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Worksheet #2

- 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.

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

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

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

- 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 bond (0.08)
6% Arizona bond (0.06)
5½% California bond (0.055)

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

$$\text{Taxable equivalent yield (Fed + Calif)} = \frac{\text{muni bond yield}}{1 - [\text{Fed bracket} + (\text{State bracket} \times (1 - \text{Fed bracket}))]} = \frac{0.055}{1 - [0.35 + (0.11 \times (1 - 0.35))]} = \frac{0.055}{1 - [0.35 + (0.11 \times 0.65)]} = \frac{0.055}{1 - [0.35 + 0.0715]} = \frac{0.055}{0.5785} = 0.09507 \approx 9.5\% \text{ Calif}$$

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% annual interest 20 year bond 5% pricing

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

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

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

$$= \$1373.96$$

20-year 8% bond priced to yield 5% premium bond

6% annual interest 10 year 9% pricing

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

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

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

$$= \$807.08$$

10-year 6% bond priced to yield 9% discount bond