

FINANCIAL ENGINEERING

IME611A

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SESSION OBJECTIVES

- Structure of any Fixed income instrument
- Types of Fixed income instruments
- Pricing approach
- Dealer quotes: Bid and Ask prices
- Few example quotes

FIXED-INCOME INSTRUMENTS

- **Fixed-income instruments:** financial instruments that offer fixed income at known time points
- A dominant class of instrument under 'fixed-income securities' - **Bond**
- Other important fixed-income instruments
 - Treasury-Bills (T-bills)
 - Treasury Notes (T-notes)
 - Treasury Bonds (T-bonds)
 - Corporate bonds
 - Municipal bonds etc.

FIXED-INCOME INSTRUMENTS: KEY FEATURES

- A **bond** is an obligation by the bond issuer to pay money to the bond holder according to rules specified at the time the bond is issued.
- Coupon: Periodic payments at specified time interval
- Maturity: Time when the bond matures
- Face Value (FV): Fixed amount payable at maturity (or *par value*)
- Yield: Interest rate implied by the payment structure
- Price: Price of the bond

BOND: AN EXAMPLE

- A **bond** issued by L&T Infrastructure offers 5% coupon payment paid annually on a face value of ₹100 and a yield of 6% per annum. The term to maturity is 3 years. Find the price of the bond.
- Coupon: ₹5 (Periodic payments) at every year (specified time interval)
- Maturity: 3 years (Time when the bond matures)
- Face Value (FV): ₹100 (Fixed amount payable at maturity)
- Yield: 6% (Interest rate implied by the payment structure)
- Price: ??

BOND QUOTATIONS: TERMINOLOGY

- Prices are quoted as percentage of face value.
 - **Example:** If FV is \$1000, a price of 100 is equivalent to \$1000
- Bid and Ask Prices
- **Bid price:**
 - Price that the **dealers** are willing to pay for the bond or buy the bond at;
 - Price at which bond can be sold immediately by bondholders.
- **Ask price:**
 - Price that the **dealers** are willing to ask for the bond or sell the bond at;
 - Price at which bond can be bought immediately by interested investors.
- Almost always, bid price is **lower than** or equal to ask price.

BOND QUOTES: AN EXAMPLE

U.S. Treasury Quotes					
Thursday, 28-Jan-2021					
Maturity	Coupon	Bid	Asked	Chg	Asked yield
1/31/2021	1.375	100.0040	100.0100	0.0020	-1.484
1/31/2021	2.125	100.0060	100.0120	0.0040	-1.448
1/31/2021	2.500	100.0100	100.0140	0.0040	-1.782
2/15/2021	2.250	100.0340	100.0400	unch.	-0.302
2/15/2021	3.625	100.0560	100.0620	unch.	-0.361
2/15/2021	7.875	100.1260	100.1320	-0.0060	-0.567
2/28/2021	1.125	100.0300	100.0340	0.0040	-0.151
2/28/2021	2.000	100.0540	100.0600	unch.	-0.188

Source: Wall Street Journal (WSJ) (Thursday, 28-Jan-2021)

<https://www.wsj.com/market-data/bonds/treasuries>

BOND QUOTES: AN EXAMPLE

U.S. Treasury Quotes					
Thursday, 28-Jan-2021					
Maturity	Coupon	Bid	Asked	Chg	Asked yield
11/15/2048	3.375	136.2340	136.2540	0.2080	1.707
2/15/2049	3.000	128.0960	128.1160	0.8820	1.721
5/15/2049	2.875	125.1820	125.2020	0.8820	1.726
8/15/2049	2.250	111.0640	111.0840	0.8680	1.747
11/15/2049	2.375	114.0500	114.0700	0.8780	1.745
2/15/2050	2.000	105.0860	105.1060	0.8240	1.764
5/15/2050	1.250	87.2620	87.2820	0.1720	1.783
8/15/2050	1.375	90.2060	90.2260	0.1740	1.781
11/15/2050	1.625	96.1440	96.1640	0.8540	1.776

Source: Wall Street Journal (WSJ) (Thursday, 28-Jan-2021)

<https://www.wsj.com/market-data/bonds/treasuries>

INDIAN GOVERNMENT SECURITIES (G-SEC)

Security Code	Security Description	Coupon %	Maturity Date	LTP	Yield	Weighted Average /Price	Turnover (Rs. Lakhs)
364TB29421	364 DAYS T-BILLS	0.00	29 Apr 2021	99.1800	3.35	99.18	87,000.00
91TB29421	91 DAYS T-BILLS	0.00	29 Apr 2021	99.1832	0.00	99.18	35,000.00
716GOI2023	7.16% GOI 2023	7.16	20 May 2023	105.8000	6.88	105.80	30,000.00
364TB4321	364 DAYS T-BILLS	0.00	04 Mar 2021	99.7000	3.23	99.70	7,500.00
687AP35	6.87 % ANDHRA PRADESH 2035	6.87	21 Apr 2035	102.2900	6.77	102.29	6,900.00
0830CGOI40	8.30% GOI 2040	8.30	02 Jul 2040	119.9400	6.89	119.79	5,000.00
182TB4321	182 DAYS T-BILLS	0.00	04 Mar 2021	99.7000	3.23	99.70	5,000.00
182TB25321	182 DAYS T-BILLS	0.00	25 Mar 2021	99.5100	3.27	99.51	5,000.00
683GOI39	6.83% GOI 2039	6.83	19 Jan 2039	104.0100	6.30	104.01	3,500.00
182TB25221	182 DAYS T-BILLS	0.00	25 Feb 2021	99.7600	3.25	99.76	2,500.00
364TB25321	364 DAYS T-BILLS	0.00	25 Mar 2021	99.5100	3.27	99.51	2,500.00
843ASSAM26	8.43% ASSAM 2026	8.43	27 Jan 2026	109.2500	3.64	109.25	150.00
852KARNATAK28	8.52 % KARNATAKA SDL 2028	8.52	28 Nov 2028	113.1900	7.79	113.19	100.00
850GUJRAT28	8.50 % GUJARAT SDL 2028	8.50	28 Nov 2028	113.0700	7.78	113.07	100.00

Source: Bombay Stock Exchange (BSE) (Thursday, 28-Jan-2021)

https://www.bseindia.com/markets/debt/debt_wholesale.aspx

DISCLAIMER

- The information in this presentation has been compiled from the following textbook which has been mentioned as a reference text for this course on **Financial Engineering**.
- **Reference Text:**
 - Investment Science, 2nd Edition, Oxford University Press, David G. Luenberger