Introduction to Municipal Bonds

Session One: Bond Concepts
October 26, 2016

Presenters:
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Craig Hill, Municipal Advisor – NHA Advisors, LLC
Overview of Presentation

1. Introduction to Bonds
   • Purpose for issuing
     • Funding Projects
     • Refinancing
   • Key terms

2. Process of Issuing
   • Types of Bonds
   • Key participants
   • Timing and Process
   • Structuring and Pricing Bonds
   • Credit Ratings
   • Costs of Issuing
   • Debt Policies & Considerations

3. Basic Bond Math
   • Present Value Calculations
   • Calculating Yield and Yield Curve
   • PMT Calculations
   • True Interest Cost Calculations

4. Real Life Example:
   Golden 1 Center, Sacramento
• What is a Municipal Bond?
  ▪ A Promise of a Borrower (Issuer) to repay a Lender (Bondholder)
  ▪ Issuer receives upfront cash payment and owes annual payments at a fixed interest rate
  ▪ Bondholder receives future repayment with interest

• Personal Example – Home Mortgage
  ▪ Homeowner gets upfront cash from Bank to buy home
  ▪ Bank gets homeowner’s promise to make payments with interest
Purpose of Municipal Bonds

• Typically issued for infrastructure (water, sewer, streets, bridges, utilities) and capital improvement projects (libraries, fire/police stations, community centers, stadiums, parks)
  
  • Used as an alternative to cash or bank loans

• Tax-exempt bonds cannot be used to pay for operating expenses

Source: MTC.ca.gov
Source: City of San Dimas
Source: OC Register
Source: Charles O'Rear
### Ways to Fund Projects

<table>
<thead>
<tr>
<th>Cash (&quot;Pay-As-You-Go&quot;)</th>
<th>Bond Financing</th>
<th>Federal and State Grants or Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Small and recurring capital projects</td>
<td>• Large capital expenditures</td>
<td>• “Free” money with strings attached</td>
</tr>
<tr>
<td>• Projects built slowly over time</td>
<td>• Acquisition Projects</td>
<td>• May require oversight or thorough review</td>
</tr>
<tr>
<td>• Future Council flexibility</td>
<td>• Future revenues from Project available for debt service</td>
<td>• Application process can be drawn-out and competitive</td>
</tr>
<tr>
<td>• Opportunity cost of funds</td>
<td>• Interest and financing costs</td>
<td>• Timing of funds can be uncertain</td>
</tr>
<tr>
<td>• Easiest source of money</td>
<td>• Staff resources required for financing</td>
<td></td>
</tr>
</tbody>
</table>
Basic Reasons for Issuing Bonds

- Project Funding
- Restructuring/Refinancing Existing Debt
  - Some bonds can be redeemed prior to maturity (called)
    - If current market interest rates are lower now than when the bond was issued, it may make financial sense to issue new bonds at the lower interest rate to refund the outstanding bonds.
    - Responsible practices dictate refunding should result in minimum 3-5% present value savings, barring extenuating circumstances
- Working Capital or Cash Flow Management (short-term notes)
Tax Exempt Nature of Municipal Bonds

• Most municipal bonds are **tax-exempt**
  • Bondholders do not pay State of Federal income tax on interest earnings from municipal bond
  • Investors are willing to purchase bond at lower interest rate
  • IRS reprieve to help local governments fund projects and compete in the capital market for investors against corporate bond issuers

• Issuers are not allowed to earn “Arbitrage”
  • General rule – Issuers can invest bond proceeds and earn yield no higher than weighted average cost of funds on bond (known as **Arbitrage Yield**)
  • All excess earnings must be “Rebated” to IRS – 100% tax

• Government gives up income tax revenues from bondholders on the interest of the bond
Introductory Vocabulary

