

## Additional sample problems:

### Problem 1:

The market value and the book value of White Elephant's one million preferred shares are \$40,000,000 and \$35,000,000, respectively. The preferred shares pay an annual dividend of 8 percent. What is the risk premium associated with these shares if the risk free rate is 3.25 percent?

Type: Medium, Calculation

Suggested answer:

$$\text{Par value of preferred stock, } PV = \frac{\$35,000,000}{1,000,000} = \$35$$

$$\text{Market price of preferred stock, } P_{ps} = \frac{\$40,000,000}{1,000,000} = \$40$$

$$\text{Preferred dividend, } D_p = \$35 \times 8\% = \$2.8$$

$$\text{The required return, } k_p = \frac{\$2.8}{\$40} = 7\%$$

$$\text{The risk premium, } RP = 7\% - 3.25\% = 3.75\%$$

### Problem 2

You have just obtained a \$150,000 10 year 6% fixed rate mortgage. The mortgage is amortized over 25 years. The interest rate is compounded semi-annually and you make monthly payments at the end of each month.

Immediately after you signed the paper work, mortgage rates dropped to 5%. Your bank has offered you the opportunity to renegotiate the mortgage for a penalty of \$10,000 penalty. Should you take this opportunity? Assume your opportunity cost equals the mortgage rate.

To solve this problem we need to compare the present value of the current monthly payments discounted at 5% with the present value of the new payments. If the difference is greater than \$10,000 then it is worth it to renegotiate.

6% case: monthly payments

$$N=25 \times 12, PV=150,000, I/Y = (1+3\%)^{1/6} - 1, \text{ solve for } PMT = \$959.7099$$

The present value of these payments at 5% compounded semi-annually will be:

$$N=25 \times 12, PV=? I/Y = (1+2.5\%)^{1/6} - 1, PMT=959.7099.$$

The present value of the monthly payments of \$959.7099 is \$165,010.61

The present value of the new payments will be \$150,000 (by definition).

As the present value of the current payments of \$959.71 is more than \$10,000 greater than \$150,000, it is worth it for us to renegotiate the mortgage and to take advantage of the lower interest rate.

**Problem 3:**

Babar bought a five-year 4.25 percent annual coupon bond for \$974 a year ago. Today, he sold the bond at the market yield of 4 percent. What is Babar's approximate real rate of return if the inflation rate over the past year was 2.2 percent?

Compute bond price:  $N=4$ ,  $I/Y=4$ ,  $PMT=\$42.5$ ,  $FV=\$1,000 \rightarrow PV = \$1,009.07$ . Nominal return =  $(42.5 + 1009.07 - 974)/(974) = 7.96\%$ . Approximate real rate =  $7.96\% - 2.2\% = 5.76\%$ .