CHAPTER 10

Bond Prices and Yields

10.1 BOND CHARACTERISTICS

Bond Characteristics

- Face or par value
- Coupon rate
  - Zero coupon bond
- Compounding and payments
  - Accrued Interest
- Indenture

Treasury Notes and Bonds

- T Note maturities range up to 10 years
- T bond maturities range from 10 – 30 years
- Bid and ask price
  - Quoted in points and as a percent of par
- Accrued interest
  - Quoted price does not include interest accrued

Figure 10.1 Listing of Treasury Issues

FIGURE 10.1
Listing of Treasury issues

U.S. Government Bonds and Notes

Representative Over-the-Counter quotation based on transactions of $1 million or more.
Treasury bond, note and bill quotes are from midafternoon. Colons in bond and note bid-and-asked quotes represent 32nds; 101:01 means 101 1/32. Net change in 32nds. n-Treasury Note. i-Inflation-indexed issue. Treasury bill quotes in hundredths, quoted in terms of a rate of discount. Days to maturity calculated from settlement date. All yields are to maturity and based on the asked quote. For bonds callable prior to maturity, yields are computed to the earliest call date for issues quoted above par and to the maturity date for issues quoted below par.
*When issued. Daily change expressed in basis points.

MATURITY RATE	MO/YR	BID	ASKED	CHG	ASK YLD
3.125	Jan 07n	99:29	99:30	—	4.83
2.250	Feb 07n	99:24	99:25	—	4.88
6.250	Feb 07n	100:02	100:03	—	4.88
3.375	Feb 07n	99:25	99:26	—	4.97
3.750	Mar 07n	99:23	99:24	+1	4.97
3.625	Apr 07n	99:18	99:19	—	4.99
5.750	Aug 10n	103:09	103:10	+2	4.73
4.125	Aug 10n	98:00	98:01	+3	4.73
3.875	Sep 10n	97:03	97:04	+3	4.73
4.250	Oct 10n	98:10	98:11	+3	4.73
4.500	Nov 10n	99:05	99:06	+3	4.73
4.375	Dec 10n	98:22	98:23	+3	4.74
4.250	Jan 11n	98:07	98:08	+3	4.74
3.500	Jan 11i	103:26	103:27	+3	2.48
5.000	Feb 11n	101:03	101:04	+3	4.69
4.500	Feb 11n	99:04	99:05	+3	4.73
4.750	Mar 11n	100:01	100:02	+3	4.73
2.375	Apr 11i	99:11	99:12	+2	2.53
4.875	Apr 11n	100:16	100:17	+3	4.73
4.875	May 11n	100:17	100:18	+3	4.73
5.125	Jun 11n	101:17	101:18	+4	4.73
4.875	Jul 11n	100:18	100:19	+4	4.73
4.625	Dec 11n	99:15	99:16	+4	4.74
3.375	Jan 12i	104:01	104:02	+3	2.50
4.875	Feb 12n	100:24	100:25	+4	4.70
3.000	Jul 12i	102:27	102:28	+2	2.49
4.375	Aug 12n	98:13	98:14	+4	4.69
4.000	Nov 12n	96:13	96:14	+4	4.71
10.375	Nov 12	104:11	104:12	+2	4.87
3.375	Feb 13n	95:17	95:18	+4	4.72
3.625	May 13n	94:02	94:03	+5	4.71
1.375	Jul 13i	96:09	96:10	+4	2.49
4.250	Aug 13n	97:10	97:11	+6	4.72
5.250	Nov 28	104:12	104:13	+8	4.92
5.250	Feb 29	104:14	104:15	+9	4.92
3.875	Apr 29n	124:17	124:18	+16	2.44
6.125	Aug 29	116:12	116:13	+9	4.91
6.250	May 30	118:19	118:20	+10	4.90
5.375	Feb 31	106:20	106:21	+8	4.90
3.375	Apr 32i	119:09	119:10	+16	2.25
4.500	Feb 36	94:19	94:20	+9	4.84