**Issuer**: Legal authority to approve and issue Bond

**Principal**: Total amount borrowed (also known as par value)

**Coupon**: Nominal interest rate charged on the Principal

**Interest**: Additional amount paid on Principal (calculated with Principal times Coupon)

**Debt Service**: Annual Principal and Interest payments on the Bond

**Maturity**: Date Principal is due
Bond Structures

- Bonds are secured by different revenue sources
- Some require voter approval

<table>
<thead>
<tr>
<th>Bonds Repaid With Dedicated Taxes</th>
<th>Bonds Repaid From General Fund</th>
<th>Special Revenue Fund Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Obligation (GO) (Local)</td>
<td>Lease Revenue (LRB)</td>
<td>Enterprise Revenue</td>
</tr>
<tr>
<td>Sales Tax Revenue</td>
<td>Certificates of Participation (COP)</td>
<td>✓ Water/Sewer</td>
</tr>
<tr>
<td>Special Tax</td>
<td>Pension Obligation</td>
<td>✓ Parking</td>
</tr>
<tr>
<td>Assessment</td>
<td>GO (State level only)</td>
<td>✓ Refuse</td>
</tr>
<tr>
<td>Tax Allocation (Redevelopment)</td>
<td></td>
<td>✓ Airport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Golf Course</td>
</tr>
</tbody>
</table>
Voter Approval Required for Certain Types of Bonds

• Once a municipality has decided to issue bonds, it may require voter approval to proceed
• Typically includes general obligation bonds or special tax type obligations
Major Exceptions to Voter Approval Requirement

1. General Fund Lease Bonds
   • Secured by lease payments for use of an asset
   • Example: Financing Authority leases City Hall to City in exchange for “rent” payments which equal debt service on Bonds
     • Similar to equipment or vehicle lease

2. Special Revenue Funds
   • Debt service comes from specific revenue source
   • Utility rates may be subject to approval process (Prop 218)
   • Example: Water, sewer, parking, refuse, airport, convention center and golf course

3. Obligation Imposed by Law
   • Involuntary debt obligations, enacted by a court
   • Example: Pension Obligation or Bankruptcy
Process of Issuing a Bond

From Start to Finish
Financing Plan

Identify Project Needs and Cash Flow
- Timing of expenditures

Quantify Available Cash Resources to Apply towards Project

Project Repayment Resources for ongoing Debt Service

Develop Financial Model
- Sources of Project Funding (Bonds and/or Cash)
- Bond Debt Service
- Available Annual Revenues
- Coverage (Revenues/Debt Service)
Debt Policy Considerations

- Essentiality of Project
- Reserve levels to be maintained
- Available cash to be applied towards Project
- Financing structure
  - Limit financial exposure to critical services (general fund)
- Financial Assumptions
  - Conservative revenue growth assumptions
  - Drought impact on water revenues
  - Credit rating implications and impact on market interest rates
- Continuing Disclosure Obligation
Assemble Financing Team

- **Issuer/Borrower**: Public agency responsible for approval and repayment obligation
- **Municipal Advisor**: Project manager who develops and implements financing plan on behalf of issuer
- **Bond Counsel**: Legal representation regarding the tax-exempt status and legitimacy of the Bonds
- **Disclosure Counsel**: Legal representation to Issuer & Bondholders on disclosure of credit - Official Statement (OS)
- **Bond Underwriter**: Serves as a middle-man to aggregate bondholders to sell Issuer Bonds
  - Makes an offer to the Issuer to purchase Bonds and resell to bondholders (individual, institutional)
  - If Bonds are not all pre-sold, underwriter “holds” the balance for future resale
- **Trustee**: Administrative duties related to protecting bondholders including collecting payments from Issuer and disbursement to bondholders
- **Rating Agency**: 3rd party credit review firm responsible for assigning rating based on creditworthiness of Issuer and Bond structure (relied on by Bondholders)
The Underwriting Process

• The underwriter has a unique role: they act as the middle-man, buying bonds wholesale from the issuer and selling them on the market.
• Involved in pricing the bond and determining market-appropriate interest rates
• Solicits investor interest
The Underwriting SELECTION Process

**Competitive Sale**
- Financing Structure created with Issuer, Bond Counsel and Municipal Advisor
- Underwriter services bid like construction project
- Typically, traditional Bond structure or higher rated credits

**Negotiated Sale**
- Underwriter selected early to assist in creation of Financing Structure
- Allows Underwriter to better understand the credit to improve sale of bonds
- Typically used on weaker rated credits
Bond Sources and Uses

