



PRESENTS

# EXECUTIVE BALANCE SHEET FORUM 2023

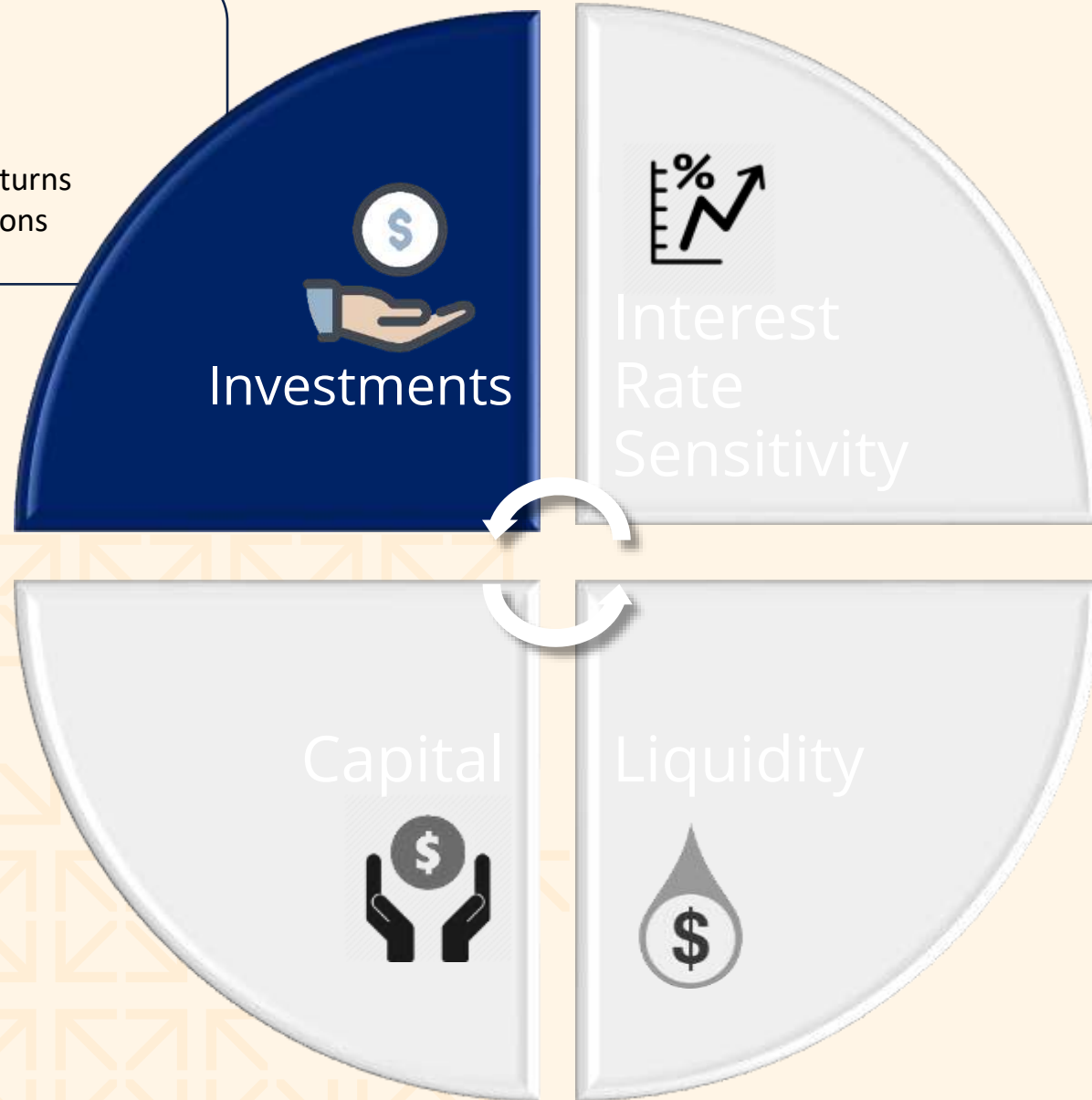
Part 1 - Portfolio Management

Sasha Antskaitis, CFA

Todd Taylor, CFA, CPA

# BALANCE SHEET MANAGEMENT – INVESTMENTS

- Liquidity Risk
- Price Risk
- Credit Risk
- Impairment
- Risk Adjusted Returns
- ALM Considerations



# STUDY THE PAST

# ASSET MIX TREND



Source: S&P Global Market Intelligence,  
Data for all banks Nationally <\$10B as of 12/31/22

# What is the PRIMARY objective of your investment portfolio?

Liquidity

Earnings

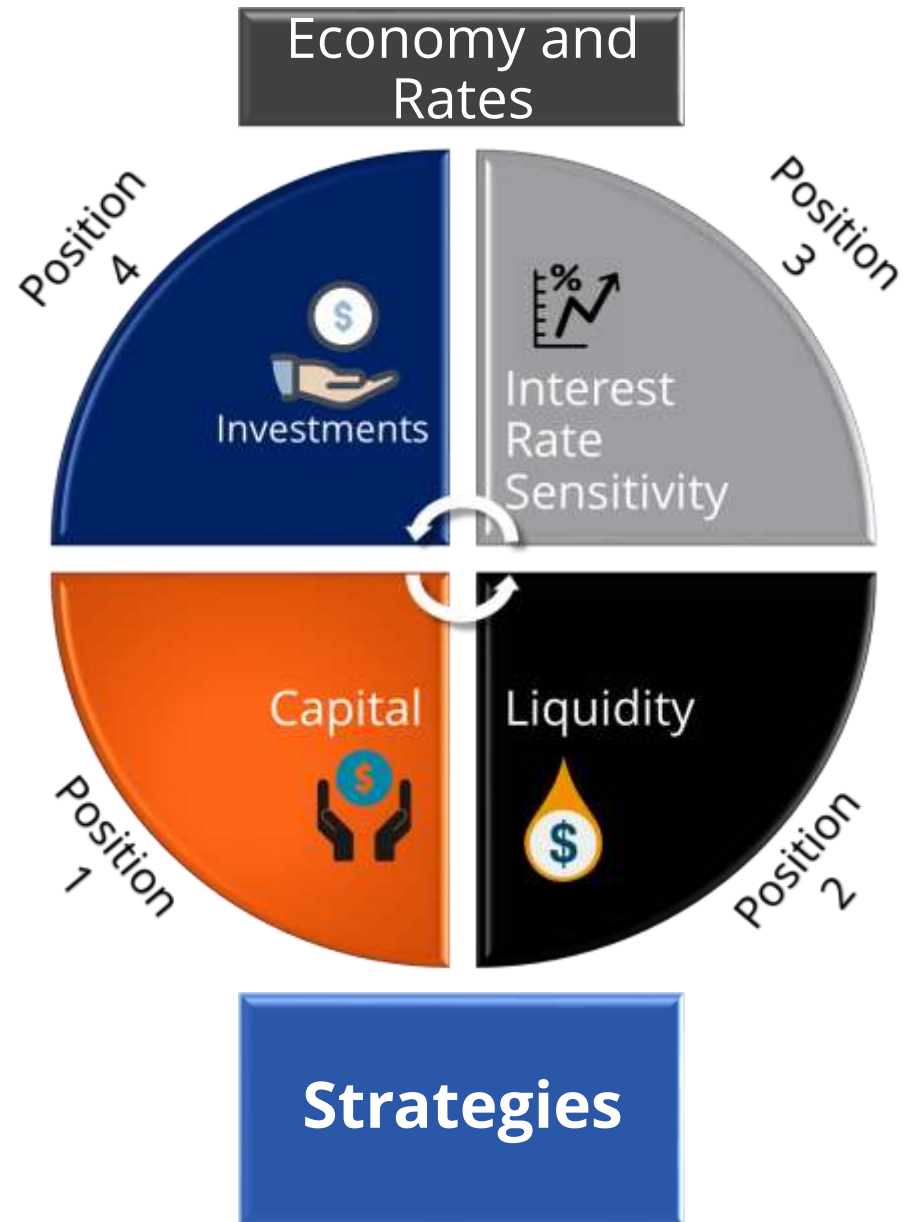
Interest Rate Risk  
Management



## Strategy

- Independent expert advice on portfolio strategies with regular review
- Whole-Bank perspective approach to portfolio positioning

# INVESTMENT BEST PRACTICES



# INVESTMENT MANAGEMENT BEST PRACTICES



## Strategy

- Independent expert advice on portfolio strategies with regular review
- Whole-Bank perspective approach to portfolio positioning



## Investment Mix

- Diversification among investment sectors, risk/reward & relative value analysis
- Expanded range of bank-permissible investment products

# SAMPLE PORTFOLIO – DATA VS. INFORMATION



**RATES ARE DOWN!**



**Matured**

~~1 Yr Treasury Note~~

**Called**

~~2 Yr Agency NC 3 Mo~~

**Fast Prepayments  
Yield Drops**

~~3 Yr WAL Premium Agency CMO (Jumbo Collateral)~~

**Coupon Resets  
Lower**

~~4 Yr Floating Rate SBA Pool~~

**Called**

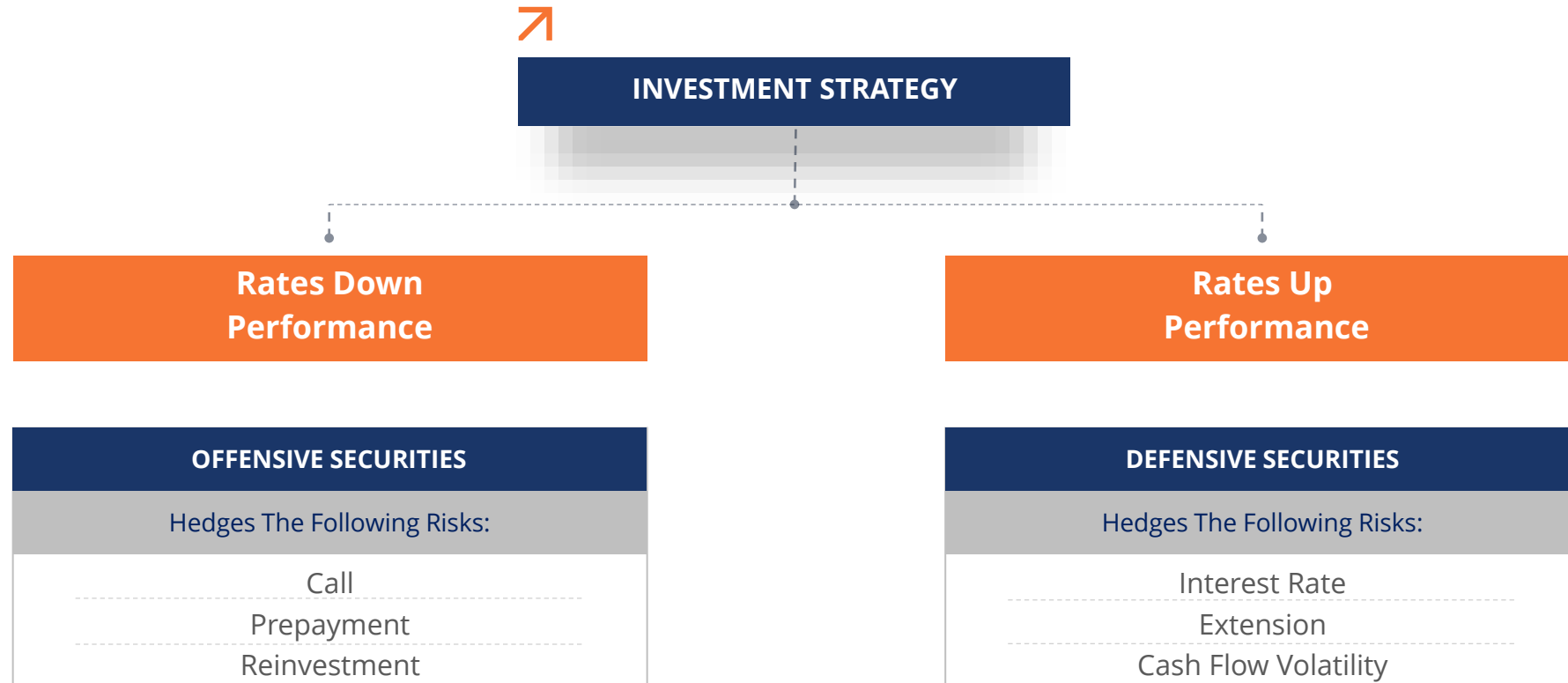
~~5 Yr Agency Step Up NC 6 Mo Bermuda~~



# HOW ARE FINANCIAL INSTITUTIONS DIFFERENT?

	Institution 1	Institution 2	Institution 3
<b>Balance Sheet Mix</b>			
Cash	10%	5%	0%
Investments	30%	50%	20%
Loans	60%	45%	80%
<b>Loan Mix</b>			
1-4 Family	80%	20%	35%
Commercial	10%	40%	45%
Consumer	10%	40%	20%
Fixed	90%	20%	50%
Float	10%	80%	50%
Loan Marketplace	Flat	Flat	Strong Growth
<b>Liquidity Position</b>			
FHLB Borrowing Capacity	High	Moderate	None
Core Deposit Stability	Stable	Stable	Volatile
Pledging Requirements	High	None	None
<b>Interest Rate Risk Position</b>			
Asset/Liability Sensitivity	Liability	Asset	Neutral

