

Southeast Management School
presents:

Investments & Advanced ALM

June 15, 2017

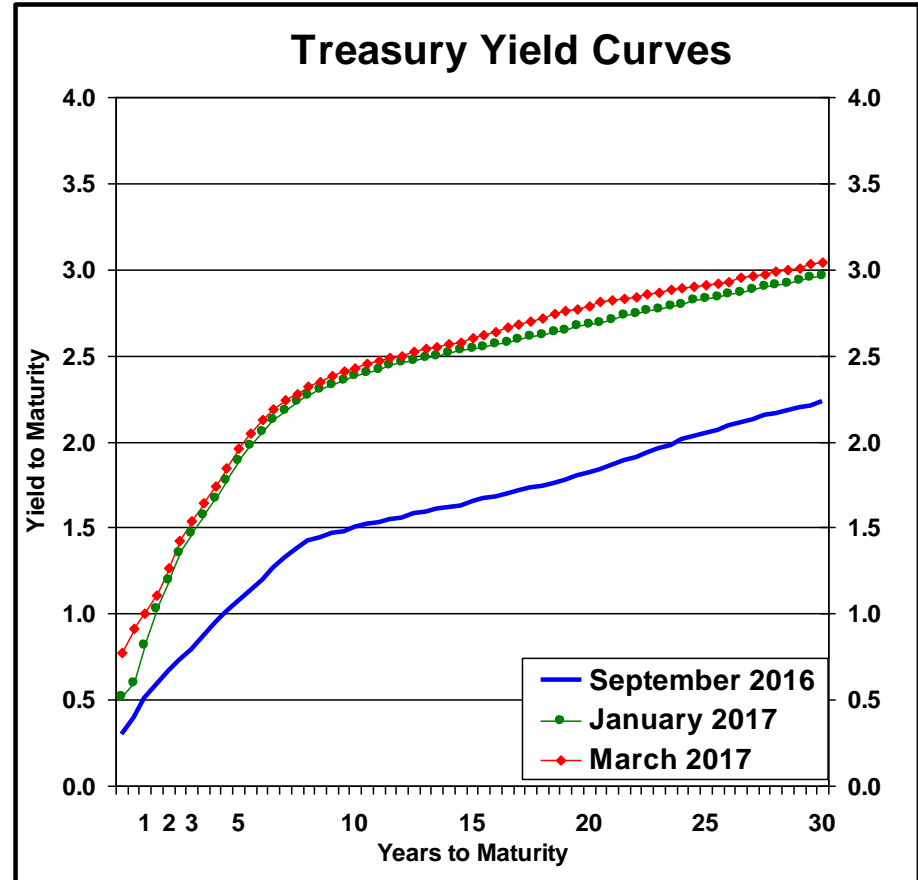
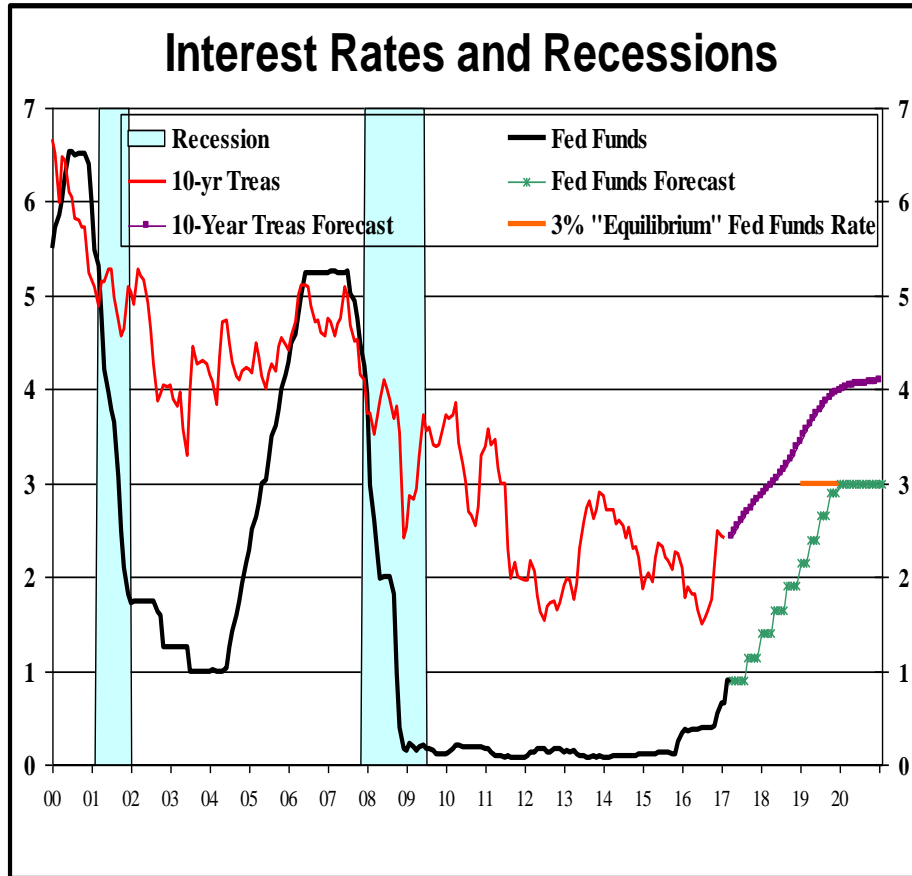
timgardner1125@hotmail.com

(404) 326-1936

What do we hope to accomplish

- Define basic investment terms
- Different features of Fixed Income Investments
- Explore Interest Rate Risk tools

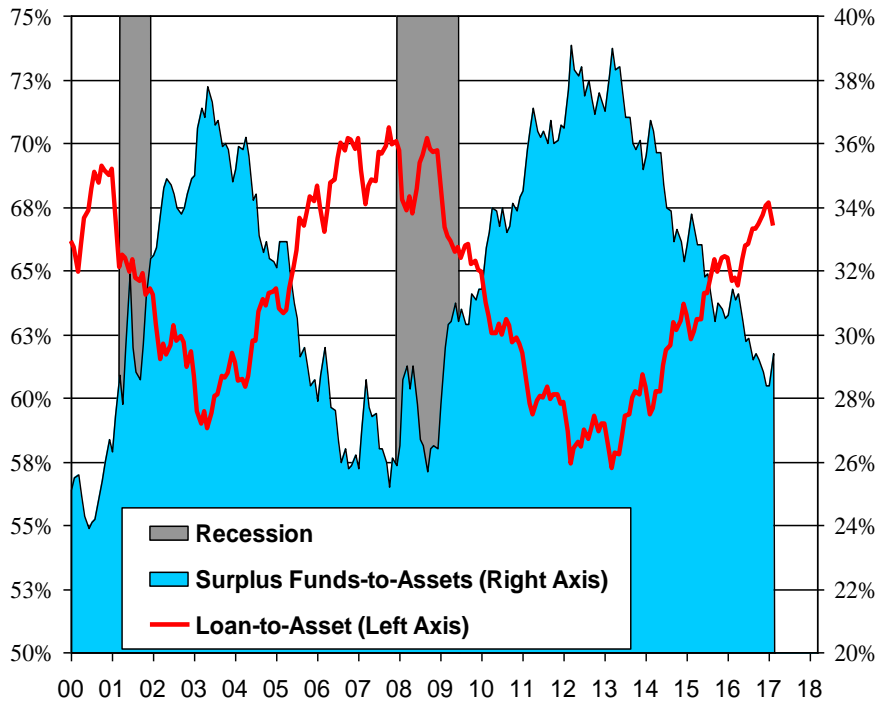
Rising Interest Rates and Parallel Yield Curve Shift