**Sources**
- **Principal/Par Amount** – Total obligation amount (face value of Bond)
- **Purchase Premium** – Amount generated from bondholders when Coupon is higher than market rate for similar maturity

**Uses**
- **Project Fund** – Project requirement
- **Capitalized Interest Fund** – Proceeds used to make interest payments while Project is being completed
- **Debt Service Reserve Fund** – Proceeds set aside in trust account to protect bondholders and make debt service payment if Issuer is unable to make payment. Typically the lesser of 3 tests
  1. Maximum annual debt service
  2. 10% of par value
  3. 125% of average annual debt service
- **Cost of Issuance**: Financing costs for bond & disclosure counsel, municipal advisor, rating agency, trustee, title or property insurance, official statement distribution
- **Underwriter’s Discount**: Fee paid to underwriter to sell Bonds

### Sources
- **Bond Principal**: $10,000,000
- **Purchase Premium**: $500,000
- **Total Proceeds**: $10,500,000

### Uses of Funds
- **Project Fund**: $8,000,000
- **Capitalized Interest**: $1,500,000
- **Debt Service Reserve**: $800,000
- **Costs of Issuance**: $150,000
- **Underwriter Discount**: $50,000
- **Total Proceeds**: $10,500,000
Serial and Term Bonds

- **Bond issue will include multiple maturities that can be either Serial or Term Bonds**
- **Serial Bonds** – Single bond with one maturity
- **Term Bonds** – Single Bond with annual redemption of identified portion of Principal prior to final maturity
  - **Sinking Fund provision** ensures that the municipality pays off portions of the term bond each year
  - Bondholder does not know if their portion of Term Bond will be paid on sinking date or at final maturity (trustee uses lottery to determine who is paid early)
- Bond amortization similar to mortgage schedule with portion including interest and principal

<table>
<thead>
<tr>
<th>Matures</th>
<th>Principal</th>
<th>Coupon</th>
<th>Interest</th>
<th>Debt Service</th>
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</thead>
<tbody>
<tr>
<td>Serial</td>
<td>6/30/2017</td>
<td>$</td>
<td>1.50%</td>
<td>$ 150,000</td>
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<tr>
<td>Serial</td>
<td>6/30/2018</td>
<td>$ 500,000</td>
<td>1.75%</td>
<td>$ 168,966</td>
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<tr>
<td>Serial</td>
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<td>$ 550,000</td>
<td>1.80%</td>
<td>$ 167,586</td>
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<tr>
<td>Serial</td>
<td>6/30/2020</td>
<td>$ 560,000</td>
<td>2.00%</td>
<td>$ 179,310</td>
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<tr>
<td>Serial</td>
<td>6/30/2021</td>
<td>$ 575,000</td>
<td>2.25%</td>
<td>$ 193,966</td>
</tr>
<tr>
<td>Serial</td>
<td>6/30/2022</td>
<td>$ 590,000</td>
<td>2.50%</td>
<td>$ 206,897</td>
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<tr>
<td>Serial</td>
<td>6/30/2023</td>
<td>$ 600,000</td>
<td>2.75%</td>
<td>$ 218,103</td>
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<tr>
<td>Term</td>
<td>6/30/2026</td>
<td>$ 2,000,000</td>
<td>4.00%</td>
<td>$ 303,448</td>
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</table>

**Mandatory Sinking Fund Prepayment for 6/30/2026 Term Bond**

<table>
<thead>
<tr>
<th>Payment Date</th>
<th>Principal Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/30/2024</td>
<td>$ 600,000</td>
</tr>
<tr>
<td>6/30/2025</td>
<td>$ 650,000</td>
</tr>
<tr>
<td>6/30/2026 (maturity)</td>
<td>$ 750,000</td>
</tr>
</tbody>
</table>
Determining Debt Service Schedule

• Structure the debt service according to the unique needs and situation of Project
  • **Amortization** refers to payment of Principal and the Interest due on the outstanding Principal balance each year
  • Level Debt service characterized by increasing Principal payments and decreasing Interest payments over time
  • **Current Interest Bonds** pay semi-annual Interest throughout the life of the Bond
  • **Capital Appreciation Bonds** pay accrued Interest at maturity (**Zero Coupon**)
  • Part of the financing costs can be defrayed using investment earnings on bond proceeds (with restrictions)
Alternative Debt Structures

