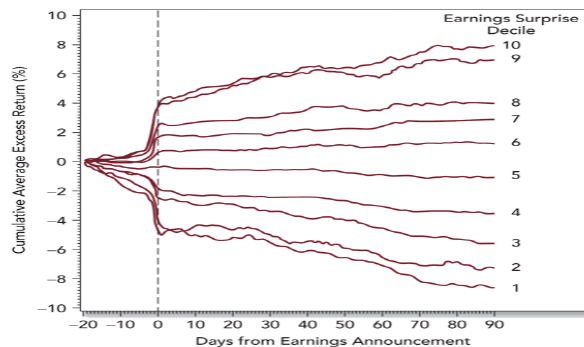


More Practice Problems for Economics 180.367

1. Suppose that GE earnings are 2 dollars per share, and the retention rate is 50%. Earnings are forecast to grow at a 3 percent annual rate forever. The required rate of return on GE stock is 5 percent. According to the dividend discount model, what is the market price of GE shares?
2. (a) What is the strong version of the Efficient Markets Hypothesis?
(b) Consider the graph below, discussed in class. Is this evidence for or against the strong form of the Efficient Markets Hypothesis?

Cumulative Abnormal Returns in Response to Earnings Announcements



3. Consider a bond with two years to maturity, semiannual coupons, a coupon rate of 8% per year, and a face value of \$1000. So the holder of the bond receives four coupons: in 6 months, 12 months, 18 months and 24 months (along with the principal value in 24 months time). Suppose that the bond-equivalent yield is 6% (semi-annual compounding).
 - (a) Find the price of the bond.
 - (b) Find the duration of the bond.
4. State two reasons why yield curves might slope up.
5. Consider a zero-coupon bond with a maturity of ten years. The face value of the bond is \$1000 and the price of the bond today is \$400.
 - (a) What is the yield-to-maturity on this bond (using semiannual compounding)?
 - (b) If the bond were instead to be callable after five years, would this make the yield-to-maturity higher or lower or would it make no difference?
 - (c) Suppose that in one years time, the price of the bond rises to \$450. What is the holding period return on this bond over this year?
6. The price of a one-year zero-coupon bond is \$952.38. The price of a two-year zero coupon bond is \$890. The price of a three-year zero-coupon bond is \$816.30. All of these bonds have \$1,000 face value.
 - (a) What is the price of a three-year bond paying 5 percent coupons with a \$1,000 face value?
 - (b) What is the one-year forward rate from two years to three years?

7. Johannes Financial Services (JFS) sells a perpetuity paying \$5 per year in coupons for ever. The current yield on a perpetuity is 10 percent. There is no default risk.

(a) Find the price of the perpetuity sold by JFS.

(b) If JFS wishes to immunize the interest rate risk on the bond that it has sold by buying Treasury STRIPS, what maturity of STRIPS will JFS buy?

8. Explain precisely what the LIBOR-OIS spread is and the significance of its widening during the recent financial crisis.

9. Cheese-on-line, or COL, is an internet start-up company. COL's dividends are now 1 dollar per share. The dividends are forecast to grow at a 3 percent annual rate forever. Suppose that the current market price of COL is 20.6 dollars.

(a) What is the required rate of return on COL's stock?

(b) If the required return of COL satisfies the CAPM, the risk-free rate is 2 percent, and the expected excess return on the market portfolio is 3 percent, what is the beta of COL's stock?

10. A perpetuity with no default risk pays \$5 a year in coupons for ever. Its current yield (annual compounding) is 10 percent. What is the price of this perpetuity?

11. A ten-year zero coupon bond with a maturity value of \$100 trades has an annual yield with annualized compounding of 7 percent. After one year, the yield falls to 6 percent (and the bond is then a nine-year bond). Calculate the holding period return on this bond.

Solutions.

1. Dividends are \$1 per share, so the price of GE shares is

$$P = \frac{1.03}{0.05 - 0.03} = \$51.50$$

2. (a) The strong form says that prices reflect all information, whether public or not.

(b) This graph is evidence against the strong form.

$$3. (a) P = \frac{40}{1.03} + \frac{40}{1.03^2} + \frac{40}{1.03^3} + \frac{1040}{1.03^4} = \$1037.17$$

$$(b) D = \left(\frac{38.83}{1037.17} * 0.5\right) + \left(\frac{37.70}{1037.17} * 1\right) + \left(\frac{36.61}{1037.17} * 1.5\right) + \left(\frac{924.03}{1037.17} * 2\right) = 1.89 \text{ years.}$$

4. Short-term rates are expected to rise, or there is a liquidity/term premium

$$5. (a) 400 = \frac{1000}{(1 + r/2)^{20}}$$

$$\left(1 + \frac{r}{2}\right)^{20} = \frac{1000}{400}$$

$$1 + r/2 = 1.04688$$

So the yield-to-maturity is 9.376 percent.

(b) It would make the price lower and the yield to maturity higher.

$$(c) HPR = \frac{450 - 400}{400} = 12.5\%$$

$$6. (a) P = 50 * 0.95238 + 50 * 0.890 + 1050 * 0.8163 = \$949.23$$

(b) The one-, two- and three-year yields are 5, 6 and 7 percent respectively. The required forward rate is

$$\frac{1.07^3}{1.06^2} - 1 = 9.03\%$$

7. (a) \$50.

(b) The duration of the perpetuity is $\frac{1+y}{y} = \frac{1.1}{0.1} = 11$. So JFS should buy 11 year STRIPS.

8. The LIBOR rate is the interbank interest rate for a term of (say) three months. It is the rate banks pay to borrow from each other for a fixed (short) term. The OIS rate is a bet on the level of the overnight interest rate for the same term. No principal changes hands in an OIS contract. The LIBOR-OIS spread therefore measures the extra interest that a bank must pay to secure funding for this period, over and above the expected overnight short-term interest rate as measured by OIS. It represents both the premium for liquidity and compensation for the risk of default. LIBOR ties up capital on the balance sheet and exposes the lender to default risk; OIS does not do either.

Prior to the recent financial crisis, the LIBOR-OIS spread was low and stable, but rose to high levels in the fall of 2007, and to extreme levels in the fall of 2008. It represents some combination of banks desire for the most liquid assets and their fear of default from counterparties.

9. (a) The required rate of return solves the equation $P = \frac{D_1}{k - g}$, i.e. $20.6 = \frac{1.03}{k - 0.03}$ and so $k=0.08$.

(b) If the required return is equal to the risk-free rate, then beta must be 2.

10. \$50.

11. The price today is \$50.83. The price in one year is \$59.19. The holding period return is 16.4 percent.