SESSION 2

Investment Terms and Concepts

Carlos Oblites

Senior Vice President and Portfolio Strategist
Chandler Asset Management

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INVESTMENT TERMS AND CONCEPTS

CHANDLER ASSET MANAGEMENT

Carlos Oblites
Senior Portfolio Strategist
Chandler Asset Management

FOR TODAY'S DISCUSSION

- Fixed-Income Management 101
  - Bond Basics
  - Defining Key Terms
  - Key Concepts
  - Bringing It Together

BONDS 101

What Exactly Is A Bond?

WHAT IS A BOND?

Lender purchases a bond from Borrower

Borrower pays interest to Lender

At maturity, Borrower returns principal to Lender

WHAT IS A BOND?

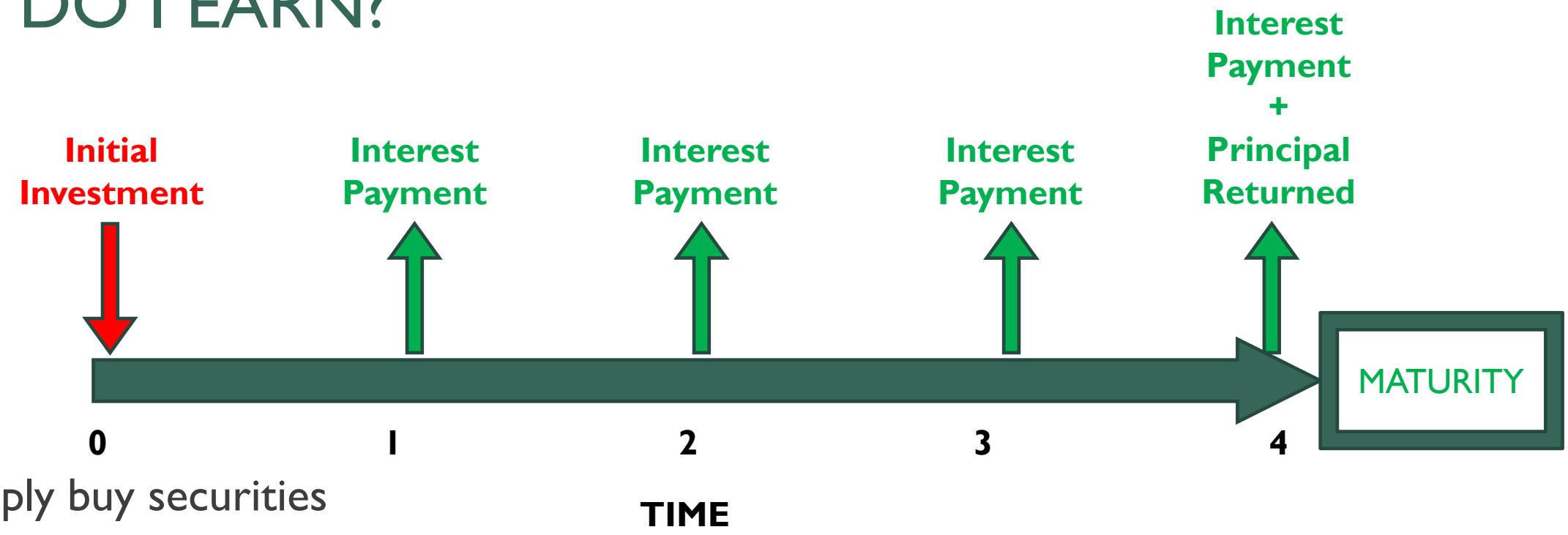
- Bonds are debt obligations
  - Referred to as fixed-income securities; offers a fixed stream of income

IOU

Issuer Promises to pay % annually on $$ and repay principal by MM/DD/YYYY

- Types of Bonds
  - *Treasury Bonds*
  - *Federal Agency Bonds*
  - *Municipal Bonds*
  - *Investment-grade Corporate Bonds*
  - *High-yield Corporate Bonds*
  - *Asset-backed Bonds*
  - *Mortgage-backed Bonds*
  - *Convertible bonds*
  - *Foreign Bonds*

HOW DO I EARN?



- Simply buy securities
- Hold them until maturity
- Reinvest maturing funds into new security
- ***But is there more to it?***

HOW THE BOND MARKET WORKS

- Not centrally exchanged
- Broker prices differ
- Prices depend on:
  - Market forces
  - Rate levels
  - Trading volume
  - Relationships
  - Broker inventory
- It means you have to shop around

USING BOND MARKET LANGUAGE

Key Terminology

BOND TERMINOLOGY—ALL THESE VALUES!

- **Par Value**—Face value of bond—it is the amount upon which coupon is calculated, and the amount you receive at maturity
- **Original Cost**—The price you paid for a bond—it can be above, below, or at par value
- **Premium or Discount**—The amount above or below par value paid for a bond
- **Amortized Cost (Book Value)**—The carrying value of the bond on your books (original cost +/- premium amortized or discount accreted to date)
- **Market Value**—The amount someone else is willing to pay for your bond

BOND TERMINOLOGY

- Basis point (1/100 of 1% or .0001)
- Spread
  - Difference between yields on differing debt instruments
    - Treasury yield is 1.00%;
    - Agency yield is 1.30%
    - **Spread = 1.3 – 1.0 = 30 bps**

BOND TERMINOLOGY

- **Yield**—Annual rate at which you are expected to earn interest income assuming same rate reinvestment
- **Return**—Rate you actually earned for a specific holding period
  - Total Return = Interest Income + Realized Gains/Losses + Unrealized Gains/Losses
  - Book Return = Interest Income + Realized Gains/Losses ONLY (no marking to market)

Yield and Return do not necessarily mean the same thing!

INVESTMENT CONCEPTS: RETURN IMPACTS

- Income: **Budget** and **ACFR**
- Fair Value Change: **ACFR** only

PROFIT AND LOSS BY MONTH
January 1 - May 21, 2019

	JAN 2019	FEB 2019	MAR 2019	APR 2019	MAY 1-21, 2019	TOTAL
▸ Income	$391.25	$521.00	$1,917.00	$7,371.52	$0.00	$10,200.77
▸ Cost of Goods Sold	$0.00	$0.00	$0.00	$405.00	$0.00	$405.00
GROSS PROFIT	$391.25	$521.00	$1,917.00	$6,966.52	$0.00	$9,795.77
▸ Expenses	$0.00	$408.08	$511.68	$3,921.16	$96.39	$4,937.31
NET OPERATING INCOME	$391.25	$112.92	$1,405.32	$3,045.36	$ -96.39	$4,858.46
▸ Other Expenses	$0.00	$0.00	$250.00	$2,666.00	$0.00	$2,916.00
NET OTHER INCOME	$0.00	$0.00	$ -250.00	$ -2,666.00	$0.00	$ -2,916.00
NET INCOME	$391.25	$112.92	$1,155.32	$379.36	$ -96.39	$1,942.46

The report included is for illustrative purposes only.