Level Principal Debt Schedule

Debt Structure with "Wrap Around" Solution

- Pre-Existing Debt Structure
- New Principal Payments
- Interest
Credit Rating Agencies

• Three Big Agencies are 3rd party assessors of credit quality
  • Standard & Poor’s
  • Moody’s Investors Service
  • Fitch Ratings

• Credit rating reflects likelihood that the Issuer will repay Bond
  • Rating reflects the security of the bond and the ability of the issuer to make debt service payments
  • Higher rated Bonds are considered safer and will have lower required interest rates
  • “AAA” rated agencies like Beverly Hills can issue Bonds at lower rates than “A” rated agencies

• Municipalities may issue non-rated bonds as an alternative to paying for a credit rating
  • Investor require higher interest rate
  • If the issue is small or if the municipality expects a sub-BBB rating, a non-rated bond may be the financially wiser option

<table>
<thead>
<tr>
<th>S&amp;P</th>
<th>Moody's</th>
<th>Fitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>Aaa</td>
<td>AAA</td>
</tr>
<tr>
<td>AA+</td>
<td>Aa1</td>
<td>AA+</td>
</tr>
<tr>
<td>AA</td>
<td>Aa2</td>
<td>AA</td>
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<tr>
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<td>Aa3</td>
<td>AA-</td>
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<tr>
<td>A+</td>
<td>A1</td>
<td>A+</td>
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<tr>
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<td>A2</td>
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</tr>
<tr>
<td>A-</td>
<td>A3</td>
<td>A-</td>
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<tr>
<td>BBB+</td>
<td>Baa1</td>
<td>BBB+</td>
</tr>
<tr>
<td>BBB</td>
<td>Baa2</td>
<td>BBB</td>
</tr>
<tr>
<td>BBB-</td>
<td>Baa3</td>
<td>BBB-</td>
</tr>
<tr>
<td>BB+</td>
<td>Ba1</td>
<td>BB+</td>
</tr>
<tr>
<td>BB</td>
<td>Ba2</td>
<td>BB</td>
</tr>
<tr>
<td>BB-</td>
<td>Ba3</td>
<td>BB-</td>
</tr>
<tr>
<td>B+</td>
<td>B1</td>
<td>B+</td>
</tr>
<tr>
<td>B</td>
<td>B2</td>
<td>B</td>
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<tr>
<td>B-</td>
<td>B3</td>
<td>B-</td>
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<td>CCC+</td>
<td>Caa1</td>
<td>CCC+</td>
</tr>
<tr>
<td>CCC</td>
<td>Caa2</td>
<td>CCC</td>
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<td>CCC-</td>
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<td>CCC-</td>
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<td>Ca</td>
<td>CC+</td>
</tr>
<tr>
<td>C</td>
<td>CC</td>
<td>CC-</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

Highest Grade
Upper Mid Grade
Lower Mid Grade
Non-Investment Grade
Highly Speculative
In Default
Credit Ratings and Yields

- Currently, required yield on a “A” rated GO bond with 30 years to maturity is **about 0.55% higher** than the required Yield on a “AAA” rated GO bond with the same maturity
  - Compensate investors for the higher risk of purchasing a bond with a lower credit rating (i.e. a higher chance of default)
  - An issuer that pays for bond insurance and effectively increases their rating from an “A” rating to an “AA” rating can save up to 0.25% on interest payments

- From a historical perspective, required yields on GO bonds are lower than they have been in the past 30 years
  - Implication is that refinancing done now will save money for the municipality in the long run (i.e. amount saved is equivalent to the difference in yields multiplied by time)
Credit Enhancements

• Bond insurance companies can “credit wrap” an Issuer’s Bonds

• Guarantees the Bondholder/Investor additional protection in the event Issuer cannot make the payment

• Issuer pays a one-time premium to Bond Insurance Company for “insured Rating”
  • Rating agencies assign rating to Bond Insurance Company based on financial reserves, credit exposure