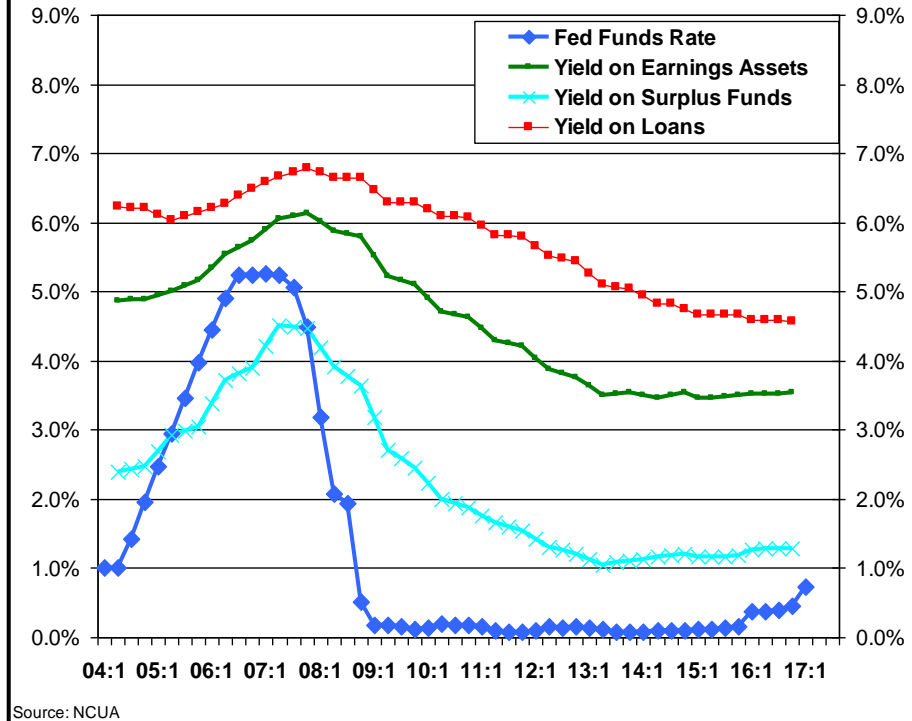
The Fed believes the new **neutral fed funds rate** is 3.0%, the rate which is neither accommodative or restrictive. Interest rates will “normalize” in 2019 at levels below previous plateaus due to lower real interest rates and lower expected inflation. The Fed will hold off ending its reinvestment program until 2017. By maintaining the current size of the Fed’s balance sheet and thereby depressing the term premium on long-term bonds, long-term interest rates will be slow to adjust upwards. This will cause a flattening of the yield curve over the next two years, which typically leads to downward pressure on credit union net interest margins.

Investments Are Falling and Yields Are Stable

CU Surplus Funds (Cash + Investments)



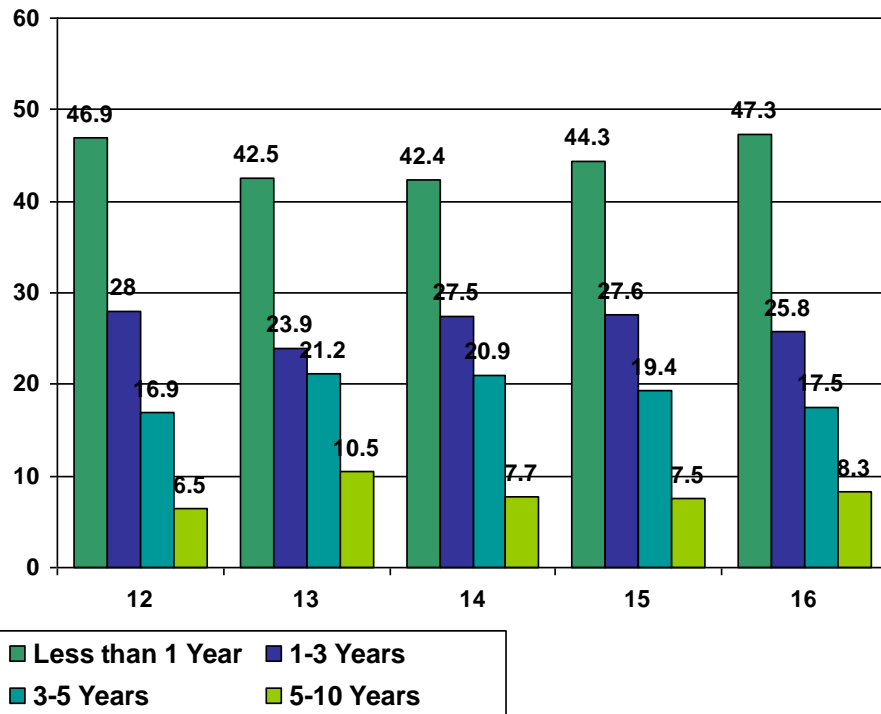
Credit Union Yield on Surplus Funds and Loans



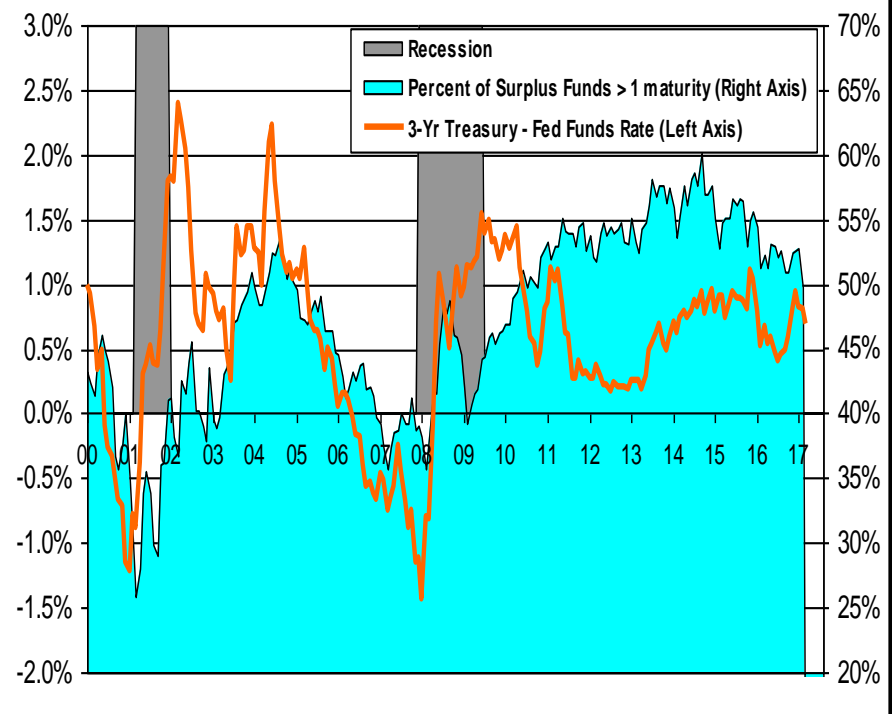
Surplus funds fell to 28.0% of assets in January, below the 30.6% in January 2016. Investments as a percent of assets fell over the last 2 years as loans growth accelerated. Loans now make up 67.9% of assets, up from the cyclical low point of 57% set in March 2013. The yield on surplus funds rose to 1.28% in Q2 2016, up from 1.17% in Q2 2015. Loan yields fell to 4.57% in Q4 2016, the lowest in credit union history, from 4.66% in Q4 2015. With loan balances expected to grow another 10% in 2017, expect surplus funds as a percent of assets to fall below 26% by year end, the lowest level of liquidity since December 2007.