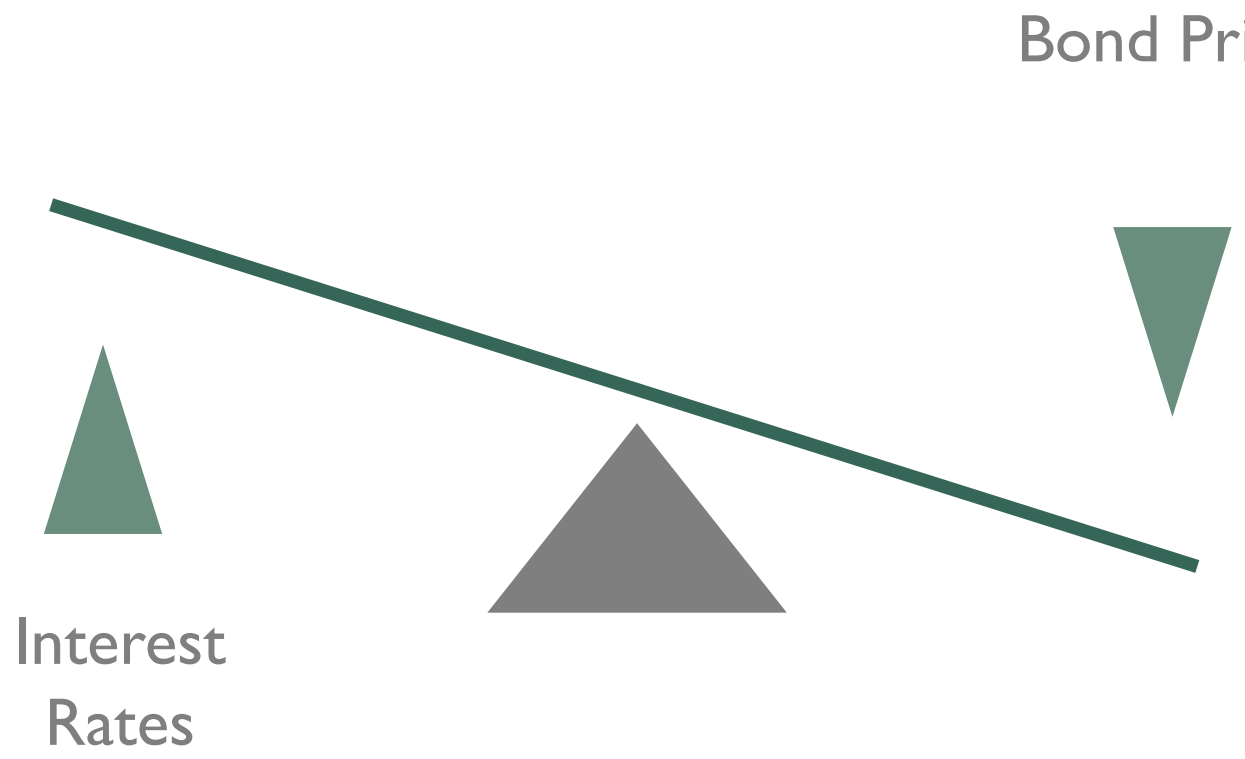
	FY 2017 Total Activity	FY 2018 Total Activity	FY 2019 Amended Budget	FY 2020 Proposed Budget
REVENUES				
Taxes				
Property Taxes	$ 3,523,943	$ 14,971,071	$ 16,745,358	$ 16,735,220
Sales & Use	12,025,807	15,852,753	15,740,000	16,090,000
Taxes	2,963,708	3,207,190	3,195,138	3,364,000
Business & Other Taxes	616,148	628,090	650,832	614,650
Licenses & Permits	561,373	773,062	1,355,819	805,528
Intergovernmental Revenues	2,846,330	2,718,438	2,632,681	2,420,920
Charges for Services	494,891	422,670	364,825	380,000
Fines & Forfeitures	127,672	506,452	966,136	701,000
Investment Income	40,281	47,363	38,331	17,000
Contributions & Donations	190,689	164,808	204,921	108,726
Miscellaneous Revenue	$ 23,390,841	$ 39,291,896	$ 41,894,041	$ 41,237,044
subtotal	$ 13,079	$ 31,240	$ 164,500	$ 10,000
Other Financing Sources	25,376,842	-	19,106,563	-
Proceeds From Sale Of	4,942,408	3,416,353	9,043,255	5,057,611
Assets Bond Proceeds	-	-	38,946,688	1,742,496
Interfund Transfers In	$ 30,332,329	$ 3,447,593	$ 67,261,006	$ 6,810,107
Budgeted Fund Balance				
subtotal				
TOTAL REVENUES	**$ 53,723,169**	**$ 42,739,489**	**$ 109,155,047**	**$ 48,047,151**
EXPENDITURES (by Function)				
General Government	$ 9,284,620	$ 4,134,131	$ 21,243,262	$ 4,807,700
Judicial	279,811	411,698	463,582	470,202
Public Safety	11,782,028	12,509,445	19,294,736	14,826,023
Public Works	3,034,654	6,290,486	24,465,749	12,772,762
Culture & Recreation	1,696,271	7,187,011	29,594,099	3,092,515
Housing & Development	1,233,965	1,441,510	2,488,554	1,733,317
Debt Service	1,208,834	1,584,128	2,561,811	2,891,076
Contingency	-	-	-	411,898
Initiatives	-	-	-	1,875,827
subtotal	$ 28,520,183	$ 33,558,409	$ 100,111,792	$ 42,881,320
Other Financing Uses				
Interfund Transfers Out	$ 4,942,408	$ 3,416,353	$ 9,043,255	$ 5,057,611
Restricted Fund Balance	-	-	-	108,220
subtotal	$ 4,942,408	$ 3,416,353	$ 9,043,255	$ 5,165,831
TOTAL EXPENDITURES	**$ 33,462,591**	**$ 36,974,762**	**$ 109,155,047**	**$ 48,047,151**

UNDERSTANDING BOND MARKET CONCEPTS

Key Concepts

KEY CONCEPT #1—PRICE AND RATE MOVE OPPOSITE ONE ANOTHER

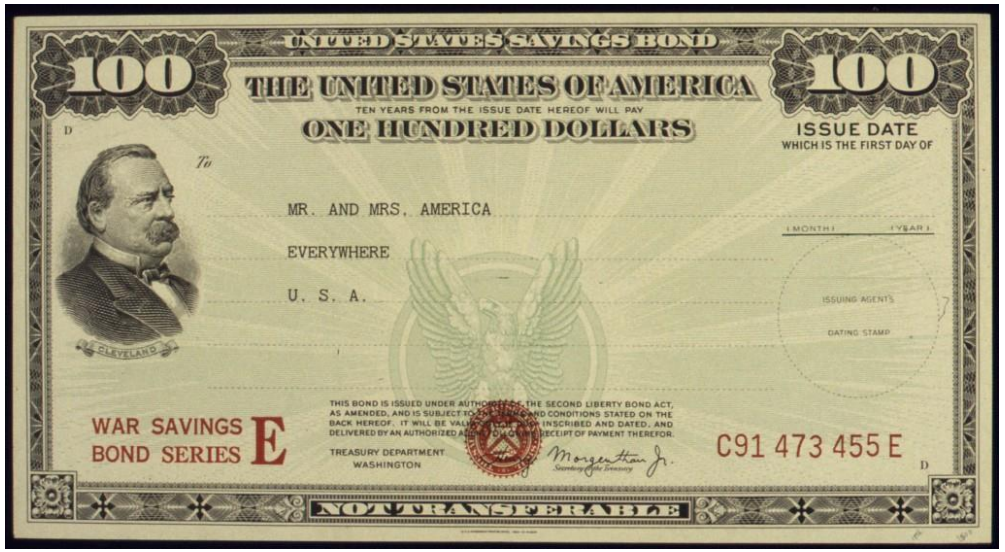
Bond prices and interest rates have an inverse relationship



HOW DOES THIS WORK?

You purchase on 6/30/2024:

Par	Credit Quality	Coupon	Maturity	Income	Yield	Price
$1 million	AAA	5%	6/30/2025	$50,000	5%	100.000



IMPACT OF RISING RATES

Rates rise on 7/1/2024, and someone else purchases a newly-issued security similar to yours, but with a higher coupon:

Your Bond	Credit Quality	Coupon	Maturity	Income	Yield	Price
$1 million	AAA	5%	6/30/2024	$50,000	5%	100.000

Their Bond	Credit Quality	Coupon	Maturity	Income	Yield	Price
$1 million	AAA	6%	6/30/2024	$60,000	6%	100.000

IMPACT OF RISING RATES

Here's some math to contemplate:

	Par	Income	Yield
Their Bond	$1 million	$60,000	6%
Your Bond	$1 million	- $50,000	5%
		= $10,000	

Your security would have to be sold at approximately $990K to make up for the rise in interest rates

$1,000,000
-$10,000
$990,000

IMPACT OF RISING RATES

- Good News!: Interest income will increase.
  - Reinvestment depends on length of average maturity
  - Budgets will benefit from increased cash flow

- Bad News!: The value of my bonds will go down.
  - Sales before maturity
  - GASB 31 and the ACFR

KEY CONCEPT #2: DURATION

- **Duration** is a direct measure of exposure to market risk in a fixed maturity bond
  - A better measure of the sensitivity to changes in interest rates.
  - A close approximation of the percent change in the price of a bond for a given change in yield.
  - Securities with equal maturity dates may not have equal interest rate risk—duration quantifies the difference.
  - **The higher the duration of a bond or fixed income portfolio, the more it's price will drop as interest rates rise.**