# INVESTMENT STRATEGY FORMATION



# INVESTMENT MANAGEMENT BEST PRACTICES



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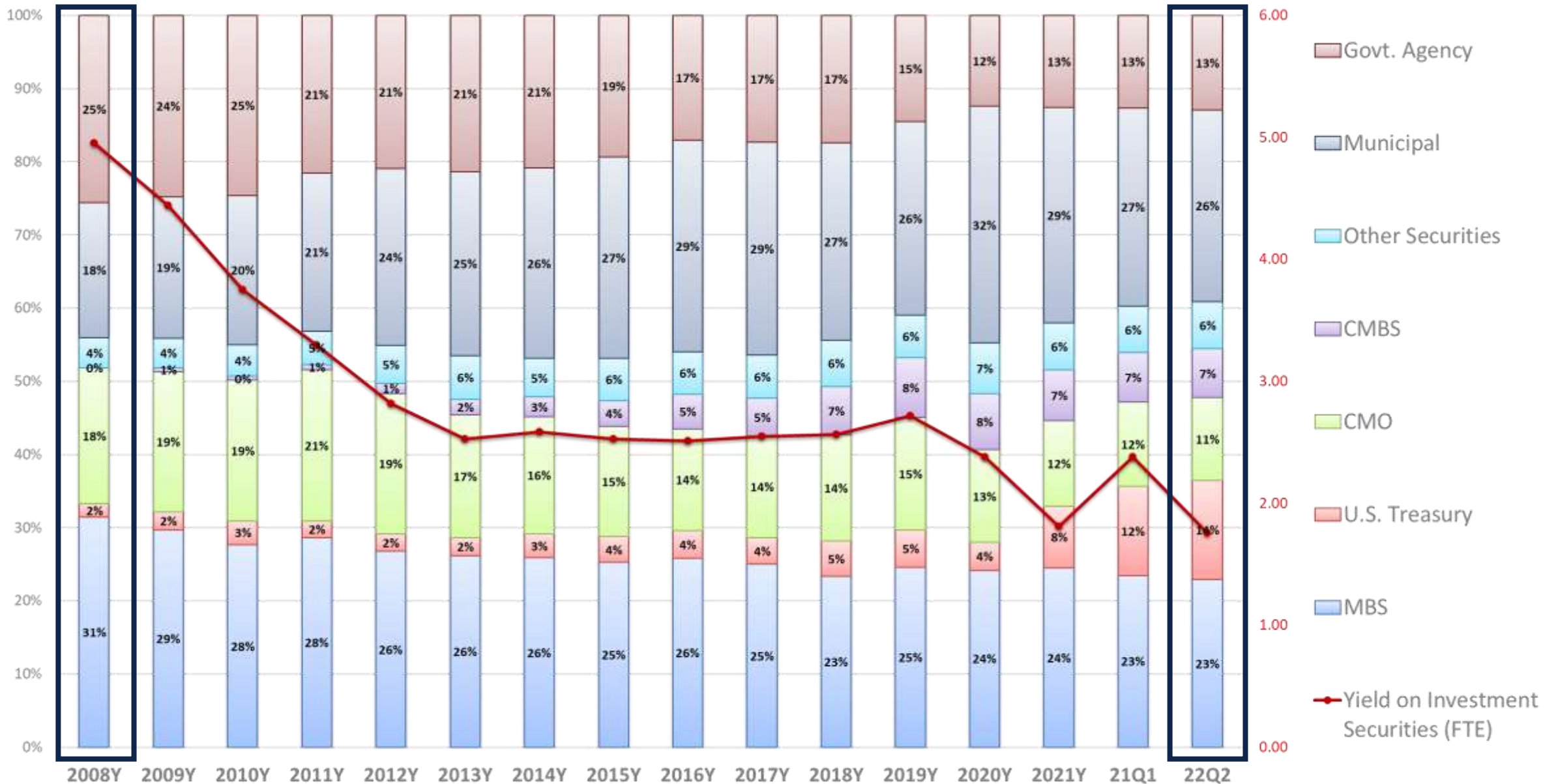


## Security Selection

- Market knowledge and expertise helps optimal security selection
  - Monitor policy compliance with security purchases

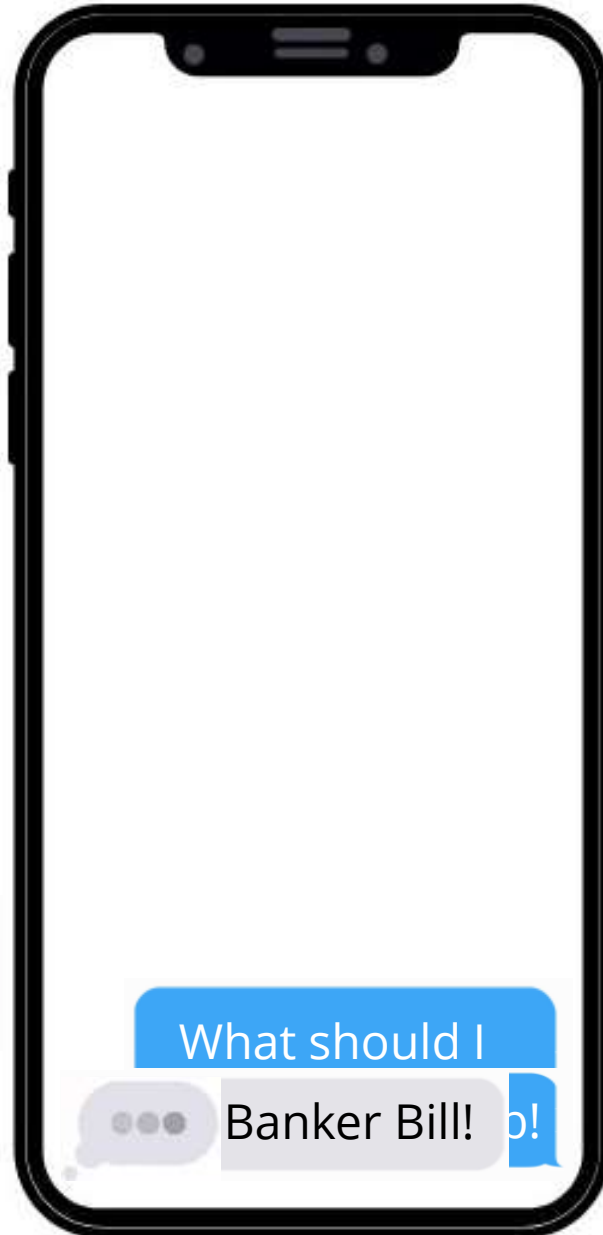
# STUDY THE PAST

# SECURITY MIX TREND



Source: S&P Global Market Intelligence, Data for all U.S. Commercial Banks <\$10B as of 6/30/22

# SECURITIES / SECTORS IN THE MARKETPLACE



FNMA Fully Indexed ARM

Index Amortizing Notes

COFI Floaters (CMO & AGY)

Covered Bonds

LIBOR Floaters (CMO & AGY)

GNMA ARM (Different CPNs)

Fed Funds

Corporate Bonds

GNMA ARM (Different Caps)

FNMA Teaser ARM

1-10 Yr Treasury

Taxable Munis

AGY Step Ups

AGY Structured Notes

AGY Callable

5-30 Yr Munis

MBS (New vs. Seasoned)

Index Amortized Notes

MBS (Different Maturities)

CMO

MBS (Different Coupons)

Asset-backed Securities

# COMPARATIVE PEER INVESTMENT MIX ANALYSIS

	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9	Bank 10
Yield on Securities TEY (%)	3.74	1.94	2.06	1.92	1.50	1.85	2.21	2.16	1.98	2.10
Ranking	1	7	5	8	10	9	2	3	6	4
Yield on Securities (%)	3.12	1.65	1.82	1.75	1.27	1.54	2.12	2.05	1.68	1.67
Ranking	1	8	4	5	10	9	2	3	6	7
<hr/>										
MBS (\$000)										
% of Portfolio	9%	1%	24%	0%	2%	2%	8%	0%	4%	5%
CMBS (\$000)										
% of Portfolio	5%	0%	0%	0%	1%	0%	4%	0%	0%	3%
CMO										
% of Portfolio	1%	0%	5%	0%	0%	14%	1%	0%	14%	3%
Municipal (\$000)										
% of Portfolio	75%	68%	64%	78%	72%	71%	74%	74%	77%	81%
Govt. Agency(\$000)										
% of Portfolio	0%	16%	5%	20%	0%	4%	10%	26%	0%	8%
U.S. Treasury (\$000)										
% of Portfolio	10%	0%	0%	2%	25%	7%	1%	0%	0%	0%
<hr/>										
Other Securities (\$000)										
% of Portfolio	10%	14%	1%	2%	25%	10%	2%	0%	6%	0%
<hr/>										
Pledged Securities (%)	0%	10%	13%	29%	18%	36%	7%	0%	8%	2%
BV Municipals as % Equity Capital	110%	140%	750%	337%	75%	525%	248%	28%	34%	333%

# INVESTMENT MANAGEMENT BEST PRACTICES



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## Trade Execution

- Poor trade execution can impact investment returns
- Fiduciary vs. Broker

# TAYLOR ADVISORS EBRIEF – ASSESSING YOUR INVESTMENT PROCESS

## Assessing Your Investment Process and Portfolio Performance: Broker vs. Advisor Approach

10/28/2020 | 8 MIN READ

*Investment portfolios and overnight cash positions have grown significantly at many financial institutions due to a recent surge in deposits and slower portfolio loan demand. With record low interest rates, carrying excess cash on the balance sheet has been costly. These factors are forcing executive teams to re-focus on the investment portfolio to help relieve net interest margin pressure from declining earning asset yields.*

*In general, financial institutions have two options for managing the investment portfolio. We will refer to these as the Broker and the Advisor approach.*

### ***The Broker Approach***

*An institution's financial executive (CFO, President, Portfolio Manager, etc.) has the option of working directly with a variety of brokers/brokerage firms to make investments for the portfolio. Usually, brokers will present different products for consideration often via...*