Falling Investment Maturities as Yield Curve Steepens

Maturity of Surplus Funds (% of Total)



Percent of Surplus Funds > 1 Year Maturity Vs Yield Curve Slope



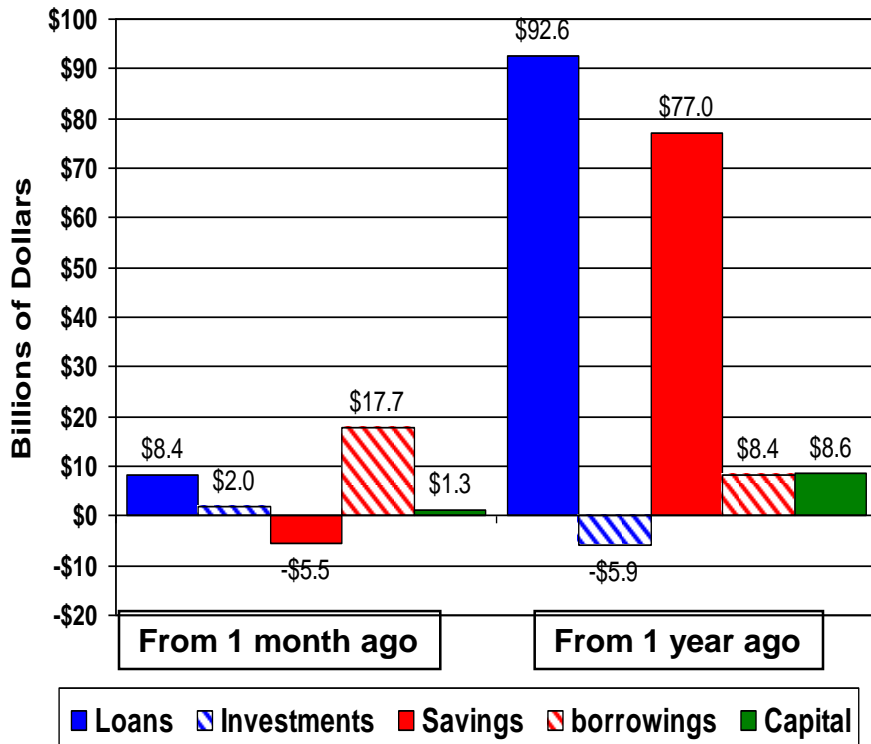
Surplus funds with a maturity less than 1 year rose to 47.3% in December 2016, up from 44.3% in December 2015.

The yield curve steepened recently (as measured by the difference between the 3-year Treasury interest rate and the fed funds interest rate) to 100 basis points due to rising inflation expectations.

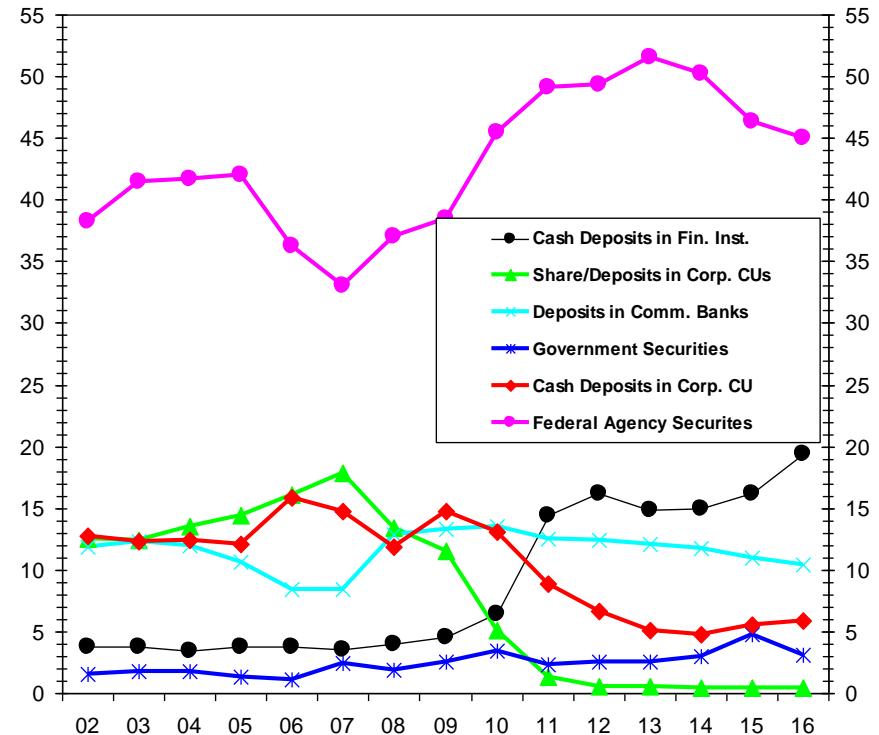
Longer term investments as a percent of surplus funds fell significantly over the last year; 3-5 year investments fell from 19.4% to 17.5%. But 5-10 year investments rose from 7.5% of surplus funds in 2015 to 8.3% today.

Federal Agency Securities Are Lions Share of Investments

Credit Union Liquidity Flows



Surplus Funds Distribution (Percent of Total)



Credit union investment dollars rose \$2.0 billion in January due to credit union borrowing funds in the overnight market and depositing the funds at the Federal Reserve as excess reserves earning 0.75% .

The Great Recession caused a shift in the composition of surplus funds. In 2007, credit unions held 33% of their surplus funds in shares/deposits at corporate credit unions. Today, only 5.9% of cash and investments are held at corporate CUs.

• Investment Side

Deposit Information

- Defines how much liquid money the credit union may need
- Liquid money is normally considered overnight funds/cash
- Anything over liquid amount could go into a ladder

Cash Flow Analysis

- Factor's in loan cash flows
- Combine with Deposit Information
- Total picture of Net Cash Inflows/Outflows

Cash Flow Analysis

	Mnths 1-3	Mnths 4-6	Mnths 7-9	Mnths 10-12	Total
Loans					
Old Money	86,735	86,735	520,410	520,410	1,214,290
New Money	90,000	90,000	600,000	600,000	1,380,000
Net Cash Outflow					165,710
Deposits					
Balance	4,854,745	4,700,000	4,650,000	4,500,000	
Net Cash Outflow					354,745
Total					520,455

Overnight Funds/Cash

- Not earning much money
- Only want to keep as much here as absolutely necessary
- Sweep accounts can help to earn a little more of a return

Overnight Funds/Cash

- General guidelines
 - Consider 10 – 20% of portfolio to be kept liquid
- This will be impacted by deposit flows

Laddering Strategy

- Choose a time horizon – normally not more than 2 years
- Same dollar amount matures each month
 - Know what you can count on
- Avoid investments with embedded options
 - Callables, MBS, etc. can cause holes in the ladder

Sample Ladder

Portfolio	\$35,000,000	Overnight Funds	\$6,000,000	0.20%
Ladder				
Jul-17	\$1,000,000	1.75%		
Aug-17	\$1,000,000	2.11%		
Sep-17	\$1,000,000	1.89%		
Oct-17	\$1,000,000	2.09%		
Nov-17	\$1,000,000	2.21%		
Dec-17	\$1,000,000	1.99%		
Jan-18	\$1,000,000	2.00%		
Feb-18	\$1,000,000	1.88%		
Mar-18	\$1,000,000	1.98%		
Apr-18	\$1,000,000	2.04%		
May-18	\$1,000,000	2.12%		

Investment Strategies

- Laddering 1 – 2 years
 - Advantages
 - Seem to be in the trough
 - Need to understand influx of deposit money
 - Increased insurable amount of \$250,000
 - Limited universe of options makes investing easier

Investment Strategies

- Laddering 1 – 2 years
 - Disadvantages
 - Not much yield pickup
 - Increased admin time for large number of CD's

Long End of the Investment Portfolio

- Day to day cash flows are covered
 - Overnight Funds
- Ladder is setup
 - Set dollar amount maturing every month
- Now we look to pickup some yield
 - Investments with longer maturities
 - Could have any maturity

Long End of the Investment Portfolio

- Factor in types of loans on balance sheet
 - How much do we have of auto loan, real estate loans, etc.
- Compare embedded options of loan to investments
 - Callable investment and Mortgage Backed Securities have similar interest rate risk characteristics

Long End of the Investment Portfolio

- Consider staying away from similar cash flows
 - When interest rates change, what happens to the embedded options
 - Decreasing rate environments means callables, MBS, and FRM present repricing risk
 - Increasing rate environment means you have extension risk

Types of Fixed Income Investments

Basic Investment Terms

- Basis point- 1/100 of 1 percent
- Coupon rate- the periodic interest on an investment
- Discount- a bond or note priced below par(100).
- Premium- a bond or note priced above par(100).

