Econ 156
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Fall 2006

Final Examination Answers

1. Using the future value equation

$$\$18(1+R)^{41} = \$100,000$$

the implicit rate of return is R = 0.234 (23.4%).

2. [Erik Eckholm, "Burial Insurance, at $2 Per Week, Survives Skeptics," The New York Times, December 3, 2006.] We have to make some assumption about the timing of the payments. Let's say there are 60(52) = 3,120 payments, with the first payment made immediately and the last payment made 1 week before death. The implicit annual rate of return R is the value that solves this future-value equation:

$$\$3\left(1+\frac{R}{52}\right)^{3120} + \$3\left(1+\frac{R}{52}\right)^{3120-1} + \ldots + \$3\left(1+\frac{R}{52}\right)^{1} = \$10,000$$

The answer works out to be R = 0.22% (i.e., about 1/5 of 1 percent).

3. Option (a) offers the security that you won't outlive your income; option (b) may be better if you can earn a higher rate of return that that used in the present value calculation or if you expect to live fewer years than the life expectancy assumed in the present value calculation.

4. Corporate bond rates are higher than Treasury bond rates because of the higher default risk. Thus, the use of a corporate bond rate reduced the size of the lump-sum payment.

5. We can use the constant-dividend-growth model:

$$P = \frac{D}{R-g} = \frac{\$250,000}{0.10-g}$$

For g = 0, P = $2,500,000; for g = 0.05, P = $5,000,000; for g = 0.15, an infinite amount is needed (i.e., no donation could be large enough to endow such a chair.)

6. They want to better match the duration of their assets and liabilities and/or take positions that will make money if interest rates rise, thereby offsetting the losses on their fixed-rate mortgages.
   a. inappropriate, because these will lose money is bond prices fall (interest rates rise)
   b. inappropriate, because these will lose money is bond prices fall (interest rates rise)
   c. inappropriate, because these will lose money is bond prices fall (interest rates rise)
   d. appropriate, because these will lose money is bond prices fall (interest rates rise)
   e. inappropriate, because their assets are already longer duration than are their liabilities

7. A stock's dividend yield is its dividend divided by its price: D/P. The dividend yield can increase even if dividends do not, if the price falls. More generally, for whatever dividend the stock pays, the stock market will price the stock to have an anticipated return that is attractive in comparison to bonds and other alternative investments.

8. The net worth of S&Ls has historically been more sensitive to interest rate movements than is the average company. During periods of stable interest rates (like the 1960s), S&Ls have low betas. During periods with big interest rate movements (like the 1970s), S&Ls have high betas. Instead of the single index model, we

might use a factor model with interest rates as one of the factors.

9. Leverage is measured by the ratio of total assets to net worth, or equity:

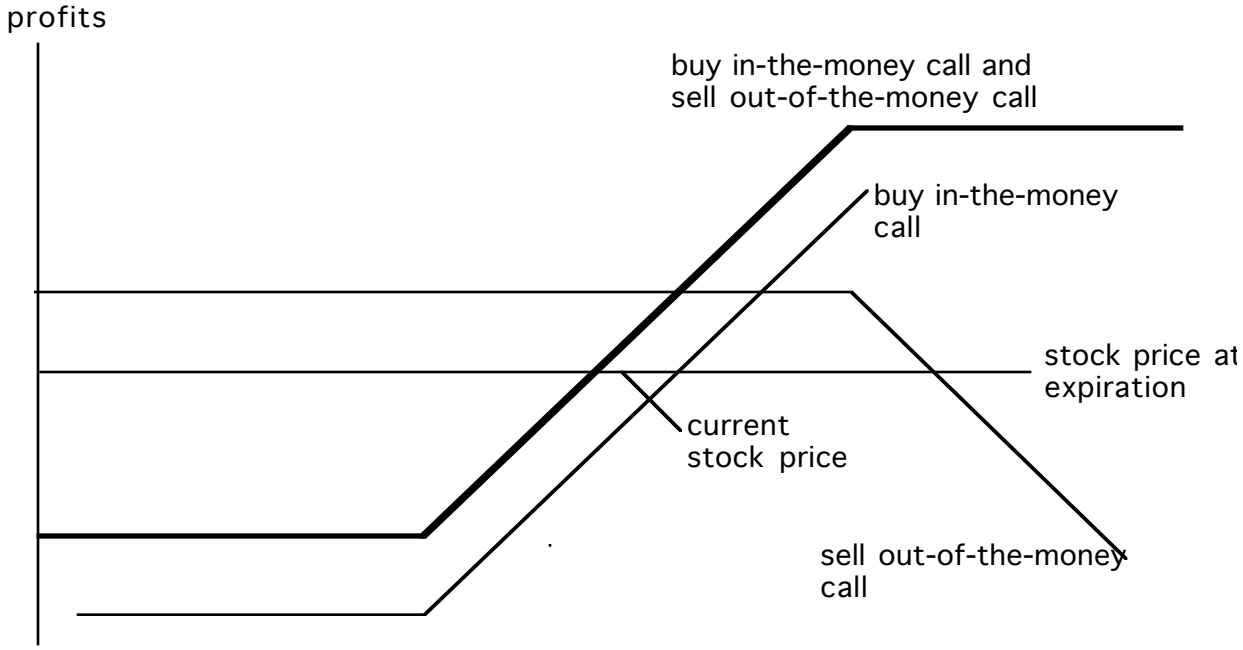
$$\text{leverage} = \frac{\text{total assets}}{\text{net worth}} = \frac{1.0}{0.6} = 1.67$$