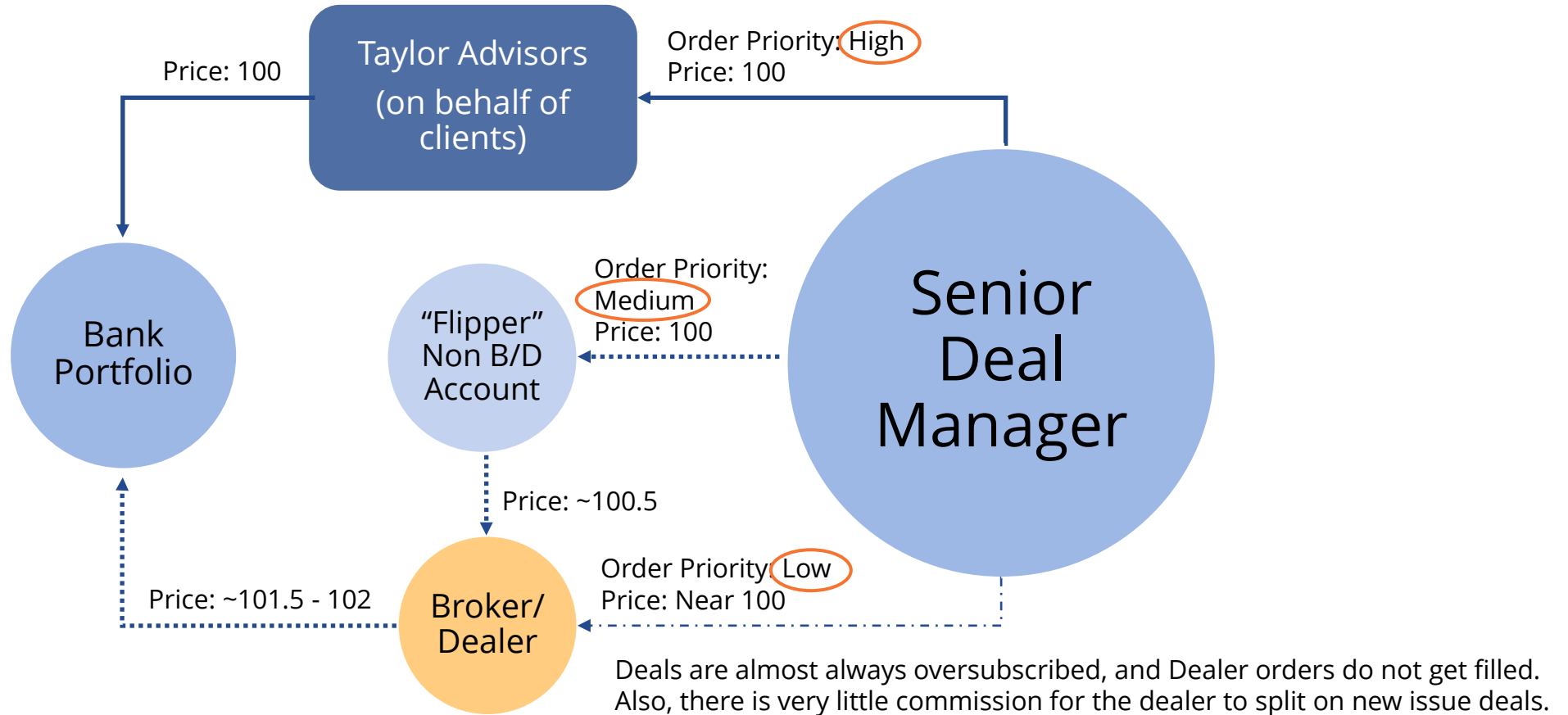
[Read Full Article](#)

*If you are considering a change from a broker approach to an advisor approach or switching advisors, below we discuss seven benefits and/or best practices of working with an investment advisor to improve portfolio and balance sheet performance:*

1. Investment Management from a Whole Balance Sheet Perspective
2. Accountability & Transparency
3. Strategy and Relative Value Analysis
4. **Exclusive Product Access**
5. Staying in Control
6. **Reducing Transaction Costs and Improving Execution**
7. Redirected Productivity



# COMPARISON OF INVESTMENT ADVISOR VS. BROKER/DEALER



**Bank Purchase**  
 Trade Date 3/16/2022  
 Almont Schools, MI  
 YTW = 2.25%  
**TEY = 2.85%** →

**Difference**  
 YTW = 70 bps  
**TEY = 88 bps**

**Taylor Advisors Purchase**  
 Trade Date 3/17/2022  
 Grandville Schools, MI  
 YTW = 2.95%  
**← TEY = 3.73%**

020366GJ Muni		Report	Alert	Settings	Page 1/11	Security Description: Muni
ALMONT MI CMNTY SCHS				94 No Notes		
REF-SER B		CUSIP 020366GJ3		Dated 02/11/2021 State MI		
25) Municipal Bond		26) Series	27) Issuer Description	28) Insights		
Pages		Municipal Bond Information		Trading Information		
11) Bond Info	Issue Type	GENERAL OBLIGATION UNLTD	1st Settle Dt	02/11/2021		
12) Addtl Info	Ult Borrower	Almont Community School...	Next Settle Dt	10/13/2022		
13) Involved Parties	Maturity Type	NON-CALLABLE	Int Accrual Dt	02/11/2021		
14) Adj Cpn Info	Ext Redemption	NONE	1st Coupon Dt	05/01/2021		
15) Credit Enhance	Coupon	FIXED 4.000	Week of Sale	01/11/2021		
16) Credit Ratings	Prc/Yld @ Iss	125.664/1.070	Piece/Inc/Par	5,000/5,000/5,000		
17) Call Sched & ERP	Coupon Freq	SEMI-ANNUAL	BVAL AAA Spd...	39		
18) Put Schedule	Tax Provision	FED BQ/ST TAX-EXEMPT				
19) Sink & Est Sink	Credit Enhancement					
20) Refunding Info	Insurance/Program - Q-SBLF					
21) DES Notes						
Quick Links		Bond Ratings				
31) TDH	MSRB Trade	S&P(Stnd)	AA	STA		
32) CACS	Material Evt	Underlying	A	STA		
33) CF	Filings					
34) CN	Sec News					
35) HDS	Holder					
66) Send Bond						

386892SK Muni		Report	Alert	Settings	Page 1/11	Security Description: Muni
GRANDVILLE MI PUBLIC SCH DIST				94 No Notes		
SER II		CUSIP 386892SK0		Dated 05/03/2022 State MI		
25) Municipal Bond		26) Series	27) Issuer Description	28) Insights		
Pages		Municipal Bond Information		Trading Information		
11) Bond Info	Issue Type	GENERAL OBLIGATION UNLTD	1st Settle Dt	05/03/2022		
12) Addtl Info	Ult Borrower	Grandville Public Schools	Next Settle Dt	10/13/2022		
13) Involved Parties	Maturity Type	CALL	Int Accrual Dt	05/03/2022		
14) Adj Cpn Info	Ext Redemption	NONE	1st Coupon Dt	11/01/2022		
15) Credit Enhance	Coupon	FIXED 4.000	Next Par Call	05/01/2032@Par		
16) Credit Ratings	Prc/Yld @ Iss	109.031/2.950	Week of Sale	03/14/2022		
17) Call Sched & ERP	Coupon Freq	SEMI-ANNUAL	Piece/Inc/Par	5,000/5,000/5,000		
18) Put Schedule	Tax Provision	FED & ST TAX-EXEMPT	BVAL AAA Spd...	85		
19) Sink & Est Sink	Credit Enhancement					
20) Refunding Info	Insurance/Program - BAM					
21) DES Notes						
Quick Links		Bond Ratings				
31) TDH	MSRB Trade	Moody's(Undl)	A1	STA		
32) CACS	Material Evt	S&P(Stnd)	AA	STA		
33) CF	Filings					
34) CN	Sec News					
35) HDS	Holder					
66) Send Bond						

Secondary Purchase @ 2.25%  
 YTW

Bought at New  
 Issue

# Q: WHAT DO BOND MARK-UPS **REALLY** COST COMMUNITY FINANCIAL INSTITUTIONS?

The ANSWER is a very well-kept secret. Institutional investors do not know how much they are being charged to buy and sell bonds.



WRITTEN BY

**Dr. Edmond J. Seifried**

*Professor Emeritus of Economics and Business at Lafayette College*

*Dean of the West Virginia Banking School and the Virginia School of Banking*

*Executive Director of the Sheshunoff Affiliation Program*

## **Industry Analysis: Hidden Mark-Ups**

- “We estimate that investors were charged \$10.58 Billion in municipal bond markups between 2005 and 2013 in our sample - \$6.38 Billion in trades on which excessive markups appear to have been charged”  
- The Securities Litigation & Consulting Group
- “The clients never saw the actual transaction costs and assumed, inappropriately, that they were getting that service fee for free.”

## **Conclusion**

- “Our Analysis finds that community financial institutions are financially impacted by significant hidden mark-ups in their investment portfolios; mark-ups that reduce ROI, ROA and financial institution capital”

# Poor Trade Execution: Lower Liquidity

056832AM Muni 99 Disclaimer 94 Export 97 Settings Trade History

Issuer BAINBRIDGE GA COMB UTILITY REV CUSIP 056832AM0  
 Series  
 Coupon 4.000 Maturity 12/01/37 Issued 12/28/21 State GA  
 Range: 02/01/22 - 07/21/22 Trade Size All Sizes

1 Bond 2 Series 3 Issuer

View Price Spread: Convention YTW YTM

Trade Aggregate			Price			Dealer to Client Volume(M)			D-D
Days	Volume (M)*	Trds	High	Low	Avg	Dlr Buy	Dlr Sell	Net	Vol(M)
2	5,440	12	99.500	96.512	97.645	1,360	1,360	0	2,720

Charts

	Date	Vol(M)*	Trds	High	Low	Avg	Dlr Buy	Dlr Sell	Net	Vol(M)
101)	06/23/22	1,000	1	99.500	99.500	99.500	0	1,000	-1,000	0
102)	06/16/22	4,440	11	98.750	96.512	97.476	1,360	360	1,000	2,720

\*Volumes of MM+ are considered 5MM until the actual volume is disclosed.  
 Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2022 Bloomberg Finance L.P.  
 SN 455022 EDT GMT-4:00 G657-3659-171 21-Jul-2022 16:08:21