Basic Investment Terms

- Maturity- the date when a bond will “pay off”
- Yield- the percent return that an investor expects to receive
- Reinvestment risk- the risk of investing in a lower rate environment

Different type of Bonds

- Treasuries – issued by US government for different periods of time (zero coupons)
- Agencies
 - Bullets – have a maturity date and no other embedded options
 - Callables – instrument can be redeemed before maturity date

Different type of Bonds

- Agencies
 - Mortgage Backed Securities – holder receives both principal and interest payments
 - Pass Throughs – Cash Flows act just like a mortgage
 - Collateralized Mortgage Backed Securities (CMO) – Receiving cash flows depends investment and traunch

Different type of Bonds

- Collateralized Mortgage Backed Securities
 - 2 types of CMO's (those that redirect principal payments only, and those that redirect both principal and interest payments)
 - Sequential Pay and Planned Amortization Classes (PAC's)

Different type of Bonds

- Sequential-Pay Classes
 - Different tranches are based when the bond holder wants to receive principal and prepayments
 - Principal and prepayments go to same tranche until it is payed off, then onto the next tranche
 - Example – 3 year class (based on WAL) would receive all principal cash flows for months 1 - 64

Different type of Bonds

- Planned Amortization Classes (PAC's)
 - Always have prepayment bands
 - If prepayments are outside of the bands, the principal is directed to companion or support tranches

Features of Fixed Income Investments

Discounts & Premiums

- Bond Relationships
 - Par – Rate = Yield = Yield to Maturity
 - Discount – Rate < Yield < Yield to Maturity
 - Premium – Rate > Yield > Yield to Maturity

Calculating the Yield

- What is the yield (annual interest rate related to market price) on a Bond - Discount
 - 4% coupon bond rate
 - Selling for \$900
 - \$1,000 par value

 - $\$1,000 \times .04 = \40
 - $\$40/\$900 = 4.44\%$

Calculating the Yield

- What is the yield (annual interest rate related to market price) on a Bond – Premium
 - 4% coupon bond rate
 - Selling for \$1,100
 - \$1,000 par value

 - $\$1,000 \times .04 = \40
 - $\$40 / \$1,100 = 3.64\%$

Calculating Yield to Maturity

- Yield to Maturity (YTM)
- Assumes that coupon payments can be reinvested at an interest rate equal to the YTM
 - 4% Bond in previous example
 - 6.5% YTM would mean what to us

Prepayments - Basics

- Constant Prepayment Rate (CPR)
 - Amount of prepayments after scheduled principal payments have been received
 - CPR 1%, \$100,000 principal balance, scheduled principal pmt \$1,000, means CPR is \$990
- Public Securities Association (PSA)
 - A multiple of the CPR rate
 - For example, 200% PSA means the prepayments will be 2 X CPR

Duration

What Duration is and is not

- Duration is an effective way to measure the IRR in the balance sheet
- Considered the first derivative of the price/yield function
 - Generic description of the sensitivity of an instrument's price to a change in yield
 - Two types of duration are:
 - Modified
 - Effective

What Duration is and is not

- Modified Duration - is a measure in which it is assumed that yield changes do not change expected cash flows (i.e. does not consider embedded options)
- Effective Duration - is a measure in which recognition is given to the fact that yield changes may change the expected cash flows
- Effective is measured by looking at how much does the market value change for every 100 bp change in rates

What Duration is and is not

- Is Duration a measure of time?
- Typically derived from Alfred Macaulay's calculation about what is the weighted average of the time to each coupon and principal payment
- Has similar drawbacks to Modified Duration because it does not consider embedded options or changing cash flows

What factors into Duration

- Coupon Rate is held constant
- Discount rate changes with the shock environments
- The shock environments will cause prepayments and decays to change/shift
- $\frac{V1 - V2}{\text{(Initial Value)}}$

(Rate Shock)

Core Deposits – Callable Investments

	Line Item Reports for Securities AFS - 3133F0-Q4-4 (72 M at)						
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300
Current Market Value	0.510%	200	202	202	201	198	163
Current Duration	0.510%	200	0.21	0.42	0.82	1.22	6.18
Current Price	0.510%	200	101.25	101.03	100.61	99.38	81.96

Why do the Duration numbers not react the same in all environments?

- Convexity – is described as the second derivative of the price/yield function
- It illustrates that cash flows do not react the same when rates increase or decrease
- Callable bonds are a good example of an instrument that has convexity, and from there we can go into mortgages

Investment Policies

Purpose of Investment Policy

- Describe a vision for investing
- Process governed by written procedures and constraints
- Define the series of actions necessary for risk acceptance
- Ultimate responsibility for policy rests with the board of directors

Investment Policies

- NCUA and State Examiners refer to Part 703 of NCUA Rules and Regulations for guidance
- Part 703 focuses gives examples of:
 - how the Board of Directors should view the investment policy
 - considerations when working with brokers/dealers
 - Acceptable investments and Interest Risk Considerations

Investment Policies – Board Responsibilities

- State the purpose and objective of investment activities
 - Levels of risk – normally stated through types of investment made
 - Liquidity needs – how much in cash, loan/share ratio's, etc.
 - Return (Yield)

Investment Policies – Board Responsibilities

- Outline the characteristics of acceptable investments
 - Issuer
 - Maturity
 - Cap/Floor
 - Call Provision
 - Average Life
 - Interest Rate Risk

Investment Policies – Types of Investments

- Treasuries – back by full faith and taxing power of US Government (only risk is Interest Rate Risk)
- FHLMC – Federal Home Loan Mortgage Corporate (Freddie Mac)
- FNMA – Federal National Mortgage Association (Fannie Mae)
- CMT – Constant Maturity Treasury
- Corporate Bonds – State chartered credit

unions

Inv Policies – 4 Types of Risk

- Interest Rate Risk – what impact will changing rates have on the value of the investment
- Liquidity Risk – will the credit union be able to meet cash obligations
- Credit Risk – Defaults
- Concentration Risk – too much invested with one company or type of security

Investment Authority

- Policy should clearly state who has authority and the extent of the authority
- Investments above stated limits may require approval of CFO, Inv Committee, ALCO, or board
- Board is responsible for ensuring those with authority are qualified

The Board's Oversight Role

- Ensure management has the skills to direct the process and control risk
- Demonstrate knowledge of the credit union's investing activities, including level of exposure
- Ensure internal controls are in place
- Seek professional advice when enhanced understanding is needed

What did we accomplish

- Defined basic investment terms
- Different features of Fixed Income Investments
- High level overview of necessary parts to an investment policy

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Advanced Asset/Liability Management

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timgardner1125@hotmail.com

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What do we hope to accomplish?

- Why has Interest Rate Risk (IRR) become so much of a focus
- Learn how we can apply NIS & NEV
- How do we use them as tools to measure IRR
- Which one is better suited for our credit union

