

# EXAM FM QUESTIONS OF THE WEEK

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## Week of February 12/07

Smith buys a bond with 5% annual coupons at an annual effective yield rate of 4%. The bond is callable at the option of the bond issuer any time from the 20th to the 25th coupon. Just after the 10th coupon is paid, the market yield rate on the bond is 6% and Smith sells the bond. Find the annual effective yield rate on Smith's investment for the 10 year period that he held the bond, assuming that the bond will be redeemed at par.

**The solution can be found below.**

## Week of February 12/07 - Solution

Suppose that the bond face amount is 100.

Since the yield rate is below the coupon rate, the callable bond is priced based on the earliest redemption date of 20 years. The initial purchase price of the bond is

$$100v_{.04}^{20} + 5a_{\overline{20}|.04} = 113.59 .$$

At the end of 10 years, the yield rate for the remainder of the bond is greater than the coupon rate, so the callable bond is priced based on the latest redemption date, which is in 15 more years. The value of the bond when Smith sells it is  $100v_{.06}^{25} + 5a_{\overline{15}|.06} = 90.29$  .

Smith's investment of 113.59 resulted in payments of 5 at the end of each year for 10 years plus a payments of 90.29 at the end of 10 years. The yield on his 10 year investment is  $j$ , where

$$113.59 = 90.29v_j^{10} + 5a_{\overline{10}|j} .$$

$j$  is found using the unknown interest calculator function,  $j = 2.60\%$  .