## Transaction Details

99.500 Client Px  
 - 96.512 Broker Px  
 = **2.988 Excessively High Mark-Up**

x 1,000,000 PAR  
**\$29,880 Broker Commission**

x 10 million PAR  
**\$298,800 Broker Commission**

# AUDIT RISK VS. ECONOMIC RISK

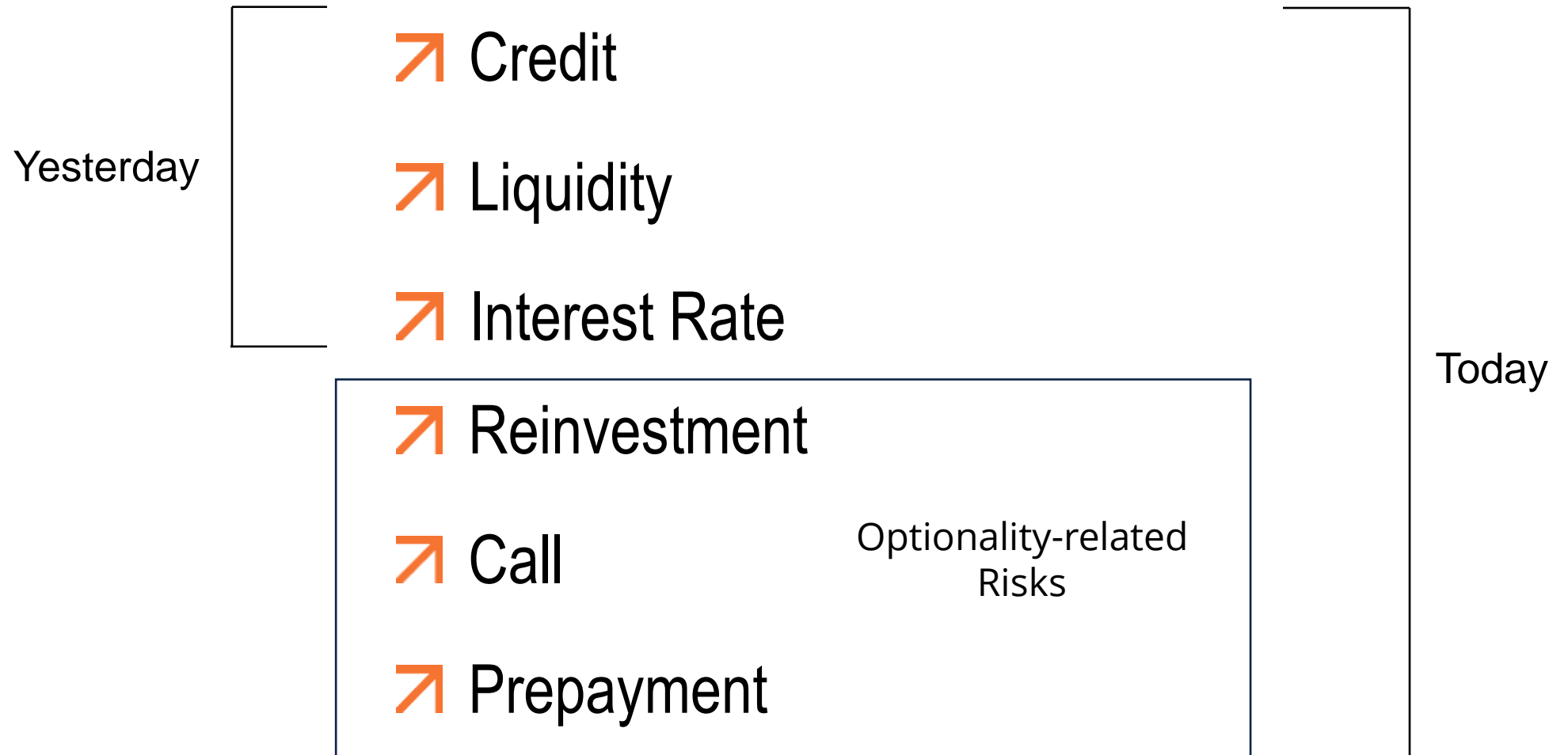


# AUDIT RISK ASSOCIATED WITH FIXED INCOME INVESTMENTS

- Existence and Classification
- Valuation and Realized Gains or Losses
- Income Accruals
- Test of Controls and Others (investment policies)



# ECONOMIC RISKS ASSOCIATED WITH FIXED INCOME INVESTING



# CREDIT RISK





# CREDIT RISK

- Default Risk
- Downgrade Risk
  - Credit Ratings
- Credit Spread Risk
  - Tightening/Widening Spreads

# CREDIT RATING AGENCIES

Moody	S&P	Fitch	Brief Definition
<b><i>Investment Grade - High Creditworthiness</i></b>			
Aaa	AAA	AAA	Ultra high grade, maximum safety
Aa1	AA+	AA+	
Aa2	AA	AA	Very high grade, high quality
Aa3	AA-	AA-	
A1	A+	A+	
A2	A	A	Upper medium grade
A3	A-	A-	
Baa1	BBB+	BBB+	
Baa2	BBB	BBB	Lower medium grade
Baa3	BBB-	BBB-	
<b><i>Distinctly Speculative - Low Creditworthiness</i></b>			
Ba1	BB+	BB+	
Ba2	BB+	BB+	Low grade, speculative
Ba3	BB-	BB-	
B1	B+	B+	
B2	B	B	Highly speculative
B3	B-	B-	

## QUESTION

➤ What is a “Fallen Angel”

➤ Name of a Horse

➤ Name of a Movie

➤ Name of a Song

➤ Bond downgraded from BBB or above to BB or below (junk)

➤ All of the Above

# IMPACT OF A DOWNGRADE ON PRICE

F 4.8 05/20/28 \$↓92.584 - .467 91.914/93.254 6.664/6.342  
 At 15:00 -- x -- Source BVAL

F 4.8 05/20/28 Corp Actions Settings Page 1/13 Security Description: Bond

25) Bond Description		26) Issuer Description	
<b>Pages</b>			
<b>10) Bond Info</b>			
Addtl Info	Name FORD MOTOR CREDIT CO LLC		
Reg/Tax	Industry Automotive (BCLASS)		
Covenants	<b>Security Information</b>		
15) Guarantors	Mkt Iss	DOMESTIC MTN	
Bond Ratings	Ctry/Reg	US	Currency USD
Identifiers	Rank	Sr Unsecured	Series NOTZ
Exchanges	Coupon	4.800000	Type Fixed
Inv Parties	Cpn Freq	S/A	
Fees, Restrict	Day Cnt	30/360	Iss Price 100.0000
Schedules	Maturity	05/20/2028	
Coupons	CALL	05/20/23@100.00	
23) Impact	Iss Sprd		
<b>Quick Links</b>			
ALLQ Pricing	Calc Type (1)STREET CONVENTION		
QRD Qt Recap	Pricing Date	05/07/2018	
TDH Trade Hist	Interest Accrual Date	05/10/2018	
CACS Corp Action	1st Settle Date	05/10/2018	
CF Filings	1st Coupon Date	11/20/2018	
CN Sec News			
HDS Holders			
Send Bond			

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2023 Bloomberg Finance L.P.  
 SN 480842 EST GMT-5:00 H899-42-168 07-Mar-2023 16:01:59

F 4.8 05/20/28 \$↓92.584 - .467 91.914/93.254 6.664/6.342  
 At 15:00 -- x -- Source BVAL

AS460893 Corp Export Settings Page 1/1 Historical Price Table

F 4.8 05/20/28		High 98.860 on 02/07/20						
Range	02/06/2020 - 03/27/2020	Low	53.057 on 03/24/20					
Market	Mid Line	Average	88.191					
View	Price Table	Net Chg	-31.812					
			-32.20%					
Date	Mid Line	Mid YTM	Date	Mid Line	Mid YTM	Date	Mid Line	Mid YTM
Fr 03/27/20	66.988	11.054	Fr 03/06/20	96.777	5.289	Fr 02/14/20	98.660	4.999
Th 03/26/20	58.336	13.343	Th 03/05/20	98.127	5.081	Th 02/13/20	98.605	5.007
We 03/25/20	56.785	13.791	We 03/04/20	98.366	5.045	We 02/12/20	98.599	5.008
<b>Tu 03/24/20 L</b>	<b>53.057</b>	<b>14.949</b>	Tu 03/03/20	98.172	5.074	Tu 02/11/20	98.667	4.998
Mo 03/23/20	60.801	12.638	Mo 03/02/20	97.369	5.197	Mo 02/10/20	98.844	4.971
Fr 03/20/20	66.564	11.145	Fr 02/28/20	97.881	5.118	Fr 02/07/20 H	98.860	4.969
Th 03/19/20	75.918	9.033	Th 02/27/20	98.080	5.088	Th 02/06/20	98.800	4.978
We 03/18/20	79.202	8.364	We 02/26/20	98.318	5.051			
Tu 03/17/20	81.378	7.940	Tu 02/25/20	98.369	5.044			
<b>Mo 03/16/20</b>	<b>82.011</b>	<b>7.819</b>	Mo 02/24/20	98.446	5.032			
Fr 03/13/20	82.620	7.703	Fr 02/21/20	98.615	5.006			
Th 03/12/20	82.553	7.715	Th 02/20/20	98.576	5.012			
We 03/11/20	85.273	7.212	We 02/19/20	98.629	5.004			
Tu 03/10/20	85.250	7.215	Tu 02/18/20	98.626	5.004			
Mo 03/09/20	92.765	5.926	Mo 02/17/20					

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2023 Bloomberg Finance L.P.  
 SN 480842 EST GMT-5:00 H899-42-168 07-Mar-2023 16:05:13

The magnitude of a credit rating downgrade:

Price before 82 after 53

Ford was downgraded to **BB+** from **BBB+** in March 2020

# CREDIT RISK – BANK SUBORDINATED DEBT

WAL 3 06/15/31 \$↑ **70.499** -.037 1123.8 bp vs T 4.625 03/15/2026  
 At 16:40 Source BMRK

WAL 3 06/15/2031 (94) Suggested Charts (96) Actions (97) Edit Line Chart  
 04/11/2022 - 04/11/2023 Last Px BMRK Local CCY Mov Avgs Key Events  
 1D 3D 1M 6M YTD 1Y 5Y Max Daily Table + Related Data Add Data Edit Chart



Bond Price

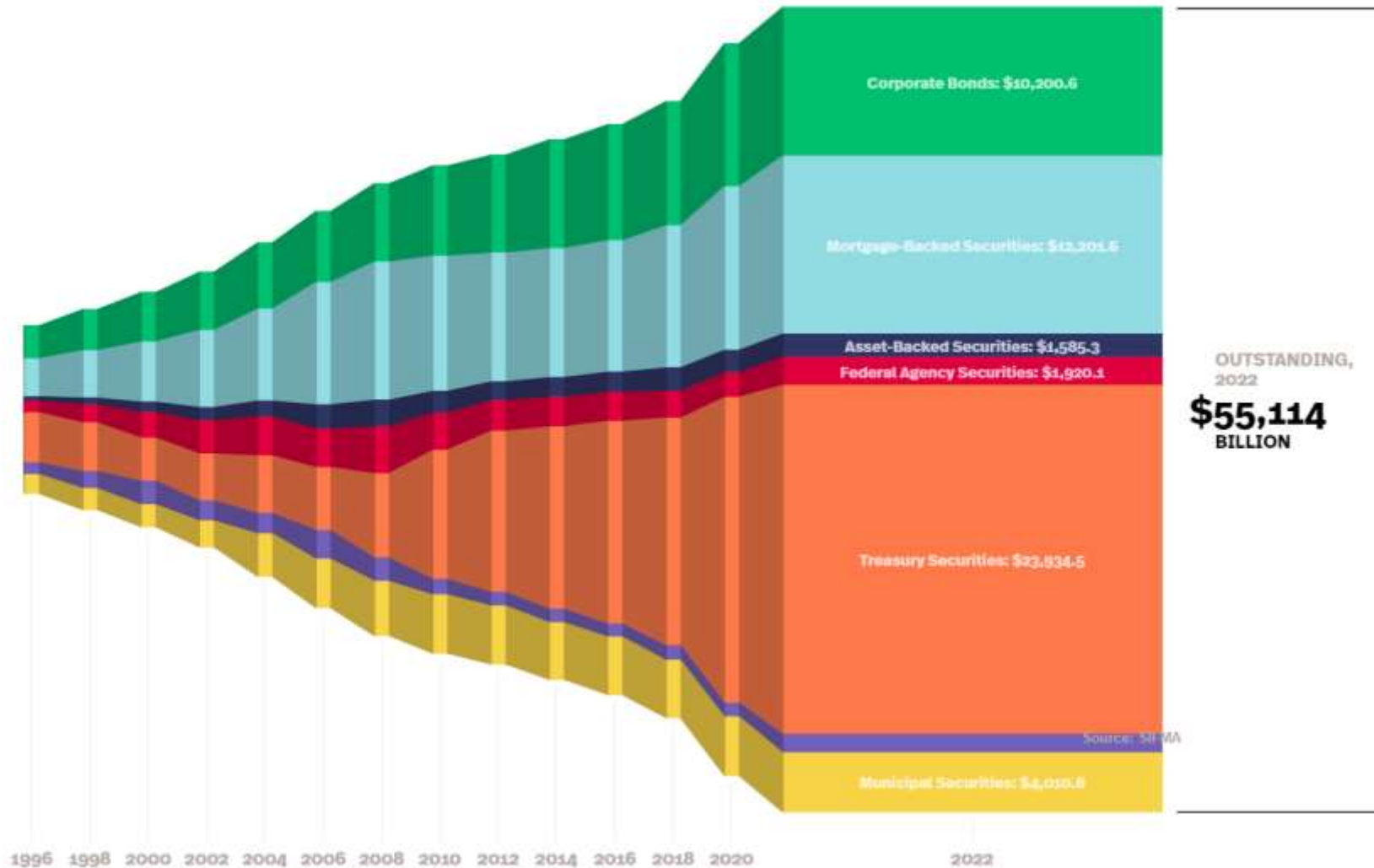
Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000  
 Copyright 2023 Bloomberg Finance L.P. SN 480842 EDT GMT-4:00 G654-1291-166 11-Apr-2023 16:40:13

