Bond Market (1)

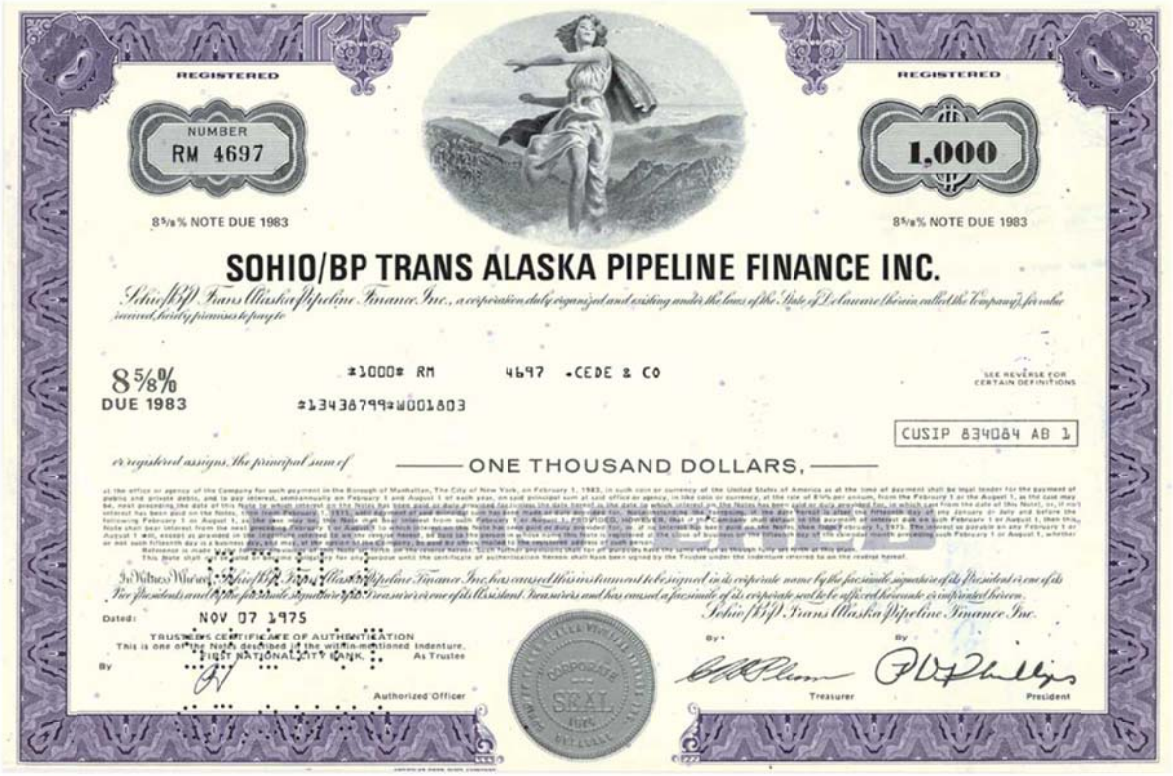


Figure 10.1 Sohio/BP Corporate Bond

Source: Eakins, *Finance: Investments, Institutions, & Management*, p. 39.

Purpose of the Capital Market

- Original maturity is *greater* than one year, typically for long-term financing or investments
- Best known capital market securities:
  - Stocks and bonds

Capital Market Participants

- Primary issuers of securities:
  - Federal and local governments: debt issuers
  - Corporations: equity and debt issuers
- Largest purchasers of securities:
  - Financial institutions, households, and individuals

Capital Market Trading

1. Primary market for initial sale (IPO)
2. Secondary market
    - Organized exchanges (i.e., NYSE)
    - Over-the-counter

Bond

- *Bonds* are securities that represent debt owed by the issuer to the investor, and typically have specified payments on specific dates.

- Types of bonds (by isssuer)
    - Government securities
    - Local government securities
    - State enterprise bonds
    - Municipal bonds
    - Corporate bonds

Government Securities

Treasury Security	Maturity
Treasury bills	
Treasury notes	
Treasury bonds	

Risk aspect of government securities

- No default risk since the Treasury can print money to payoff the debt
- Low return, often considered the risk-free rate (although inflation risk is still present)

