ECON 133 – Securities Markets – FALL 2010, UCSC
HOMEWORK # 5 AK

1. Using a financial calculator, PV = -746.22, FV = 1,000, t=5, pmt = 0. The YTM is 6.0295%.
   Using a financial calculator, PV = -730.00, FV = 1,000, t=5, pmt = 0. The YTM is 6.4965%.
2. A bond's coupon interest payments and principal repayment are not affected by changes in market rates. Consequently, if market rates increase, bond investors in the secondary markets are not willing to pay as much for a claim on a given bond's fixed interest and principal payments as they would if market rates were lower. This relationship is apparent from the inverse relationship between interest rates and present value. An increase in the discount rate (i.e., the market rate) decreases the present value of the future cash flows.
3.
   a. Use the following inputs: n = 40, FV = 1000, PV = –950, PMT = 40. You will find that the yield to maturity on a semi-annual basis is 4.26%. This implies a bond equivalent yield to maturity of: 4.26% $\times$ 2 = 8.52%

      Effective annual yield to maturity = $(1.0426)^2 - 1 = 0.0870 = 8.70\%$

   b. Since the bond is selling at par, the yield to maturity on a semi-annual basis is the same as the semi-annual coupon, 4%. The bond equivalent yield to maturity is 8%.

      Effective annual yield to maturity = $(1.04)^2 - 1 = 0.0816 = 8.16\%$

   c. Keeping other inputs unchanged but setting PV = –1050, we find a bond equivalent yield to maturity of 7.52%, or 3.76% on a semi-annual basis.

      Effective annual yield to maturity = $(1.0376)^2 - 1 = 0.0766 = 7.66\%$

4. If the yield to maturity is greater than current yield, then the bond offers the prospect of price appreciation as it approaches its maturity date. Therefore, the bond is selling below par value.

5.

	Zero	8% coupon	10% coupon
Current prices	$463.19	$1,000	$1,134.20
Price one year from now	$500.25	$1,000	$1,124.94
Price increase	$37.06	$0.00	($9.26)
Coupon income	$0.00	$80.00	$100.00
Income	$37.06	$80.00	$90.74
Rate of Return	8.00%	8.00%	8.00%

6.
   a. The forward rate (f_2) is the rate that makes the return from rolling over one-year bonds the same as the return from investing in the two-year maturity bond and holding to maturity:

      $1.08 \times (1 + f_2) = (1.09)^2 \Rightarrow f_2 = 0.1001 = 10.01\%$

b. According to the expectations hypothesis, the forward rate equals the expected value of the short-term interest rate next year, so the best guess would be 10.01%.

7.

Computation of duration:

a. YTM = 6%

(1)	(2)	(3)	(4)	(5)
Time until Payment (Years)	Payment	Payment Discounted at 6%	Weight	Column (1) × Column (4)
1	60	56.60	0.0566	0.0566
2	60	53.40	0.0534	0.1068
3	1060	890.00	0.8900	2.6700
	Column Sum:	1000.00	1.0000	2.8334

Duration = 2.833 years

b. YTM = 10%

(1)	(2)	(3)	(4)	(5)
Time until Payment (Years)	Payment	Payment Discounted at 10%	Weight	Column (1) × Column (4)
1	60	54.55	0.0606	0.0606
2	60	49.59	0.0551	0.1101
3	1060	796.39	0.8844	2.6531
	Column Sum:	900.53	1.0000	2.8238

Duration = 2.824 years, which is less than the duration at the YTM of 6%

8. The percentage bond price change is:

$$-\text{Duration} \times \frac{\Delta y}{1+y} = -7.194 \times \frac{0.0050}{1.10} = -0.0327 \text{ or a 3.27\% decline.}$$

9. Black subtracted historic returns on Treasury bonds from historic stock returns.
10. Smith was able to generate both efficient markets and bubbles in the laboratory, depending on market design.