Sources of Loan Growth

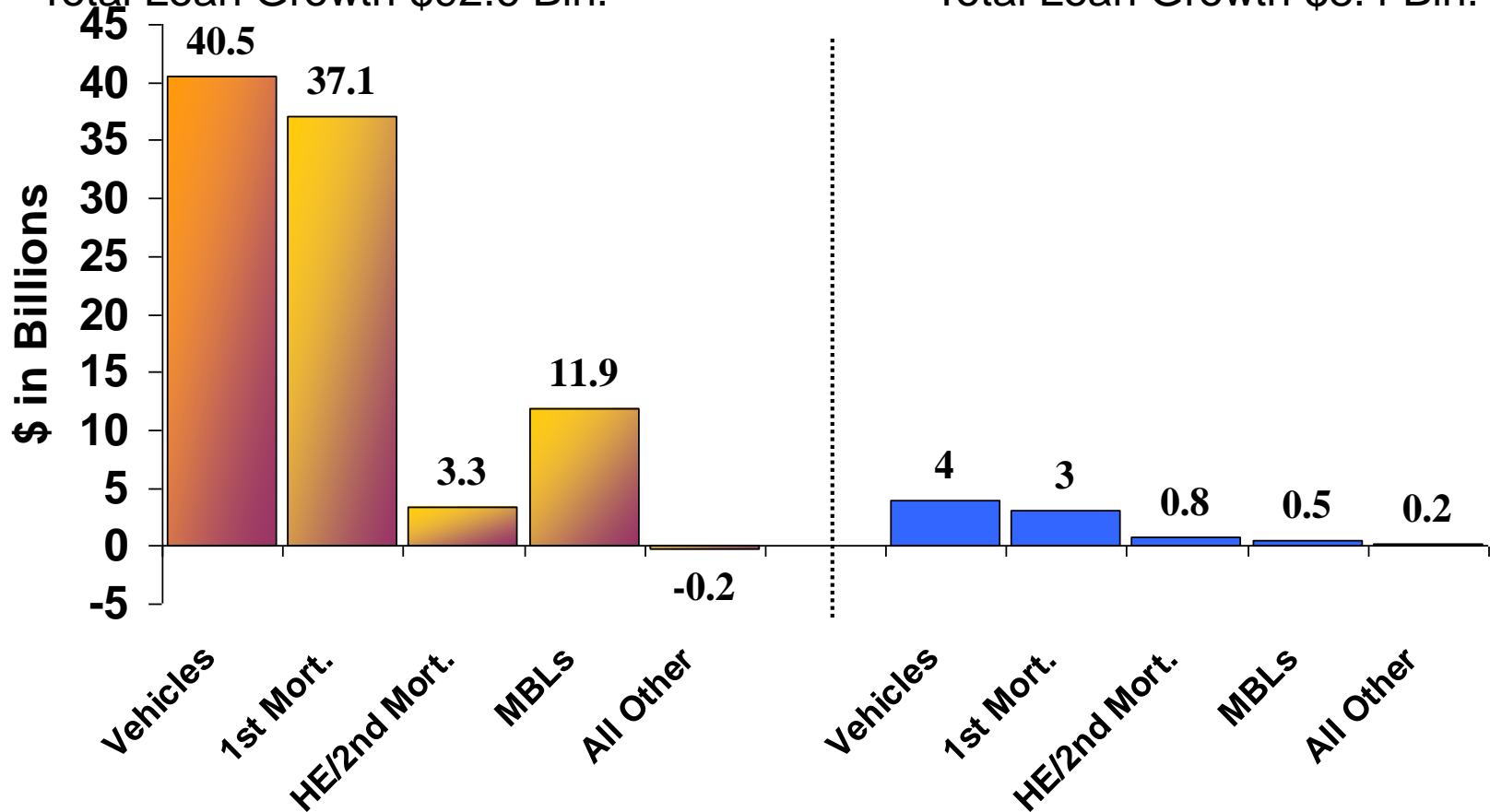
(\$ in Billions)

January 2016 – January 2017 Growth

Total Loan Growth \$92.6 Bln.

Year – to – Date January 2017

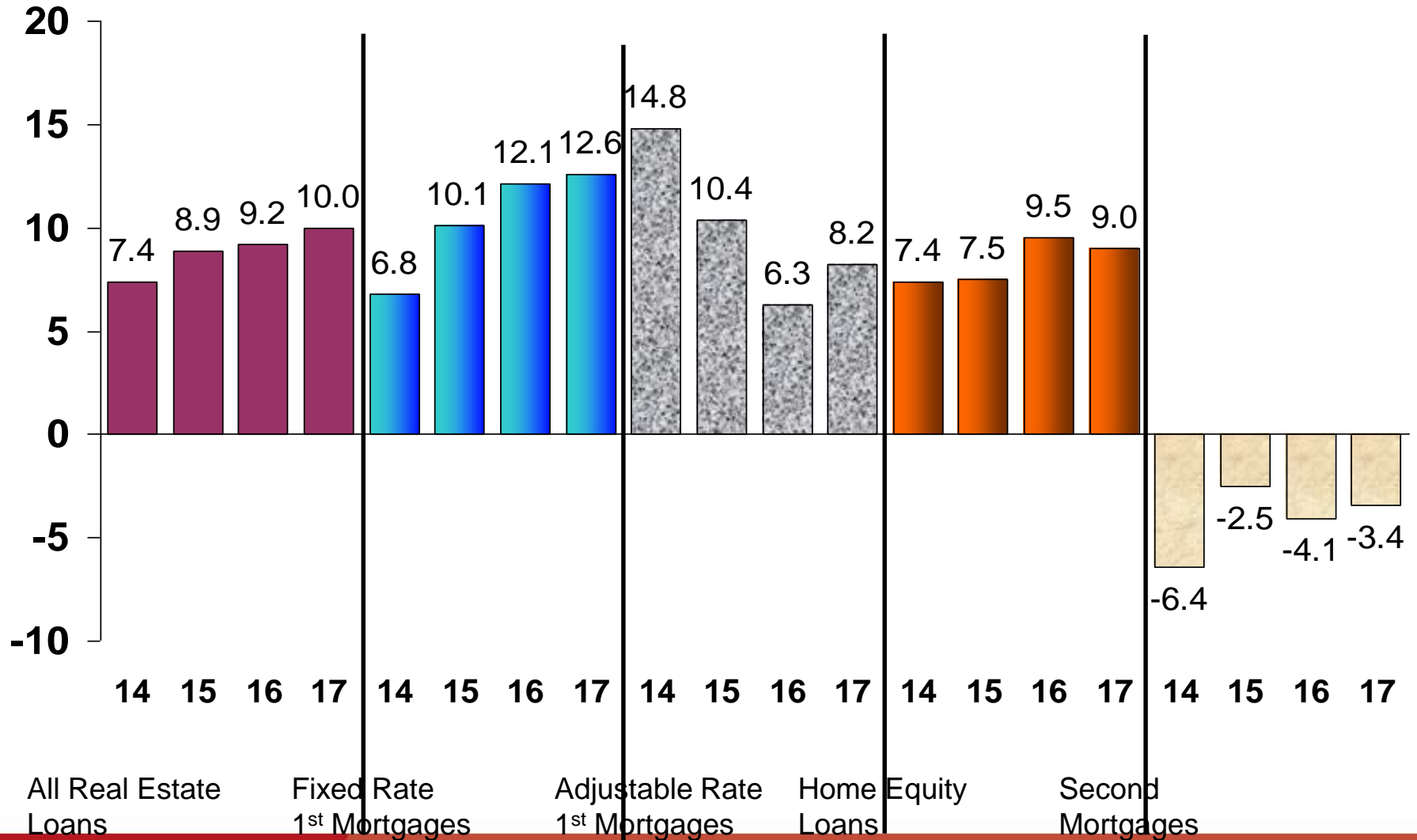
Total Loan Growth \$8.4 Bln.