• Issuer Bond rating becomes rating of Bond Insurance Company
  • Could change over time if financial position of Bond Insurance Company improves or becomes weaker
Determine Market Interest Rates

- Market rates based on Bond rating and Issuer credit qualities
- Principal amount will also determine bondholder interest
  - Too small and institutional investors will ignore regardless of credit rating
- Market transparency makes finding comparable bond issues easy (TM3 database)
- Special Bond Characteristics
  - Green Bonds – Special class of investors
  - Bank Qualified – Smaller Issuers provide traditional banks with tax credits if invested in “Bank Qualified Bonds” – typically under $10,000,000 in a single year
Pricing the Bonds

• **Reoffering Yield**: Return to Bondholder after adjusting Coupon for initial purchase premium or discount
  - “Return on investment” from the perspective of the investor.
  - As price increases, yield (return) decreases

• **Premium Bonds** have a Coupon higher than the current market rates; Purchase price above 100
  - Premium bond prices typically less volatile but have higher risk of being called later

• **Par Bonds** have a Coupon rate that matches current market rates; Purchase price 100

• **Discount Bonds** have a Coupon lower than the current market rates; Purchase price below 100
  - Discount Bonds less likely to be called

<table>
<thead>
<tr>
<th>Settlement Date</th>
<th>Maturity Date</th>
<th>Coupon</th>
<th>Market Yield</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>4.00%</td>
<td>104.452</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>4.25%</td>
<td>103.316</td>
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<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>4.50%</td>
<td>102.195</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>4.75%</td>
<td>101.090</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>5.00%</td>
<td>100.000</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>5.25%</td>
<td>98.925</td>
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<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>5.50%</td>
<td>97.865</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>5.75%</td>
<td>96.819</td>
</tr>
<tr>
<td>12/1/2016</td>
<td>12/1/2021</td>
<td>5.00%</td>
<td>6.00%</td>
<td>95.788</td>
</tr>
</tbody>
</table>
Effect of Price on Bond Size

- Issuing a premium Bond can decrease need to issue as many Bonds
  - Increasing the coupon by 100 basis points (bps) or 1.00% has a big effect on bond price.

- In the example, both the premium Bonds and the discount Bonds raised the same amount of money

**Example**
Issue $10MM in 30-yr bonds
Market Yield is 3.50%

1. Issue Premium Bonds at 4.50% price at $118.39. Need to issue **8,500** bonds to reach $10MM

2. Issue Par Bonds at 3.50% results in a price of $100. Need to issue **10,000** bonds to reach $10MM

3. Issuing Discount Bonds at 2.50% results in a price of $81.61. Need to issue **12,250** bonds to reach $10MM

As price increases
Size of the issue decreases
Calculating Purchase Premiums

• Purchase premium is a function of the difference between the Underwriter’s purchase price and the re-offer price to the public.
  • It depends on yields, bond maturity, and coupon rates
  • Total premium is an aggregate of premiums on individual issues.

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Par Amount</th>
<th>Coupon</th>
<th>Market Yield</th>
<th>Underwriter Purchase Price</th>
<th>Reoffering Price</th>
<th>Premium</th>
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<tbody>
<tr>
<td>12/1/2017</td>
<td>$100.00</td>
<td>5.00%</td>
<td>4.75%</td>
<td>$99.00</td>
<td>$100.24</td>
<td>$1.24</td>
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<tr>
<td>12/1/2018</td>
<td>$100.00</td>
<td>5.13%</td>
<td>5.00%</td>
<td>$99.00</td>
<td>$100.23</td>
<td>$1.23</td>
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<tr>
<td>12/1/2019</td>
<td>$100.00</td>
<td>5.25%</td>
<td>5.13%</td>
<td>$99.00</td>
<td>$100.34</td>
<td>$1.34</td>
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<tr>
<td>12/1/2020</td>
<td>$100.00</td>
<td>5.25%</td>
<td>5.25%</td>
<td>$99.00</td>
<td>$100.00</td>
<td>$1.00</td>
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<tr>
<td>12/1/2021</td>
<td>$100.00</td>
<td>5.25%</td>
<td>5.50%</td>
<td>$99.00</td>
<td>$98.93</td>
<td>-$1.07</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong> Premium</td>
<td><strong>$4.74</strong></td>
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</table>
The Official Statement

