



ALM Basics Interest Rate Risk

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Objectives

- ALM Overview
- What is Interest Rate Risk and What are the Sources of Risk
- How to Measure Interest Rate Risk
- Understanding Interest Rate Risk Reports
- NCUA IRR Supervision





Progress always involves risks. You can't steal second base and keep your foot on first."

-- Frederick B. Wilcox

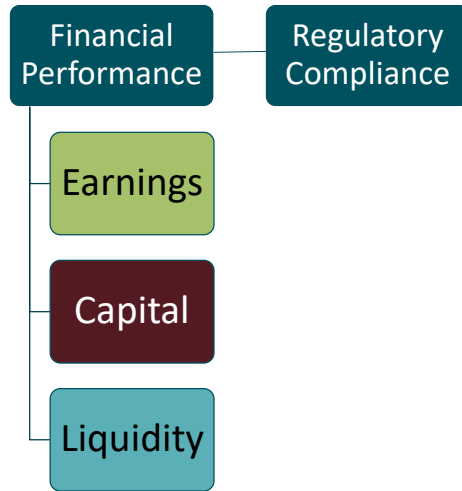


Asset Liability Management

The process of managing our members loans and shares along with investment/borrowing portfolios in a manner that meets financial goals while maintaining adequate liquidity and sensitivity to interest rate risk as economic conditions change.



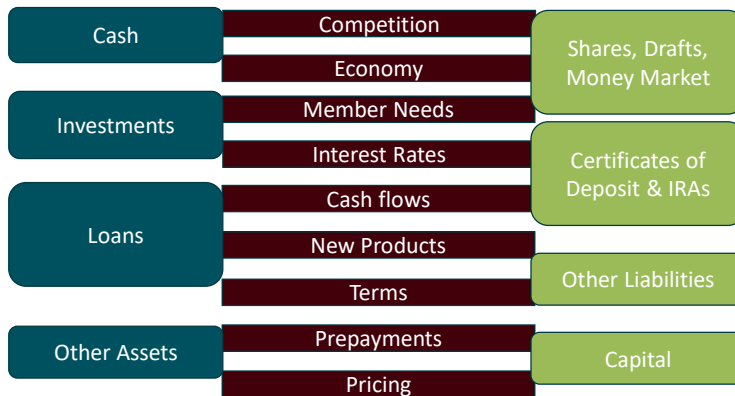
Goal of ALM



Asset Liability Management

Assets

Liabilities & Capital

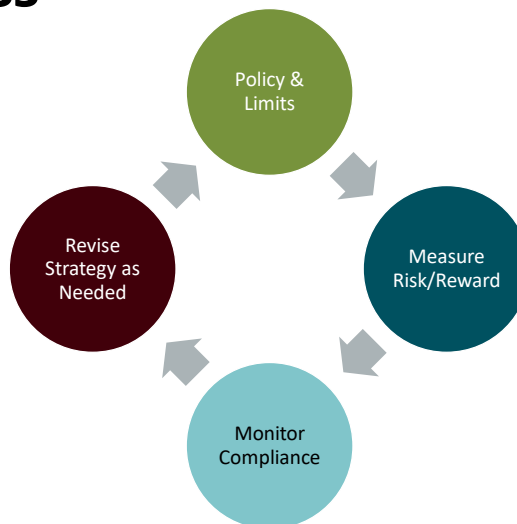


Keys to a Successful ALM Process



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ALM Process



What is Interest Rate Risk?

Threat that a change in market interest rates may:

