

October 28, 2016

# CDIAC Debt Essentials Seminar

*Group Exercise and Discussion: Bond  
Pricing*

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# Outline

- I. Review of Fundamentals
- II. Pre-Pricing Day (Exercises A & B)
- III. Pricing Day (Exercise C)
- IV. Final Thoughts and Conclusion

# Introduction

- ❖ Your perspective as an issuer
  - You must live with the issue on a long-term basis
  - The underwriter facilitates access to investors
  - Investor relations should play a role in the process

# Key Team Members

## ❖ Municipal Advisor

- Advises the issuer on all matters regarding bond issuance
- Issuer's representative in and to the bond market
- Fiduciary duty to the issuer

## ❖ Underwriter

- Purchases municipal securities for resale; either by competitive or negotiated sale
- Investor relations
- Helps develop structure, credit and marketing plans

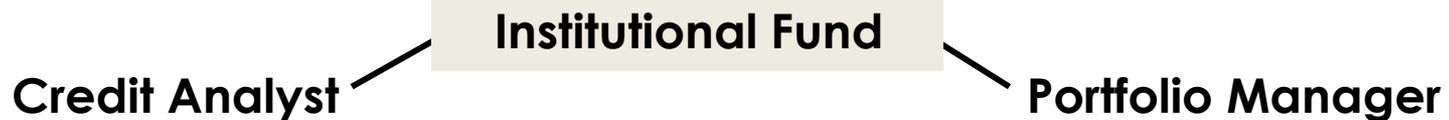
# Who are the Buyers?

## Institutional Investors

- ❖ Mutual/bond funds
- ❖ Insurance companies
- ❖ Hedge funds
- ❖ Tend to buy larger blocks of bonds (>\$1 million)

## Retail Investors

- ❖ Money managers
- ❖ Wealth advisors
- ❖ Individuals
- ❖ Tend to buy smaller blocks of bonds (<\$1 million)



- ❖ Evaluates issuer and provides credit approval
- ❖ Negotiates bond terms
- ❖ Long-term monitoring and credit surveillance

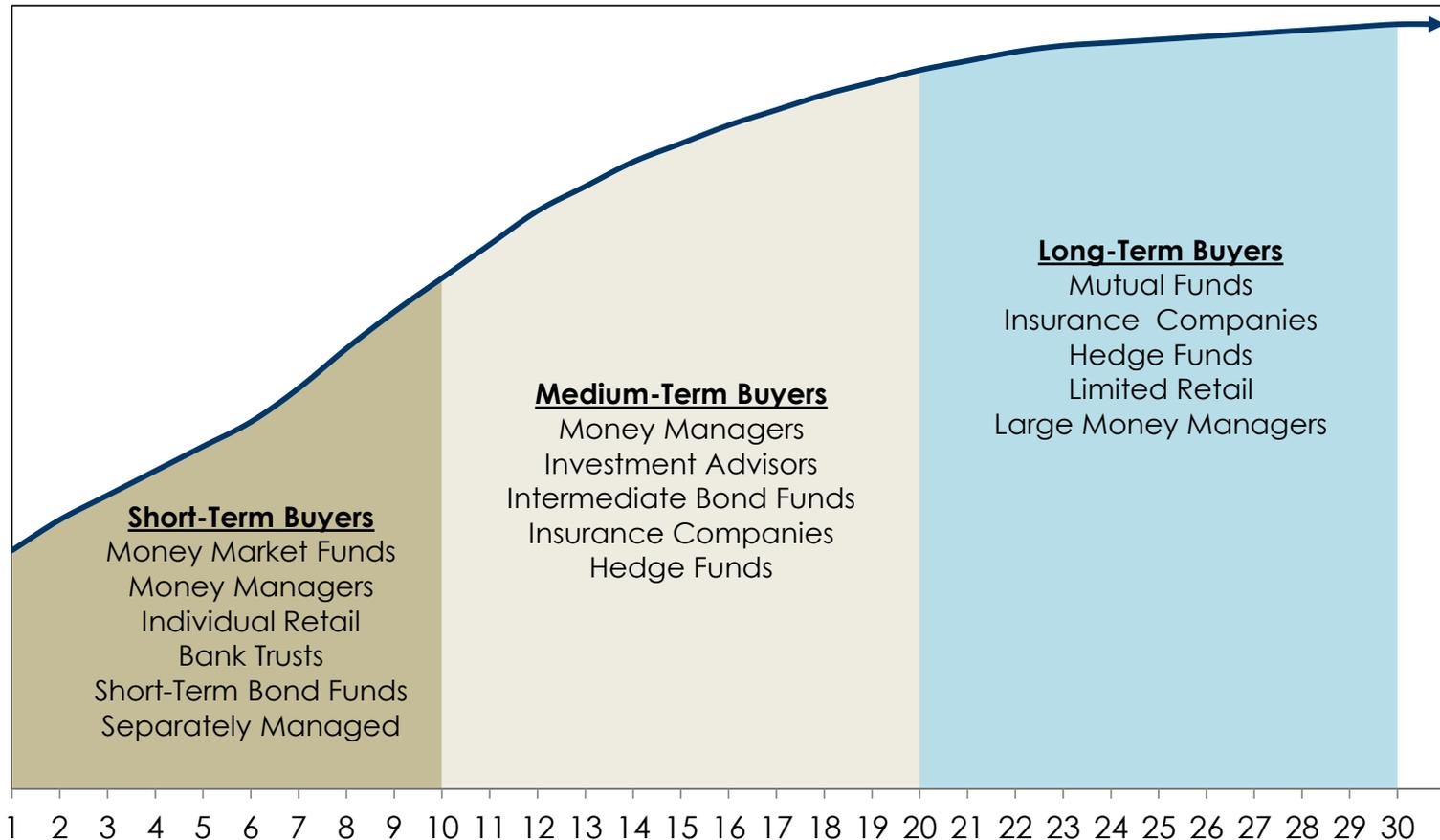


- ❖ Decides how much to buy and at what interest rate
- ❖ Can only buy “credit-approved” deals