DURATION—FOR MATH FANS

$$Duration = \sum_{t=1}^{n} t\left(\frac{C_t}{\frac{(1+k)^t}{B_0}}\right) + n\left(\frac{M}{\frac{(1+k)^n}{B_0}}\right)$$

WHAT EXACTLY IS HAPPENING?

n	Years to Maturity	10 years
C	Coupon Payment	$50
k	Market Rate of Interest (YTM)	7%
M	Maturity (Par) Value	$1,000
B_0	Bond Price (PV of Bond)	$859.53

Year	Cash Flow	PV of CF	PV/B_0	Year*(PV/B0)
1	$50	$46.73	0.0544	0.0544
2	$50	$43.67	0.0508	0.1016
3	$50	$40.81	0.0475	0.1425
4	$50	$38.14	0.0444	0.1775
5	$50	$35.65	0.0415	0.2074
6	$50	$33.32	0.0388	0.2326
7	$50	$31.14	0.0362	0.2536
8	$50	$29.10	0.0339	0.2709
9	$50	$27.20	0.0316	0.2848
10	$50	$25.42	0.0296	0.2957
10	$1,000	$508.35	0.5914	5.9143
		Σ = $859.53		Σ = 7.9351 Years

Duration = 7.9351 Years

GENERAL RULE FOR DURATION

"As a general rule, for every 1% increase or decrease in interest rates, a bond's price will change approximately 1% in the opposite direction for every year of duration"

Example using the "General Rule":

- A bond with a duration (modified) of 3.2 will go up about 3.2% in price if it's yield drops by 1% (100 basis points), and down about 3.2% if it's yield rises 100 basis points.

IMPACT OF DURATION

Portfolio #1: $50 million and 2.0 duration

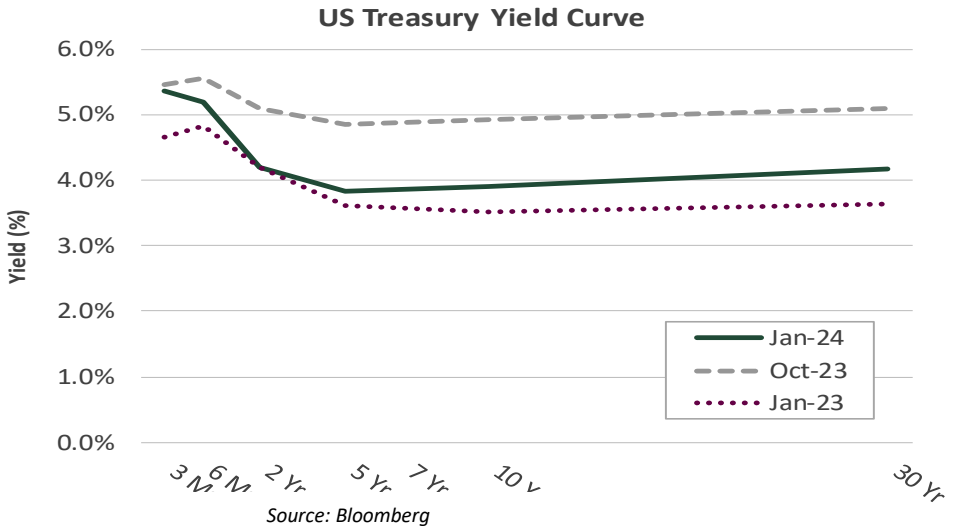
- If rates **increase** 1.25%, then **($1,250,000) Loss**
  $50 million x 2 x 1.25% x -1 = $50 million x -2.5% = **($1,250,000)**
- If rates **decrease** 1.25%, then **$1,250,000 Gain**
  $50 million x 2 x 1.25% x 1 = $50 million x 2.5% = **$1,250,000**

Portfolio 2 = $50 million and 1.0 duration

- If rates **increase** 1.25%, then **($625,000) Loss**
  $50 million x 1 x 1.25% x -1 = $50 million x -1.25% = **($625,000)**
- If rates **decrease** 1.25%, then **$625,000 Gain**
  $50 million x 1 x 1.25% x 1 = $50 million x 1.25% = **$625,000**

KEY CONCEPT #3—TERM STRUCTURE OF INTEREST RATES—KNOWN AS THE TREASURY YIELD CURVE

Treasuries Are Government IOUs
That Pay Interest, and different interest rates for different time periods

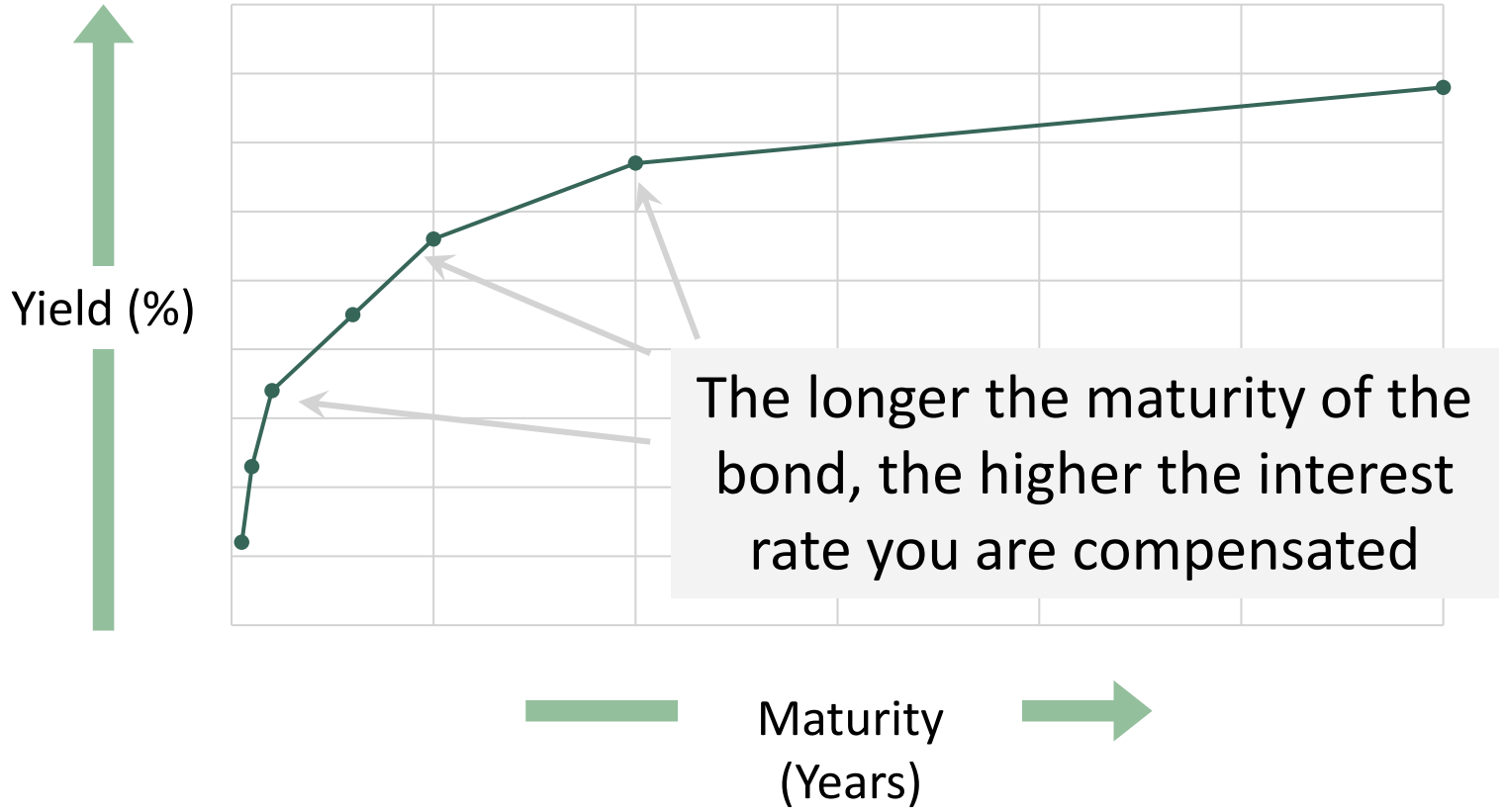


Source: Bloomberg

- Treasuries are considered among the safest bond investments due to government backing.
- Yield curves are graphs depicting the yields of bonds of various maturities.
- The shape and direction of the Treasury yield curve is closely watched by economists and investors.