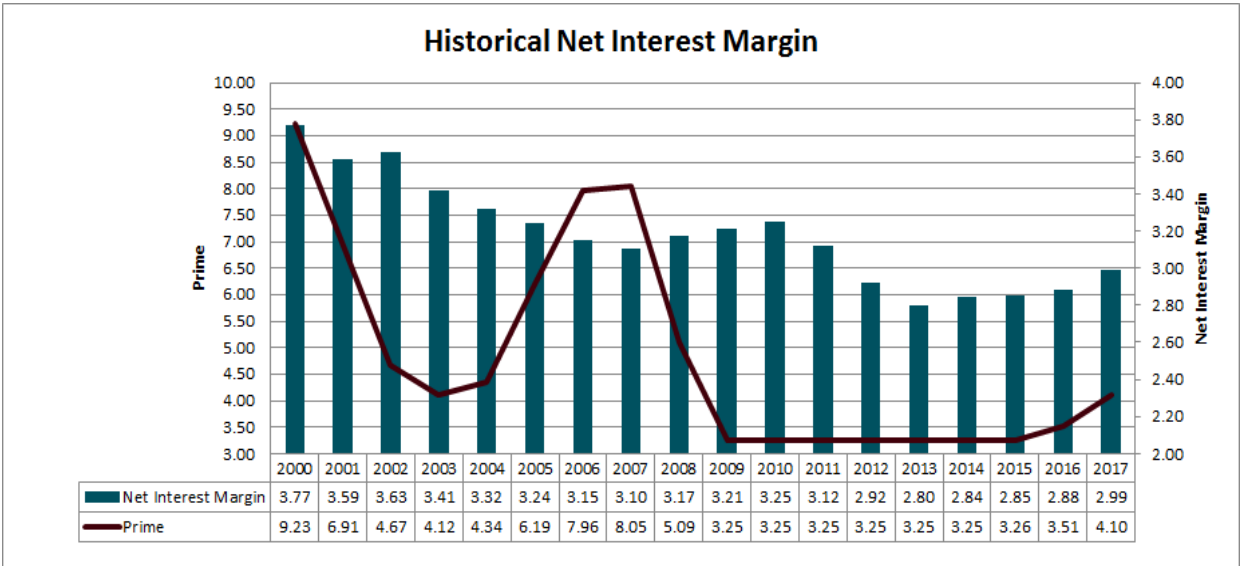
- Reduce net interest income/net income
- Adversely affect the economic values of financial assets and liabilities
- Impair capital, elevating the risk of insolvency
- Impair liquidity



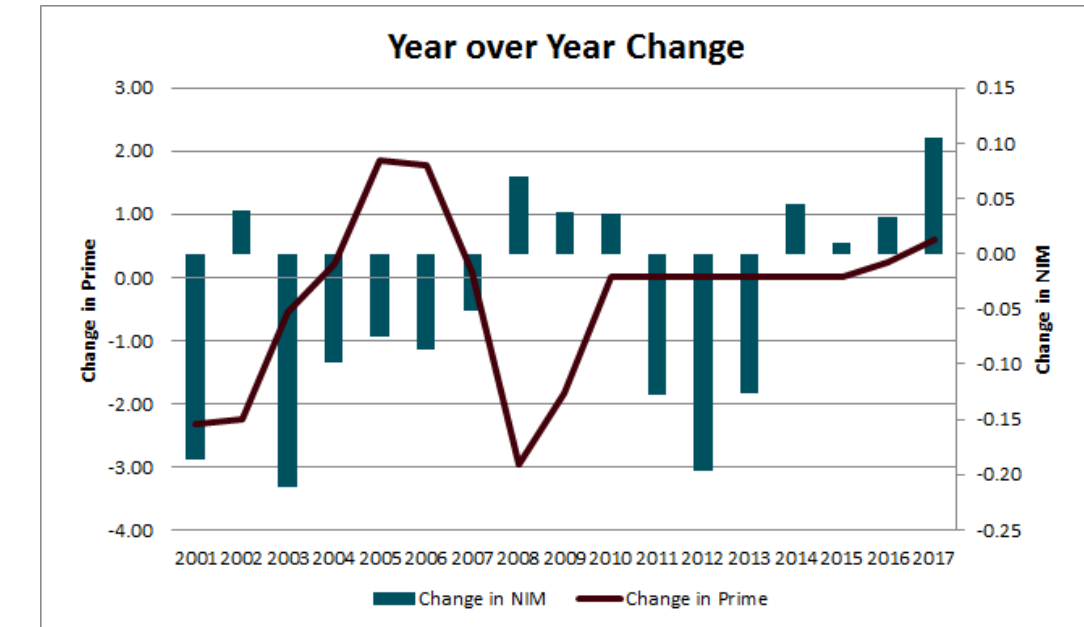
Interest Rate Risk: Why Is It Important?