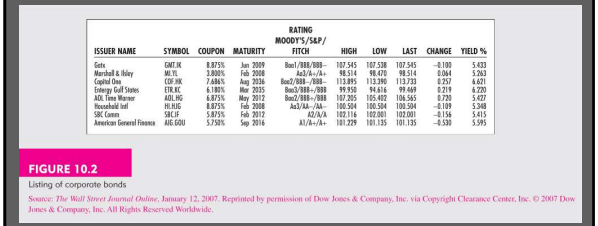
Treasury Bills

MATURITY	DAYS TO MAT	BID	ASKED	CHG	ASK YLD
Mar 22 07	64	4.96	4.95	+0.02	5.06
Mar 29 07	71	4.96	4.95	+0.01	5.07
Apr 05 07	78	4.96	4.95	+0.01	5.07
Apr 12 07	85	4.96	4.95	—	5.08
Apr 19 07	92	4.98	4.97	+0.02	5.10
Apr 26 07	99	4.96	4.95	—	5.09
May 03 07	106	4.96	4.95	+0.01	5.09
May 10 07	113	4.96	4.95	—	5.10
May 17 07	120	4.97	4.96	+0.01	5.11
May 24 07	127	4.97	4.96	+0.01	5.12
May 31 07	134	4.95	4.94	+0.01	5.10
Jun 07 07	141	4.94	4.93	+0.01	5.10
Jun 14 07	148	4.94	4.93	—	5.10
Jun 21 07	155	4.94	4.93	—	5.11
Jun 28 07	162	4.94	4.93	—	5.11
Jul 05 07	169	4.95	4.94	—	5.13
Jul 12 07	176	4.95	4.94	—	5.13

Corporate Bonds

- Most bonds are traded over the counter
- Registered
- Bearer bonds
- Call provisions
- Convertible provision
- Put provision (putable bonds)
- Floating rate bonds
- Preferred Stock

Figure 10.2 Investment Grade Bonds



ISSUER NAME	SYMBOL	COUPON	MATURITY	RATING MOODY'S/S&P/ FITCH	HIGH	LOW	LAST	CHANGE	YIELD %
Gets	GMT.IK	8.875%	Jun 2009	Ba1/BB/BB-	107.545	107.538	107.545	-0.100	5.433
Marshall & Ilsley	MI.TL	3.800%	Feb 2008	Aa3/A+/A+	98.514	98.470	98.514	0.064	5.263
Capital One	COF.HK	7.686%	Aug 2036	Baa2/BBB-/BBB-	113.895	113.390	113.733	0.257	6.631
Entergy Gulf States	ETR.KC	6.180%	Mar 2035	Baa3/BBB-/BBB	99.950	94.616	99.469	0.219	6.220
AOL Time Warner	AOL.HG	6.875%	May 2012	Baa2/BBB-/BBB	107.205	105.402	106.565	0.720	5.427
Household Intl	HI.NJG	8.875%	Feb 2008	Aa3/Aa-/AA-	100.504	100.504	100.504	-0.109	5.348
SBC Comm	SBC.IF	5.875%	Feb 2012	A2/A/A	102.116	102.001	102.001	-0.156	5.415
American General Finance	AIG.GOU	5.750%	Sep 2016	A1/A+/A+	101.229	101.135	101.135	-0.530	5.595

FIGURE 10.2

Listing of corporate bonds

Other Domestic Issuers

- Federal Home Loan Bank Board
- Farm Credit Agencies
- Ginnie Mae
- Fannie Mae
- Freddie Mac

Innovations in the Bond Market

- Reverse floaters
- Asset-backed bonds
- Pay-in-kind bonds
- Catastrophe bonds
- Indexed bonds
  - TIPS (Treasury Inflation Protected Securities)

