

Midterm Answers

1. These calculations are an example of the total-payments error.
  - a. The extra \$25 a month reduces the principal (the unpaid balance) and consequently reduces the interest the household had to pay on the unpaid balance.
  - b. At that time, 7.25% was a relatively low-interest mortgage. The bank wanted people to pay off their loans more quickly so that the bank could lend the money at a higher interest rate.
2. The growth rate is  $g = (1 - d)\rho = 0.6(0.10) = 0.06$ . Using the constant-growth model, the present value of the dividend stream is

$$\begin{aligned}
 V &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \dots \\
 &= \frac{D_1}{R-g} = \frac{4}{0.08-0.06} = 200
 \end{aligned}$$

Tobin's q is (market value)/(book value) = 200/100 = 2.

3. We can answer this question by thinking of the durations—the present-value weighted average wait until the cash flow is received. An interest-only mortgage has more of the payments at the end than does an amortized mortgage. A 5% interest-only mortgage has lower monthly payments than does a 10% interest-only mortgage, with the same payment at the end. A balloon mortgage is a zero and has an even longer duration. The assets are in order, from highest sensitivity to lowest: d, c, b, and a. (The 5 durations, from a to d, are 8.49 years, 9.58 years, 15.59 years, and 30 years.)
4. It depends on the spread between corporate and municipal bond rates. Suppose the municipal bond's interest rate is  $M$  and the before-tax interest rate on an otherwise comparable corporate bond is  $C$ . If your tax rate is  $t$ , then the effective after-tax interest rates are  $M$  and  $(1 - t)C$ . If  $t = 0.15$  and, say,  $C = 5\%$ , then the after-tax corporate rate is  $(1 - 0.15)5\% = 4.25\%$ . Municipal bonds have a higher rate if  $M > 4.25\%$  and a lower rate if  $M < 4.25\%$ . (In general, the municipal bond rate is higher if  $M > (1 - t)C$ .)
5. We should use the *annual* dividend with the annual required return and growth rate (or else use the quarterly required return and quarterly growth rate with the quarterly dividend). In the dividend growth model used here, the dividend growth takes into account the capital gains, and it is double counting to add together both present values. Using annual values, the implied required return is 9.534%:

$$35.28 = \frac{1.00}{0.09534 - 0.067}$$

6. The Fed should buy long-term bonds (pushing bond prices up and yields down) and sell short-term bonds (pushing prices down and yields up). The Expectations Hypothesis implies that long-term rates won't fall below short-term rates unless investors believe that interest rates are going to fall in the future. Thus, to maintain this twisted term structure, the Fed had to convince investors of an implausible scenario in which interest rates stay high while investors continue to believe that they will decline.
7. This is a conservation-of-value question
  - a. The *Journal* explains: "if cash dries up, companies can halt a repurchase program easily and more

quietly than they can cut a dividend, which often results in much publicity and a big drop in stock price. What's more, dividends are taxable; a successful buyback program creates capital gains taxed at a lower rate." [I expected the second explanation on this test.]

- b. The former may have abandoned insufficiently profitable operations or planned investment (an important economic event if  $\rho < R$ ), while the latter were dispersing surplus cash (a financial nonevent).
8. [Jim Jubak, Senior Markets Editor for MSN Money Central, "Find stocks built for speed—and acceleration" [moneycentral.msn.com](http://moneycentral.msn.com), September 1, 2000.] If widely expected, this will already be reflected in the prices.
9. Consider the dividend-discount model,

$$P = \frac{D}{R - g}$$
$$R = \frac{D}{P} + g$$

If the firm has a low  $g$ , then it must have a low  $P$  and high dividend yield  $D/P$  to provide shareholders their required return. (Less satisfactory is the explanation that firms that pay large dividends retain less and therefore grow slower. The dividend yield depends on the market price; investors presumably price the stock so that the dividend yield plus the anticipated capital gains gives them their required return.)

10. In the short run, the increase in interest rates gives the investor capital losses (answer A). As time passes, the extra income on the reinvested coupons boosts the return (answer B). For a horizon equal to the duration of the bond (here, about 7 1/2 years), the total return--reinvested income plus capital gain or loss--is (approximately) unaffected by changes in interest rates.