Growth CU Real Estate Loans

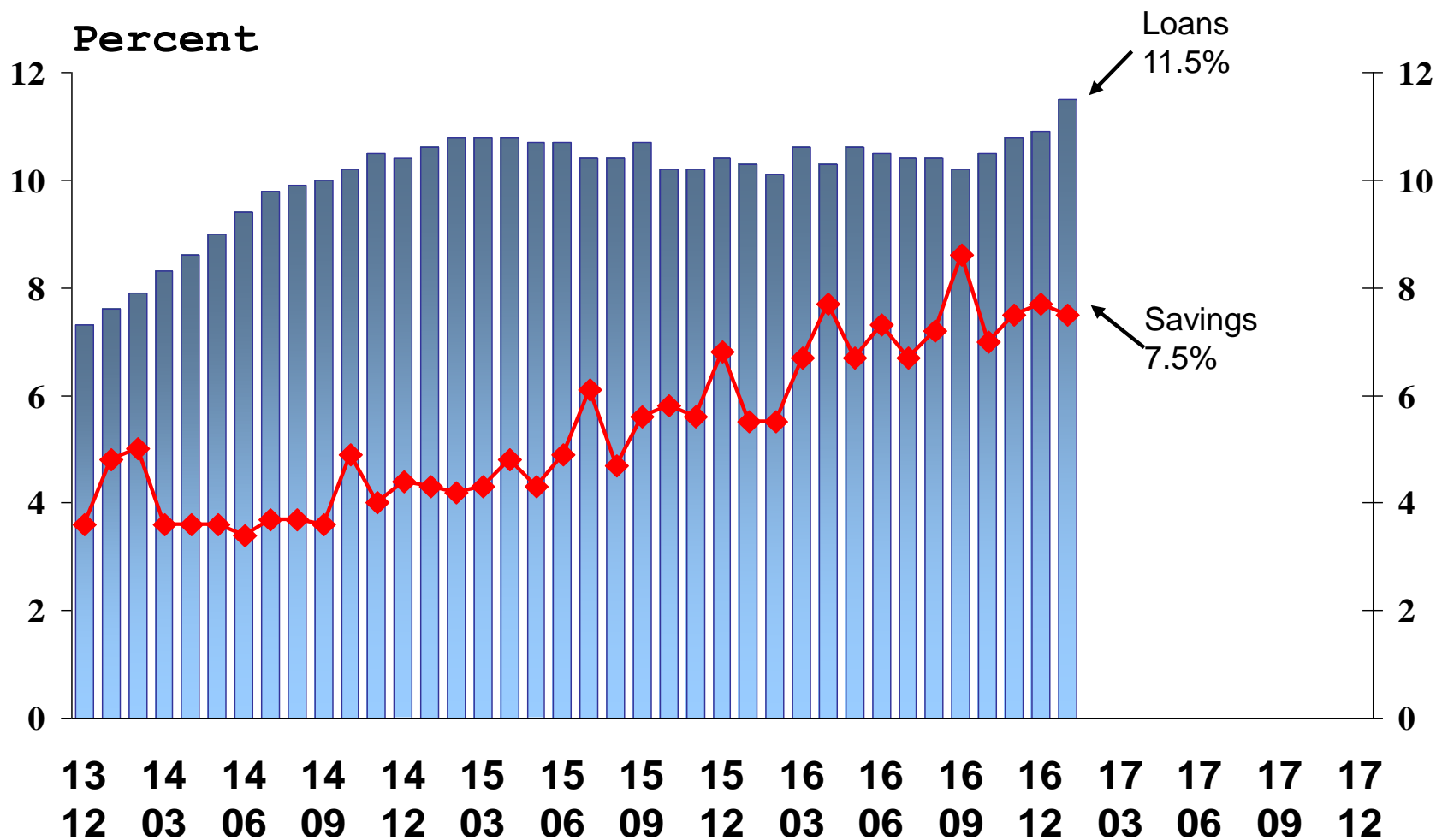
2017 = January

Percent



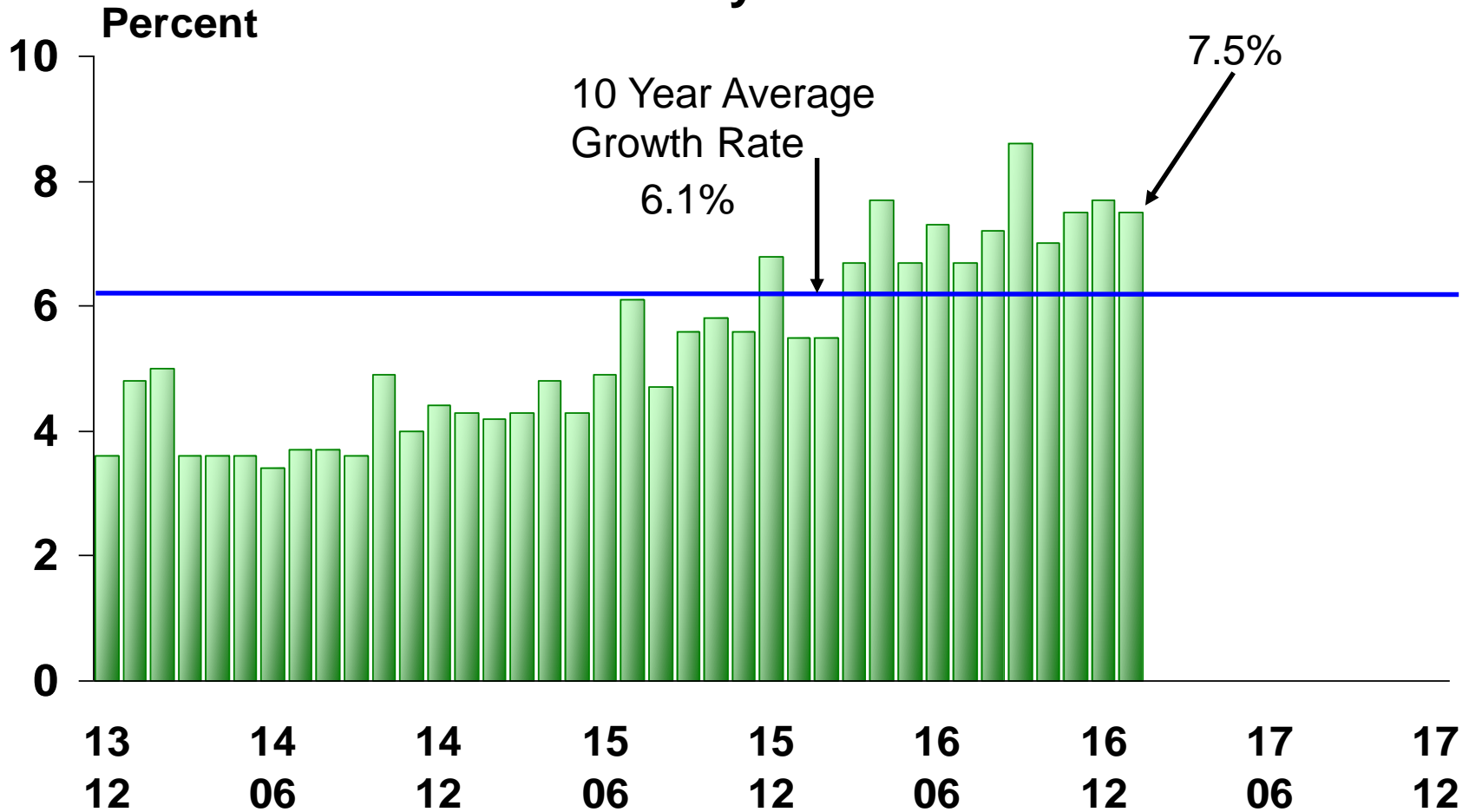
Growth Comparison - Loans vs. Savings

January 2017

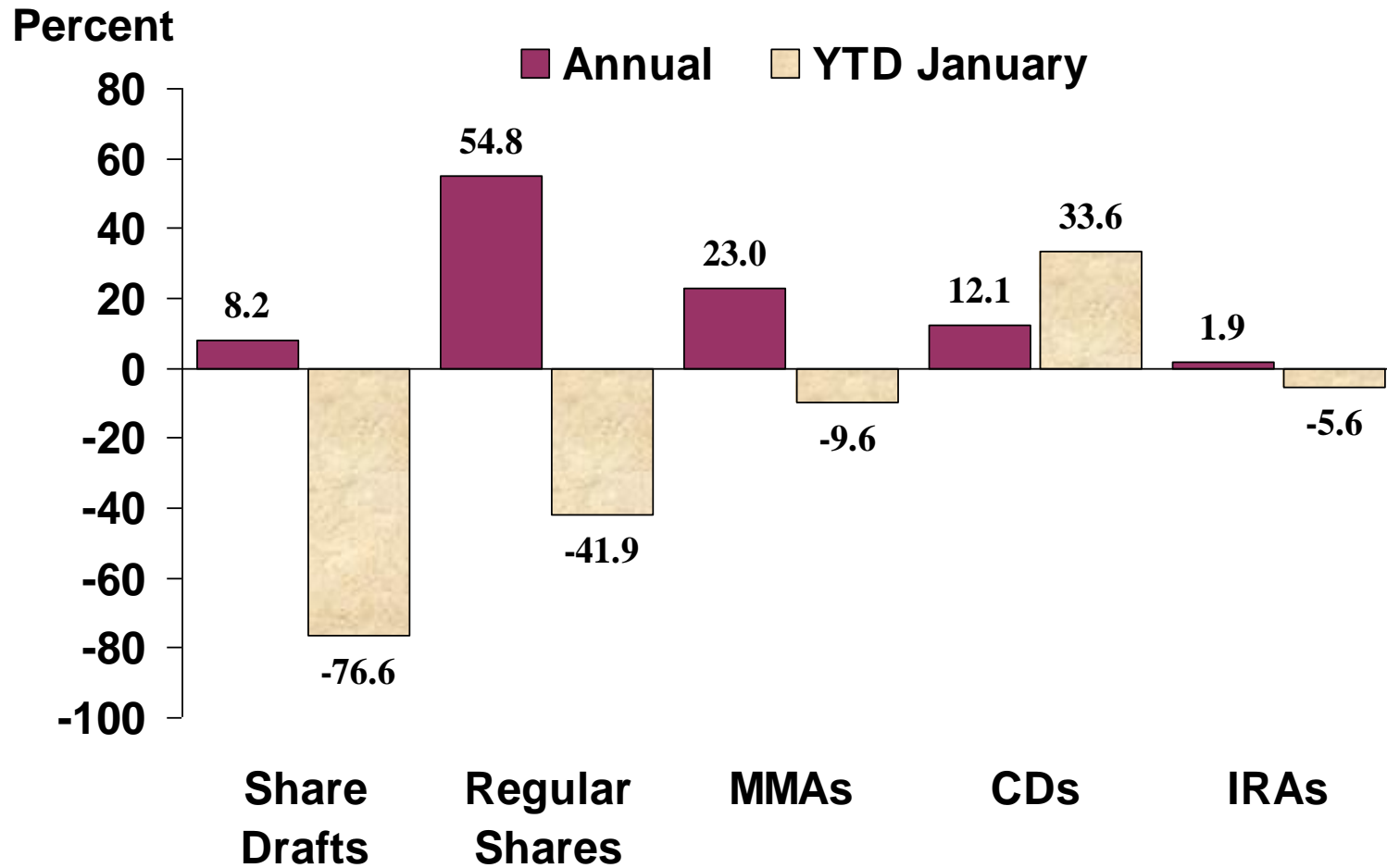


Growth In Credit Union Savings

January 2017

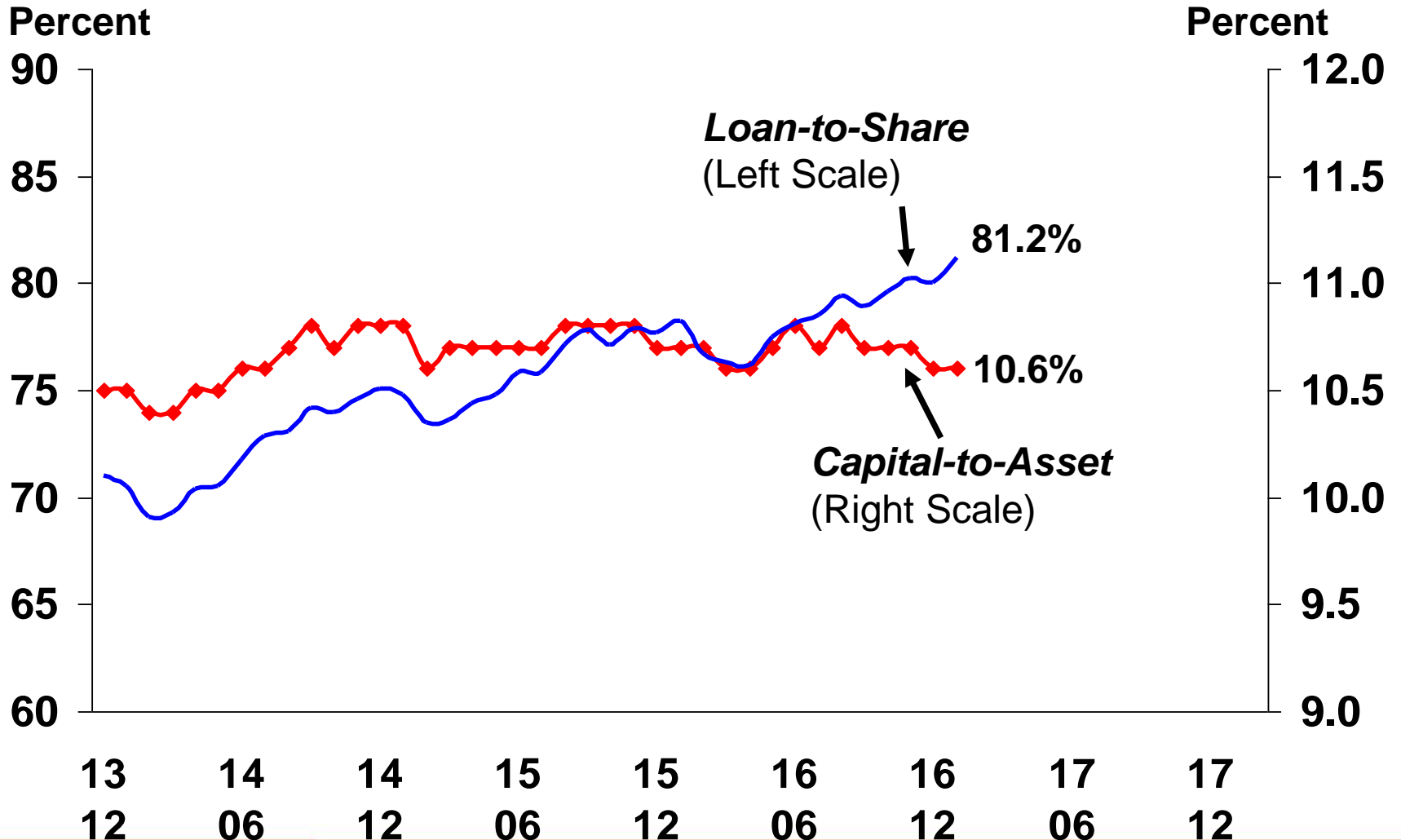


Sources of Savings Growth



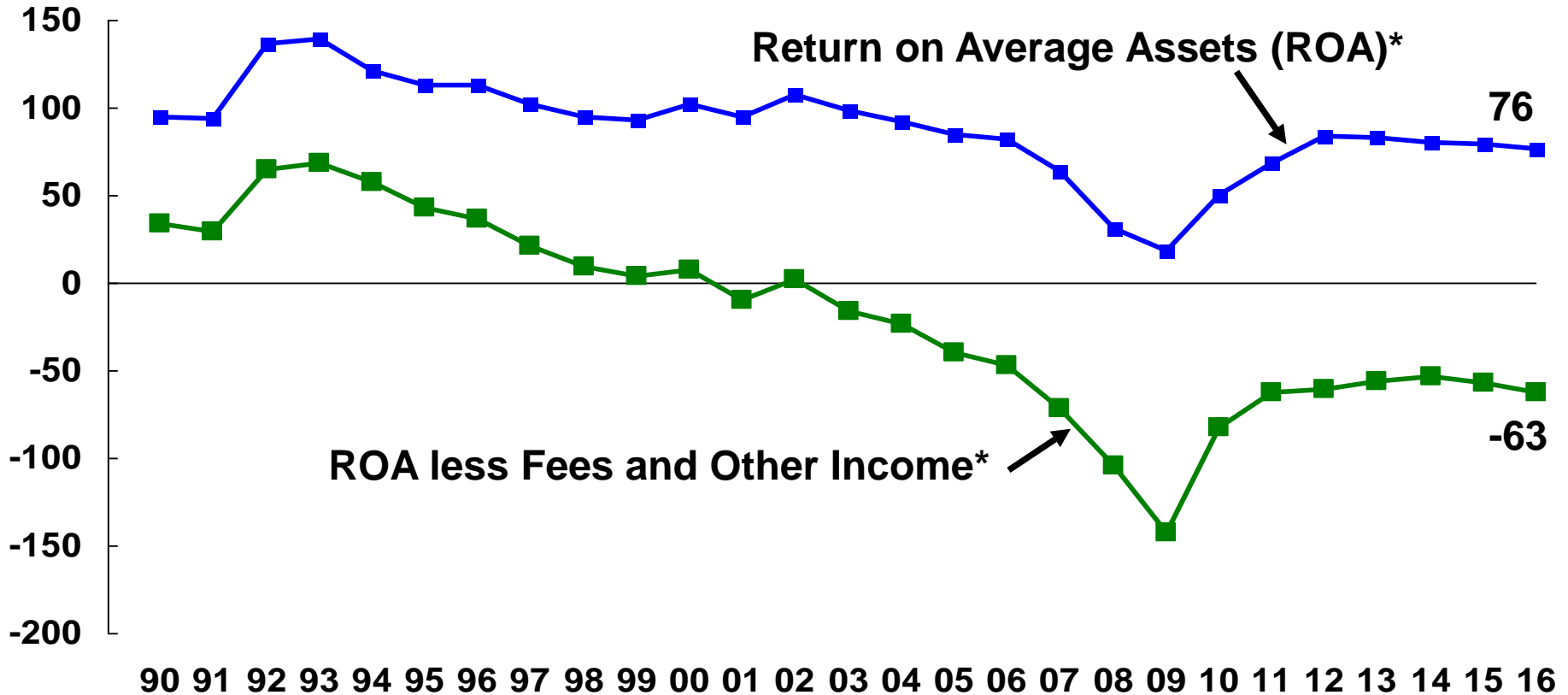
Credit Union Key Ratios

January 2017



CU's Greatest Challenge Living on Less

Basis Points



* Credit unions did not uniformly report stabilization expense or reversals of the expense. Therefore, some income and expense ratios are not comparable to previous periods. Use extreme caution when coming to conclusions from this data.

- Risk vs. Return tradeoff

The Risk – Net Economic Value

	Book Value	-300 bp	Flat	+300bp
Port. Equity Ratio	12.794%	14.812%	15.039%	12.039%
Rate Sensitivity		-22.7	0.0	-300.0
Equity Exposure		1.93%	0.00%	-26.20%

The Return – Net Income Simulations

	-300 bp	Flat	+300bp
Net Income	54,776	146,952	38,306
Variance %	-62.73%	0.00%	-73.93%
ROA	0.101	0.271	0.071
ROE	0.811	2.192	0.568

How can we apply the duration numbers

- Gets at the heart of the Risk vs. Return trade-off
- Keeping a smaller duration, normally considered less than 2.00, there may not be a lot of money to be made
- Higher durations means there should be more of a return

How can Core Deposits help

- First question that needs to be answered is what is the average life
 - Safe Harbor 3 years
 - OTS 5 years
 - McGuire 8 years

Core Deposits – Short Term

	Line Item Selected Reports for Regular Shares - Safe Harbor						
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300
Current Market Value	0.400%	15,286	15,942	15,452	15,145	14,845	14,262
Current Duration	0.400%	15,286	1.75	2.03	2.01	1.98	1.94
Current Price	0.400%	15,286	104.29	101.08	99.08	97.11	93.30

Core Deposits – Medium Term

