

BONDS AND THEIR VALUE

What are bonds? An Example

- One year ago, Yost Corporation borrowed money by issuing bonds. Each bondholder lent the firm money for 10 years at a 10 percent annual coupon. Yost Corporation pays each bondholder \$100 per year and returns the principal (\$1,000) back to the bondholder at the end of the 10 years, or 9 years from today.

Bond Terms

- Coupon: The stated interest payment made on a bond.
- Face Value: The principal amount of a bond that is repaid _____ of the term. Also called _____.
- Coupon Rate: The _____ coupon divided by the face value of a bond.
- Maturity: Specific date on which the principal amount of a bond (i.e., the face value) is repaid.
- Yield to Maturity (YTM): The rate required in the _____ on the bond. This is quoted as an APR and is often not the same as the coupon rate.

Calculating the Price of a Bond

- How do we calculate the price of a bond?
- The price of a bond is equal to the _____ of the bond's _____.

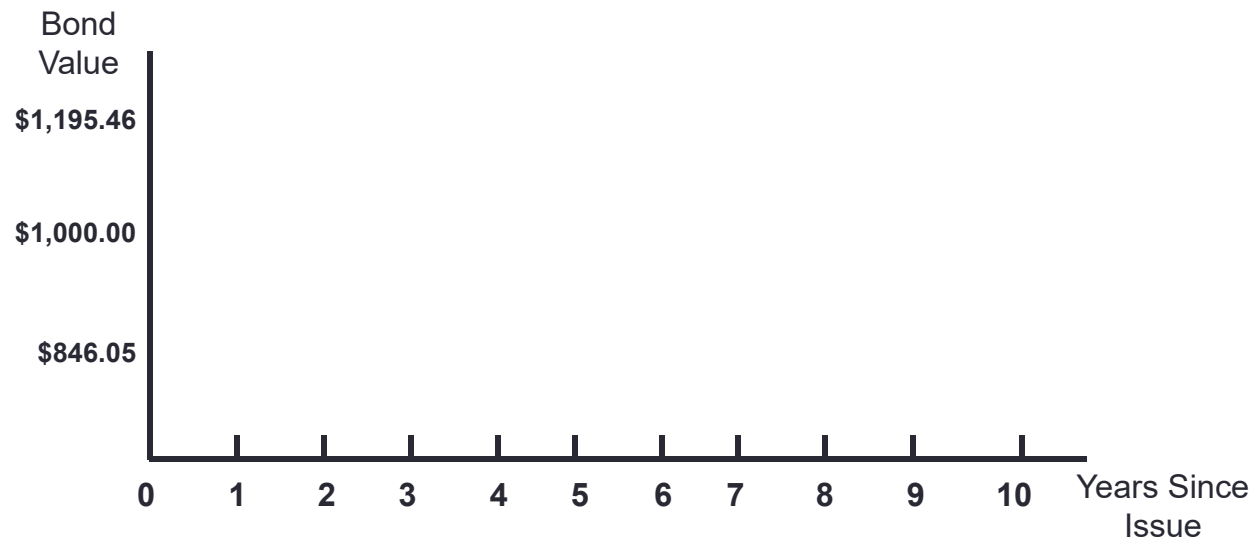
Bond Valuation

- What was the price of the bond when it was issued if the yield to maturity was 10 percent?

Bond Valuation

- What is the value of the bond now if the yield to maturity is 10 percent? 7 percent? 13 percent?

Bond Valuation Over Time



Payment Frequency

- Now, assume that the bond makes semiannual coupon payments. What is the value of the bond now if the yield to maturity is 10 percent?

Bond Yields

- What is a yield to maturity?
- What is a yield to call?
- What is a current yield?

An Example

- A recently issued \$1,000 par value bond has 10 years to maturity and currently sells for \$1,163.51. It has a 6 percent coupon rate, paid semiannually. It is call-protected for 5 years, after which it pays a call premium equal to an annual coupon payment, steadily declining thereafter. What are the YTM, YTC, and current yield?