- **The majority of our assets and liabilities are financial instruments**
- **We buy and sell money:**
 - **Income → We sell loans and receive interest**
 - **Expense → We buy shares and pay a dividend**
- **Financial Performance is therefore affected by future economic circumstances**

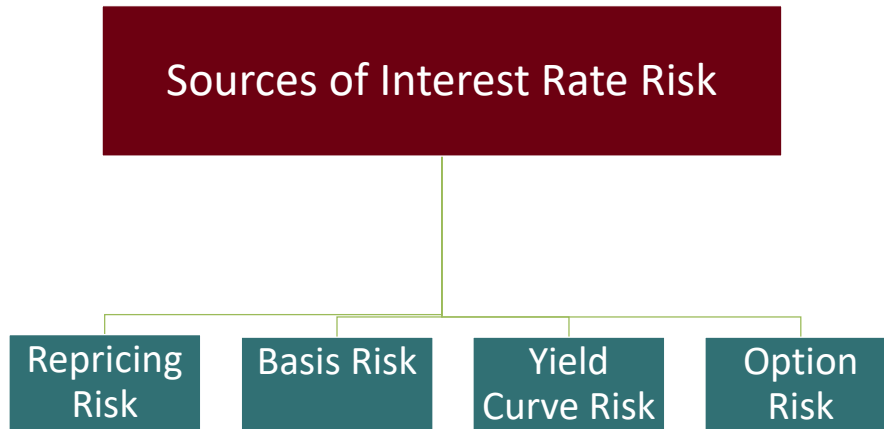




Source: NCUA Financial Performance Report – All CUs



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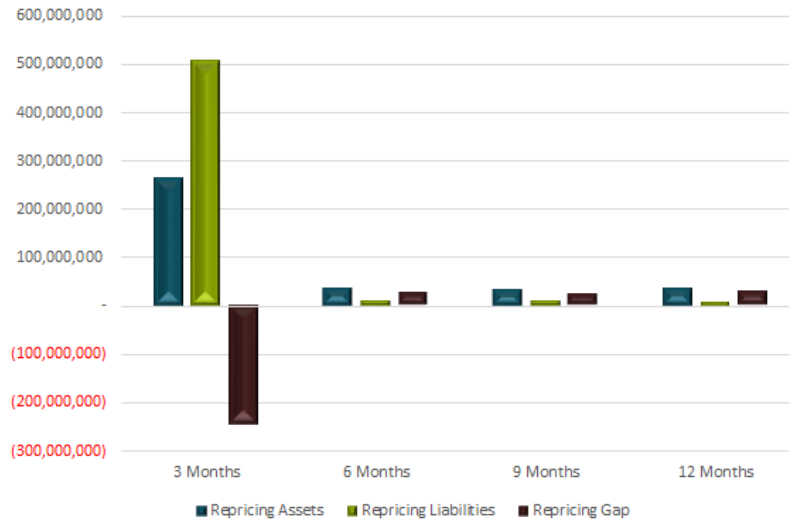


Repricing Risk

- Repricing risk is the risk resulting when assets and liabilities have different average maturities or repricing dates
- Earnings change when there is a change in the level of rates



Repricing Gap



Basis Risk

This is the risk from unequal movements in interest rates on a credit union's assets and liabilities with the same maturity or repricing



Basis Risk Example

Balance Sheet	Year 1		Year 2 1CMT ↑ 1%		Year 3 1CMT ↓ 1.5%	
	Rate	Income/ Expense	Rate	Income/ Expense	Rate	Income/ Expense
\$5M 5/1 ARM	4.25%	\$212,500	5.25%	\$262,500	3.75%	\$187,500
\$5M 1 Year Certificate	1.50%	\$75,000	2.00%	\$100,000	1.25%	\$62,500
Net Interest Income	2.75%	\$137,500	3.25%	\$162,500	2.50%	\$125,000



Causes of Option Risk

Option Risk arises whenever credit union products give the member the right, but not the obligation, to alter the quantity or the timing of cash flows