# LIQUIDITY RISK





# LIQUIDITY RISK: SIZE OF BOND MARKET



# LIQUIDITY RISK

Marketplace is a collection of buyers and sellers with supply/demand forces

- Unable to sell quickly and at fair price
  - Specific audience securities: unique, non-rated, odd lots
  - During market volatility, flight to quality (TSY)
- Bid-ask spread
  - High spread signals less liquid market

Bond Accounting Pricing is only an estimate of market pricing



# INTEREST RATE RISK



# INTEREST RATE RISK

## ➤ Interest Rate Risk

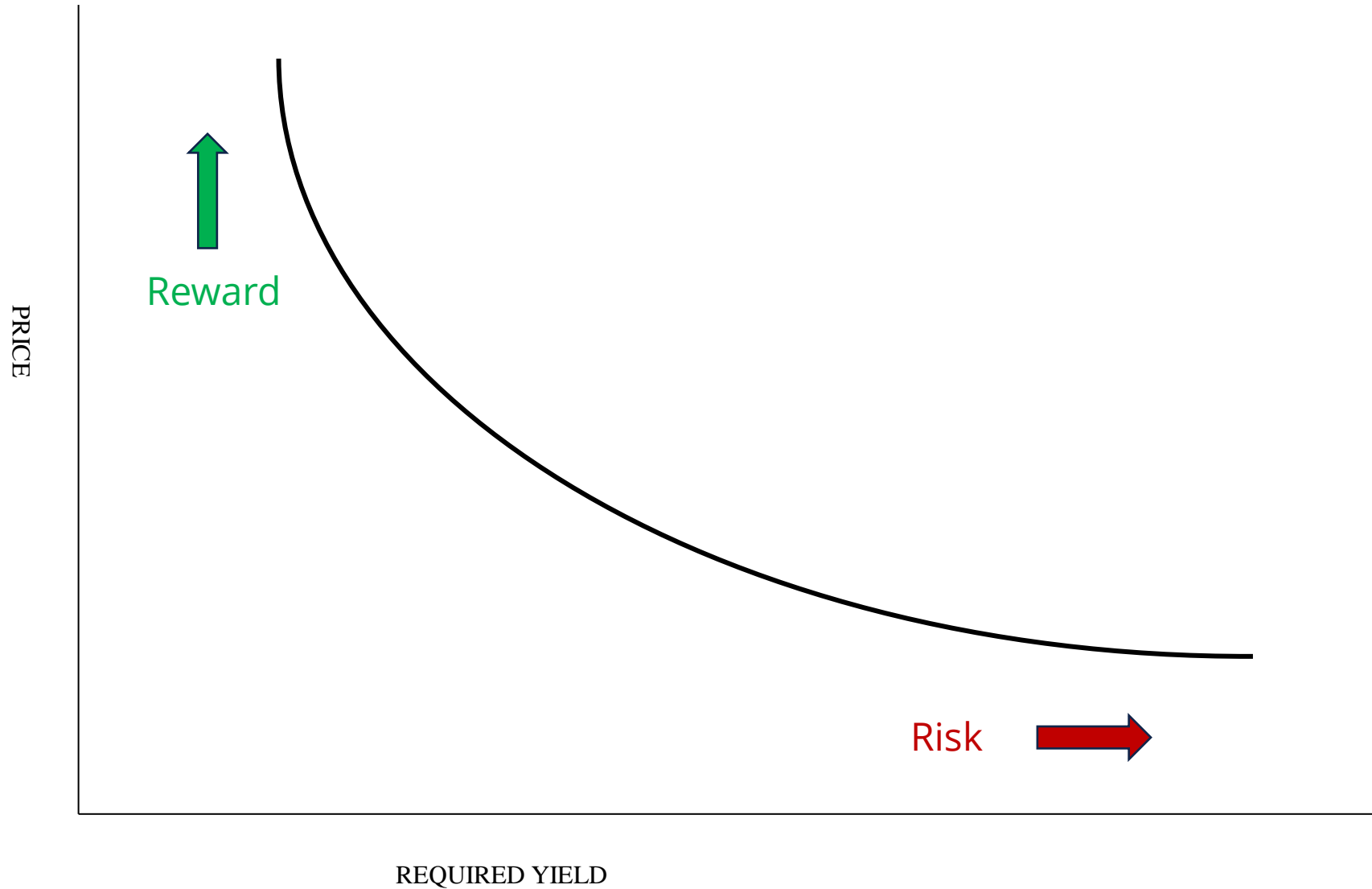
### ➤ Price Risk

Yields ↑ Price ↓; Yields ↓ Price ↑

### ➤ Reinvestment Risk

At what rate the cash flow is reinvested?

# BOND PRICE AND MARKET YIELD RELATIONSHIP



# KEY MEASURES OF INTEREST RATE RISK

## ➤ Weighted Average Life

- Measures the timing of principal cash flows
- Often used for mortgage-related investments

## ➤ Modified Duration

- Expected change in value of the bond given 100 bp change in yield, static measure
- Expressed in %

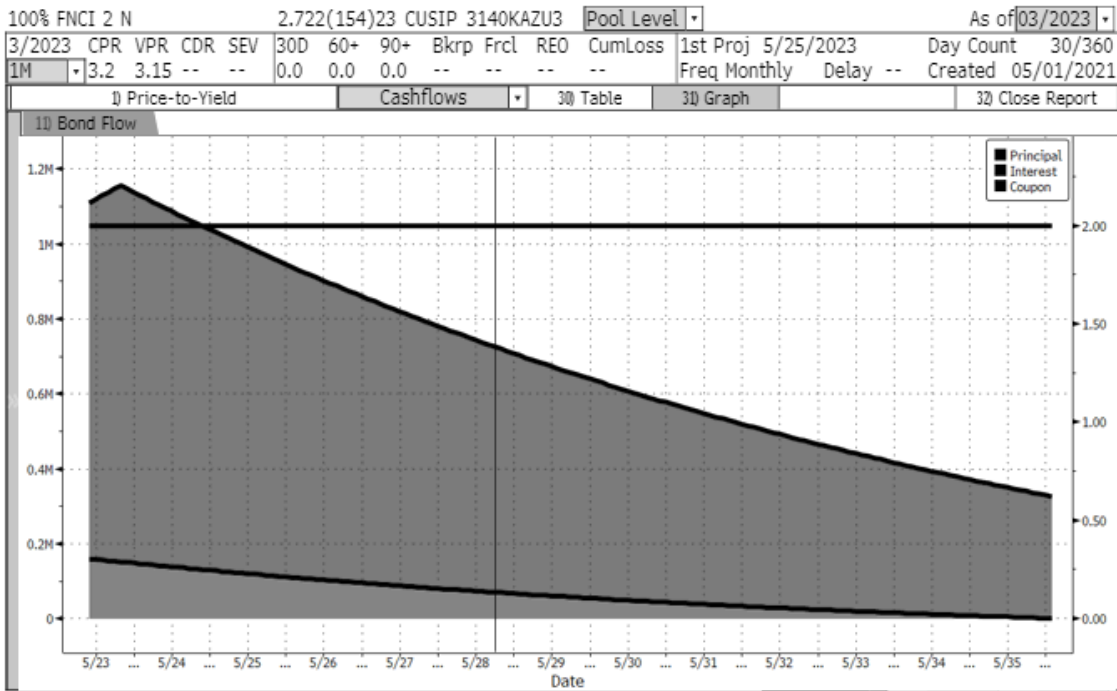
## ➤ Effective Duration

- Measures actual price sensitivity given +/-100 bp change in yield
- Expressed in %

# WEIGHTED AVERAGE LIFE (WAL) EXAMPLE

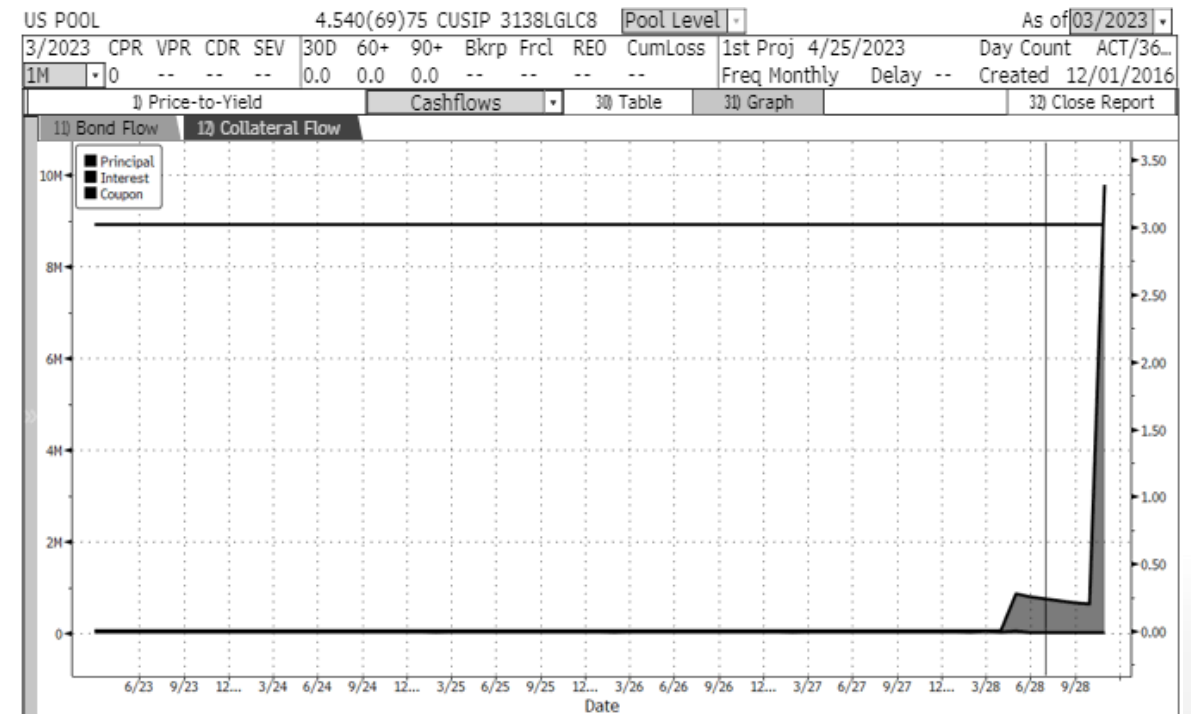
➤ Average Life is the length of time the principal of a debt issue expected to be outstanding.