	Line Item Selected Reports for Regular Shares - OTS							
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300	
Current Market Value	0.400%	15,286	15,600	15,141	14,837	14,452	13,942	
Current Duration	0.400%	15,286	1.71	2.04	2.32	2.60	2.01	
Current Price	0.400%	15,286	102.05	99.05	97.06	94.54	91.21	

Core Deposits – Long Term

	Line Item Selected Reports for Regular Shares - McGuire						
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300
Current Market Value	0.400%	15,286	14,950	13,502	12,854	12,238	11,178
Current Duration	0.400%	15,286	5.44	5.04	4.92	4.79	4.34
Current Price	0.400%	15,286	97.80	88.33	84.09	80.06	73.13

Core Deposits – Callable Investments

	Line Item Reports for Securities AFS - 12345-67-8 (72 Mat)						
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300
Current Market Value	0.510%	200	202	202	201	198	163
Current Duration	0.510%	200	0.21	0.42	0.82	1.22	6.18
Current Price	0.510%	200	101.25	101.03	100.61	99.38	81.96

Core Deposits – 30 FRM

	Line Item Reports for 30 FRM						
Current Market Value	Market Rate	Book Value	-300	-100	0	100	300
Current Market Value	1.000%	3,053	3,437	3,328	3,305	3,205	2,907
Current Duration	1.000%	3,053	1.33	0.67	1.85	3.03	4.02
Current Price	1.000%	3,053	112.58	109.00	108.27	104.99	95.22

- NEV Analysis
 - Trends
 - Forecasted NEV

NEV Trends

	Dec '15	June '16	Dec '16
NEV - 0 bp Environment	11.22%	11.38%	11.98%
NEV - Plus 300 bp Environment	9.45%	9.89%	9.71%
Change in NEV Ratio	1.78%	1.50%	2.27%

Current Net Economic Value

- 3 pieces to the puzzle
 - Coupon Rate (held constant)
 - Market Rate or Discount Rate (changes with market)
 - Cash Flows (as discount rate changes, the cash flows of various instruments will change as well)

Forecasted Net Economic Value

- 4 pieces to the puzzle
 - Coupon Rate (held constant)
 - Market Rate or Discount Rate (changes with market)
 - Cash Flows (as discount rate changes, the cash flows of various instruments will change as well)