KEY CONCEPTS: THE TREASURY YIELD CURVE

- Term Structure of Interest Rates



The longer the maturity of the bond, the higher the interest rate you are compensated

However, there are times when this is not true!

WHAT DETERMINES THE SHAPE OF THE YIELD CURVE?

- **Expectations Hypothesis**: Equilibrium long-term rate is the rate long-term investors would expect to earn through successive investments in short-term bonds over the term to maturity of the long-term bond.

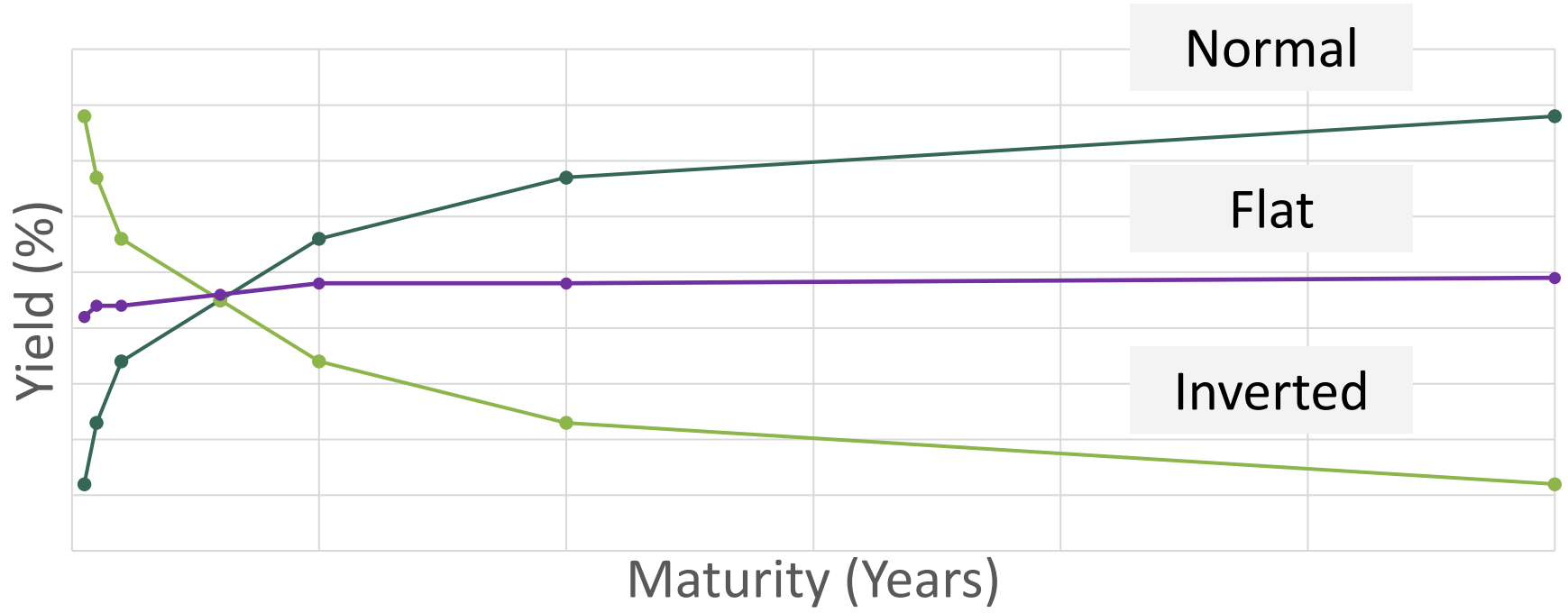
- **Liquidity Preference Hypothesis:** Lenders prefer short-term loans, and to induce them to lend long-term, it is necessary to offer higher yields.

- **Segmented Market Hypothesis**: Shape of the yield curve is a function of the policies of institutional investors/major financial institutions.

- Other forces?

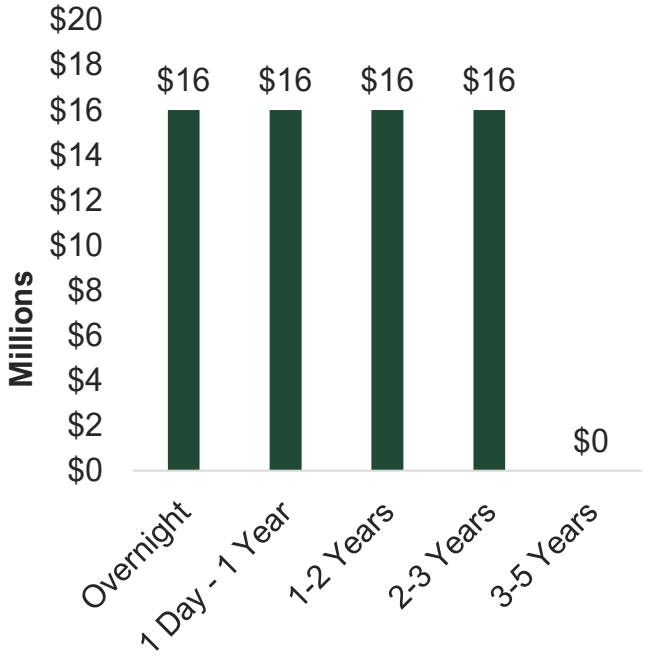
DIFFERENT YIELD CURVES FOR DIFFERENT ENVIRONMENTS

- The Holy Grail of Investment Indicators?

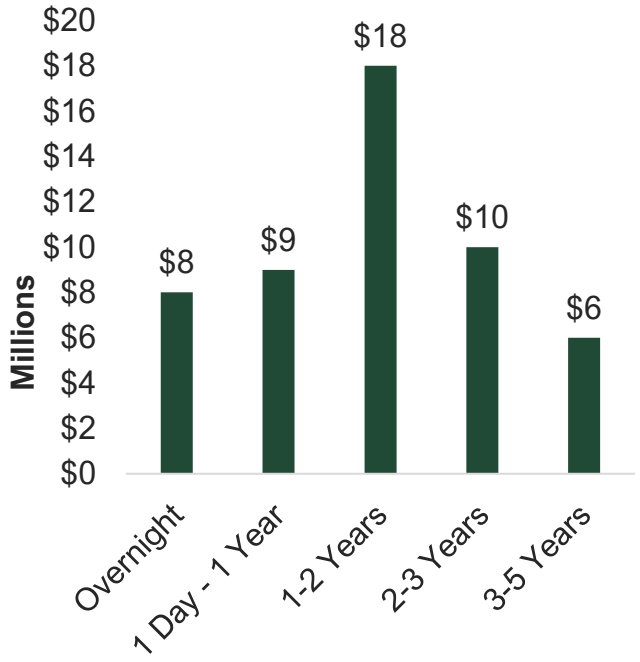


- It is possible for long-term rates to fall below short-term rates. This is an "inverted yield curve."
- Inverted yield curves have historically been associated with possible future recessions.