10.2 BOND PRICING

Bond Pricing

$$P_B = \sum_{t=1}^{T} \frac{C_t}{(1+r)^T} + \frac{Par\ Value_T}{(1+r)^T}$$

P_B = Price of the bond
C_t = interest or coupon payments
T = number of periods to maturity
r = semi-annual discount rate or the semi-annual yield to maturity

Price of 8%, 10-yr. with yield at 6%

$$P_B = 40 \times \sum_{t=1}^{20} \frac{1}{(1.03)^t} + 1000 \times \frac{1}{(1.03)^{20}}$$

$$P_B = 1{,}148.77$$

Coupon = 4%*1,000 = 40 (Semiannual)

Discount Rate = 3% (Semiannual)

Maturity = 10 years or 20 periods

Par Value = 1,000

10.3 BOND YIELDS

Bond Prices and Yields

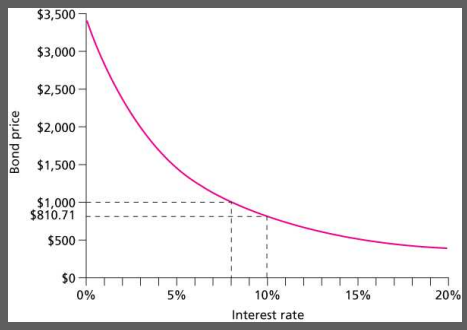
- Prices and Yields (required rates of return) have an inverse relationship
- When yields get very high the value of the bond will be very low
- When yields approach zero, the value of the bond approaches the sum of the cash flows

Yield to Maturity

- YTM is the discount rate that makes the present value of a bond's payments equal to its price
- 8% coupon, 30-year bond selling at $1,276.76:

$$\$1,276.76 = \sum_{t=1}^{60} \frac{\$40}{(1+r)^t} + \frac{\$1,000}{(1+r)^{60}}$$

Figure 10.3 The Inverse Relationship Between Bond Prices and Yields



Alternative Measures of Yield

- Current Yield
- Yield to Call
  - Call price replaces par
  - Call date replaces maturity
- Holding Period Yield
  - Considers actual reinvestment of coupons
  - Considers any change in price if the bond is held less than its maturity

Figure 10.4 Bond Prices: Callable and Straight Debt

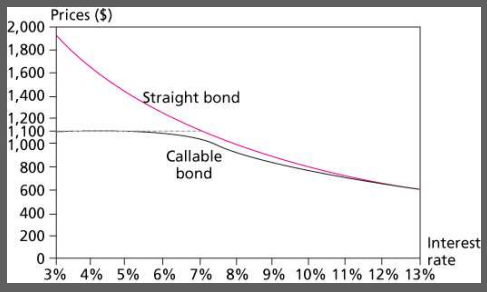
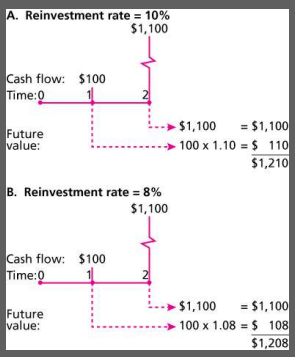


Figure 10.5 Growth of Invested Funds



10.4 BOND PRICES OVER TIME

Premium and Discount Bonds

- Premium Bond
  - Coupon rate exceeds yield to maturity
  - Bond price will decline to par over its maturity
- Discount Bond
  - Yield to maturity exceeds coupon rate
  - Bond price will increase to par over its maturity

Figure 10.6 Premium and Discount Bonds over Time

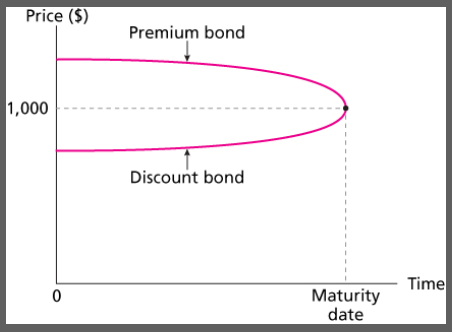
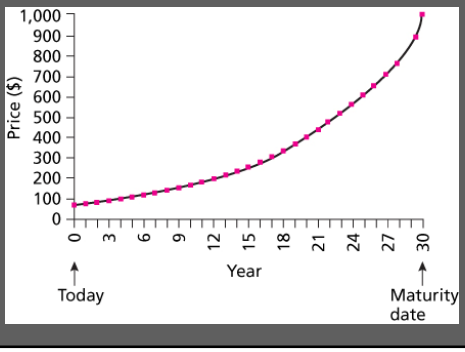