• Document created by Disclosure Counsel
• Securities document required to educate bondholders prior to purchasing Bond
• Preliminary Official Statement (POS) must include:
  • Issuer Profile and Legal Authority
  • Tax-Exempt or Taxable Bond Status
  • Principal Amount, Maturity Dates
  • Redemption/Call Provisions
  • Source of Repayment/Security for Bondholders
  • Remedies of Delinquency
  • Issuer Credit and Community Demographics and Description
  • Credit Enhancement/Bond insurance information (if applicable)
  • Finance team players
  • Continuing Disclosure requirements
• Final Official Statement (FOS)
  • Will include final Principal Amounts and Interest Rates/Coupons
Continuing Disclosure Requirements

• Continuing Disclosure Certificate in the Official Statement (OS) requires the issuer to
  1. Post Financial Information and Operating Data to MSRB’s EMMA system annually
     • Generally due 9 months after end of public agency’s fiscal year
  2. Provide notices of significant events
     • Principal and interest payment delinquencies
     • Unscheduled draws on DSRF
     • Unscheduled use of Credit enhancement
     • Substitution of credit/liquidity providers
     • Rating changes
     • Adverse tax opinions by IRS
     • Bond calls and tender offers
     • Defeasances
     • Bankruptcy, insolvency, receivership

• Continuing Disclosure Certificate is legally binding

• SEC has heightened scrutiny of Continuing Disclosure compliance

• Failure to comply could lead to the SEC taking action against an issuer and/or underwriter
Bond Covenants

- Promise to repay principal and interest
- Promise to take necessary action to ensure payment
- Promise to maintain tax exempt status

- These promises commit the municipality to take action to preserve investor interests
- Underscores the importance of maintaining documentation at the Issuer level to assure that these covenants are being honored.
Basic Bond Math

Price
Yield
TIC (Total Interest Cost)
Debt Service Payments
Basic Bond Math

• Municipal Finance Professionals typically use customized financial software or complex Excel spreadsheets to make their calculations

• Excel functions provide a fairly accurate approximation
  1. Bond Price
  2. Yield to Maturity
  3. Annual Debt Service Payments
  4. True Interest Cost
Calculating Price on a Bond

• You can use the equation:

\[
\text{Bond Price} = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \ldots + \frac{C}{(1+i)^n} + \frac{M}{(1+i)^n}
\]

C=coupon payments, i=interest rate, M=payment at maturity, n=number of periods

• Excel function:

=PRICE(delivery date, maturity date, coupon, yield, value at maturity, coupon payments per year, day count basis)

**Example:**
Delivery Date: 12/1/2016
Maturity Date: 12/1/2026
Coupon (Interest Rate): 5.00%
Purchase Yield: 4.50%
Maturity Value: $100
Coupon Payments per Year: 1
Day Count Basis: 0 (0 = 360 days/year)

Price: $103.96
Calculating Yield to Maturity

• **Equation**
  
  Back-solves using bond price to determine yield
  
  \[
  \text{Bond Price} = \frac{\text{Cashflow 1}}{(1 + \text{yield})^1} + \frac{\text{Cashflow 2}}{(1 + \text{yield})^2} + \ldots + \frac{\text{Last Cashflow}}{(1 + \text{yield})^n}
  \]

• **Excel Function**

  \[=\text{YIELD}(\text{delivery date}, \text{maturity date}, \text{coupon}, \text{price}, \text{value at maturity}, \text{coupon payments per year}, \text{day count basis})\]

**Example**

- **Delivery Date**: 12/1/2016
- **Maturity Date**: 12/1/2026
- **Coupon (Interest Rate)**: 5.00%
- **Purchase Price**: $110.00
- **Maturity Value**: $100.00
- **Coupon Payments per Year**: 1
- **Day Count Basis**: 0 (0=360 days/yr)

**YTM**: 3.78%
Calculating Debt Service Payments

- If public agency needs to issue Bonds to pay for a police station, knowing the expected cost of the station, how can you approximate the yearly debt service?