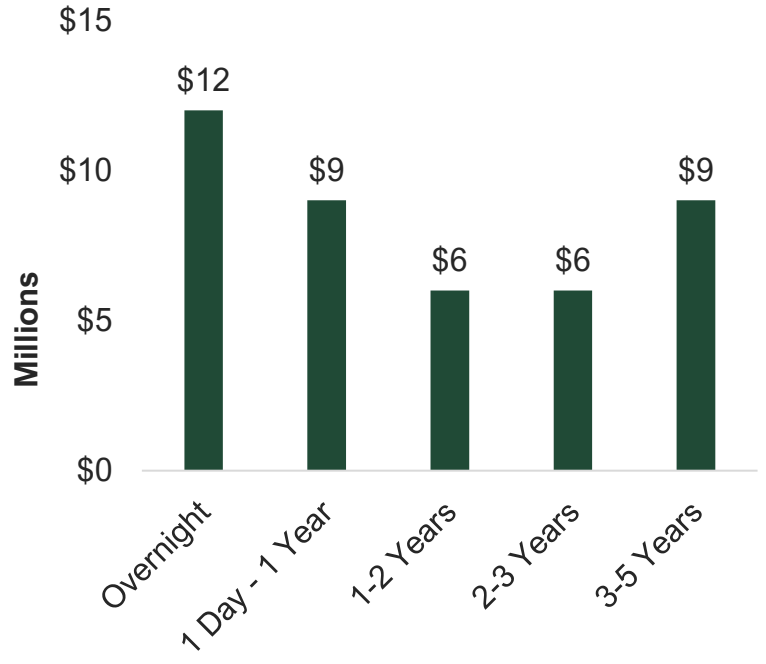
DIFFERENT YIELD ENVIRONMENTS CALL FOR DIFFERENT TERM STRUCTURES



Ladder



Bullet



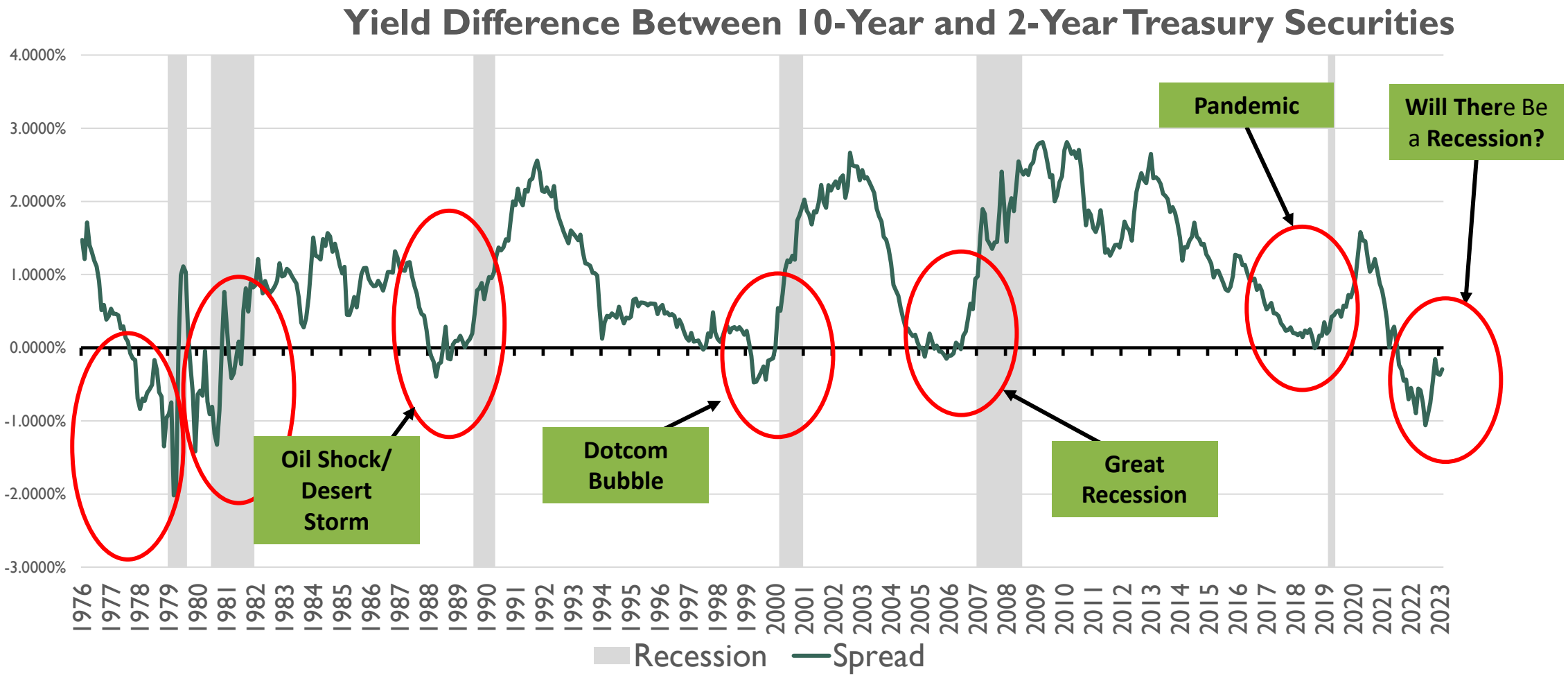
Barbell

This is shown as an example for illustrative purposes only. Please refer to the important disclosures at the end of this presentation.

RATES ARE HIGHER AND CURVE IS INVERTED

Source: Bloomberg

BEWARE OF THE INVERSION!



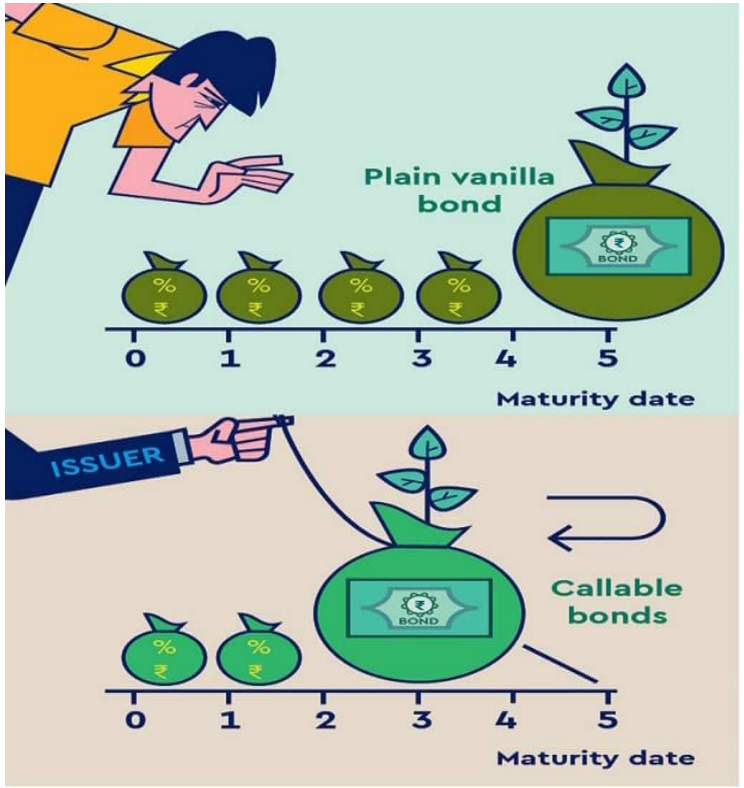
Source: Bloomberg, NBER

KEY CONCEPT #4: UNDERSTANDING CALLABLE STRUCTURES

- **Callable is two securities**
  - Issuer sells fixed income security to investor
    - Value = present value of stream of cash flows
  - Investor sells option to call to issuer
    - Value = probability of being exercised based upon current yield curve, a rate of volatility, and time to exercise date
- **Lock-out period**
  - Call protection; initial period during which issuer can't call bonds

UNDERSTANDING CALLABLE STRUCTURES

- **Federal Agency Callables**: Issuer has option to buy back the bond at a predetermined price and date
  - European—One time call
  - Bermudan—Callable quarterly or semi-annually
  - American—Callable any time after a specific date
  - Canary—Callable until first step, then becomes bullet
  - Verde—Bermuda to first step, callable on step dates
- Make-whole calls—not a federal agency callable!
- When do callables make sense?



CALLABLES AND DURATION

- **Call features reduce effective maturity of bond and therefore reduce effective duration**
- **Callable bonds have several possible durations**
  - Duration to maturity
    - To final maturity (option not expected to be exercised)
  - Duration to call
    - to the first call date (option expected to be exercised)
  - Effective duration is option adjusted
    - duration of bond expressed as level of interest rate volatility and resulting probability option will be exercised
    - effective duration lies between duration to first call and duration to maturity