Figure 10.7 The Price of a Zero-Coupon Bond over Time



10.5 DEFAULT RISK AND BOND PRICING

Default Risk and Ratings

- Rating companies
  - Moody's Investor Service
  - Standard & Poor's
  - Fitch
- Rating Categories
  - Investment grade
  - Speculative grade

Figure 10.8 Definitions of Each Bond Rating Class

	Bond Ratings			
	Very High Quality	High Quality	Speculative	Very Poor
Standard & Poor's	AAA AA	A BBB	BB B	CCC D
Moody's	Aaa Aa	A Baa	Ba B	Caa C

At times both Moody's and Standard & Poor's use adjustments to these ratings. S&P uses plus and minus signs; A+ is the strongest A rating and A- the weakest. Moody's uses a 1, 2, or 3 designation—with 1 indicating the strongest.

Moody's	S&P	
Aaa	AAA	Debt rated Aaa and AAA has the highest rating. Capacity to pay interest and principal is extremely strong.
Aa	AA	Debt rated Aa and AA has a very strong capacity to pay interest and repay principal. Together with the highest rating, this group comprises the high-grade bond class.
A	A	Debt rated A has a strong capacity to pay interest and repay principal, although it is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than debt in higher-rated categories.
Baa	BBB	Debt rated Baa and BBB is regarded as having an adequate capacity to pay interest and repay principal. Whereas it normally exhibits adequate protection parameters, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay interest and repay principal for debt in this category than in higher-rated categories. These bonds are medium grade obligations.
Ba	BB	Debt rated in these categories is regarded, on balance, as predomi-
B	B	nantly speculative with respect to capacity to pay interest ad repay
Caa	CCC	principal in accordance with the terms of the obligation. BB and Ba
Ca	CC	indicate the lowest degree of speculation, and CC and Ca the highest degree of speculation. Although such debt will likely have some quality and protective characteristics, these are outweighed by large uncertainties or major risk exposures to adverse conditions. Some issues may be in default.
C	C	This rating is reserved for income bonds on which no interest is being paid.
D	D	Debt rated D is in default, and payment of interest and/or repayment of principal is in arrears.

Factors Used by Rating Companies

- Coverage ratios
- Leverage ratios
- Liquidity ratios
- Profitability ratios
- Cash flow to debt

Protection Against Default

- Sinking funds
- Subordination of future debt
- Dividend restrictions
- Collateral

Figure 10.9 Callable Bond Issued by Mobil

A Mobil Corp. debenture 8s, due 2032:
Rating — Aa2

AUTH — $250,000,000.
OUTSTG — Dec. 31, 1993, $250,000,000.
DATED — Oct. 30, 1991.
INTEREST — F&A 12.
TRUSTEE — Chemical Bank.
DENOMINATION — Fully registered, $1,000 and integral multiples thereof. Transferable and exchangeable without service charge.
CALLABLE — As a whole or in part, at any time, on or after Aug. 12, 2002, at the option of Co. on at least 30 but not more than 60 days' notice to each Aug. 11 as follows:

