Finance 7110 – Fall 2011

Fixed Income Assignment – Answer Key

1.

A. $(1 + z_3)^3 = (1 + z_2)^2 (1 + {}_2f_3)$

$(1.0306)^3 = (1.029255)^2 (1 + {}_2f_3)$

$(1 + {}_2f_3) = 1.033295$

${}_2f_3 = 3.33\%$ BEY = 6.66%

B. $(1 + z_5)^5 = (1 + z_4)^4 (1 + {}_4f_5)$

$(1.0337)^5 = (1.03115)^4 (1 + {}_4f_5)$

$(1 + {}_4f_5) = 1.043963$

${}_4f_5 = 4.40\%$ BEY = 8.79%

C. $(1 + z_4)^4 = (1 + z_2)^2 (1 + {}_2f_4)^2$

$(1.03115)^4 = (1.02925)^2 (1 + {}_2f_4)^2$

$(1 + {}_2f_4)^2 = 1.0672$

$(1 + {}_2f_4) = 1.033054$

${}_2f_4 = 3.31\%$ BEY = 6.61%

D. $(1 + z_6)^6 = (1 + z_4)^4 (1 + {}_4f_6)^2$

$(1.0336)^6 = (1.03115)^4 (1 + {}_4f_6)^2$

$(1 + {}_4f_6)^2 = 1.0785$

$(1 + {}_4f_6) = 1.0385$

${}_4f_6 = 3.85\%$ BEY = 7.7%

E. $(1 + z_8)^8 = (1 + z_6)^6 \ (1 + {}_6f_8)^2$

$(1.03325)^8 = (1.0336)^6 \ (1 + {}_6f_8)^2$

$(1 + {}_6f_8)^2 = 1.065438$

$(1 + {}_6f_8) = 1.032201$

${}_6f_8 = 3.22\%$ BEY = 6.44%

2. Price a 10-yr. zero-coupon bond so that it has the same yield as a 7% coupon bond which matures at the same time and is currently priced at 101:20 (ignore accrued interest).

First you must find the BEY of a 10 yr. 7% bond priced at 101:20

101:20 = 101.625

$$101.625 = 3.5\left[\frac{1}{r} - \frac{1}{r(1+r)^{20}}\right] + 100/(1+r)^{20}$$

r = .03387 ⇒ BEY = 6.774%

Next, you must price a 10 yr. zero coupon bond to yield (BEY) 6.774%

$$PV = \frac{100}{(1.03387)^{20}} = 51.3683$$

3. If a Treasury bill has a BEY of 4.5% and it matures in 90 days, calculate its
   A. Price

$$BEY = \frac{100 - p}{p} \cdot \frac{365}{n}$$

$$= \frac{100}{p} - 1 \cdot \frac{365}{n}$$

$$\frac{(BEY)(n)}{365} + 1 = \frac{100}{p}$$

$$p = \frac{100}{\frac{(BEY)(n)}{365} + 1}$$

$$p = \frac{100}{\frac{(.045)(90)}{365} + 1}$$

$$p = 98.9026$$

B. Yield on a Discount Basis

$$d = \frac{100 - p}{100} \cdot \frac{360}{n}$$

$$= \frac{100 - 98.9026}{100} \cdot \frac{360}{90}$$

$$= 4.38965\%$$

C. Effective Annual Rate

$$EAR = (FV/PV)^{1/t} - 1$$

$$= (100/98.9026)^{365/90} - 1$$

$$= 4.576866\%$$