Examples of Option Risk

- **Contractual Options**
 - Call/Put options in securities
 - Interest rate caps, floors
- **Ambiguous Options**
 - Loan prepayments/payoffs
 - Revolving balance accounts, credit cards, lines of credit
 - Withdrawal of shares
 - “Implicit” rate caps and floors

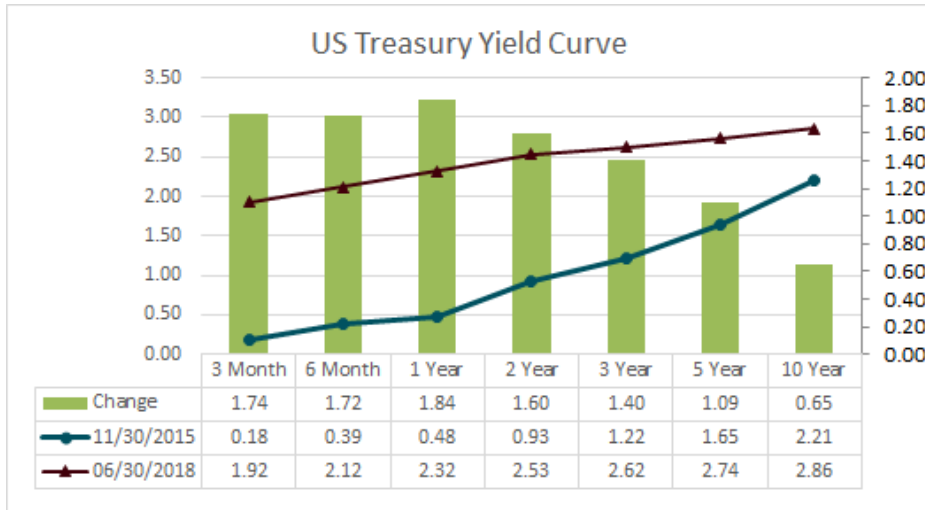


Yield Curve Risk

- Risk of short-term rates changing by more or less than the change in long-term rates
- **Rule of Thumb**
 - Short term rates are often more volatile than intermediate and long-term rates