2003	105.007	2004	104.756	2005	104.506
2006	104.256	2007	104.005	2008	103.755
2009	103.505	2010	103.254	2011	103.004
2012	102.754	2013	102.503	2014	102.253
2015	102.003	2016	101.752	2017	101.502
2018	101.252	2019	101.001	2020	100.751
2021	100.501	2022	100.250		

and thereafter at 100 plus accrued interest.
SECURITY — Not secured. Ranks equally with all other unsecured and unsubordinated indebtedness of Co. nor any Affiliate will not incurr any indebtedness; provided that Co. will not create as security for any indebtedness for borrowed money, any mortgage, pledge, security interest or lien on any stock or indebtedness is directly owned by Co. without effectively providing that the debt securities shall be secured equally and ratably with such indebtedness, so long as such indebtedness shall be so secured.
INDENTURE MODIFICATION — Indenture may be modified, except as provided with, consent of 66⅔% of debs. outstg.
RIGHTS ON DEFAULT — Trustee, or 25% of debs. outstg., may declare principal due nad payable (30 days' grace for payment of interest).
LISTED — On New York Stock Exchange.
PURPOSE — Proceeds used for general corporate purposes.
OFFERED — ($250,000,000) at 99.51 plus accrued interest (proceeds to Co., 99.11) on Aug. 5, 1992 thru Merrill Lynch & Co., Donaldson, Lufkin & Jenrette Securities Corp., PaineWebber Inc., Prudential Securities Inc., Smith Barney, Harris Upham & Co. Inc. and associates.

10.6 THE YIELD CURVE

Term Structure of Interest Rates

- Relationship between yields to maturity and maturity
- Yield curve - a graph of the yields on bonds relative to the number of years to maturity
  - Usually Treasury Bonds
  - Have to be similar risk or other factors would be influencing yields

Figure 10.10 Yields on Long-Term Bonds

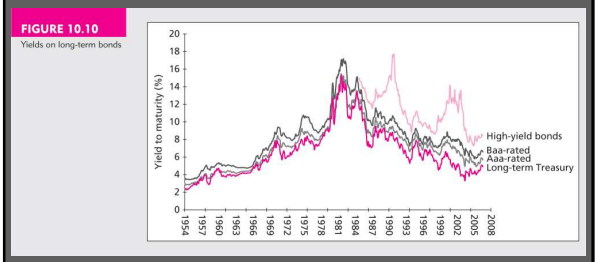


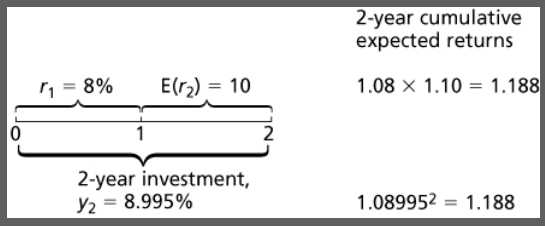
Figure 10.11 Treasury Yield Curves

FIGURE 10.11
Treasury yield curves

Theories of Term Structure

- Expectations
  - Long term rates are a function of expected future short term rates
  - Upward slope means that the market is expecting higher future short term rates
  - Downward slope means that the market is expecting lower future short term rates
- Liquidity Preference
  - Upward bias over expectations
  - The observed long-term rate includes a risk premium

Figure 10.12 Returns to Two 2-year Investment Strategies



Forward Rates Implied in the Yield Curve

$$(1+y_n)^n = (1+y_{n-1})^{n-1}(1+f_n)$$

$$(1.12)^2 = (1.11)^1(1.1301)$$

For example, using a 1-yr and 2-yr rates

Longer term rate, y(n) = 12%

Shorter term rate, y(n-1) = 11%

Forward rate, a one-year rate in one year = 13.01%

Figure 10.13 Illustrative Yield Curves

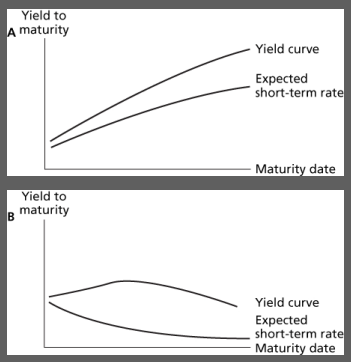


Figure 10.14 Term Spread

FIGURE 10.14

Term spread: Yields on 10-year versus 90-day Treasury securities