Another Example

- There are two \$1,000 bonds identical (i.e., same risk) except for their coupons and their prices. Both have 3 years to maturity and annual coupons. The first has an 8 percent coupon rate and sells for \$974.69. What is its yield to maturity (YTM)?
- The second bond has a 10 percent coupon rate. If it has the same YTM as the first bond, what is its price?
- Which is better?

What about zero-coupon bonds?

- What are they?
- How do I calculate their price?
- What is the price of a zero-coupon bond that has a face value of \$1,000 and matures in 10 years, if the YTM is 8%? **Assume semiannual compounding.**

Types of Bonds

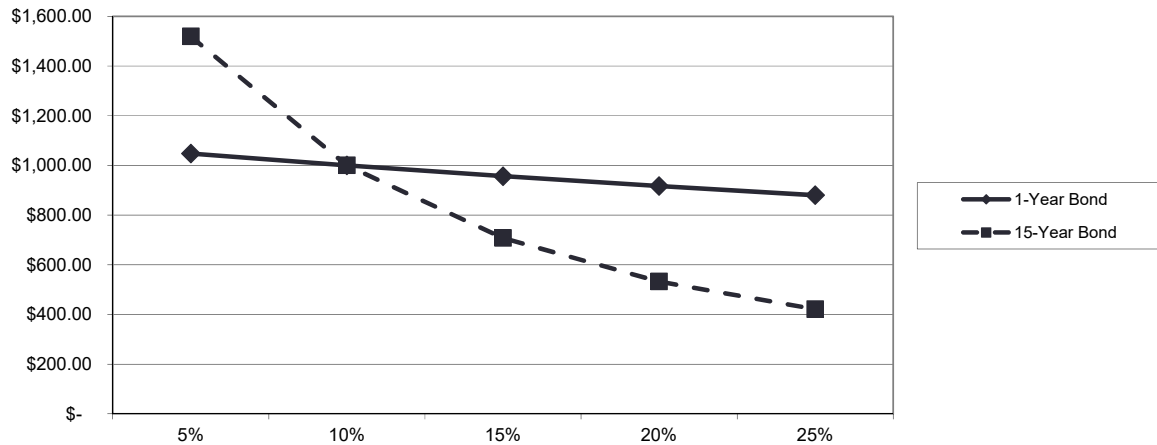
- Coupon vs. Zero Coupon
- Corporate
- Treasury
 - Bonds
 - Notes
 - Bills
- Municipal
- Foreign

Interest Rate Risk

- What is it?
- How is it minimized?

Current Market Interest Rate	Value	
	1-Year Bond 10% coupon	15-Year Bond 10% coupon
5%	\$ 1,047.62	\$ 1,518.98
10%	\$ 1,000.00	\$ 1,000.00
15%	\$ 956.52	\$ 707.63
20%	\$ 916.67	\$ 532.45
25%	\$ 880.00	\$ 421.11

Interest Rate Risk



Reinvestment Rate Risk

- What is it?
- How is it minimized?

The Term Structure of Interest Rates

- Term Structure: The relationship between interest rates and time-to-maturity of a debt security.

The Term Structure of Interest Rates

- Term Structure: The relationship between interest rates and time-to-maturity of a debt security.
- Yield on Bonds
 - Real Interest Rate
 - Inflation Premium
 - Interest Rate Risk Premium
 - Default Risk Premium
 - Liquidity/Marketability Premium

The Bond Contract

- Indenture
- Restrictive covenants
- Seniority
 - Mortgage bonds
 - First, second (or senior, junior)
 - Debentures
 - Debentures and subordinated debentures

Bond Features

- Call Provisions
 - Call Premium
 - Deferred Call
 - Who benefits?
- Redeemable Bonds
 - Who benefits?

Bond Features

- Sinking Fund Provisions
 - Lottery redemption at par
 - Purchase in the open market
 - Which should be chosen?