**Goal:** Minimize credit risk / default

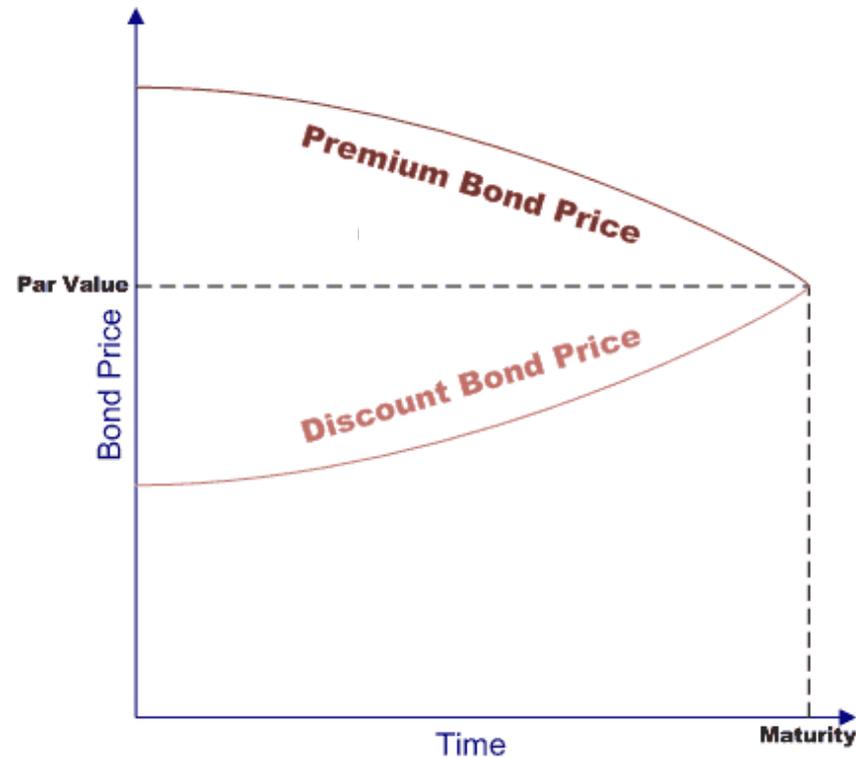
**Goal:** Maximize yield and manage cash inflows/outflows

# Investors Along the Yield Curve



# Review of Bond Pricing Terminology

- ❖ **“Price”** represents the discounted present value of debt service on an individual maturity
  - Debt service is calculated using the coupon, then discounted at the yield
- ❖ **“Yield”** is the rate that equates the present value of the future cash flows to the amount paid for the bond
  - “Yield-to-Maturity” (YTM)
  - “Yield-to-Call” (YTC)
  - Bonds are sold at the “Price-to-the-Worst”
- ❖ **“Premium Bonds”** - Coupon rate is greater than market yield. Price is greater than the par value of the bond
- ❖ **“Discount Bonds”** - Coupon rate is less than market yield. Price is less than the par value of the bond
- ❖ **“Par Bonds”** - Coupon rate equals market yield. Price is equal to the par value of the bond



# Serial Bonds vs. Term Bonds

Serial Bonds	Term Bonds
Principal installments that mature every year over a period of consecutive years.	A series of principal installments that mature on a single date.
No sinking fund payments.	Annual sinking fund payments are made which are used to call bonds (selected by lot) prior to maturity at par.
Each serial bond is structured separately with a specific coupon / yield / price.	All the bonds are structured with the same coupon / yield / price.
Favored by retail & institutional investors.	Favored by institutional investors.

# Sample Bond Pricing Report

	Maturity	Amount	Rate	Yield	Price	Yield to		
	Date					Maturity	Call Date	Call Price
<b>Serial Bonds</b>	1/1/2017	1,680,000	2.000%	0.780%	101.212			
	1/1/2018	1,715,000	3.000%	0.880%	104.193			
	1/1/2019	1,765,000	4.000%	0.960%	108.968			
	1/1/2020	1,835,000	4.000%	1.040%	111.567			
	1/1/2021	1,910,000	5.000%	1.120%	118.815			
	1/1/2022	2,005,000	5.000%	1.200%	121.935			
	1/1/2023	2,105,000	5.000%	1.310%	124.604			
	1/1/2024	2,210,000	5.000%	1.440%	126.809			
	1/1/2025	2,320,000	5.000%	1.560%	128.780			
	1/1/2026	2,440,000	5.000%	1.670%	130.550			
	1/1/2027	2,560,000	5.000%	1.780%	129.377 C	2.010%	1/1/2026	100.000
	1/1/2028	2,690,000	5.000%	1.890%	128.216 C	2.296%	1/1/2026	100.000
	1/1/2029	2,825,000	5.000%	1.970%	127.380 C	2.517%	1/1/2026	100.000
	1/1/2030	2,965,000	5.000%	2.050%	126.550 C	2.709%	1/1/2026	100.000
	1/1/2031	3,110,000	5.000%	2.110%	125.931 C	2.862%	1/1/2026	100.000
	1/1/2032	3,270,000	5.000%	2.170%	125.317 C	2.997%	1/1/2026	100.000
	1/1/2033	3,430,000	5.000%	2.220%	124.807 C	3.110%	1/1/2026	100.000
	1/1/2034	3,600,000	5.000%	2.270%	124.300 C	3.212%	1/1/2026	100.000
1/1/2035	3,785,000	5.000%	2.310%	123.896 C	3.297%	1/1/2026	100.000	
1/1/2036	3,970,000	5.000%	2.350%	123.494 C	3.375%	1/1/2026	100.000	
<b>Term Bond</b>	1/1/2037	4,170,000	3.000%	3.100%	98.269			
	1/1/2038	4,295,000	3.000%	3.100%	98.269			
	1/1/2039	4,425,000	3.000%	3.100%	98.269			
	1/1/2040	4,555,000	3.000%	3.100%	98.269			
	1/1/2041	4,695,000	3.000%	3.100%	98.269			
		22,140,000						