- Excel Function
  
  \[ \text{PMT}(\text{Rate}, \text{Number of periods}, \text{Present Value}, \text{Future Value}, \text{when payment due}) \]

<table>
<thead>
<tr>
<th>Bond Issue Size: $25,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV: $25,000,000</td>
</tr>
<tr>
<td>FV: $0.00</td>
</tr>
<tr>
<td>Coupon: 3.500%</td>
</tr>
<tr>
<td>Years to Maturity: 30</td>
</tr>
<tr>
<td>When Payment Due: 0 (0= end of period)</td>
</tr>
</tbody>
</table>

Approximate Yearly Debt Service: $1,359,283
Calculating True Interest Cost

• Calculation of effective rate representing the present value of payments made on Bond to the NET price from Bond
  • All-inclusive borrowing rate on Bond

Excel function
=IRR(values, guess)

Values are a series of payments (cash outflows must have negative number, cash inflows are positive)
Guess gives Excel a place to start solving

Example
$10,000,000 Bond with a 10 year maturity. Knowing the Debt Service Schedule, what is the TIC?

Note: Annual Debt Service as negative cash flows (money going out)

TIC: 3.727%

<table>
<thead>
<tr>
<th>Cash Flow Date</th>
<th>Annual Debt Service Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/1/2016</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>12/1/2017</td>
<td>$(1,050,000)</td>
</tr>
<tr>
<td>12/1/2018</td>
<td>$(1,050,000)</td>
</tr>
<tr>
<td>12/1/2019</td>
<td>$(1,050,000)</td>
</tr>
<tr>
<td>12/1/2020</td>
<td>$(1,050,000)</td>
</tr>
<tr>
<td>12/1/2021</td>
<td>$(1,150,000)</td>
</tr>
<tr>
<td>12/1/2022</td>
<td>$(1,150,000)</td>
</tr>
<tr>
<td>12/1/2023</td>
<td>$(1,150,000)</td>
</tr>
<tr>
<td>12/1/2024</td>
<td>$(1,250,000)</td>
</tr>
<tr>
<td>12/1/2025</td>
<td>$(1,250,000)</td>
</tr>
<tr>
<td>12/1/2026</td>
<td>$(2,250,000)</td>
</tr>
</tbody>
</table>
What is Arbitrage?

- Internal Revenue Service defines “Arbitrage” as the earnings on bond proceeds that exceed the allowable yield.
- The Arbitrage Yield is the rate the Issuer is paying for the Bonds:
  - Includes principal, interest and any reoffering premium or discount.
  - Also includes any credit enhancement premium.
  - Does NOT include underwriter discount or costs of issuance.
- Issuer must “Rebate” 100% of excess earnings on Bonds back to the Federal Government.
- IRS does not want Issuers making money on the money they borrow.
Real life Example

Sacramento Golden 1 Center
Recent Example: Golden 1 Center Financing

Future Sports and Entertainment Complex **Cost: $299,995,000**

- Sacramento Public Financing Authority issued Lease Revenue Bonds (LRB)
  - Security: Lease agreement with the City of Sacramento
  - Repayment Source: Net Parking Revenues and Rent Payments from the Kings
  - Exempt from State income tax, Federally taxable
  - Final Maturity 2050
    - Serial Bonds: 2016-2023
    - Term Bonds: 2050 (Sinking Fund Provision)
  - Credit Rating “A” (Fitch), “A+” (S&P)
Rent from Kings Basketball Team

Parking Revenues Collected by City

Double-Barrel Pledge

Bond Investors
Assemble Financing Team

- **Issuer/Borrower**: Public agency responsible for approval and repayment obligation
- **Municipal Advisor**: Project manager who develops and implements financing plan on behalf of issuer
- **Bond Counsel**: Legal representation regarding the tax-exempt status and legitimacy of the Bonds
- **Disclosure Counsel**: Legal representation to Issuer & Bondholders on disclosure of credit - Official Statement (OS)
- **Bond Underwriter**: Serves as a middle-man to aggregate bondholders to sell Issuer Bonds
  - Makes an offer to the Issuer to purchase Bonds and resell to bondholders (individual, institutional)
  - If Bonds are not all pre-sold, underwriter “holds” the balance for future resale
- **Trustee**: Administrative duties related to protecting bondholders including collecting payments from Issuer and disbursement to bondholders
- **Rating Agency**: 3rd party credit review firm responsible for assigning rating based on creditworthiness of Issuer and Bond structure (relied on by Bondholders)
Golden 1 Center Debt Service and Sources and Uses Tables