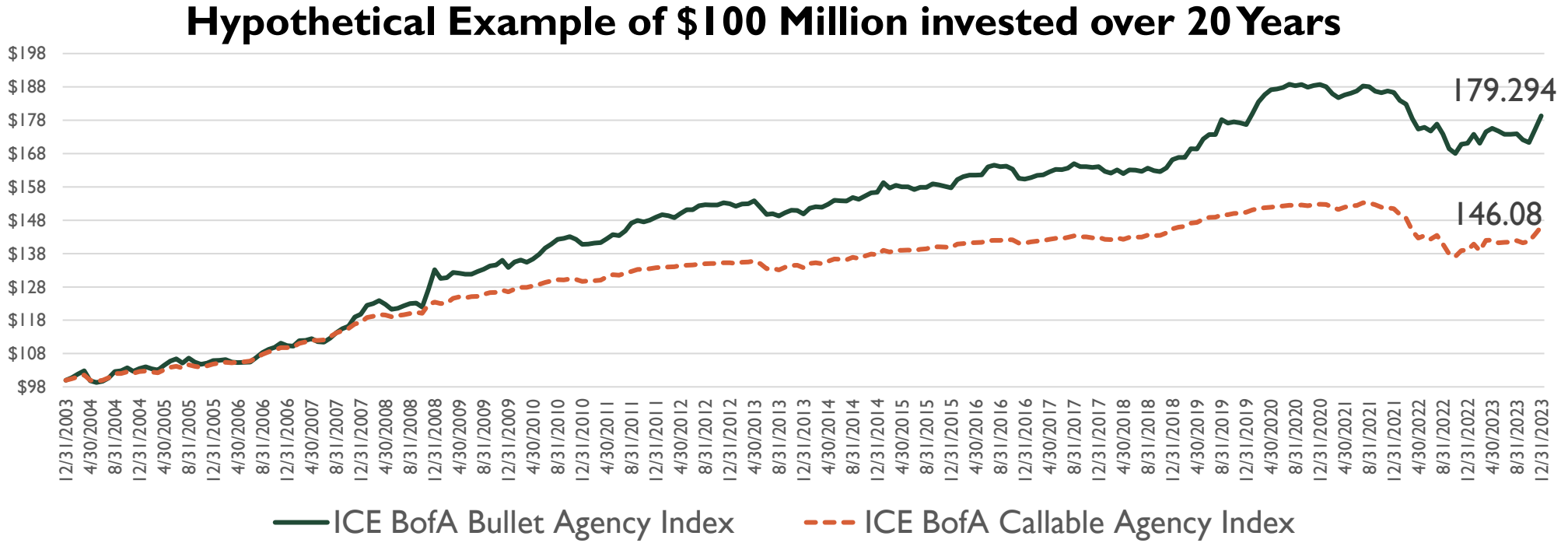
HOW ARE CALLABLES PRICED?

- **Priced at spread to Treasuries**

- **Yield to Worst (YTW)**
  - Which is lesser: Yield to Maturity or Yield to Call

- **Option Adjusted Spread (OAS)**
  - Creates synthetic "bullet"
  - Compare spread from OAS analysis to historical spread for non-callable securities from same market sector

COMPARISON BETWEEN AGENCY CALLABLES AND NON-CALLABLES



- Historically, non-callable agencies have outperformed callable agencies over time.
- Over the past 20+ years the earnings difference for an agency bullet versus a callable agency portfolio was about $383,000 per $1 million invested.

Source: Bloomberg and ICE BofA Indices. Graph demonstrating the performance of commonly used benchmarks among our clients. Historical benchmark performance data for the ICE BofA Bullet Agency Index and Callable Agency Index sourced from Bloomberg AIM. Index returns assume reinvestment of all distributions. Historical performance results for investment indexes generally do not reflect the deduction of transaction and/or custodial charges or the deduction of an investment management fee, the incurrence of which would have the effect of decreasing historical performance results. It is not possible to invest directly in an index. Please see important hypothetical disclosures at the end of this presentation, pages 18-19.

KEY CONCEPT #4: INVESTING IN CREDIT

- Exposure to non-governmental issuers
- Investors receive higher yields when they purchase securities from lower rated issuers
  - Agencies vs. Treasuries
  - Corporates vs. Agencies
  - "A" vs. "AAA"
- Credit ratings change over time
- Yield spreads among different quality and sectors vary over time

BOND CREDIT RATINGS

Moody's		S&P		Fitch		Rating description	
Long-term	Short-term	Long-term	Short-term	Long-term	Short-term		
Aaa	P-1	AAA	A-1+	AAA	F1+	Prime	Investment-grade
Aa1		AA+		AA+		High grade	
Aa2		AA		AA			
Aa3		AA−		AA−			
A1		A+	A-1	A+	F1	Upper medium grade	
A2		A		A			
A3	P-2	A−	A-2	A−	F2		
Baa1		BBB+		BBB+		Lower medium grade	
Baa2	P-3	BBB	A-3	BBB	F3		
Baa3		BBB−		BBB−			

Source: Standard & Poor's, Moody's, Fitch Ratings

- **Credit Outlook**: Evaluates the financial condition of the issuer in relation to the economic environment
- **Credit Watch**: Formal warning of the possible deterioration or upgrade of the financial strength and ability of the issuer to meet their debt obligations

CORPORATE CREDIT

Annual Default Rate Statistics for Global Corporates (1981-2021):

	AAA	AA	A	BBB	BB	B	CCC/C
Minimum	0.00%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%
Maximum	0.00%	0.38%	0.39%	1.02%	4.24%	13.84%	49.46%
Weighted Long-Term Average	0.00%	0.02%	0.05%	0.15%	0.60%	3.18%	26.55%
Median	0.00%	0.00%	0.00%	0.06%	0.58%	3.40%	25.00%
Standard Deviation	0.00%	0.06%	0.10%	0.25%	0.99%	3.25%	11.86%
2008 Default Rates	0.00%	0.38%	0.39%	0.49%	0.81%	4.11%	27.27%
Latest Four Quarters (1Q21-4Q21)	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	10.99%

- The average annual default rate for an Investment Grade-rated issuer is around 0%
- Maximum annual default rates for A-AAA rated issuers are <0.50% (2008)

Three-Year Average Credit Rating Migration for Global Corporates (1981-2021):

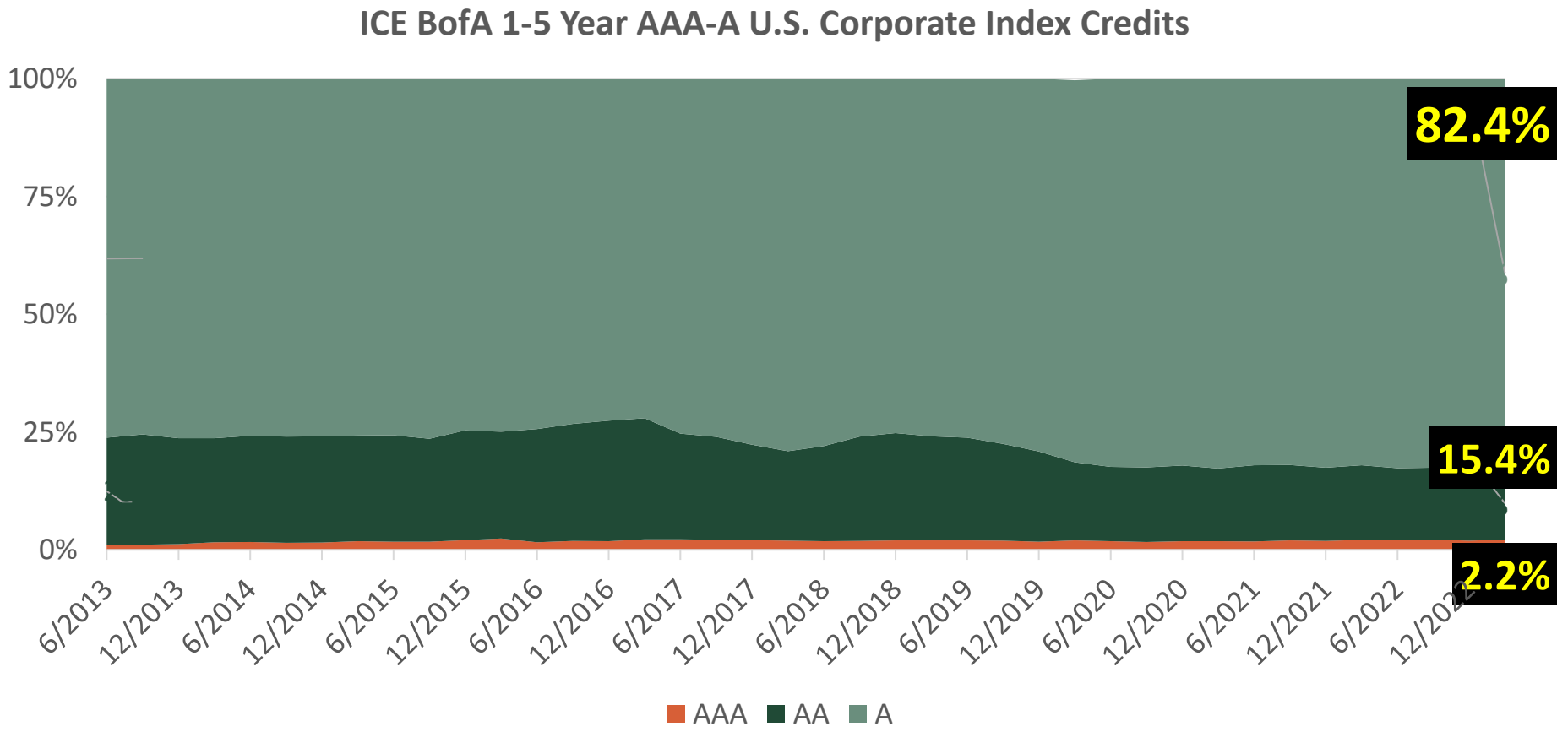
From/To	AAA	AA	A	BBB	BB	B	CCC/C	D	Not Rated
AAA	65.54%	22.15%	2.32%	0.32%	0.26%	0.08%	0.11%	0.13%	9.08%
AA	1.11%	67.26%	18.04%	1.92%	0.32%	0.20%	0.03%	0.11%	11.01%
A	0.05%	3.67%	70.68%	11.14%	1.10%	0.38%	0.08%	0.22%	12.67%
BBB	0.02%	0.24%	7.90%	66.78%	6.71%	1.42%	0.25%	0.74%	15.93%
BB	0.01%	0.05%	0.43%	10.32%	49.13%	11.30%	1.15%	3.39%	24.23%
B	0.00%	0.02%	0.16%	0.63%	9.08%	42.39%	5.26%	11.56%	30.90%
CCC/C	0.00%	0.00%	0.11%	0.50%	1.51%	16.52%	9.73%	42.29%	29.35%