 - Model runoffs old money and supplies new money (constructs a new balance sheet and runs NEV calculations)

Base NEV with 1 year Forecasted NIS

	-100		100	200	300
Portfolio Equity	17,862,023	17,211,128	16,589,122	15,589,711	13,419,446
Portfolio Equity Ratio	10.00%	9.77%	9.54%	9.10%	8.01%
Rate Sensitivity	23.30	0.00	-22.93	-66.63	-175.73
Equity Exposure	3.78%	0.00%	-3.61%	-9.42%	-22.03%
Return on Assets (Ending Quarter)	0.3376	0.6661	0.9667	1.2803	1.6053

1 year forecasted NEV and NIS

	-100		100	200	300
Portfolio Equity	17,415,363	16,845,465	16,102,775	14,393,105	10,776,712
Portfolio Equity Ratio	8.77%	8.58%	8.30%	7.55%	5.81%
Rate Sensitivity	18.57	0.00	-27.58	-102.68	-276.52
Equity Exposure	3.38%	0.00%	-4.41%	-14.56%	-36.03%
Return on Assets (Ending	0.8702	1.0874	1.2688	1.4596	1.6579

- Grow 30 FRM's by 10%
- Funding source is investment's
- Assume no unusual growth in Core Deposit

Which one is a better tool for IRR?

- What are we attempting to measure?
- Do our instruments have embedded options?
- What are the length of the cash flows for the credit unions products?

What does NIS tell us?

- How does a movement in market rates effect our rate sensitive accounts?
- What will be our effective yield in the forecast?
- If Net Income changes, how with the Net Worth ratio be effected?

What does NEV tell us?

- How would the “Market” value our portfolio’s?
- When market rates change, how does the Capital ratio change?
- Is there enough equity left to not be effected by PCA?

Which one is better for your credit union?

- NEV is better to measure the embedded options
- NIS is good to look at how Interest Rate changes can effect the bottom line
- NEV is becoming preferred by the examiners

What did we accomplish?

- Define basic investment terms
- Different features of Fixed Income Investments
- Explore Interest Rate Risk tools