

CHAPTER 17

BOND FUNDAMENTALS

Answers to Questions

1. A bond is said to be “called” when the issuer, at its own discretion, “calls” in the bond, and purchases it from the holder at a price stipulated in the bond indenture. When a bond is “refunded,” it is called, but the firm reissues bonds for the same amount with a lower coupon rate. On a pure call (without refunding), the issue is usually retired.
2. The three factors affecting the price of a bond are coupon, yield, and term to maturity. The relationship between price and coupon is a direct one - the higher the coupon, the higher the price. The relationship between price and yield is an inverse one - the higher the yield the lower the price, all other factors held constant. The relationship between price and maturity is not so clearly evident. Price changes resulting from changes in yields will be more pronounced, the longer the term to maturity.
3. For a given change in the level of interest rates, two factors that will influence the relative change in bond prices are the **coupon** and **maturity** of the issues. Bonds with longer maturity and/or lower coupons will have the greatest price changes in response to a given change in interest rates. Other factors likewise cause differences in price volatility, including the call features, but these factors are typically much less important.
4. A call feature and a sinking fund are bond indenture provisions that can affect the maturity of the bond issue. Specifically there are three alternative call features: (1) freely callable provision that allows the issuer to retire the bond at any time during the life of the bond issue, (2) noncallable provision that does not allow the issuer to retire the bond prior to its maturity, and (3) deferred call provision that allows the issuer to retire the bond after a designated period of time. A sinking fund requires that a bond be paid off systematically during the life of the issue rather than at maturity.
5. Interest income from municipal bonds is normally not taxable by the federal government or by the state or city in which it is issued. Interest income on U.S. Treasury bonds is taxable at the federal level, but not by state or local governments. Corporate bond interest is taxable at all levels, as are capital gains from any of the bonds.
6. Several institutions that participate in the market are life insurance companies, commercial banks, property and liability insurance companies, private and governmental retirement and pension funds, and mutual funds. They participate in the market because of restrictions on equity purchases (banks), the need for predictable cash flows (insurance companies), the tax exposure of the institutions, and the nature of the institutions’ liabilities. Commercial banks are subject to normal tax exposure and have fairly short-term liability structures, so they tend to favor intermediate term municipals. Pension funds and are virtually tax-free institutions with long-term commitments, so they generally prefer high yielding long-term corporate bonds.

7. An investor should be aware of the trading volume for a particular bond because a lack of sufficient trading volume may make selling the bond in a timely manner impossible. As a result, prices may vary widely while the investor is trying to change his position in the bond.
8. Bond ratings provide a very important service in the market for fixed income securities because they provide the fundamental analysis for thousands of issues. The rating agencies conduct extensive analyses of the intrinsic characteristics of the issue to determine the default risk for the investor and inform the market of the analyses through their ratings.
9. The differences between the Japanese and U.S. bond markets are clear from Exhibit 17.2. The Japanese bond market is dominated by government bonds, which accounted for 81.4% of their market in 2010. The corporate sector accounted for only 11.1%. In contrast, in the U.S. federal government issues accounted for only 34.5% of the bond market in 2010, with federal agency issues taking up an additional 12.6%. Next to government issues the largest sector was securitized/collateralized bonds with 27.6% of the total.
There are several reasons for the differences. In Japan, corporations tend to get long-term funding from banks. This is not the typical practice in the U.S. Also, U.S. federal agencies and government sponsored organizations finance several legislative mandates, such as housing.
10. In the United States, government agency issues, although not direct issues of the Treasury, carry the full faith and credit of the U.S. government. The rate of interest on these securities is higher than the rate of interest on straight Treasury bond issues. However, some of the government agency issues are subject to state and local income tax, whereas interest received on Treasury issues is exempt from state and local levies.
11. The difference between a foreign bond and a Eurobond can be broken down as a difference in issuer and the market in which they are issued. For example, a foreign bond in Japan (e.g., a Samurai) is denominated in the domestic currency (yen) and is sold in the domestic market (Japan), but it is sold by non-Japanese issuers. On the other hand, a Eurobond is denominated in the domestic currency (yen) but it is sold outside the domestic country in a number of national markets. These bonds are typically underwritten by international syndicates. The relative size of these two markets varies by country.

CHAPTER 17

Answers to Problems

1.

$$ETY = \frac{i}{1-t} = \frac{.055}{1-.28} = \frac{.055}{.72} = .07639$$

Assuming all other relevant factors are equal, the corporate bond carrying an 8 percent coupon and selling at par offers a better return than a 5 1/2 percent municipal bond (with an equivalent tax yield of 7.639 percent).

2(a). Present Value = Future Value / (1 + discount rate)ⁿ

$$PV = \$1,000 / (1.06)^{30} = 174.11$$

The discount rate is 12% annually/2 interest payments per year which equals 6% for 30 semi-annual periods (15 years x 2 interest payments per year)

2(b). $PV = \$1,000 / (1.05)^{40} = 142.05$

The discount rate is 10% annually/2 interest payments per year which equals 5% for 40 semi-annual periods (20 years x 2 interest payments per year)

3.

$$ETY = \frac{i}{1-t}$$

3(a). For the 15% tax bracket

$$ETY = \frac{.084}{1-.15} = \frac{.084}{.85} = .0988 \text{ or } 9.88\%$$

3(b). For the 25% tax bracket

$$ETY = \frac{.084}{1-.25} = \frac{.084}{.75} = .1120 \text{ or } 11.20\%$$

3(c). For the 35% tax bracket

$$ETY = \frac{.084}{1-.35} = \frac{.084}{.65} = .1292 \text{ or } 12.92\%$$

4(a). Present Value = Future Value / $(1 + \text{discount rate})^n$

$$PV = \$1,000 / (1.04)^{30} = 308.32$$

The discount rate is 8% annually/2 interest payments per year which equals 4% for 30 semi-annual periods (15 years x 2 interest payments per year)

4(b). $PV = \$1,000 / (1.04)^{24} = 390.12$

The discount rate is 8% annually/2 interest payments per year which equals 4% for 24 semi-annual periods (12 remaining years x 2 interest payments per year)

4(c). $PV = \$1,000 / (1.05)^{24} = 310.07$

The discount rate is 10% annually/2 interest payments per year which equals 5% for 24 semi-annual periods (12 remaining years x 2 interest payments per year)

5(a). $PV = \$1,000 / (1.06)^{40} = 97.22$

The discount rate is 12% annually/2 interest payments per year which equals 6% for 40 semi-annual periods (20 years x 2 interest payments per year)

5(b). $PV = \$1,000 / (1 + r)^n$ inserting the known items,

$$\$601 = \$1,000 / (1.04)^n$$

Solving algebraically or with a financial calculator (PV=-601; FV=1000; r=4; CPT n) we find that the number of periods equals 12.98 semi-annual periods or about 6 ½ years for the maturity.

5(c). $PV = \$1,000 / (1 + r)^n$ inserting the known items,

$$\$350 = \$1,000 / (1 + r)^{18} \text{ (use 18 as the number of periods is } 2 \times 9 \text{)}$$

Solving algebraically or with a financial calculator (PV=-350; FV=1000; n=18; CPT r) we find that the periodic yield equals 6.0% or an annual yield of 12%