# Overview of Pricing Process

## 1. Developing a Sense of the Market

- Rates, indices, etc.
- Supply and demand

## 2. Preliminary Pricing

- Recent issues
- Secondary market trades
- Competition
- Benchmarks

## 3. The Order Process

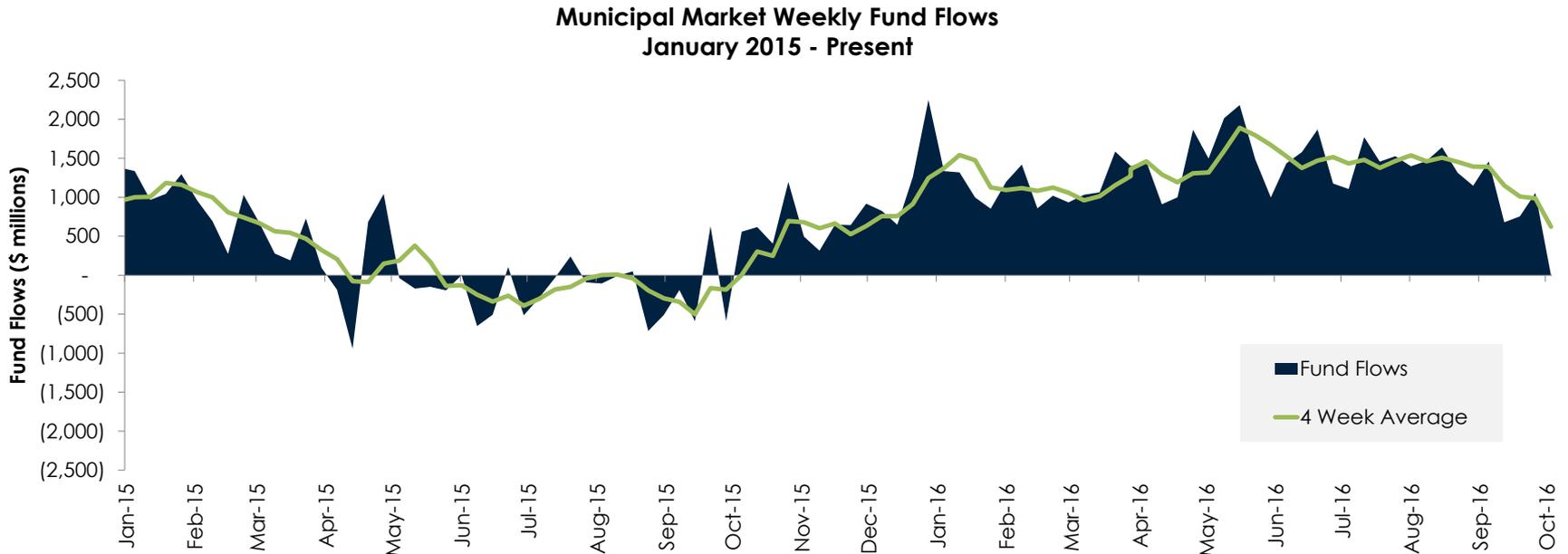
- Who's playing; who's not
- Prices at which orders are entered
- Negotiating
- "Bid" to purchase

# Identifying Market Trends

- ❖ Technical vs. fundamental factors
  - Technical = supply and demand
  - Fundamental = economics and interest rates
- ❖ Forward supply
  - Current inventory (what's currently for sale)
  - Visible supply ("snapshot" of what's coming in next 30 days)
- ❖ Distribution of issues in market
  - By rating
  - By region or state
  - By size

# Municipal Market Demand

- ❖ Positive Fund Flows into Municipal Asset Class
  - 52 consecutive weeks of inflows since October 2015
  - \$53 billion net inflows since the start of the year