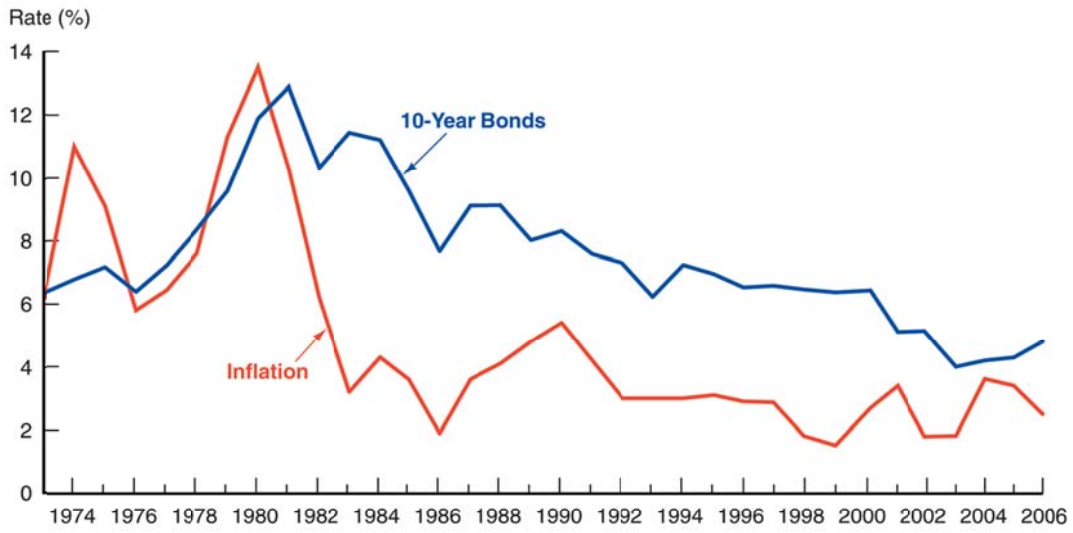


Figure 10.2 Interest Rate on Treasury Bonds and the Inflation Rate, 1973–2006

Sources: http://www.federalreserve.gov/releases and ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

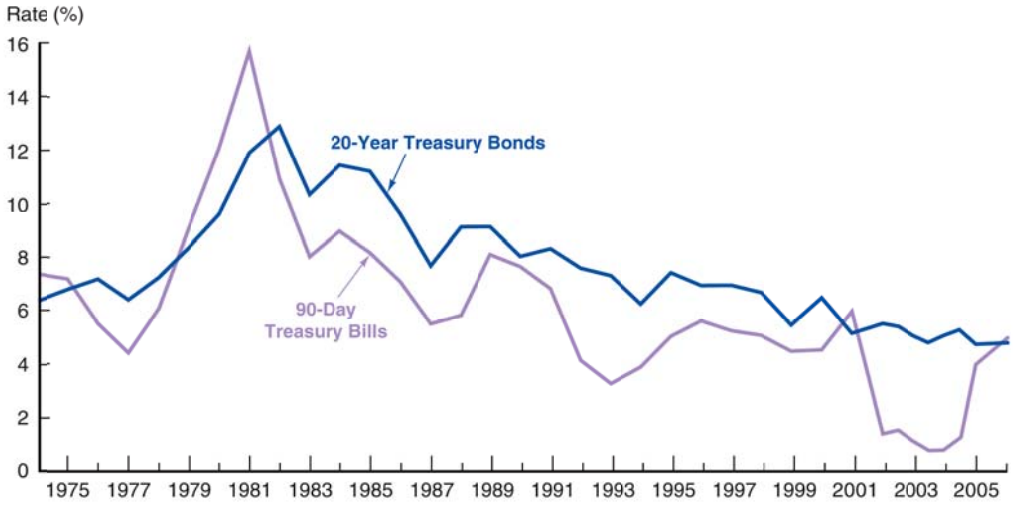


Figure 10.3 Interest Rate on Treasury Bills and Treasury Bonds, 1974–2006 (January of each year)

Source: http://www.federalreserve.gov/releases.

Finding the Value of Coupon Bonds

- Bond pricing is, in theory, no different than pricing any set of known cash flows. Once the cash flows have been identified, they should be discounted to time zero at an appropriate discount rate.