## 15 Yr MBS, 5.3yr WAL



5.3 Years

## 5.3 Yr ACMBS, 5.3yr WAL



5.3 Years

## TRUE OR FALSE: VARIABLE RATE SECURITIES HAVE NO INTEREST RATE RISK

FALSE

changes in spread will cause price to change

Example: 5 Year bond with SOFR **+23 bps** coupon will  
price at a discount if market requires SOFR **+52 bps**

# TRUE OR FALSE: VARIABLE RATE SECURITIES HAVE NO INTEREST RATE RISK

US CMBS : FREDDIE				7.165(104)17 CUSIP 3137H5DU8				95 Buy		96 Sell		
03/23	1mo	71.90	WAOLS	29.2MMMfam	98.16% TX	27.30%	Coupon	4.76% Delay	0	Maturity	12/25/2031	
30D	0.00 3mo	34.50	LTV	70.00 Mob...	1.84% FL	21.03%	Descr	SC,FLT,... CFace	746MM	Created	04/10/2023	
60D	0.00 6mo	19.07	DSCR	1.69	NC	7.38%		OFace	829.3MM	1st Proj	04/25/2023	
90+D	0.00 12mo	10.04	CL Pls	--	CT	6.52%	# Loans	38 Factor	0.8996	Next Pay	04/25/2023	
					MO	4.77%	1xSOFR30A +23BP Cap AFC	Flr	0.23%	Mthly		
								1) Price-to-DM		Current SOFR30A		4.73335
Settle	04/14/23				CF							
Indices/Call			C N		v							
Vary	32		0 CPY		v							
	97-00				66.758							
	98-00				52.000							
	99-00				37.415							
Price	100-00				23.000							
	101-00				8.751							
Avg Life					8.47							
Spread Duration					6.82							

Required Market Spread

## MODIFIED DURATION

- Approx. expected change in price for a 100bps change in rates
- A duration of 3.0 means price is expected to change by ~3% for every 100bps change in yield
- Modified Duration is a **static** measure and assumes cash flows do not change

*Investors need to be mindful of this limitation for securities with optionality:*

For example, 20yr MBS    base case duration is 5.3

                                  +200bps duration is 7.5



## EFFECTIVE DURATION

- Measure of price change given +/- 100 bps shock
  - Average of the two scenarios
- Expressed in % of price change not years
  
- Pro: encompasses rate shocks
- Con: can give misleading information regarding risk if used in isolation

## EFFECTIVE DURATION EXAMPLE

➤ 3.5yr Treasury  
➤ 7yr non-call 3mo Agency } **3.4% Eff Duration**

➤ 7yr non-call 3mo -100bps duration is 0.2%  
+100bps duration is 6.7%  
average is 3.4%

**Averaging of two outcomes produces misleading results**

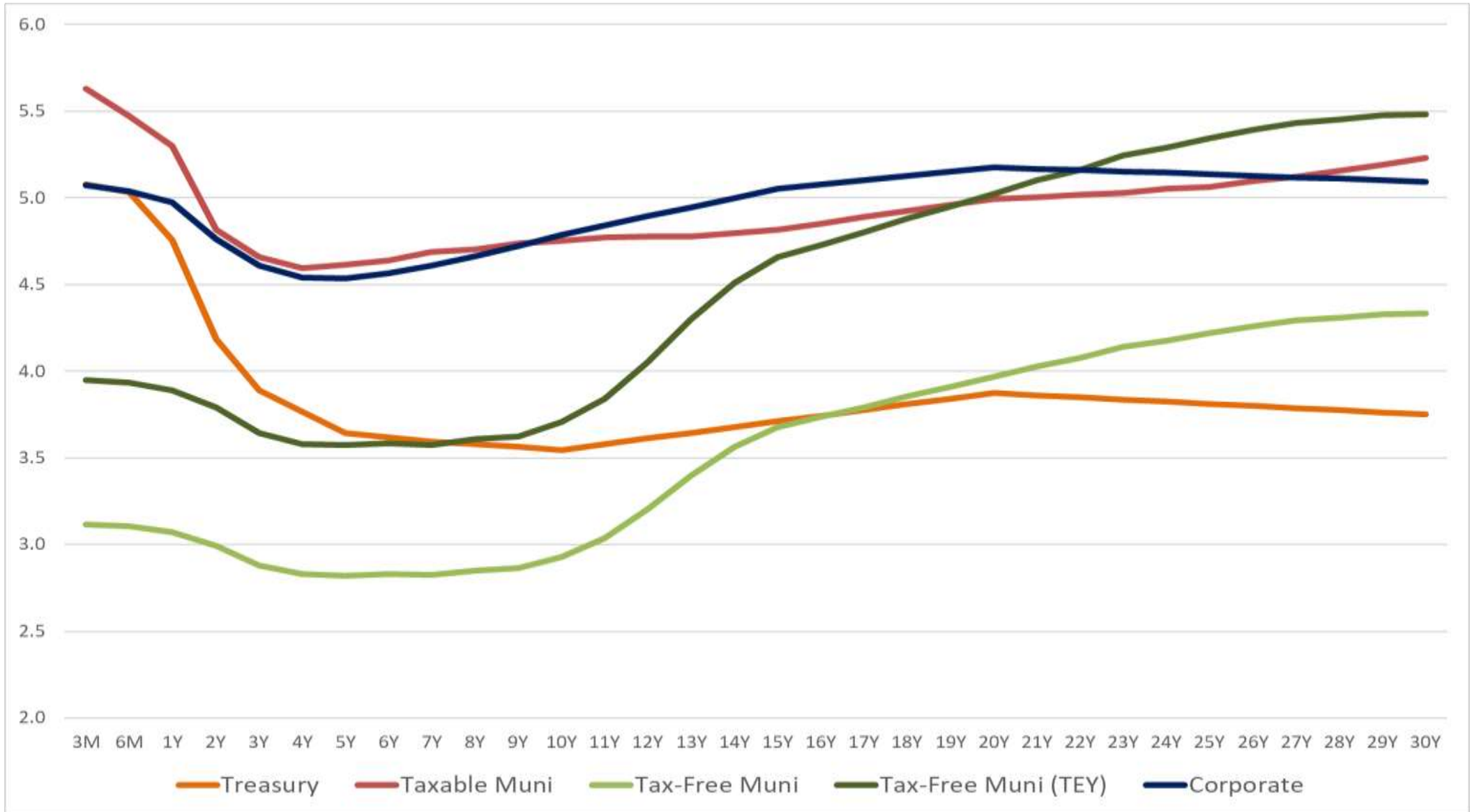
## LONGER DURATION: THE “GOOD” AND THE “BAD”

- Longer duration is sometimes perceived as “bad” as investors focus on price depreciation when rates rise
  
- In rates down scenarios, longer duration is “good” as it helps portfolios:
  - maintain higher income
  - provide price appreciation due to call protection
  - reduce reinvestment risk - diversification
  
- **Longer duration is “bad” if it does not provide a benefit in rates “down” scenarios**

# YIELD CURVES

- Shows relationship between short- and long-term interest rates
- “Pure Expectation Theory” – shape of the Treasury yield curve is function of investors’ outlook for future short-term interest rates
- Yield curves are generally upward-sloping
- Each non-Treasury investment has its own distinct Yield Curve that differs in shape and level from the Treasury yield curve

# YIELD CURVE EXAMPLES



# REINVESTMENT RISK



# REINVESTMENT RISK

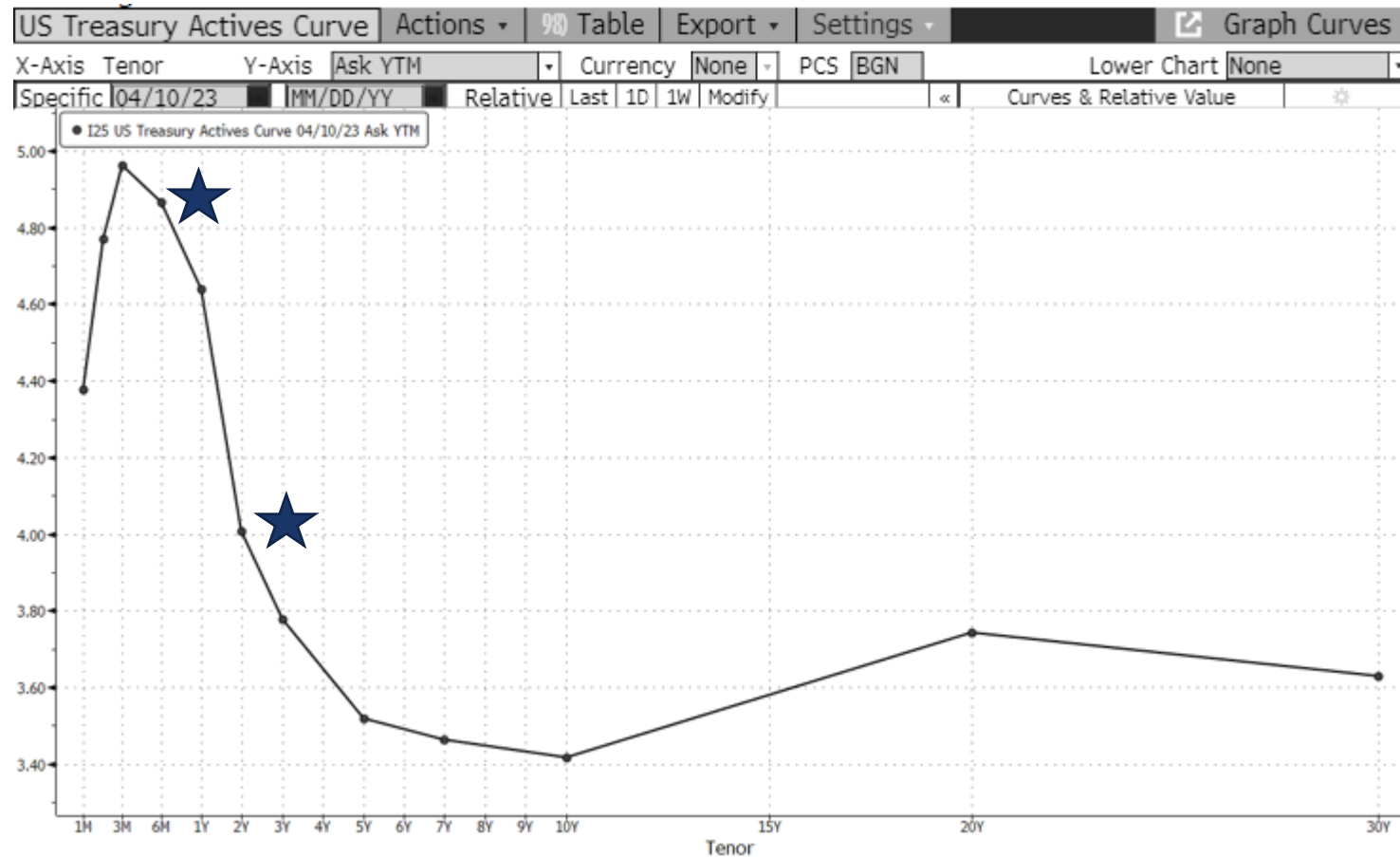
The uncertainty of future yields upon re-investment of cash flows

- Affects bonds differently (Bullets vs. Mortgages)
  - Size and frequency of P&I payments impact reinvestment risk
  - Investment horizon impacts reinvestment risk

Optionality can exaggerate reinvestment risk

# YIELD CURVE IS A GAUGE OF REINVESTMENT RISK

Why would a 1-Yr T-Bill have a higher yield than a 2-year Treasury?