Yield Curve Risk



IRR Risk Measurement

Income Simulation

Measurement of short-term risk

Earnings Perspective

Project income over 12 to 36 months

Observe changes across rate scenarios

Change is measure of risk

Net Economic Value

Measurement of long-term risk

Value Perspective

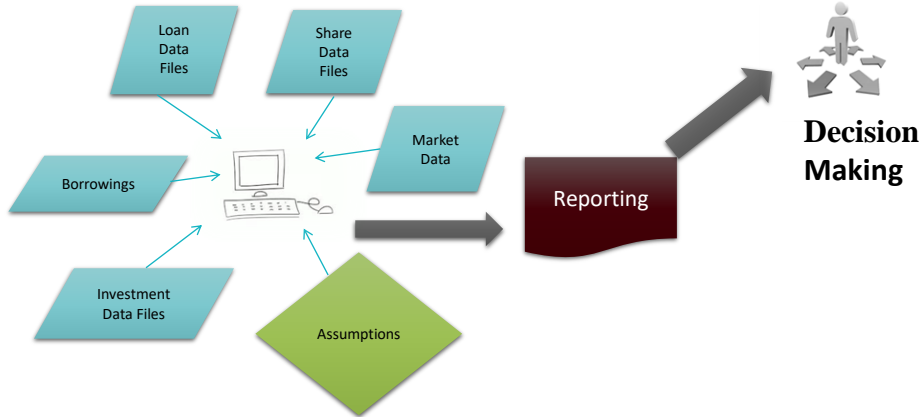
Point in time analysis

Observe changes across rate scenarios

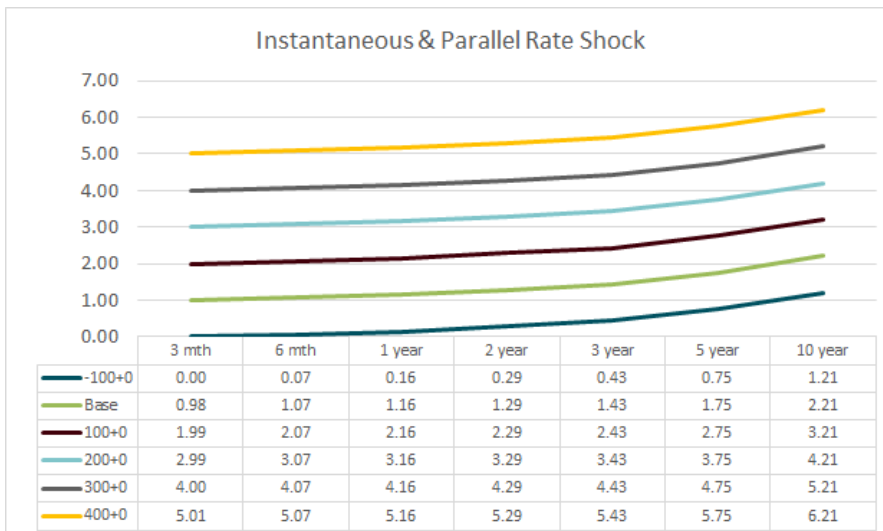
Change is measure of risk



IRR Model



IRR Measurement Market Scenarios



Market Scenarios

- Not Intended to Represent a Most Likely Ratio Scenario
- Stress Test to see how Balance Sheet holds up under a range of alternative future interest rates
- Severe but plausible



Income Simulation Modeling

- **Income simulation models project future net interest income and how it changes as interest rates move**
- **The amount that it changes from current market rates to higher and lower market rates determines the level of risk**



Income Simulation

(000's)	Rates Down 100	Flat Rates	Rates Up 300
+ Interest Income	\$2,900	\$3,000	\$3,100
- Interest Expense	\$940	\$1,300	\$1,620
= Net Interest Income	\$1,960	\$1,700	\$1,480
\$ Change from Flat	\$260	-	\$-220
% Change from Flat	15.3%	-	-12.9%
Policy Limit	20%		20%

Net Economic Value (NEV) Models

- Measurement of the future (long-term) earnings potential of today's balance sheet
- Risk is measured by the change in value of the credit union's assets and liabilities due to interest rate movements and the impact these changes have on the capital position
- NOT liquidation value – Regulator perspective – hit to share insurance fund



Net Economic Value Formula

+	The value today (present value) of <u>future amounts the credit union will receive</u> , such as loan principal and interest payments, and investment principal and interest.
-	The value today (present value) of <u>future amounts the credit union will pay</u> for its funds, such as deposit principal and interest payments.
=	Net Economic Value