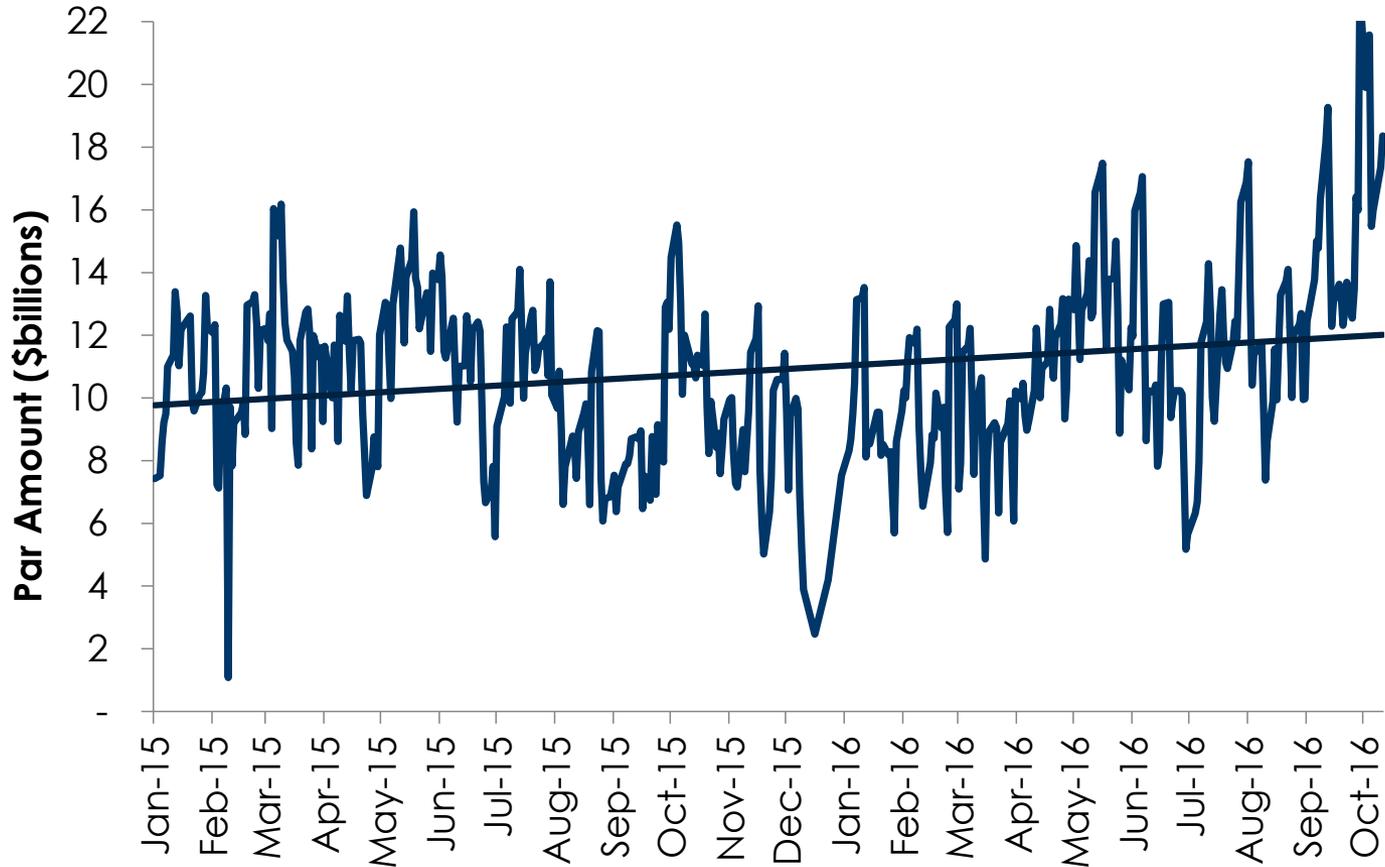


Source: Bloomberg

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# Municipal Market Supply

30-Day Visible Supply  
January 2015 - Present



Source: Bond Buyer

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# Economic Indicators

## November 2016

Monday	Tuesday	Wednesday	Thursday	Friday
	1	2	3	4
	PMI Manufacturing Index ISM Mfg Index Construction Spending	ADP Employment Report EIA Petroleum Status Report FOMC Meeting Announcemen	Jobless Claims Productivity and Costs Factory Orders ISM Non-Mfg Index	Employment Situation International Trade
7	8	9	10	11
	Redbook JOLTS <b>Presidential Election</b>	MBA Mortgage Applications EIA Petroleum Status Report	Jobless Claims Treasury Budget	Consumer Sentiment <b>Veterans Day</b>
14	15	16	17	18
	Retail Sales Empire State Mfg Survey Import and Export Prices Business Inventories	PPI-FD Industrial Production Housing Market Index EIA Petroleum Status Report Treasury International Capital	Consumer Price Index Housing Starts Jobless Claims Philadelphia Fed Outlook	
21	22	23	24	25
	Existing Home Sales	Durable Goods Orders Jobless Claims PMI Mfg Index Flash New Home Sales Consumer Sentiment EIA Petroleum Status Report FOMC Minutes	<b>Thanksgiving Day</b>	International Trade
26	27	28		
Dallas Fed Mfg Survey	GDP S&P Corelogic Case-Shiller HPI Consumer Confidence	ADP Employment Report Personal Income and Outlays Chicago PMI Pending Home Sales Index EIA Petroleum Status Report Beige Book		