### Level Annual Debt Service

<table>
<thead>
<tr>
<th>Year Ending June 30</th>
<th>Principal</th>
<th>Interest(a)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>$11,709,801.95</td>
<td>$11,709,801.95</td>
<td>$23,419,603.90</td>
</tr>
<tr>
<td>2017</td>
<td>$11,409,692.90</td>
<td>$11,409,692.90</td>
<td>$22,819,385.80</td>
</tr>
<tr>
<td>2018</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2019</td>
<td>$11,085,933.90</td>
<td>$11,085,933.90</td>
<td>$22,171,867.80</td>
</tr>
<tr>
<td>2020</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2021</td>
<td>$11,003,933.90</td>
<td>$11,003,933.90</td>
<td>$22,007,867.80</td>
</tr>
<tr>
<td>2022</td>
<td>$11,085,933.90</td>
<td>$11,085,933.90</td>
<td>$22,171,867.80</td>
</tr>
<tr>
<td>2023</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2024</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2025</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2026</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2027</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2028</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2029</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
<tr>
<td>2030</td>
<td>$11,108,863.90</td>
<td>$11,108,863.90</td>
<td>$22,217,727.80</td>
</tr>
</tbody>
</table>

(a) Interest through October 1, 2017, is expected to be paid from proceeds of the Series 2015 Bonds deposited in the Capitalized Interest Fund.

### Sources:

- **Principal Amount of Series 2015 Bonds**: $299,995,000.00
- **Additional City Moneys**: $2,703,451.00
- **Total Sources**: $302,698,451.00

### Uses:

- **Deposit to Project Fund**
- **Deposit to Capitalized Interest Fund**
- **Deposit to Reserve Fund (MADS)**
- **Deposit to Costs of Issuance Fund**
- **Total Uses**: $302,698,451.00

Uses:

- **Project Fund**
- **Capitalized Interest**: to make interest payments until project completion (October 2016)
- **Reserve Fund (MADS)**
- **COI Fund (costs of financing)**
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
</table>
| Par Amount, Issuer, Issue Type, Credit Rating | • Date of Issuance 
• Purpose of the Bonds 
• Project Description/Obligations of Issuer 
• Security for Bonds 
• Tax Status 
• Underwriters |

**Golden 1 Center OS**

- The Bonding Overlay is to be used for the primary purpose of providing information in connection with the issuance of the bonds and the sale of the Golden One Center at the Golden 1 Center, Sacramento, California (the "Project").
- The Credit Ratings are intended for reference use only. The Project is a taxable project and no tax benefits have been allocated to the Project.
- The project is located in the City of Sacramento, Sacramento County, California. The Project is a taxable project and no tax benefits have been allocated to the Project.
- The Underwriters are responsible for the sale and distribution of the bonds issued in connection with the Project.

**SACRAMENTO PUBLIC FINANCING AUTHORITY**

- The bonds are sold by the Sacramento Public Financing Authority (the "Authority") on behalf of the City of Sacramento, Sacramento County, California, and are secured by the tax revenues generated by the Project.
- The bonds are subject to the Taxable Status of the Project, and to applicable state and federal laws.
- The bonds are senior lien bonds and are secured by a perfected mortgage lien on the Project.
- The bonds are sold by the Authority on behalf of the City of Sacramento, Sacramento County, California, and are secured by the tax revenues generated by the Project.
Summary of Presentation

• Understand Bond Basics
• Develop Financial Plan for Project
• Adopt Debt Policies and Procedures to Guide Process
• Work with Finance Team to Implement Best Financial Solution
• Understand and Prepare for ongoing Continuing Disclosure Requirements once Bonds are issued
Contact Information

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