Section 6: Callable Bonds

A callable bond is a bond in which the issuer reserves the right to redeem the bond at different discrete times, possibly for different redemption values. When a callable bond is bought, no one knows when the bond will be called, however it can only be called at the times agreed upon at issue.

Callable bond problems will be obvious by the wording of the problem. Unless told that the bond is callable within the wording of the problem, assume all bonds are held to maturity and redeemed for the stated redemption value.

The most common questions asked with callable bonds involve either

(i) determining the maximum price that can be paid for the bond to guarantee a certain yield rate, or

(ii) determining the minimum yield rate for a bond that was bought at a certain price.

The recommended strategy for solving callable bond problems is to create a two-column table with the first column representing the time at which the bond can be called (or redeemed).

For type (i) problems, the second column is the corresponding price in order to receive the desired yield rate, keeping in mind the redemption value may be different at the different redemption dates. Then think through what happens when the bond is bought for the prices in the table but redeemed at other times in the table, and answer the question accordingly.

For type (ii) problems, the second column of the table is the yield rate that would produce the given price, again keeping in mind the redemption value may be different at the different redemption dates. Answer the question accordingly.

Module 3 Section 6 Problems:

1. A 1000 face value 20-year callable bond with 5% annual coupons is selling for 1150. The bond can be redeemed at the end of 18 years for 950, at the end of 19 years for 975, or at the end of 20 years for 1000. Determine the minimum annual yield rate that a buyer will earn on this bond.

2. A 1000 face value 20-year callable bond, redeemable at 1200, with 5% annual coupons can be redeemed at the end of year 18, 19, or 20. Determine the maximum price a buyer is willing to pay in order to earn an annual yield of at least 3%.

3. A 1000 face value 20-year callable bond with 4% annual coupons can be redeemed according to the following schedule:

    1000 at the end of years 12 through 14,
    1025 at the end of years 15 through 17,
    975 at the end of years 18 through 20.

    Determine the maximum price a buyer is willing to pay in order to earn an annual yield of at least 4%.

4. A 1000 face value 10% annual coupon bond is redeemable as follows:

    1100 at the end of years 15, 16, or 17
    1000 at the end of years 18, 19, or 20.

    A buyer pays 1500 for this bond. Determine the buyer's minimum annual yield.

Answers to Module 3 Section 6 Problems

1) 3.647%

2) 1392.55

3) 987.66

4) 5.474%