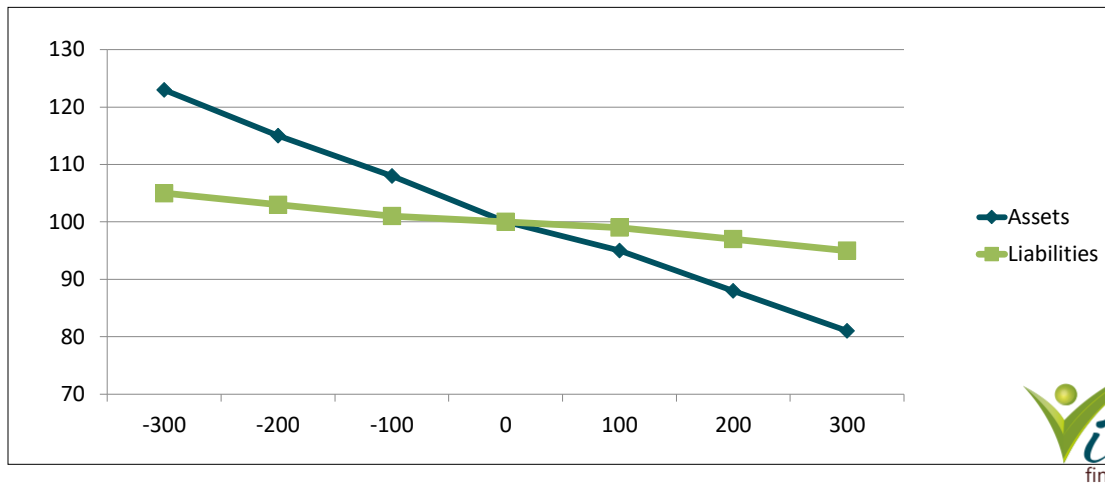


Value Changes With Interest Rates

Amount: *\$1,000* | Coupon: *6%* | Life: *5 years* | Payments: *Annual*

Period	Cash Flow	5%	6%	7%
1	60.00	57.14	56.60	56.07
2	60.00	54.42	53.40	52.41
3	60.00	51.83	50.38	48.98
4	60.00	49.36	47.53	45.77
5	<u>1,060.00</u>	<u>830.54</u>	<u>792.09</u>	<u>755.77</u>
Total	1,300.00	1,043.29	1,000.00	959.00
% Change		4.33%		-4.10%

Price Sensitivity



Price Sensitivity & Maturity

- For a Given Rate Change – Fixed Rate Instruments
 - Shorter Maturities Have Smaller Value Changes
 - Longer Maturities Have Larger Value Changes



NEV – Impact of Changes in Interest Rates

Change in Interest Rates	Increase /Decrease in PV	Impact on NEV
↑	Asset - Decrease	Unfavorable ☹️
	Liability - Decrease	Favorable 😊
↓	Asset – Increase	Favorable 😊
	Liability – Increase	Unfavorable ☹️



Net Economic Value

(000's)	Rates Down 100	Flat Rates	Rates Up 300
+ PV Assets	148,500	146,400	139,600
- PV Liabilities	125,000	123,400	119,200
= Net Economic Value	23,500	23,000	20,400
\$ Change from Flat	500	-	(2,600)
% Change from Flat	2.1%	-	(11.3)%
Policy Limit	25%		25%
NEV Ratio	15.8%	15.7%	14.6%
Policy Limit	6.0%	6.0%	6.0%

Interest Rate Risk Red Flags



- Noncompliance with risk limits
- No risk limits
- Frequent exceptions to the interest rate risk policy
- Significant changes in the level and trends of interest rate risk exposure
- Reports are not provided by management that identify and quantify the level of interest rate risk



Modeling Considerations

- Non-parallel Rate Shocks/Rate ramps
- Dynamic Balance Sheet
- Change in Deposit Composition
- Share Attrition
- Stress Assumptions
 - Non-Maturity Shares
 - Prepayments



NEV Supervisory Test

- Uses NEV analysis from CU IRR model - +/- 300 bp rate shock
 - NEV Sensitivity - % change in NEV from base (flat rates) and +/- 300 bp
 - NEV Ratio – Value of Capital/Value of Assets
- Non-Maturity Share Valuation
 - Capped at 1% premium in Base case
 - Capped at 4% premium in +300 scenario



NEV Supervisory Test

	Book Value	Economic Value		NCUA NEV Test*	
	Base	Base	300+0	Base	300+0
Total Assets	765,005,029	766,138,614	728,904,700	766,138,614	728,904,700
Total Shares	575,004,663	537,036,539	467,515,602	569,278,572	546,096,888
Other Liabilities & Borrowings	105,564,653	106,073,676	93,833,961	106,073,676	93,833,961
Economic Value of Equity	84,435,713	123,028,399	167,555,138	90,786,366	88,973,852
* Using Premiums of 1%/4%					
\$ Change			44,526,739		(1,812,514)
% Change			36.19%		-2.00%

NEV Supervisory Test

NCUA NEV Risk Measurement	Credit Union		NCUA Guidelines			
	Rate Shock	Risk Level	Low	Moderate	High	Extreme
% decline in NEV	300+0	-2.00%	<40%	40% to 65%	65% to 85%	>85%
NEV Ratio	300+0	12.21%	>7%	4% to 7%	2% to 4%	<2%
Risk Level	Low		Overall Risk Level is based upon the more severe risk rating assigned to the Percent Change in NEV and the NEV Ratio			



IRR Summary

If you can't identify your risks,
 You can't measure them,
 If you can't measure them,
 You can't understand them
 If you can't understand them,
 You can't manage them.



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