- Other Types of Bonds:
 - Convertible
 - Income
 - Inflation Indexed

Standard & Poor's Moody's	Investment-Quality Bond Ratings				Low-Quality, Speculative, and/or "Junk" Bond Ratings					
	High Grade		Medium Grade		Low Grade		Very Low Grade			
	AAA	AA	A	BBB	BB	B	CCC	CC	C	D
	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C	
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; B	BB; B	Debt rated in these categories is regarded, on balance, as predominantly speculative with respect to capacity to pay interest and repay principal in accordance with the terms of the obligation. BB and Ba indicate the lowest degree of speculation, and Ca, CC, and C the highest degree of speculation. Although such debt is likely to have some quality and protective characteristics, these are outweighed by large uncertainties or major risk exposures to adverse conditions. Issues rated C by Moody's are typically in default.								
Caa	CCC									
Ca	CC									
C	C									
	D	Debt rated D is in default, and payment of interest and/or repayment of principal is in arrears.								

NOTE: At times, both Moody's and S&P use adjustments (called notches) 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 being the highest.

Bond Ratings and Bond Spreads

(Bloomberg, May 2019)

Long-term Bonds	Yield (%)	Spread (%)
10-Year Treasury	2.4024	
AAA	2.9924	0.5900
AA	3.1606	0.7582
A	3.3685	0.9661
BBB	3.9413	1.5389
BB	5.8186	3.4162
B	6.6135	4.2111

Financial Distress

- Out-of-court Restructuring
- Chapter 11 Reorganization
- Chapter 7 Liquidation

Corporate Bond Reporting

<http://finra-markets.morningstar.com/BondCenter/>

Most Active Investment Grade Bonds

Issuer Name	Symbol	Coupon	Maturity	Moody's/S&P /Fitch	High	Low	Last	Change	Yield%
DEUTSCHE BK AG GLOBAL MEDIUM TERM NTS BO	DB.GKL	3.450%	03/30/2015	A3//A+	100.96000	100.81800	100.81800	-0.050000	0.737301
ROYAL BK SCOTLAND PLC	RBS3681986	4.875%	03/16/2015	Baa1//A	101.10000	101.08000	101.10000	-0.070000	
VERIZON COMMUNICATIONS INC	VZ4050432	3.650%	09/14/2018	Baa1/BBB+/A-	106.85700	105.11500	105.51500	-0.242000	2.115090
BARCLAYS BK PLC	BCS3820939	2.750%	02/23/2015	A2//A	100.46670	100.45600	100.46110	-0.005900	0.500451
MCKESSON CORP NEW	MCK4104769	1.292%	03/10/2017	Baa2//BBB+	100.33300	99.50600	99.58100	-0.026000	1.481994
CREDIT SUISSE FIRST BOSTON USA INC	CS.NP	4.875%	01/15/2015	A1/A/A	100.42900	100.35390	100.42900	0.053000	0.324831
GILEAD SCIENCES INC	GILD4184056	3.500%	02/01/2025	A3/A-/	103.80895	101.73800	101.93100	-0.533000	3.269039
MORGAN STANLEY	MS4175944	3.700%	10/23/2024	Baa2/A-/A	101.21130	100.36900	101.07200	0.316000	3.569753
WELLS FARGO & CO NEW MEDIUM TERM SR NTS	WFC4160708	3.300%	09/09/2024	A2/A+/AA-	100.29100	100.04100	100.15400	0.215000	3.281002
VERIZON COMMUNICATIONS INC	VZ4132476	1.350%	06/09/2017	Baa1/BBB+/A-	99.87300	99.66300	99.67100	0.013000	1.484828