- A-AAA rated issuers have a lower risk of ratings migration to High Yield than BBB issuers

Source: Standard & Poor's 2021 Annual Global Corporate Default and Transition Study.

EVOLUTION OF CREDITS ELIGIBLE FOR PURCHASE BY CA LOCAL GOVERNMENTS

Credits are slim for investors limited to rating category AA or higher!



Source: Bloomberg

QUANTITATIVE RISKS

Examples

- Liquidity
- Solvency
- Leverage
- Profitability
- Operating Efficiency
- Industry Specific Ratios (e.g., reserve replacement ratio)

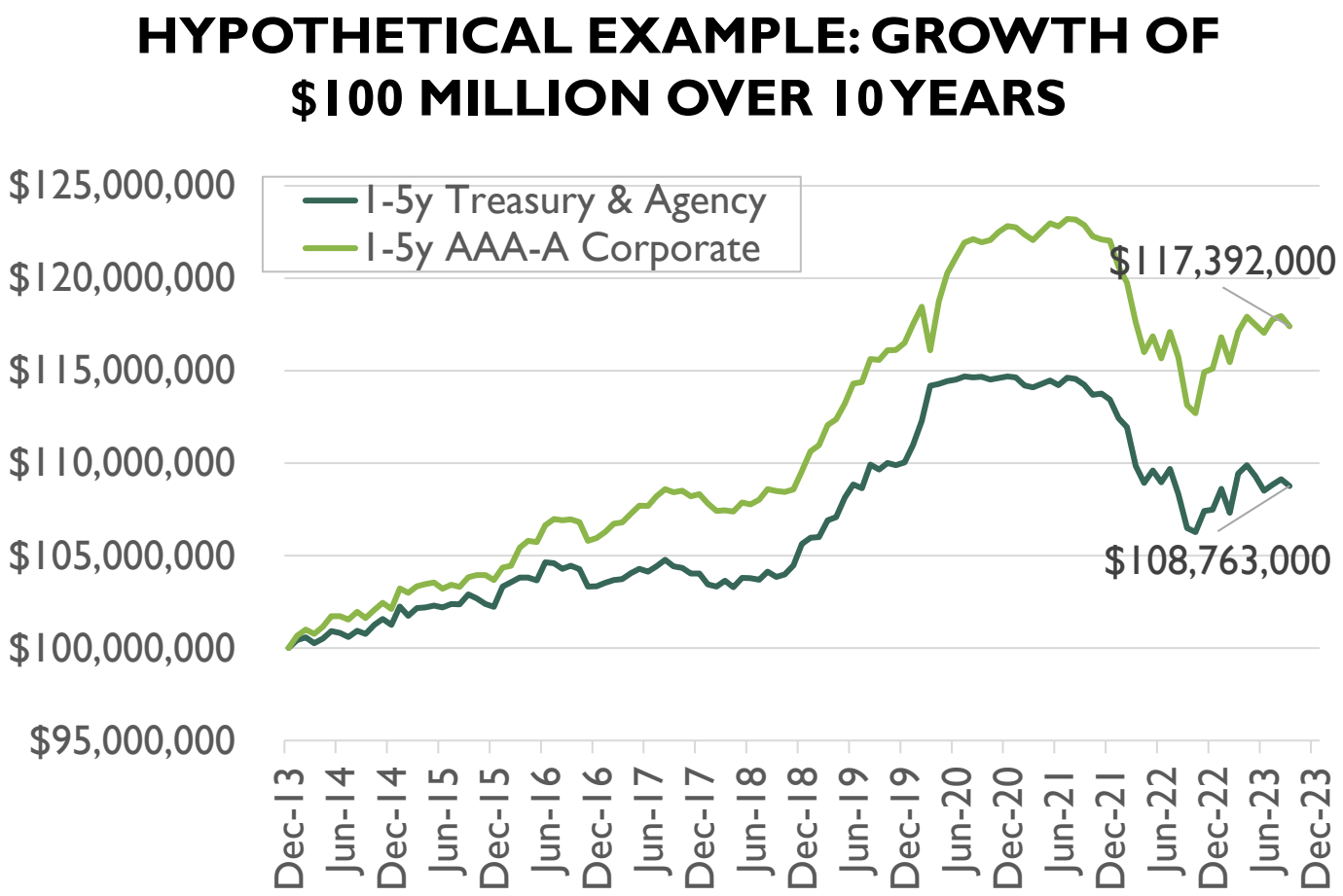
Compare:

- *Temporal trends*
- *Company trends compared to "industry" trends*

Sources for Financial Evaluation

- 10K/10Q/20F
  - Balance Sheet, Income Statement, Statement of Cash Flows, Statement of Shareholder's Equity
  - Footnotes
  - Management Discussion and Analysis
  - Auditor's Report / Opinion
- Bloomberg
- Factset
- Reuters
- Rating Agencies
- Industry and Company Websites

WHY INVEST IN CREDIT SECURITIES?



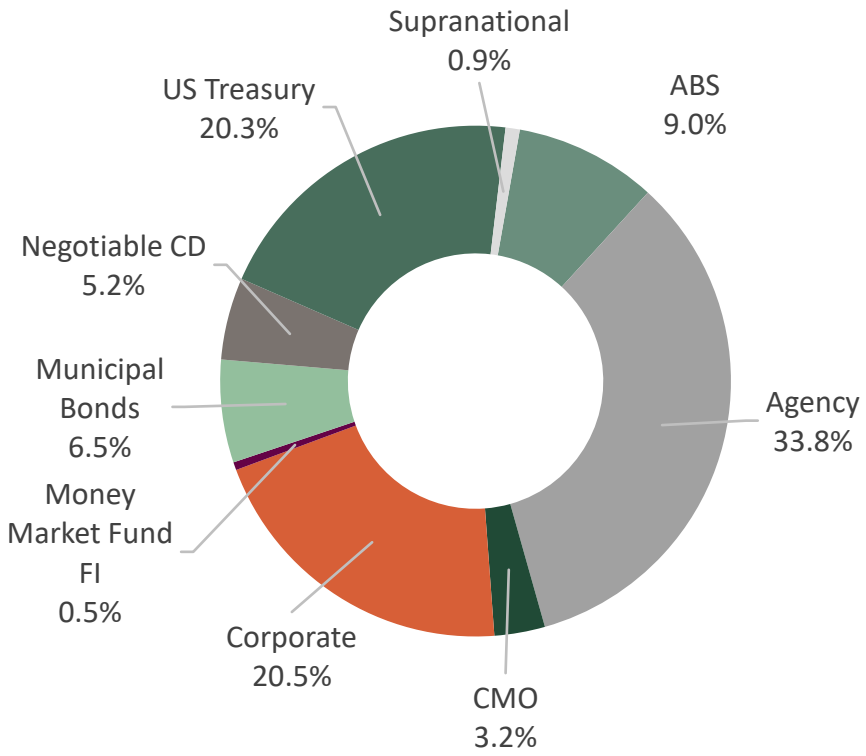
Value on 12/31/2023 of $100 Million invested on 12/31/2013		
	12/31/2023	Annualized Return
1-5y Treasury & Agency	$108,763,000	0.84%
0-5y AAA Fixed Rate ABS	$114,606,000	1.37%
1-5y AAA-A Corporate	$117,392,000	1.61%

