BUS-123 Spring 2014
Instr: F. Paiano

Bond Prices and Yields
Worksheet #2

Name: KEY
Chap 10 Worksheet

7% $70 annual interest

1) A 7%, 30-year bond has a par value of $1,000 and a call price of $1,030. It is callable in 10 years. The bond is currently selling for $1,060. Calculate the current yield, yield-to-maturity, and yield-to-call of this bond.

$$\text{current yield} = \frac{\text{annual interest}}{\text{market price}} = \frac{\$70}{\$1060} = 0.06604 \cong 6.6\% \text{ current yield}$$

$$\text{yield to maturity} = \frac{\text{Annual interest} + \frac{\text{Par Value} - \text{Market Value}}{\text{Years to Maturity}}}{\frac{\text{Par Value} + \text{Market Value}}{2}} = \frac{\$70 + \frac{1000 - 1060}{30}}{\frac{1000+1060}{2}} = \frac{70+(-2)}{1030} = \frac{68}{1030} = 0.06602 \cong 6.6\%$$

yield to maturity

$$\text{yield to call} = \frac{\text{Annual Interest} + \frac{\text{Call Price} - \text{Market Price}}{\text{Years to Call}}}{\frac{\text{Call Price} + \text{market Price}}{2}} = \frac{\$70 + \frac{1030-1060}{10}}{\frac{1030+1060}{2}} = \frac{\$70+(-3)}{1045} = \frac{\$67}{1045} = 0.06411 \cong 6.4\%$$

yield to call

2) A married couple from California is in the 35% Federal tax bracket and the 11% California tax bracket. They are considering a 6% Arizona municipal bond (Federal tax-free), a 5½% California bond (double tax-free) or an 8% corporate bond (fully-taxable). Which bond offers the highest after-tax interest rate?

8% corporate

6% (0.06) Arizona bond

$$\text{Taxable equivalent yield (Fed only)} = \frac{\text{muni bond yield}}{1 - \text{Fed tax bracket}} = \frac{0.06}{1.0 - 0.35} = \frac{0.06}{0.65} = 0.09231 \cong 9.2\% \text{ Arizona bond}$$

35%

5½ (0.055) California bond

$$\text{Taxable equivalent yield (Fed + CALIF)} = \frac{\text{muni bond yield}}{1.0 - \left[\text{Fed bracket} + \left(\text{State bracket} * (1.0 - \text{Fed bracket})\right)\right]} = \frac{0.055}{1.0 - \left[0.35 + (0.11 * (1 - 0.35))\right]}$$

$(0.35 + (0.11 * 0.65))$
$(0.35 + 0.0715)$
$1.0 - 0.4215$
0.5785

$$= \frac{0.055}{0.5785} = 0.09507 \cong 9.5\%$$ Calif

Calif is highest taxable equivalent yield

3) Using annual compounding, find the prices for the following bonds:

a) 8%, 20-year bond priced to yield 5%

b) 6%, 10-year bond priced to yield 9%

8% $80 annual interest 20 year bond 5% pricing

$$\text{bond price} = \text{Present value}\left(\text{interest income}\right) + \text{Present value}\left(\text{principal repayment}\right)$$

left table — right table

$$= \$80 * 12.462 + \$1000 * 0.377$$

$$= \$996.96 + \$377$$

$$= \$1373.96$$

premium bond

20-year 8% bond priced to yield 5%

6% $60 annual interest 10 year 9% pricing

$$\text{bond price} = \text{Present value}\left(\text{interest income}\right) + \text{present value}\left(\text{principal repayment}\right)$$

$$= \$60 * 6.418 + \$1000 * 0.422$$

$$= \$385.08 + \$422$$

$$= \$807.08$$

discount bond

10-year 6% bond priced to yield 9%