Source: Bloomberg

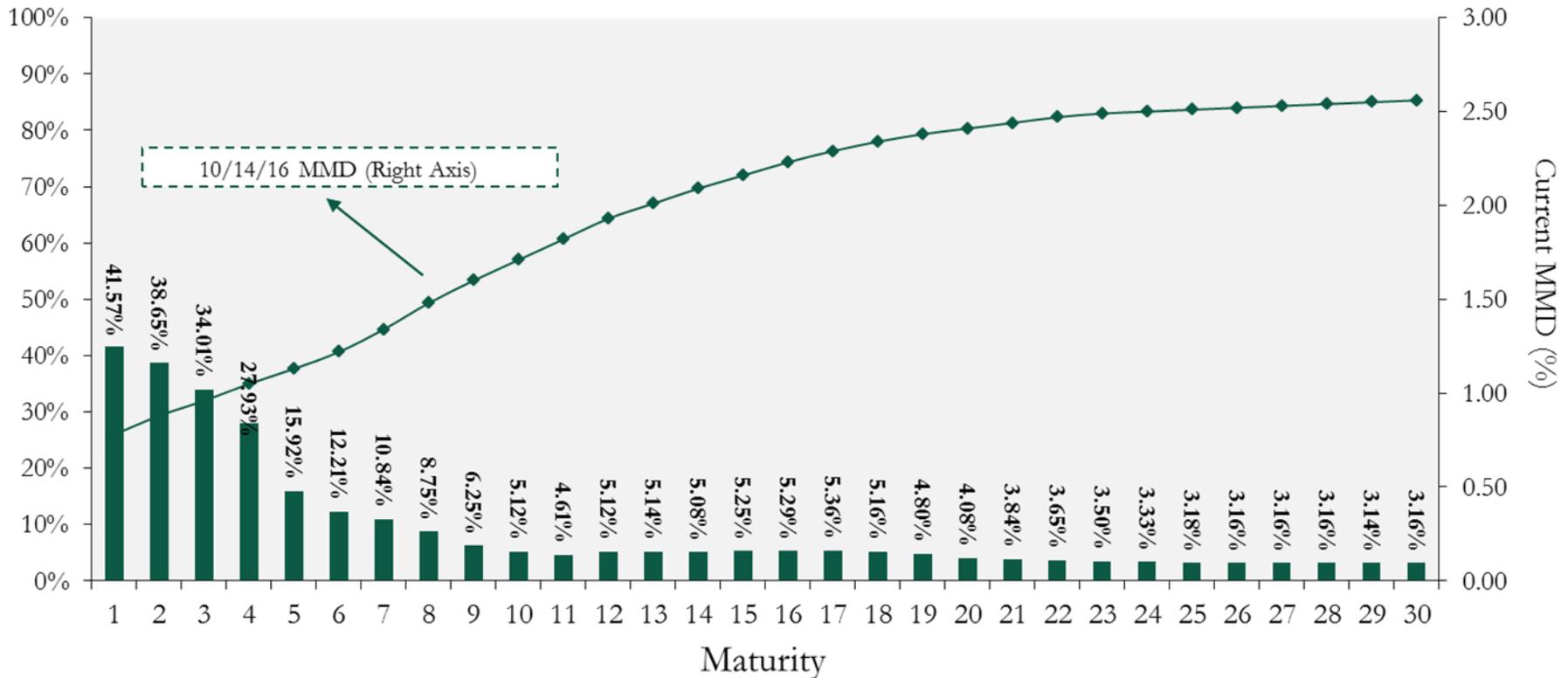
# How Tax-Exempt Interest Rates are Set



- ❖ **"MMD"** – The benchmark interest rate for a "AAA" or a "perfect" tax-exempt bond (interest earned by the investor is "triple tax-exempt")
  - Municipal Market Data is a private company
  - Compiled and adjusted on a daily basis
  - Released to the market after 12 noon (Pacific)
- ❖ **"Spread"** – The additional interest rate over MMD that investors require for the added risk associated with a particular bond

# 30-Year AAA MMD Yield

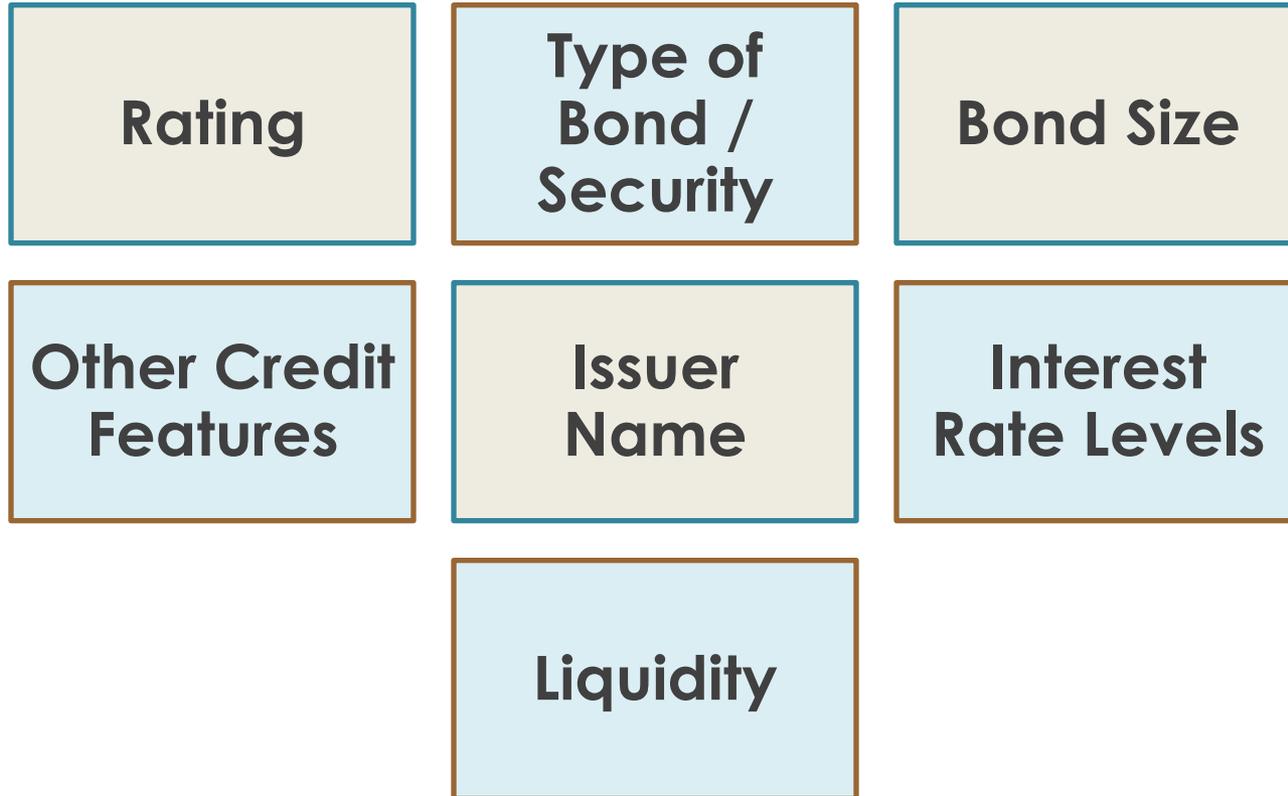
**Current "AAA" MMD and Percentage of Time Historical "AAA" MMD has been Lower than Current "AAA" MMD**  
*from January 2, 1998 through October 14, 2016*