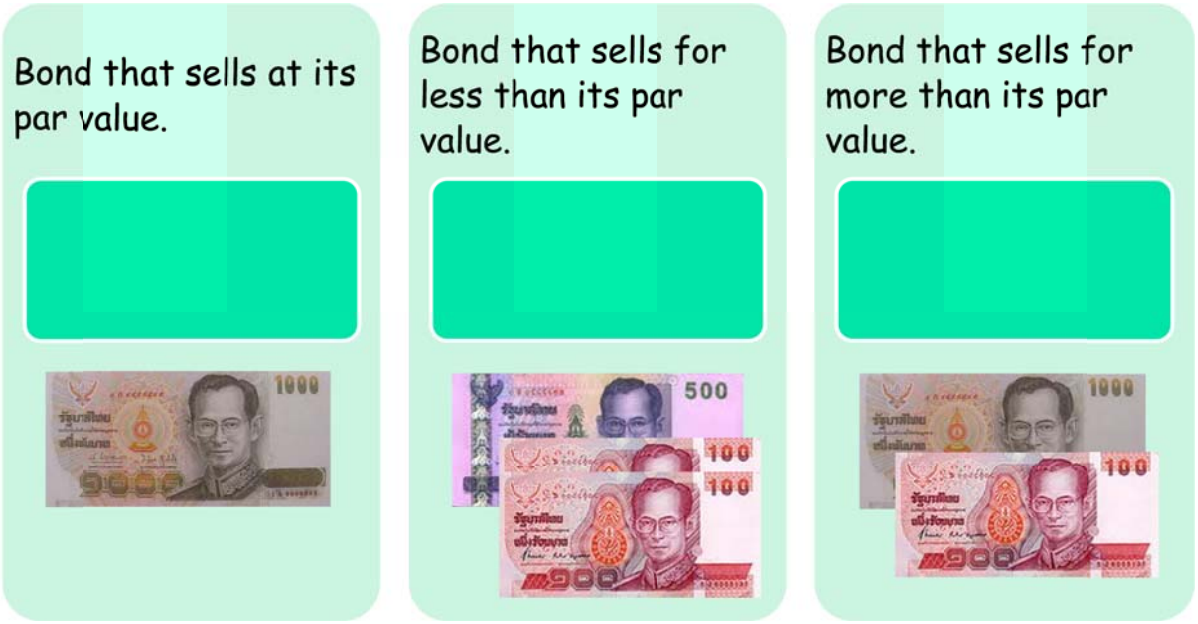
TABLE 10.3 Bond Terminology

Coupon interest rate	The stated annual interest rate on the bond. It is usually fixed for the life of the bond.
Current yield	The coupon interest payment divided by the current market price of the bond.
Face amount	The maturity value of the bond. The holder of the bond will receive the face amount from the issuer when the bond matures. *Face amount* is synonymous with *par value*.
Indenture	The contract that accompanies a bond and specifies the terms of the loan agreement. It includes management restrictions, called covenants.
Market rate	The interest rate currently in effect in the market for securities of like risk and maturity. The market rate is used to value bonds.
Maturity	The number of years or periods until the bond matures and the holder is paid the face amount.
Par value	The same as *face amount*.
Yield to maturity	The yield an investor will earn if the bond is purchased at the current market price and held until maturity.

Bond Yield

- Bond yields are return computing by a variety of conventions, depending on both the type of issue and the market.
- Yield-to-Maturity
- Current Yield: Annual coupon divided by price
- Capital Gain Yield: difference between yield-to-maturity and current yield, i.e., gain (or loss) for the difference between buying and selling price
- Holding-Period Yield

Types of Bond (by price)



$$\text{Price}_0 = \frac{I}{(1+YTM)^1} + \frac{I}{(1+YTM)^2} + \ldots + \frac{I}{(1+YTM)^n} + \frac{I+Par}{(1+YTM)^n}$$

Given YTM = yield-to-maturity
n = numbers of period that borrower needed to service the bond
I = interest payment for period
Par = par value or face value

Exercise

1. What is the price of Wayne Enterprise five-year bond, 10.00 percent coupon bond with a par value (face value) of 1,000 baht?

   Given the yield-to-maturity equals to:
   a. 10.00 percent
   b. 12.00 percent
   c. 8.00 percent

   Also, compute current yield and capital gain yield.

Exercise

2. Xavier Academy Bond has the following characteristics:
   - Fifteen year, 12.50 percent coupon rate, quarterly coupon payments.

   Compute current yield and capital gain yield of Xavier bond given the yield-to-maturity equals to:
   a. 10.75 percent
   b. 12.50 percent
   c. 14.25 percent

3. Homer would like to invest in these bonds:

   Bond A: 10 years to maturity, with a 5.00 percent annual coupon.
   Bond B: 10 years to maturity, with a 10.00 percent annual coupon.
   Bond C: 15 years to maturity, with a 10.00 percent annual coupon.

