# BUSS207

## Assignment 2

1.

a. Yield for T-bond with 5 years to maturity = k* + IP + MRP = 2.5% + 3% + (5-1)0.1% = 5.9%

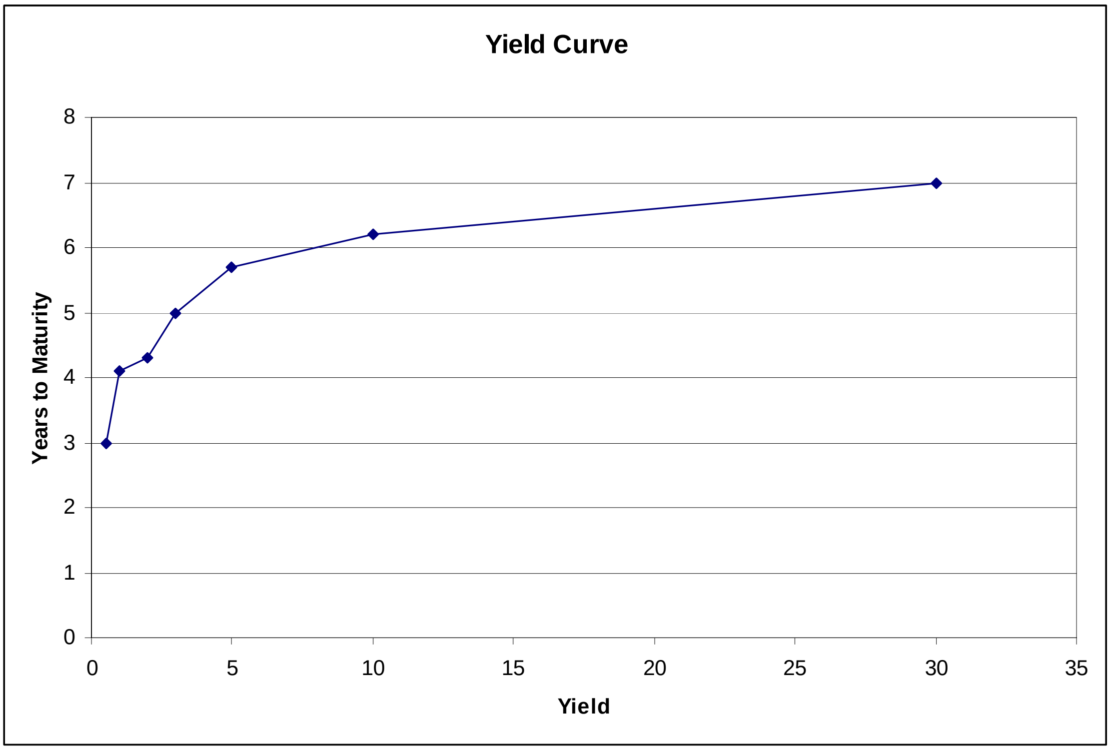
where $IP_5 = \frac{\sum_{i=1}^{5} IP_i}{5} = 3\%$

b. The two corporate bonds must have different default risk: Gateway has more default risk than Dell. Treasury bonds have no default and liquidity risk premiums, corporate bonds do. This is the reason for the difference between the T-bond yield and the corporate bond yields.

c. Both bonds: k = k* + IP + MRP + LRP + DRP. Dell = 7.5% = 2.5% + 3% + (5-1)0.1% + 1.4% +DRP. Dell's DRP = 0.2%. Gateway's DRP = 0.9%.

2.

a.




b. This yield curve is upward (normal) sloping. An upward sloping yield curve means long-term rates are higher than short-term rates. A flat yield curve means long-term and short-term interest rates are the same. A downward sloping yield curve means long-term rates are lower than short-term rates.

c. According to the expectations theory, an upward sloping yield curve means that investors expect interest rates to increase in the future. The liquidity preference theory assumes that investors think long-term debt (bonds or securities) is more risky than short-term debt. Because of the perceived higher risk, investors will demand a higher interest rate on longer term securities. This theory supports the idea of the existence of a maturity risk premium and implies that long-term rates should always be higher than short-term rates. Yes, this theory can explain the upward sloping yield curve we have here.