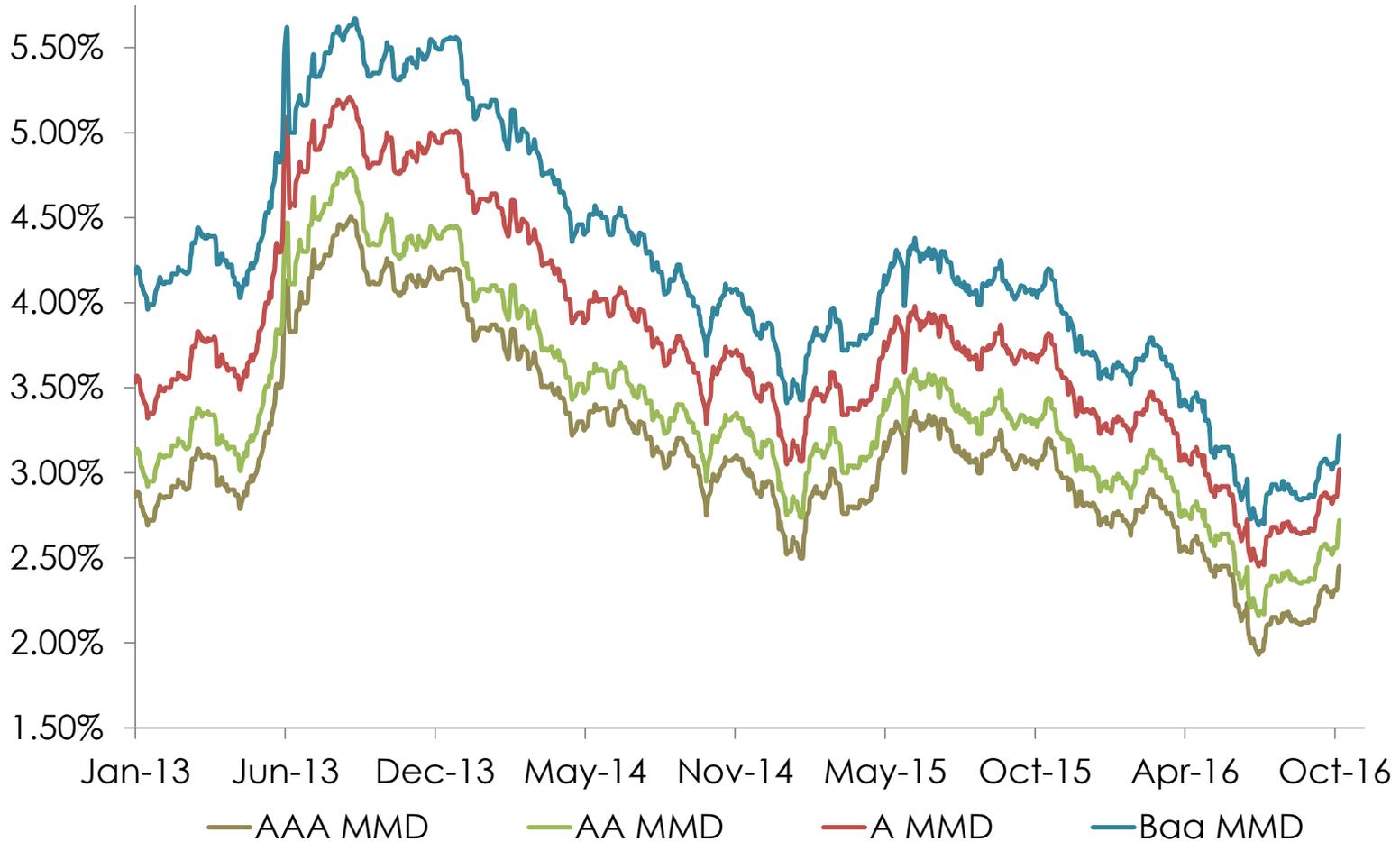
Source: Thomson Municipal Market Monitor

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# Factors that Impact Credit Spreads



# MMD Credit Spreads



Source: Thomson Municipal Market Monitor; as of 10/12/2016

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# Spreads Between Types of Bonds

## Sample "AA-" Spreads to MMD by Security Type

Maturity	General Obligation	Lease Revenue	Enterprise Revenue	Tax Allocation
1-year	+ 5 bps	+ 10 bps	+ 5 bps	+ 10 bps
5-year	+ 5 bps	+ 20 bps	+ 5 bps	+ 15 bps
10-year	+ 20 bps	+ 40 bps	+ 20 bps	+ 30 bps
20-year	+ 30 bps	+ 50 bps	+ 30 bps	+ 40 bps
30-year	+ 30 bps	+ 50 bps	+ 30 bps	+ 40 bps

