	SHOCK UP 100 BP	SHOCK UP 200 BP	SHOCK UP 300 BP
Net Interest Income (NII)	$21,414	$23,871	$24,386	$24,544	$24,620
$ Change from benchmark NII	(2,457)		515	673	749
% Change from benchmark NII	-10.3%		2.2%	2.8%	3.1%
Maximum Allowed % Change from Benchmark NII	-15.0%		-15.0%	-15.0%	-15.0%
Net income:	$7,112	$9,569	$10,084	$10,242	$10,318
ROA:	1.01%	1.36%	1.44%	1.46%	1.47%

- Increase beta on regular shares from .16% to .59% and add $30,000,000 in 30-year fixed rate mortgages

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IRR AND RELATED POLICY

Does my IRR Policy have all the right elements?

- Establishes an effective IRR program
- Include limits and controls.
- Consistent with the credit union's business strategies.
- Reflects the credit union's current financial condition.
- Not too restrictive or too liberal.
- Adequately reflect board's risk tolerance.

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SUMMARY OF INCOME SIMULATION

Positives

- Simple, easy-to-understand concept
- Uses familiar terms to describe result; i.e., forecasted loan income
- Very effective estimate of risk to net interest income
- A good estimate for credit unions that don't have many long-term assets (over 3 years)

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SUMMARY OF INCOME SIMULATION

Negatives

- Uses many complex assumptions
- Limited to 1-3 years
- Will miss risk for assets and liabilities with lives longer than 3 years

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MANAGEMENT AND BOARD RESPONSIBILITIES

- ALM Policy
- Identify risk
- Quantify risk
- Control—Policy or Risk Limits
- Monitor risk

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OUTSOURCE BENEFITS TO YOU AND YOUR CREDIT UNION

Easy

Save time

Delegate to the experts

Extensive experience

Regulator responses

Reliable

Reputable

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EASY AND AFFORDABLE CECL SOLUTION

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A CREDIT WILL BE GIVE FOR THE FEE WITH AGREEMENT PRIOR TO 12/31/2022

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