d. According to PEH, ${}_0r_2 = ({}_0r_1 + {}_1r_2)/2$, $4.3\% = (4.1\% + {}_1r_2)/2 \Rightarrow {}_1r_2 = 4.5\%$, One year Treasury rate = 4.5% = $k^* + IP = 2\% + IP \Rightarrow IP = 2.5\%$

e. According to PEH, ${}_0r_3 = ({}_0r_1 + {}_1r_2 + {}_2r_3)/3$, ${}_0r_2 = ({}_0r_1 + {}_1r_2)/2 \Rightarrow 4.3\% = ({}_0r_1 + {}_1r_2)/2 \Rightarrow ({}_0r_1 + {}_1r_2) = 8.6\%$, $5\% = ({}_0r_1 + {}_1r_2 + {}_2r_3)/3 = (8.6\% + {}_2r_3)/3 \Rightarrow {}_2r_3 = 6.4\%$, One year Treasury rate = 6.4% = $k^* + IP = 2\% + IP \Rightarrow IP = 4.4\%$

f. According to PEH, ${}_0r_3 = ({}_0r_1 + {}_1r_2 + {}_2r_3)/3 \Rightarrow 5\% = (4.1\% + {}_1r_2 + {}_2r_3)/3 \Rightarrow ({}_1r_2 + {}_2r_3) = 10.9\%$ ${}_1r_3 = ({}_1r_2 + {}_2r_3)/2. = 10.9\%/2 = 3.63\%$

g. According to PEH, $({}_3r_4 + {}_4r_5)/2 = {}_3r_5$. ${}_0r_3 = ({}_0r_1 + {}_1r_2 + {}_2r_3)/3 \Rightarrow 5\% = ({}_0r_1 + {}_1r_2 + {}_2r_3)/3 \Rightarrow ({}_0r_1 + {}_1r_2 + {}_2r_3) = 15\%$. ${}_0r_5 = ({}_0r_1 + {}_1r_2 + {}_2r_3 + {}_3r_4 + {}_4r_5)/5, \Rightarrow 5.7\% = (15\% + {}_3r_4 + {}_4r_5)/5 \Rightarrow {}_3r_4 + {}_4r_5 = 13.5\%$, ${}_3r_5 = ({}_3r_4 + {}_4r_5)/2 = 13.5\%/2 = 6.75\%$.

h. $K = {}_0r_{10} = 6.2\% = k^* + IP + MRP = 1\% + IP + (10-1)*0.1\% \Rightarrow IP + 4.3\%$.

3.

a. ABC expected return = .15(-10%) + .55(20%) + .2(25%) + .1(40%) = 18.5%
ABC standard deviation = $[(-10\% - 18.5\%)^2(.15) + (20\% - 18.5\%)^2(.55) + (25\% - 18.5\%)^2(.2) + (40\% - 18.5\%)^2(.1)]^{1/2} = 13.33\%$. CV = 13.33%/18.5% = 0.72
XYZ expected return = .15(30%) + .55(25%) + .2(2%) + .1(-40%) = 14.65%
XYZ standard deviation = $[(30\% - 14.65\%)^2(.15) + (25\% - 14.65\%)^2(.55) + (2\% - 14.65\%)^2(.2) + (-40\% - 14.65\%)^2(.1)]^{1/2} = 20.61\%$. CV = 20.61%/14.65% = 1.41

b. Expected return on the portfolio = .15(.3*-10% + .7*30%) + .55(.3*20% + .7*25%) + .2(.3*25% + .7*2%) + .1(.3*40% + .7*-40%) = 15.81%. That is the portfolio's return under each outcome as follows. Recession = .3*-10% + .7*30% = 18.00%, Normal = .3*20% + .7*25% = 23.50%, Boom = .3*25% + .7*2% = 8.90%, and Bubble = .3*40% + .7*-40% = -16.00%. Now, find the standard deviation using these numbers. Portfolio standard deviation = $[(18.00\% - 15.81\%)^2(.15) + (23.50\% - 15.81\%)^2(.55) + (8.90\% - 15.81\%)^2(.2) + (-16.00\% - 15.81\%)^2(.1)]^{1/2} = 11.999\%$

c. Weighted average of standard deviations of ABC and XYZ = .3(13.33%) + .7(20.61%) = 18.43%. Portfolio standard deviation = 10.00%. The standard deviation of a portfolio of stocks is equal to the weighted average of the standard deviations of the individual stocks only when all the individual stock returns are perfectly positively correlated with one another. In other words, when all the correlation coefficients between all the stocks are equal to +1. The standard deviation of this portfolio is less than the weighted average of the two stocks' standard deviations, meaning that the correlation coefficient between the two stocks is close to 1 but not quite. In other words, by forming this portfolio, we can enjoy a diversification effect.