# How to Use Pricing Comparables

- ❖ Pricing comparables (or “pricing comps”) help you evaluate the proposed and final market pricing levels for your bonds
- ❖ Relevant pricing comps have similar characteristics (bond type, rating, size, etc.) to your bonds
  - Understand “the story” behind comparable transactions
  - Timing of sales / sale date is important
- ❖ If similar financings are limited, other issues may be used as a comp based on spread relationships

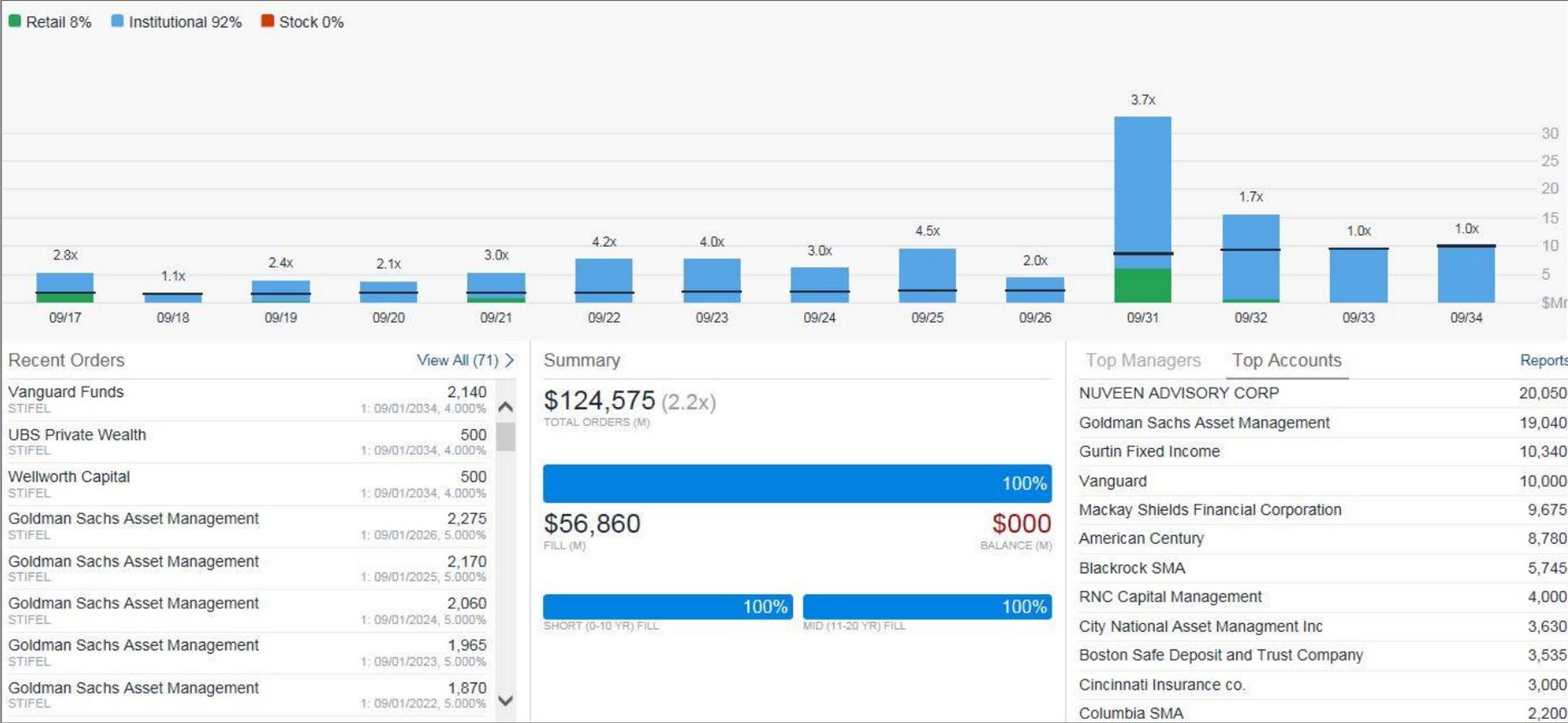
# Understanding the Pricing Comps

- ❖ Comparison of **Spread to MMD** (tax-exempt) or **Spread to US Treasuries** (taxable)