   Compute price of each bond with the following yield-to-maturity:

Bond	YTM 8.00 percent	YTM 10.00 percent	YTM 12.00 percent
Bond A			
Bond B			
Bond C			

   Compute percentage changes in price for the following situation:
   Yield-to-maturity changes from 10.00 percent to 8.00 percent
   Yield-to-maturity changes from 10.00 percent to 12.00 percent

Bond	10.00% to 8.00%	10.00% to 12.00%
Bond A		
Bond B		
Bond C		

   Describe to Homer the interest rate risk from above information.

4. Maul bond has 10 years 3 months remaining to maturity. Interest is paid quarterly, with 100,000 yen par value. The coupon interest rate is 12.00 percent, and yield-to-maturity equals to 11.50 percent.

   What is the bond's current market price?

   Compute current yield and capital gain yield.

5. Six years ago, Forest Company issued 30-year bonds with 10.50 percent semi-annual coupon bond. Given current market interest rate of 8.75 percent, compute current year's current yield and capital gain yield for this bond.

6. Shakespeare Company has a 1,000 baht par value bond, 10-year to maturity, with 7.75 percent annual coupon sells for 955.25 baht.
    a. What is Shakespeare's yield-to-maturity?
    b. Assume that the yield-to-maturity remains constant, what will be the price be 3 years from today?

7. Liberty bond has a maturity of 15 years, 6.50 percent semiannual coupon, and currently sells at a price of US$1,050. What is this bond's yield-to-maturity? Also, compute current year's current yield and capital gain yield for this bond.

8. There are 4 bonds with the following characteristics:

    - Bond Potter: 4-year bond 10.00 percent coupon rate
    - Bond Weasley: 4-year bond 12.00 percent coupon rate
    - Bond Granger: 4-year bond 8.00 percent coupon rate
    - Bond Diggory: 4-year bond 0.00 percent coupon rate

    All of these bonds have 10.00 percent yield-to-maturity, compute prices of these bonds at each of the following years to maturity. Explain the difference in price patterns.

Years to maturity	Bond Potter	Bond Weasley	Bond Granger	Bond Diggory
4				
3				
2				
1				
0				

9. You are considering Circus Bond, a 10-year, 1,000 baht par value bond. Its coupon rate is 10.00 percent and interest is paid semiannually. If you required an effective annual interest rate of 10.15 percent, how much should you willing to pay for the bond?

10. Joker buys an 8.50 percent annual coupon bond for $1,000. The bond has 10 years to maturity. What rate of return does Joker expect to earn on his investment?

    One year from now, the YTM of his bond has declined, and he decides to sell at $1,075. What is the holding period return for Joker? Compare this yield to the YTM when Joker first bought the bond. Why are they different?

11. Montgomery Burns is the owner of Springfield Nuclear Power Plant (SNPP.) Currently, SNPP has two different bonds outstanding. Bond SNPP1 has a face value of $30,000 matures in 20 years. The bond makes no payments for the first five years, the pays $1,800 every six months over the subsequent seven years, and finally pays $2,300 every six months over the last eight years. Bond SNPP2 also has a face value of $30,000 and a maturity of 20 years; it makes no coupon payments of over the life of the bond. If the required return on both bonds is 10 percent quarterly compounded, what is the current price of bond SNPP1? Bond SNPP2?

12. For 18-year Lincoln bond with 14.00 percent current yield 15.00 percent yield-to-maturity, what is the coupon interest rate for this bond?

Amortised Bond

- Bond that the lender provides the borrower with an amount of funds, which must be repaid by making the same payment every period (such as per month), consisting of part of the principal and interest for a set number of years.

$$\text{Price}_0 = \frac{CF}{(1+YTM)^1} + \frac{CF}{(1+YTM)^2} + \ldots + \frac{CF}{(1+YTM)^n}$$

$$\text{Price}_0 = \frac{I_1 + P_1}{(1+YTM)^1} + \frac{I_2 + P_2}{(1+YTM)^2} + \ldots + \frac{I_n + P_n}{(1+YTM)^n}$$

Given
CF = annual cash flow payment to service the bond per period
YTM = yield-to-maturity
n = numbers of period that borrower needed to service the bond
I^i = interest payment for period i
P^i = principal repayment for period i

Exercise

13. 3-year amortised bond which prices 1,000 baht today gives 12.00 percent yield-to-maturity. Compute annual payment and construct the amortisation schedule.

Year	Beginning Principal	Total Payment	Interest Payment	Principal Repayment	Ending Principal
1					
2					
3					

Exercise

14. 4-year amortised bond which prices 1,000 baht today gives 9.25 percent yield-to-maturity, semi-annual payments. Compute annual payment and construct the amortisation schedule.