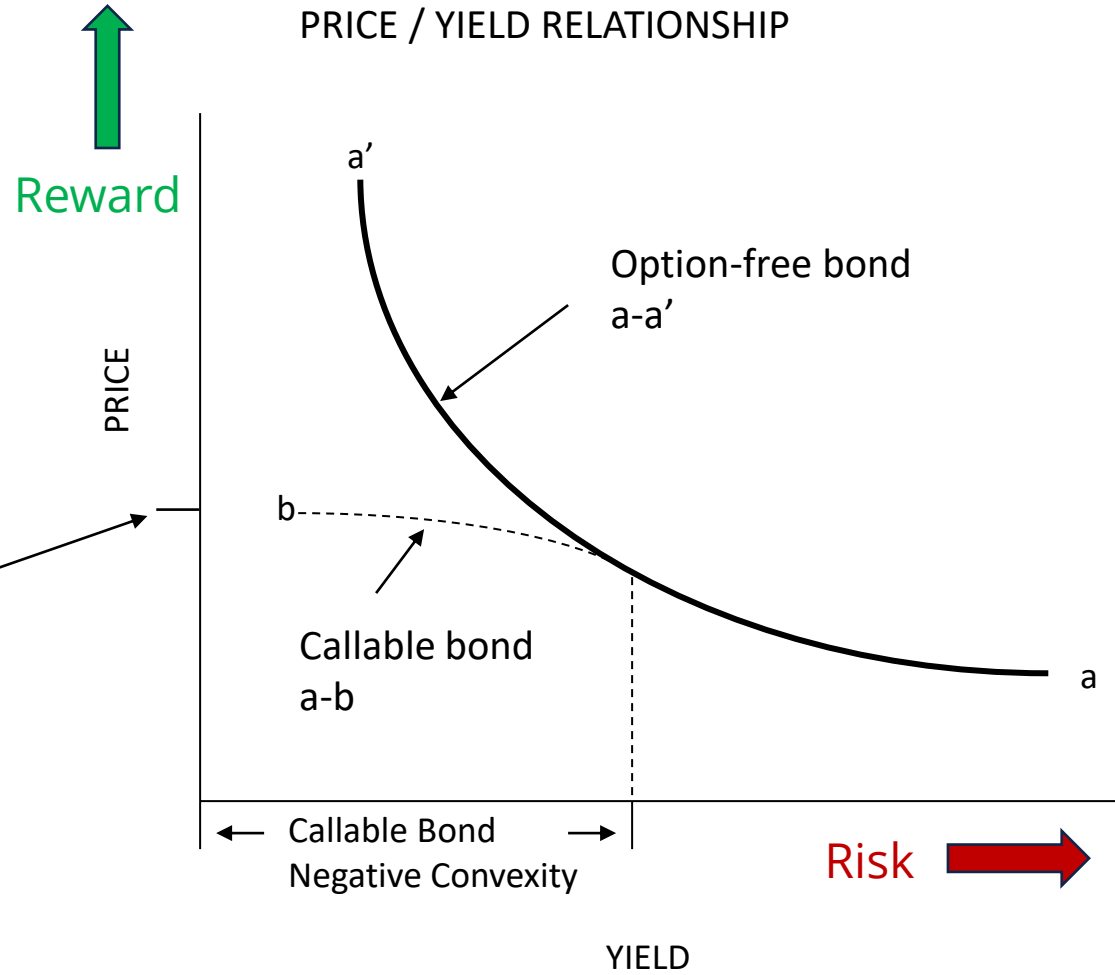


# CALL RISK



# CALL RISK

PRICE / YIELD RELATIONSHIP



## Reward Cap

Continuously callable bond will not appreciate above 100

## CALL RISK IMPACT ON RETURNS

If a bond is called, returns likely suffer in three ways:

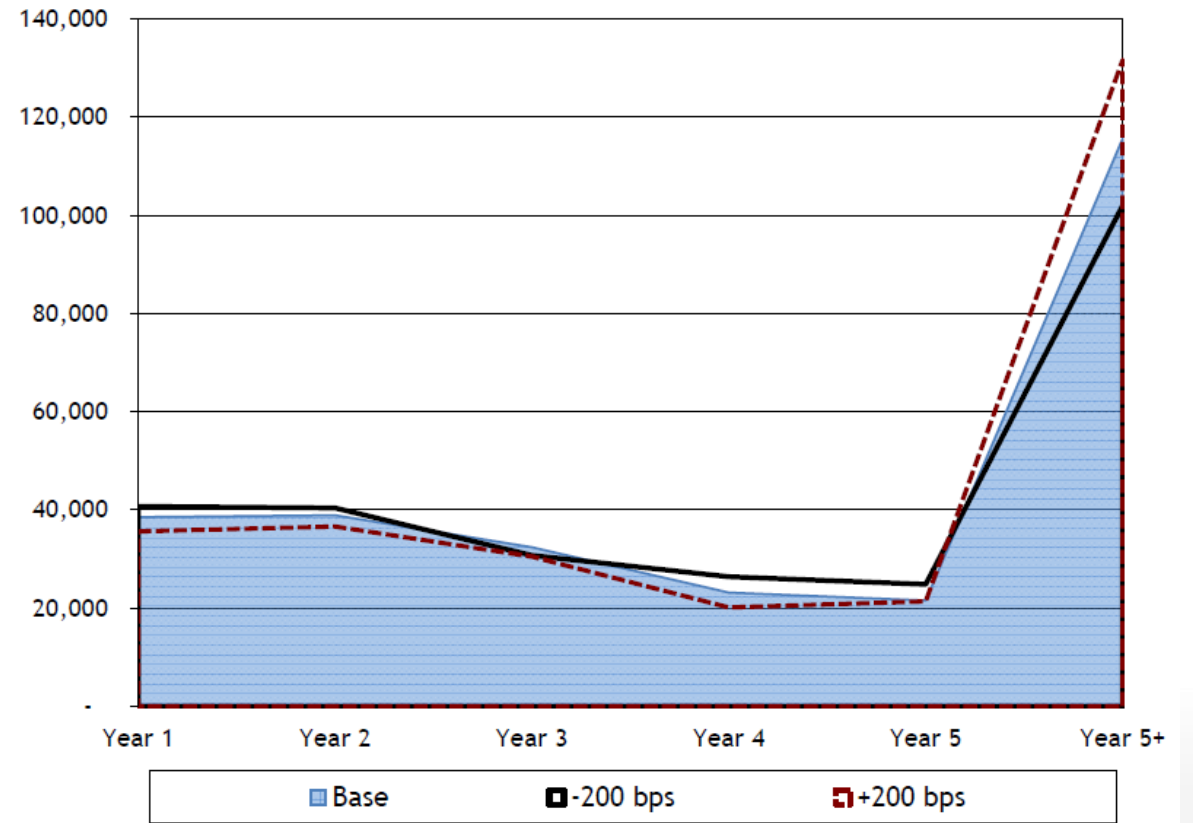
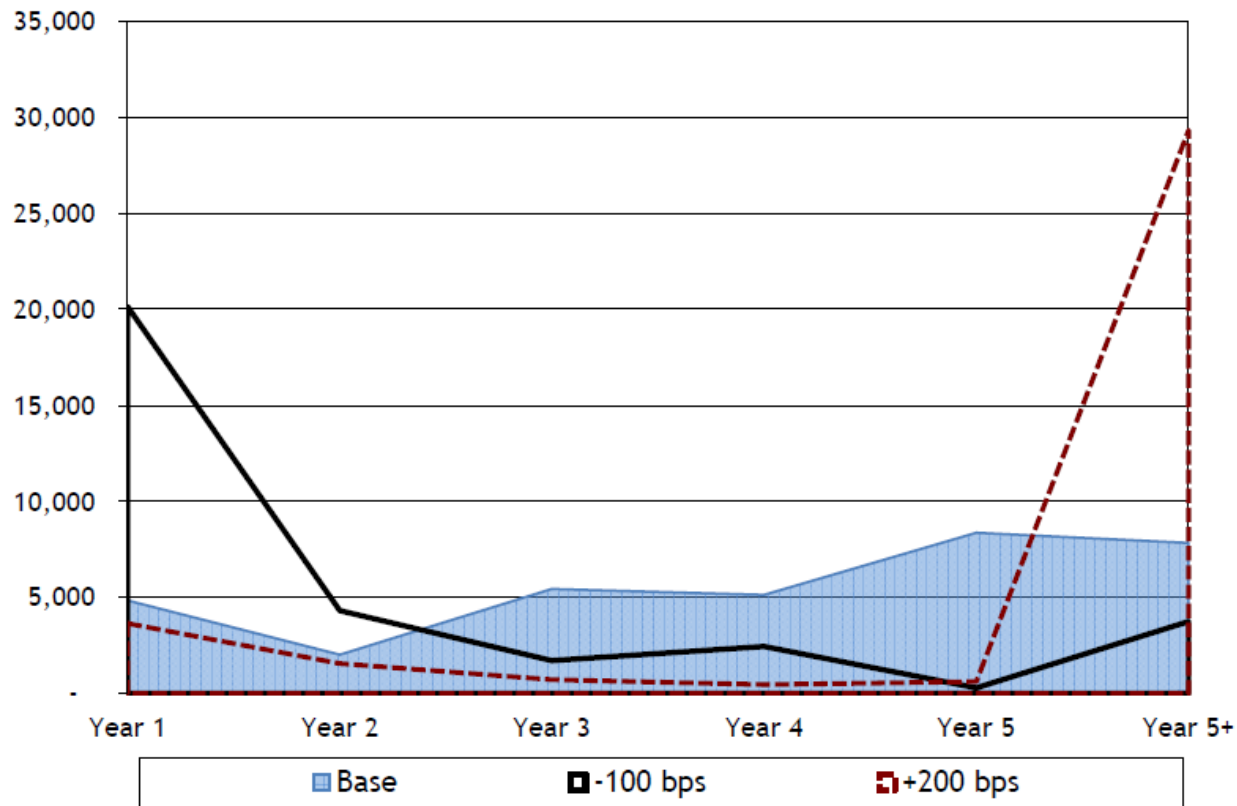
- Above market coupon is taken away
- Miss out on price appreciation
- Forced to reinvest at lower rates

Avoid Callable Bond “Trap”

# CALL RISK IN PORTFOLIOS – CASH FLOW

**Lots of optionality** = we get cash flow only when we do not want it, hurting returns

**Stable profile** = predictable cash flow means we can achieve better returns over time



# DOES MORE YIELD MEAN MORE RETURN?



## WHICH IS A “HIGHER RETURN” SECURITY?

- 1) Both are 5 Year Risks
- 2) Both are Government Quality
- 3) 2018 – Top of Fed Cycle

### Today

	<u>A</u>	<u>B</u>
Price	100.00	99.65
Yield	3.50	3.06

# SECURITY A DESCRIPTION: 5 Yr Non-Call 1 Yr Agency

FHLB 3 1/2 10/23/23 Cor		Actions ▾	Settings ▾	Page 1/13	Security Description: Bond
Data not provided by Bloombe...		94	Notes	95	Buy
96		Sell			
25) Bond Description		26) Issuer Description			
Pages	Issuer Information			Identifiers	
11) Bond Info	Name	FEDERAL HOME LOAN BANK		FIGI	BBG00M6PBBW7
Addtl Info	Industry	Government Sponsored (BCLASS)		CUSIP	3130AF4T1
Reg/Tax	Security Information			ISIN	US3130AF4T18
14) Covenants	Mkt Iss	US DOMESTIC		Bond Ratings	
15) Guarantors	Ctry/Reg	US	Currency	USD	
Bond Ratings	Rank	Unsecured	Series		
Identifiers	Coupon	3.500000	Type	Fixed	
Exchanges	Cpn Freq	S/A			
Inv Parties	Day Cnt	30/360	Iss Price	100.0000	
Fees, Restrict	Maturity	10/23/2023		Issuance & Trading	
Schedules	CALL	10/23/19@100.00		Amt Issued/Outstanding	
Coupons	Iss Sprd			USD	25,000.00 (M)
23) Impact	Calc Type	(1)STREET CONVENTION		USD	(M)
Quick Links	Pricing Date	10/09/2018		Min Piece/Increment	
ALLQ Pricing	1st Coupon Date	04/23/2019		10,000.00/ 5,000.00	
QRD Qt Recap	Call Announcement Date	10/16/2019		Par Amount	5,000.00
TDH Trade Hist	Call Effective Date	10/23/2019		Book Runner	JOINT LEADS
CACs Corp Action	Security created by firm INCAPITAL LLC			Reporting	TRACE
CF Filings					
CN Sec News					
HDS Holders					
Send Bond					