Government Bond Reporting

<http://www.wsj.com>

Treasury Notes & Bonds

Maturity	Coupon	Bid	Asked	Chg	Asked yield
1/31/2015	2.250	100.2891	100.3047	-0.0313	0.093
2/15/2016	4.500	104.9219	104.9531	-0.0391	0.299
3/15/2017	0.750	99.9688	99.9844	unch.	0.757
3/31/2018	2.875	105.4844	105.5000	0.1250	1.173
5/15/2019	3.125	106.8594	106.8750	0.1719	1.515
8/15/2020	2.625	104.5156	104.5313	0.2422	1.783
6/30/2021	2.125	101.1641	101.1797	0.2578	1.933
11/15/2022	7.625	141.2891	141.3047	0.3594	1.973
5/15/2023	1.750	97.1953	97.2109	0.3438	2.113
11/15/2024	2.250	100.2656	100.2813	0.2969	2.218
2/15/2025	7.625	149.4688	149.4844	0.4453	2.179
8/15/2027	6.375	143.8281	143.8906	0.5000	2.352
11/15/2028	5.250	133.2734	133.3359	0.5313	2.417
2/15/2029	5.250	133.5625	133.6250	0.5313	2.432
8/15/2029	6.125	145.2500	145.3125	0.5781	2.435
5/15/2030	6.250	148.4531	148.5156	0.6016	2.454
2/15/2031	5.375	138.1641	138.2266	0.5625	2.490
2/15/2036	4.500	130.8203	130.8828	0.6719	2.595
2/15/2037	4.750	135.2266	135.2891	0.6841	2.638
5/15/2037	5.000	139.8594	139.9219	0.6875	2.632
2/15/2038	4.375	128.2578	128.3203	0.5625	2.720
8/15/2039	4.500	130.8672	130.8984	0.5313	2.764
11/15/2039	4.375	128.7031	128.7344	0.5391	2.771
2/15/2040	4.625	133.3516	133.3828	0.5313	2.774
5/15/2040	4.375	129.0938	129.1250	0.5234	2.771
8/15/2041	3.750	117.9063	117.9375	0.5391	2.792
11/15/2041	3.125	105.5625	105.5938	0.5469	2.827
2/15/2042	3.125	105.3125	105.3438	0.5703	2.841
11/15/2042	2.750	97.6250	97.6563	0.5156	2.873
2/15/2043	3.125	104.9453	104.9766	0.5703	2.866
2/15/2044	3.625	114.9844	115.0156	0.5859	2.862
11/15/2044	3.000	102.5156	102.5469	0.5781	2.873

Differences Between Debt and Equity

- **Debt**
 - Not an ownership interest
 - Creditors do not have voting rights
 - Interest is considered a cost of doing business and is tax deductible
 - Creditors have legal recourse if interest or principal payments are missed
 - Excess debt can lead to financial distress and bankruptcy
- **Equity**
 - Ownership interest
 - Common stockholders vote for the board of directors and other issues
 - Dividends are not considered a cost of doing business and are not tax deductible
 - Dividends are not a liability of the firm and stockholders have no legal recourse if dividends are not paid
 - An all equity firm can not go bankrupt

Chapter 8 Suggested Problems

- **Concept Questions**
 - 1, 2, 5, 7, 8, 12, 16, and 17
- **Questions and Problems**
 - 1, 2, 3, 7, 8, 19, 20, 21, and 28 (parts a and b only)

Example #1

- I just purchased a \$1,000 zero-coupon bond that matures in 8 years. If the yield-to-maturity is 6.5%, how much did I pay?

Example #2

- You are considering purchasing a \$1,000 Alpha Corp. bond at par. The bond has a 10% coupon rate, paid semiannually, and matures in 4 years. What is its YTM?

Example #3

- Beta Enterprises is issuing 10 year bonds with a face value of \$1,000. The coupon rate is 10%, paid semiannually. What is the price of the bond if the YTM is 8%?

Example #4

- Gamma Corporation bonds are selling for \$1,386.09. They have a face value of \$1,000 and a current yield of 7.2145%. If the YTM is 5%, interest is paid annually, and the bond has 10 years to maturity, what is the coupon rate?