10. Earnings are E = ROE(A) = 0.20($35) = $7. A $3.50 dividend represents a d = 0.5 payout: d = D/E = $3.50/$7.00 = 0.5. Analyst 1 looks at the dividend yield D/P = $3.50/$70 = 0.05 and ignores the retained earnings which will increase future earnings and dividends. Analyst 2 looks at the firm's 20% profits and ignores its payout/plowback policy. Analyst 3 does not take into account the price of the stock! Another approach is to estimate the growth rate as g = (1 – d)ROE = 0.50(0.20) = 0.10 and to estimate the shareholders' return as

$$R = \frac{D}{P} + g = \frac{\$3.50}{\$7.00} + 0.10 = 0.15$$

11. Tobin's q = $70/$35 = 2.0. Since q > 1 implies that stock market values this firm's assets at more than their cost (apparently ROE > R), the retention of earnings to finance expansion should raise the price of the firm's stock.

12. The illustrative profit picture below shows that this strategy is an implicit bet that the stock's price will increase, but that both profits and losses are limited.



13. Dividends are not a tax-deductible expense for corporations; interest payments are. In addition, dividends are likely to increase over time, interest payments will not.

14. This strategy is intended to take advantage of the steep term structure of interest rates that then prevailed. Some banks tried to do the same thing by using short-term deposits to finance the purchase of long-term Treasury bonds. The expectations hypothesis explanation of an upward sloping term structure is that interest rates are expected to increase. If interest rates do increase by more than the implicit forward rates embedded in the term structure, the U. S. Treasury will be forced to roll over its short-term debt at sharply

higher interest rates, and its borrowing costs will be even higher than had it issued long-term bonds.

15. Before the 1986 sale of additional shares, the Korea Fund's assets were \$18(5 million) = \$90 million. After the sale of 1.2 million new shares, the fund had 6.2 million shares and assets of \$90 + \$38.4 = \$128.4 million, for a net asset value (NAV) of \$128.4/6.2 = \$20.7, a 15 percent increase over the \$18 NAV before the sale. Selling shares at a premium over NAV always raises a fund's NAV, just as does redeeming shares at a discount from NAV.

16. A plausible statistical explanation is regression towards the mean. Those firms with the highest observed profit rates are more likely to be experiencing an unusually good year than an unusually bad year. Those with the lowest profit rates are, on average, experiencing unusually bad years.

17. We can use the conservation of value principle. The total market value of the company before the warrant issue is \$20(50 million) = \$1 billion. If 50 million warrants are issued and exercised at \$20 each, the company will receive \$1 billion in cash, doubling its assets. Since the number of outstanding shares has doubled too, there is no change in the value of the stock. If, instead, 50 million warrants are exercised at \$10, the company only receives \$0.5 billion, increasing its assets to \$1.5 billion. With 100 million shares outstanding, the value of each falls to (\$1.5 billion)/(100 million) = \$15.

18. She wants her investment in the 6-month and 2-year zeros to have the same duration as the 1-year zero, so that these two strategies will be affected equally by equal changes in interest rates. The 1-year zeros have a duration of 1 year. The duration of the other portfolio is $\alpha(0.5) + (1 - \alpha)2.0$. Equating the two durations,

$$1 = \alpha(0.5) + (1-\alpha)2$$
$$1 = 2 - 1.5\alpha$$
$$1.5\alpha = 1$$
$$\alpha = \frac{2}{3}$$

19. a. A stop-loss order becomes an order to sell at the best available price if the price drops to (or below) the stop-loss price. A primary drawback is that stop-loss orders will be activated frequently in a see saw market, so that the investor spends lots of money on commissions protecting the portfolio from crashes that never occur.
    b. A put option gives the owner the right to sell the stock at a fixed price. A drawback is that if, as usually happens, the stock price doesn't fall below the exercise price, the put expires worthless and the investor is out the price of the put. Since put options only last a few months, it can be expensive to maintain them continuously.
    c. If you sell an overvalued stock, you get out before the price collapses. The drawback is that it is not easy to identify overvalued stocks. How do you know that it is overvalued, while those who buy the stock from you don't know this?
    d. If you sell borrowed stock and replace it after the price has declined, you make a profit. As with (c), it is not easy to identify stocks that will decline in price. If you short a stock that goes up you lose money.
    e. Past performance is not a reliable guide to future performance.

20. Sell futures (which will go down in price and be increasingly profitable if stock prices fall) with a value of \$800 million (because the \$400 million portfolio should fluctuate 2-for-1 with the market.