Callable in 1 Year



# SECURITY B DESCRIPTION: 5 Year Treasury Note

25) Bond Description		26) Issuer Description		95) Buy	96) Sell
Pages	Issuer Information		Identifiers		
11) Bond Info	Name US TREASURY N/B		ID Number	9128285K2	
12) Addtl Info	Industry Treasury (BCLASS)		CUSIP	9128285K2	
13) Covenants	Security Information		ISIN	US9128285K26	
14) Guarantors	Issue Date	10/31/2018	SEDOL 1	BGN70C1	
15) Bond Ratings	Interest Accrues	10/31/2018	FIGI	BBG00M922479	
16) Identifiers	1st Coupon Date	04/30/2019	Issuance & Trading		
17) Exchanges	Maturity Date	10/31/2023	Issue Price	99.529382	
18) Inv Parties	Floater Formula	N.A.	Risk Factor	.587	
19) Fees, Restrict	Workout Date	10/31/2023	Amount Issued	39000 (MM)	
20) Schedules	Coupon	2.875	Amount Outstanding	39000 (MM)	
21) Coupons	Cpn Frequency	S/A	Minimum Piece	100	
Quick Links	Mty/Refund Type	NORMAL	Minimum Increment	100	
32) ALLQ Pricing	Calc Type	STREET CONVENTION	SOMA Holdings	39.31	
33) QRD Quote Recap	Day Count	ACT/ACT			
34) CACS Corp Action	Market Sector	US GOVT			
35) CN Sec News	Country/Region	US	Currency	USD	
36) HDS Holders	TENDERS ACCEPTED: \$39000MM.				
66) Send Bond					

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000  
 Japan 81 3 4565 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2023 Bloomberg Finance L.P.  
 SN 480842 EDT GMT-4:00 H189-42-173 21-Mar-2023 15:19:26

**Yield To Maturity: 3.06%**



## 1 Year Horizon

**In October 2018, you had a choice of purchasing a 5-year NC 1 or 5-Year Treasury. You got +44bps spread over a 5-Year Treasury by purchasing a 5-Year NC 1. On a \$1,000,000 Investment, who won and by how much?**

- Agency by \$4,400 **A**
- Treasury by \$14,400 **B**
- Agency by \$22,000 **C**
- Treasury by \$51,600 **D**

# HISTORICAL YIELD CURVE (1 YEAR HORIZON)

US Treasury Actives Curve | Actions ▾ | 90 Chart | Export ▾ | Settings ▾ | Graph Curves

X-Axis Tenor Y-Axis Ask YTM Currency None PCS BGN

Specific 10/23/19 10/09/18 Relative Last 1D 1W Modify Curves & Relative Value

Values and Members  Values  Members  Constituents

		I25 Ask YTM US Treasury Actives Curve	I25 Ask YTM US Treasury Actives Curve	I25 Ask YTM (Change)
	Tenor	10/23/19	10/09/18	10/23/19-10/09/18
11)	1M	1.733	2.152	-41.9
12)	2M	1.692		
13)	3M	1.651	2.235	-58.3
14)	6M	1.635	2.421	-78.6
15)	1Y	1.576	2.617	-104.1
16)	2Y	1.582	2.885	-130.3
17)	3Y	1.580	2.979	-139.9
18)	5Y	1.591	3.056	-146.5
19)	7Y	1.678	3.148	-147.1
20)	10Y	1.764	3.206	-144.2
21)	30Y	2.254	3.369	-111.4

Where did rates go from purchase to horizon date?

# WHAT HAPPENED TO OUR SECURITIES?

**Security A – CALLED IN 1 YEAR**

**Security B – PRICE APPRECIATED:**

<b>Horizon</b>	<b>Date</b>	<b>Treasury Price</b>
Original Purchase	10/9/18	99.65
1 Year from Purchase	10/23/19	105.25
Difference		5.60

Security B appreciated by 5.6 points from purchase

# TOTAL RETURN COMPARISON

	<u>Security A</u>	<u>Security B</u>	<u>Difference</u>
Beginning \$\$	\$1,000,000	\$1,000,000	\$ -
Income	35,000	30,600	(4,400)
Market Value $\Delta$	<u>-</u>	<u>56,000</u>	<u>56,000</u>
Ending \$\$	\$1,035,000	\$1,086,600	\$ 51,600
<b>Purchase Yield</b>	<b>3.50%</b>	<b>3.06%</b>	<b>0.44%</b>
<b>Total Return</b>	<b>3.50%</b>	<b>8.66%</b>	<b>-5.16%</b>

Answer: D. Treasury by \$51,600

# INCOME TO MATURITY ANALYSIS

Security A	Security B	Difference	Cumulative Difference
3.50	3.06	+44	44
1.59	3.06	-147	-103
1.59	3.06	-147	-250
1.59	3.06	-147	-397
1.59	3.06	-147	-544
<b>9.86</b>	<b>15.30</b>		

5.44

$$\$1,000,000 \times .0544 = \$54,400$$

## CONCLUSIONS

- Yield does not equal Return
- Call protection is an important component of performance
- Even if we do not sell, unrealized gain represents higher income
- The difference between Income-to-Maturity Analysis and Total Return is the Present Value of Future Cash Flows

# PREPAYMENT RISK



# MORTGAGE REFINANCING ACTIVITY

**When Mortgage Rates are low, refinancing activity picks up.**





# SECURITY EXAMPLE

In June of 2019, a bank purchased the following security:

G2 784658 Mtge		Export		Page 1/3 Security Description								
100% G2SF 4.5 M		4.984(306)50 CUSIP 3622AAB37		Pool Level	99 Buy 90 Sell							
Summary		Platinum		Comments								
Pool	G2 784658	Seasoning	G2SF 4.5 M	As Of	03/2023							
Type	(SP) Platinum 30 years Level pay	Vintage	G2SF 4.5 2018	Issue Date	02/01/2019							
Traits	Platinum, 30/360	Maturity Date	02/20/2049									
Seller	GNMA PLATINUM SEC...	Issuer	GNMA									
12) Pool Information   PDI				Balance								
Coupon	4.500	WAC	4.984	Orig WAC*	4.977							
		WARM	306	Orig WAM*	358							
		WALA	50									
13) Collateral Information   CLC				Prepay								
WAOLTV	102			CPR	PSA							
WAOLTV-HPI*	71	WAOLS	225,888	1 Month	0.0 0							
WAOCLTV	102	MAXLS	330,000	3 Month	0.1 2							
WAOCS	733	WAOLT	360	6 Month	21.1 352							
		WAODTI*	33	1 Year	37.4 624							
# Loans	7	Delay	49 ( 19 )	Life	58.3 1336							
TRACE Eligible				18) States								
				Texas	30.8							
				Virginia	22.2							
				Colorado	13.2							
15) Paydown Info   PDI PERF				*Value calculated by Bloomberg								
Prepay History	Mar23	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr22
1 Month CPR	0.0	0.3	0.0	0.0	0.0	75.9	0.0	90.6	0.0	0.0	84.0	0.0
3 Month CPR	0.1	0.1	0.0	37.7	37.7	71.7	54.6	54.6	45.7	45.7	79.3	61.9
6 Month CPR	21.1	21.1	46.8	46.8	46.8	60.8	50.3	69.3	54.5	64.7	64.7	65.7
12 Month CPR	37.4	50.8	50.8	56.7	56.7	63.3	61.2	64.3	59.4	59.4	59.4	58.5

30 Yr GNMA MBS with 4.98 average loan rate

# MORTGAGE POOL HISTORY

G2 784658 **99-07%** 99-05<sup>3</sup>/<sub>a</sub>/99-08<sup>3</sup>/<sub>a</sub> Yield 4.676/4.655 Coupon 4.500% BVAL  
 As of 21 Mar Prepay 100BAM Ginnie Mae II Pool BAM TOAS 18.2

G2 784658 Mtge Export Paydown Information

100% G2SF 4.5 M 4.984(306)50 CUSIP 3622AAB37 Pool Level

Summary	Paydown	Collateral	Performance							
Date	Factor	Coupon	Balance	WAC	WAM	WALA	1M CPR	3M CPR	6M CPR	12M CPR
04/2021	0.104967780	4.50000	5,442,264.49	4.981	330	27	66.07	44.77	41.03	55.63
03/2021	0.115027430	4.50000	5,963,827.16	4.994	327	26	50.22	29.59	35.03	52.08
02/2021	0.122088080	4.50000	6,329,900.68	4.990	328	25	0.24	31.38	43.93	59.30
01/2021	0.122286410	4.50000	6,340,183.50	4.990	329	24	29.70	37.04	53.92	64.55
12/2020	0.126109090	4.50000	6,538,377.99	4.983	330	23	53.92	40.06	60.17	67.93
11/2020	0.134711240	4.50000	6,984,373.66	4.977	331	22	22.95	54.18	64.56	71.77
10/2020	0.137863300	4.50000	7,147,798.52	4.974	333	21	39.34	66.27	66.61	79.86
09/2020	0.143928320	4.50000	7,462,251.61	4.981	334	20	79.42	73.54	64.66	84.62
08/2020	0.164422240	4.50000	8,524,799.88	4.987	334	19	69.26	72.58	70.47	82.94
07/2020	0.181653420	4.50000	9,418,184.87	4.992	337	18	70.71	66.95	72.73	81.36
06/2020	0.201500320	4.50000	10,447,187.09	4.995	337	17	77.11	52.80	74.18	79.35
05/2020	0.228149330	4.50000	11,828,858.31	5.003	339	16	46.18	68.19	77.51	76.72
04/2020	0.240557520	4.50000	12,472,185.74	5.005	340	15	14.66	77.51	87.86	75.49
03/2020	0.244081220	4.50000	12,654,879.01	5.005	341	14	92.99	85.87	93.31	75.18
02/2020	0.304997620	4.50000	15,813,211.60	4.999	343	13	80.97	84.11	90.15	69.03
01/2020	0.350687240	4.50000	18,182,081.33	4.994	344	12	78.85	93.44	87.25	64.44
12/2019	0.399683110	4.50000	20,722,370.20	4.994	346	11	90.02	96.83	83.49	
11/2019	0.484943520	4.50000	25,142,866.68	4.990	348	10	98.66	93.90	75.90	
10/2019	0.695726210	4.50000	36,071,316.81	4.980	349	9	97.62	75.21	50.55	
09/2019	0.951092720	4.50000	49,311,304.25	4.975	349	8	28.56	13.90	7.90	
08/2019	0.979370740	4.50000	50,777,434.76	4.977	350	7	10.59	4.88	2.64	
07/2019	0.989793200	4.50000	51,317,808.04	4.977	352	6	0.08	1.33	0.81	
06/2019	0.991098920	4.50000	51,385,505.71	4.977	353	5	3.66	1.49		
05/2019	0.995424650	4.50000	51,609,781.83	4.977	354	4	0.21	0.36		
04/2019	0.996837900	4.50000	51,683,054.60	4.977	355	3	0.55	0.28		
03/2019	0.998522680	4.50000	51,770,405.39	4.977	357	2	0.30			
02/2019	1.000000000	4.50000	51,847,000.00	4.977	357	2				

80% of the pool balance paid off (refi) in 1 year as mortgage rates dropped