Year	Beginning Principal	Total Payment	Interest Payment	Principal Repayment	Ending Principal

15. Sara borrowed 1,000,000 baht to purchase her house. The loan is 30-year with 12.00 percent yield-to-maturity, the loan asking for monthly payments. Compute interest and principal repayments during year 21

Year	Beginning Principal	Total Payment	Interest Payment	Principal Repayment	Ending Principal

The 2007 – 2009 Financial Crisis and Bailout of Fannie Mae and Freddie Mac

Because it encouraged excessive risk taking, the peculiar structure of Fannie Mae and Freddie Mac – Private companies sponsored by the government – was an accident waiting to happen. Many economists predicted exactly what came to pass: a government bailout of both companies, with huge potential losses for American taxpayers.

When there is a government safety net for financial institutions, there needs to be appropriate government regulation and supervision to make sure these institutions do not take on excessive risk. Fannie and Freddie were given a federal regulator and supervisor, the Office of Federal Housing Enterprise Oversight (OFHEO), as a result of legislation in 1992, but this regulator was quite weak with only a limited ability to rein them in. This outcome was not surprising: These firms had strong incentives to resist effective regulation and supervision because it would cut into their profits. This is exactly what they did: Fannie and Freddie were legendary for their lobbying machine in Congress, and they were not apologetic about it. In 1999, Franklin Raines, at the time Fannie's CEO said, "We manage our political risk with the same intensity that we manage our credit and interest-rate risks." Between 1998 and 2008, Fannie and Freddie jointly spent over $170 million on lobbyists, and from 2000 to 2008, they and their employees made over $14 million in political campaign contributions.

Their lobbying efforts paid off: Attempts to strengthen their regulator, OFHEO, in both the Clinton and Bush administrations came to naught, and remarkably this was even true after major accounting scandals at both firms were revealed in 2003 and 2004, in which they cooked the books to smooth out earnings. (It was only in July of 2008, after the cat was let out of the bag and Fannie and Freddie were in serious trouble, that legislation was passed to put into place a stronger regulator, the Federal Housing Finance Agency, to supersede OFHEO.)

With a weak regulator and strong incentives to take on risk, Fannie and Freddie grew like crazy, and by 2008 had purchased or were guaranteeing over $5 trillion dollars of mortgages or mortgage-backed securities. The accounting scandals might even have pushed them to take on more risk. In the 1992 legislation, Fannie and Freddie had been given a mission to promote affordable housing. What way to better do this than to purchase subprime and Alt-A mortgages or mortgage-backed securities? The accounting scandals made this motivation even stronger because they weakened the political support for Fannie and Freddie, giving them even greater incentives to please Congress and support affordable housing by the purchase of these assets. By the time the subprime financial crisis hit in force, they had over $1 trillion of subprime and Alt-A assets on their books. Furthermore, they had extremely low ratios of capital relative to their assets: Indeed, their capital ratios were far lower than for other financial institutions like commercial banks.

By 2008, after many subprime mortgages went into default, Fannie and Freddie had booked large losses. Their small capital buffer meant that they had little cushion to withstand these losses, and investors started to pull their money out. With Fannie and Freddie playing such a dominant role in mortgages markets, the US government could not afford to have them go out of business because this would have had a disastrous effect on the availability of mortgage credit, which would have had further devastating effects on the housing market. With bankruptcy imminent, the Treasury stepped in with a pledge to provide up to $200,000 million of taxpayer money to the companies if needed. This largess did not come for free. The federal government in effect took over these companies by putting them into

conservatorship, requiring that their CEOs step down, and by having their regulator, the Federal Housing Finance Agency, oversee the companies' day-to-day operations.

In addition, the government received around $1,000 million of senior preferred stock and the right to purchase 80% of the common stock if the companies recovered. After the bailout, the prices of both companies' common stock was less than 2% of what they had been worth only a year earlier.

The ultimate fate of these two companies is also unclear. The sad saga of Fannie Mae and Freddie Mac illustrates how dangerous it was for the government to set up GSEs that were exposed to a classic conflict of interest problem because they were supposed to serve two masters. As publicly traded corporations, they were expected to maximise profits for their shareholders, but as government agencies, they were obliged to work in the interest of the public. In the end, neither the public nor the shareholders were well served. It is not yet clear how much the government bailout of Fannie and Freddie will cost the American taxpayer.