Chapter 6

CT

1. No. As interest rates fluctuate, the value of a Treasury security will fluctuate. Long-term Treasury securities have substantial interest rate risk.

2. All else the same, the Treasury security will have lower coupons because of its lower default risk, so it will have greater interest rate risk.

10. The term structure is based on pure discount bonds. The yield curve is based on coupon-bearing issues.

12. As a general constitutional principle, the federal government cannot tax the states without their consent if doing so would interfere with state government functions. At one time, this principle was thought to provide for the tax-exempt status of municipal interest payments. However, modern court rulings make it clear that Congress can revoke the municipal exemption, so the only basis now appears to be historical precedent. The fact that the states and the federal government do not tax each other’s securities is referred to as “reciprocal immunity.”

Problems

1. The yield to maturity is the required rate of return on a bond expressed as a nominal annual interest rate. For noncallable bonds, the yield to maturity and required rate of return are interchangeable terms. Unlike YTM and required return, the coupon rate is not a return used as the interest rate in bond cash flow valuation, but is a fixed percentage of par over the life of the bond used to set the coupon payment amount. For the example given, the coupon rate on the bond is still 10 percent, and the YTM is 8 percent.

2. Price and yield move in opposite directions; if interest rates rise, the price of the bond will fall. This is because the fixed coupon payments determined by the fixed coupon rate are not as valuable when interest rates rise—hence, the price of the bond decreases.

3. \[ P = 90(PVIFA_{8\%,12}) + 1000(PVIF_{8\%,12}) = 1,075.36 \]

4. \[ 902.25 = 70(PVIFA_{R\%,8}) + 1000(PVIF_{R\%,8}) \]

5. \[ 905 = C(PVIFA_{8.5\%,13}) + 1000(PVIF_{8.5\%,13}); \quad C = 72.648; \quad \text{coupon rate} = 7.26\% \]

6. \[ P = 37.50(PVIFA_{4.3\%,20}) + 1000(PVIF_{4.3\%,20}) = 927.20 \]

14. This is a premium bond because it sells for more than 100% of face value.

Current yield = \$61.25/\$1,032.1875 = 5.93%; YTM = 5.88%

Bid-Ask spread = 103:08 – 103:07 = 1/32
**Intermediate**

15. **X:**  
\[ P_0 = \$90(PVIFA_{7\%,13}) + \$1000(PVIF_{7\%,13}) = \$1,167.15 \]  
\[ P_1 = \$90(PVIFA_{7\%,12}) + \$1000(PVIF_{7\%,12}) = \$1,158.85 \]  
\[ P_3 = \$90(PVIFA_{7\%,10}) + \$1000(PVIF_{7\%,10}) = \$1,140.47 \]  
\[ P_8 = \$90(PVIFA_{7\%,5}) + \$1000(PVIF_{7\%,5}) = \$1,082.00 \]  
\[ P_{12} = \$90(PVIFA_{7\%,1}) + \$1000(PVIF_{7\%,1}) = \$1,018.69 ; P_{13} = \$1,000 \]

**Y:**  
\[ P_0 = \$50(PVIFA_{7\%,13}) + \$1000(PVIF_{7\%,13}) = \$832.85 \]  
\[ P_1 = \$50(PVIFA_{7\%,12}) + \$1000(PVIF_{7\%,12}) = \$841.15 \]  
\[ P_3 = \$50(PVIFA_{7\%,10}) + \$1000(PVIF_{7\%,10}) = \$859.53 \]  
\[ P_8 = \$50(PVIFA_{7\%,5}) + \$1000(PVIF_{7\%,5}) = \$918.00 \]  
\[ P_{12} = \$50(PVIFA_{7\%,1}) + \$1000(PVIF_{7\%,1}) = \$981.31 ; P_{12} = \$1,000 \]

All else held equal, the premium over par value for a premium bond declines as maturity approaches, and the discount from par value for a discount bond declines as maturity approaches. In both cases, the largest percentage price changes occur at the shortest maturity lengths.