Source: Bloomberg. Graph demonstrating the performance of commonly used benchmarks among our clients. Historical benchmark performance data for the 1-5 year Treasury & Agency, 0-5 year AAA Fixed Rate ABS, and 1-5 year AAAA-A Corporate indices sourced from Bloomberg AIM. Index returns assume reinvestment of all distributions. Historical performance results for investment indexes generally do not reflect the deduction of transaction and/or custodial charges or the deduction of an investment management fee, the incurrence of which would have the effect of decreasing historical performance results. It is not possible to invest directly in an index. Please see important hypothetical disclosures at the end of this presentation, page 18-19.

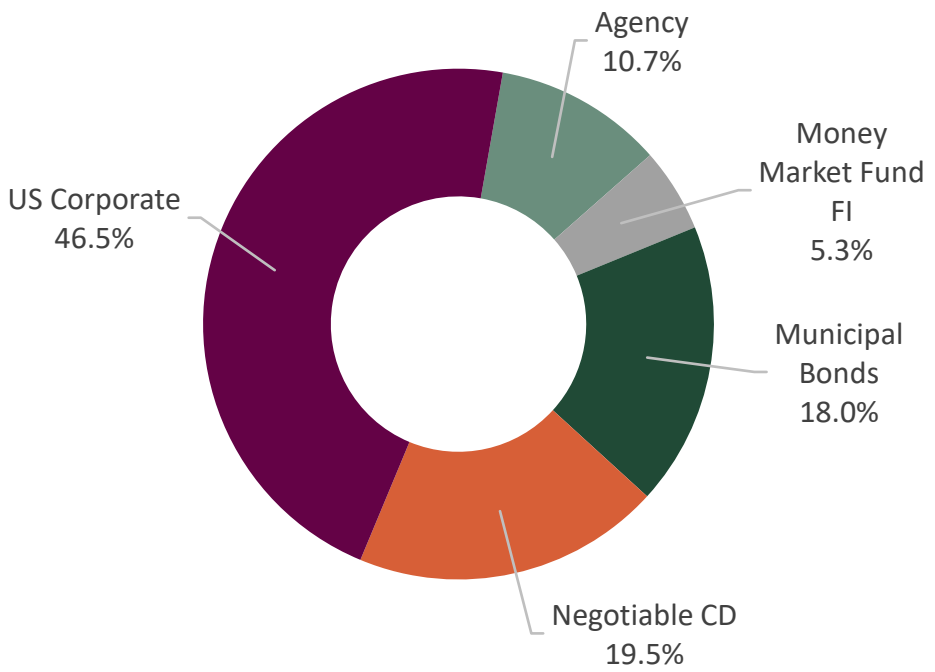
KEY CONCEPT #5

- Rotating sectors can enhance return.

December 31, 2023



June 30, 2023



Sample asset allocation. For illustrative purposes only.

HOW DO WE DO THAT?

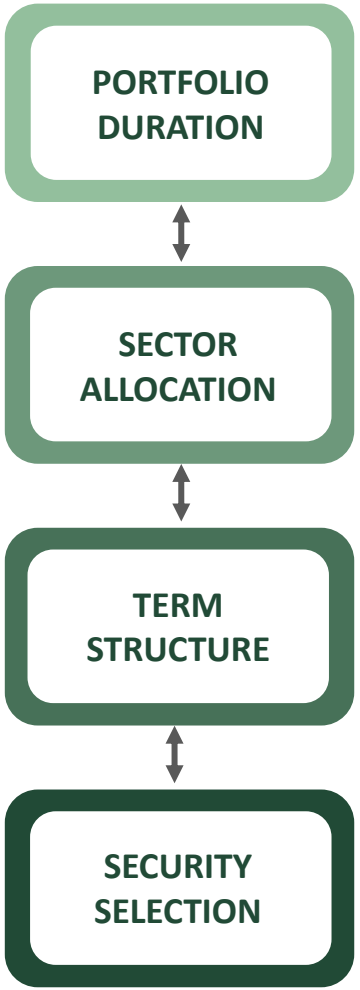
- We monitor spreads between sectors to identify opportunities

Source: Bloomberg

FINAL THOUGHTS

Putting it into context

KEY ELEMENTS TO BUILD PORTFOLIOS



Most impactful on market risk and return

Strategic allocations to key sectors, with value-based rotation

Positioning securities along the yield curve to capture value across maturities

Selecting bonds that meet the Code credit requirements and the greatest potential for risk-adjusted return

RISK MANAGEMENT

- Portfolio management is a specialized form of risk management
- Identifying risks and determining risk exposures
  - **Liquidity risk**: having funds available when needed for disbursements
  - **Credit risk**: deteriorating credit quality impacting the value of the bond, its credit rating and potential for default
  - **Market Risk**: change in interest rates that impacts value of security
    - Inverse relationship
    - The higher the duration, the greater the volatility
- Other risks
  - Reinvestment risk
  - Headline risk - political

THANK YOU!

QUESTIONS?

DISCLOSURES

This report is being provided for informational purposes only. No investment decision should be made based solely on the information provided herein. All investments involve risk, including loss of principal invested. The strategies referenced may not be suitable for all investors. The information contained herein is based on internal research derived from various sources and does not purport to be statements of all material facts relating to the strategies. While not guaranteed as to accuracy or completeness, some of the information has been obtained from sources we believe to be reliable. Opinions expressed herein are subject to change without notice. There can be no assurance that an account or specific investment product will be able to achieve its investment objective. No guarantee of investment performance is being provided and no inference to the contrary should be made.

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Economic factors, market conditions and investment strategies will affect the performance of any portfolio and there are no assurances that it will match or outperform any particular benchmark. The data contained in this presentation is the property of those providers, which were obtained from sources believed to be reliable, but are subject to change at any time at the provider's discretion. Unless otherwise noted, Chandler is the source of data contained in this presentation.

Fixed Income investments are subject to interest, credit and market risk. Interest rate risk: the value of fixed income investments will decline as interest rates rise. Credit risk: the possibility that the borrower may not be able to repay interest and principal. Low rated bonds generally must pay higher interest rates to attract investors willing to take on greater risk. Market risk: the bond market in general could decline due to economic conditions, especially during periods of rising interest rates.

References to specific securities are examples of securities held in a portfolio and are not intended to be, and should not be interpreted as an offer, solicitation, or recommendation to purchase or sell any financial instrument, an indication that the purchase of such securities was or will be profitable, or representative of the composition or performance of the portfolio. The information contained in this sample presentation was obtained from sources we believe to be reliable, but we do not guarantee its accuracy. Past performance is not indicative of future success.

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ICE BofA 1-5 Year US Treasury & Agency Index
The ICE BofA 1-5 Year US Treasury & Agency Index tracks the performance of US dollar denominated US Treasury and nonsubordinated US agency debt issued in the US domestic market. Qualifying securities must have an investment grade rating (based on an average of Moody's, S&P and Fitch). Qualifying securities must have at least one year remaining term to final maturity and less than five years remaining term to final maturity, at least 18 months to maturity at time of issuance, a fixed coupon schedule and a minimum amount outstanding of $1 billion for sovereigns and $250 million for agencies.

The ICE BofA 1-5 Year AAA-A US Corporate Index
The ICE BofA 1-5 Year AAA-A US Corporate Index tracks the performance of US dollar denominated investment grade corporate debt publicly issued in the US domestic market. Qualifying securities must be rated AAA through A3 (based on an average of Moody's, S&P and Fitch). In addition, qualifying securities must have at least one year remaining term to final maturity and less than five years remaining term to final maturity, at least 18 months to final maturity at the time of issuance, a fixed coupon schedule, and a minimum amount outstanding of $250 million.

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