Issue: Call Feature: Principal: Ratings:	Maturity	\$10,000,000 "Newbonds" City Hall COPs 2026 at 100% 6/1 A/A-/NR			\$3,000,000 "Otherbonds" Golf Course COPs 2026 at 100% 6/1 NR/BBB/BBB			\$12,000,000 "Likebonds" Courthouse COPs 2026 at 100% 6/1 A/A+/A+			\$200,000,000 "Statebonds" G.O. Bonds 2026 at 100% 6/1 Aa2/AA/AA		
		MMD as of 10/10/16	Coupon	Yield	Spread to MMD (bps)	Coupon	Yield	Spread to MMD (bps)	Coupon	Yield	Spread to MMD (bps)	Coupon	Yield
2017	0.77%	2.00%	1.02%	+ 25 bps	2.00%	1.07%	+ 30 bps	2.00%	0.92%	+ 15 bps	2.00%	0.82%	+ 5 bps
2018	0.86%	3.00%	1.11%	+ 25 bps	3.00%	1.16%	+ 30 bps	3.00%	1.01%	+ 15 bps	3.00%	0.91%	+ 5 bps
2019	0.94%	4.00%	1.24%	+ 30 bps	4.00%	1.29%	+ 35 bps	4.00%	1.14%	+ 20 bps	4.00%	0.99%	+ 5 bps
2020	1.01%	4.00%	1.36%	+ 35 bps	4.00%	1.41%	+ 40 bps	4.00%	1.26%	+ 25 bps	4.00%	1.06%	+ 5 bps
2021	1.09%	4.00%	1.49%	+ 40 bps	4.00%	1.54%	+ 45 bps	4.00%	1.39%	+ 30 bps	5.00%	1.14%	+ 5 bps
2022	1.17%	4.00%	1.62%	+ 45 bps	4.00%	1.67%	+ 50 bps	4.00%	1.52%	+ 35 bps	5.00%	1.24%	+ 7 bps
2023	1.27%	4.00%	1.72%	+ 45 bps	4.00%	1.82%	+ 55 bps	4.00%	1.62%	+ 35 bps	5.00%	1.34%	+ 7 bps
2024	1.40%	5.00%	1.90%	+ 50 bps	5.00%	2.00%	+ 60 bps	5.00%	1.80%	+ 40 bps	5.00%	1.50%	+ 10 bps
2025	1.52%	5.00%	2.02%	+ 50 bps	5.00%	2.17%	+ 65 bps	5.00%	1.92%	+ 40 bps	5.00%	1.62%	+ 10 bps
2026	1.63%	5.00%	2.15%	+ 52 bps	5.00%	2.30%	+ 67 bps	5.00%	2.05%	+ 42 bps	5.00%	1.75%	+ 12 bps
2027	1.74%	5.00%	2.39%	+ 65 bps	5.00%	2.44%	+ 70 bps	5.00%	2.29%	+ 55 bps	5.00%	1.89%	+ 15 bps
2028	1.86%	5.00%	2.51%	+ 65 bps	5.00%	2.61%	+ 75 bps	5.00%	2.41%	+ 55 bps	5.00%	2.06%	+ 20 bps
2029	1.96%	5.00%	2.66%	+ 70 bps	5.00%	2.76%	+ 80 bps	5.00%	2.56%	+ 60 bps	5.00%	2.16%	+ 20 bps
2030	2.05%	5.00%	2.85%	+ 80 bps	5.00%	2.95%	+ 90 bps	5.00%	2.75%	+ 70 bps	5.00%	2.25%	+ 20 bps
2031	2.11%	5.00%	2.91%	+ 80 bps	5.00%	3.01%	+ 90 bps	5.00%	2.81%	+ 70 bps	5.00%	2.31%	+ 20 bps

# The Order Period

❖ Issuers are able to monitor order flow during order period



# Reviewing the Order Book

- ❖ After the order period, the underwriter makes a final pricing proposal
- ❖ Final pricing proposal may reflect adjustments from the preliminary pricing scale based on market conditions, order book results and investor feedback

## Order Period Results for Select Maturities

Maturities	Amounts (\$000's)	Orders (\$000's)	Subscription	Comments
2017 Serial	930	930	1.00x	Retail (3 orders)
2018 Serial	945	855	0.90x	Retail (1 order)
2019 Serial	960	1,960	2.04x	Retail (2 orders for \$960); member (\$1,000)
2021 Term	10,000	2,000	0.20x	Institutional (1 order)
2041 Term	12,000	36,000	3.00x	Institutional (3 orders of \$12,000 each)

**What adjustments can we negotiate?**

# Receiving the Bid

- ❖ Critical information:
  - Strength of market
  - Quality of orders as well as quantity
  - How many bonds on the “street” after the award?
- ❖ Do I care if the underwriter loses money?
- ❖ What happens after the award is important
  - MSRB trade activity reporting system as a resource
  - Reports from the underwriter at syndicate/account closing

# Marketing and Pricing Process

## Internal Marketing (3 weeks to pricing)

Distribute POS, rating report, maturity structure internally

Receive feedback from underwriting / trading / sales teams on structure

Develop a sales point memorandum

Internal meetings to brief institutional & retail sales teams

Distribute POS, rating report, maturity structure to investors



## Credit Approval (1 week to pricing)

Schedule individual meetings/calls with credit analysts (as needed)

Answer questions / receive feedback from investors

Receive credit approvals for the transaction



## Pricing Process (week of pricing)

Review overall market conditions & municipal flows

Review recent bond comparables & trading levels

Develop "price thoughts" and provide market update to client

Pre-pricing call to develop consensus scale

Hold order period; review order book with client

Agree on final interest rate scale; confirm orders with investors

# Detailed Pricing Timeline

## PRE-PRICING DAY

- **1:00 PM:** Underwriter Distributes Pre-Pricing Presentation (including Pricing Comps and Proposed Pre-Pricing Scale)
- **2:00 PM:** Hold Pre-Pricing Call with Issuer and Municipal Advisor

## PRICING DAY

- **5:30 AM:** Review Market Conditions; Adjust Scale (as needed)
- **7:00 AM:** Release Scale; Open Bond Order Period
- **9:00 AM:** Close Bond Order Period
- **10:30AM:** Distribute Final Pricing Scale
- **11:00 AM:** Pricing Call; Receive “Verbal Award”
- **11:45 AM:** Receive Cash Flow Verification (in the case of a refunding)
- **12:00 PM:** Distribute Final Bond Cash Flows
- **12:00 PM:** Final Bond Purchase Agreement Distributed
- **12:30 PM:** Bond Purchase Agreement Signature Pages Released (“Written Award”); Orders Confirmed with All Investors

# Questions?

