

Final Examination Answers

1. The 2005 purchase price is a sunk cost. The relevant question in 2011 is whether the marginal benefit of signing Pujols exceeded the cost.
2. a. The price of the bond with the 4 percent coupon could be sufficiently low to make it more attractive.
b. The yield to maturity y is given by

$$110 = \frac{6}{(1+y)^1} + \frac{6}{(1+y)^2} + \dots + \frac{6}{(1+y)^{10}} + \frac{100}{(1+y)^{10}}$$

The solution works out to be $y = 0.0473$ (4.73 percent).

3. a. They sold futures.
b. They bought puts.
4. Leverage = assets/equity = $100/60 = 1.67$
5. In general, borrowing money at low interest rates is profitable, and borrowing money at high interest rates is unprofitable. It is not profitable to pay down his current low-interest loan. It would make more sense to invest the money now and pay down the loan *after* interest rates have risen. The only advantage of paying the loan down now is if he does not have the discipline to save for a future pay down.
6. A stock's attractiveness depends on its price; for example, its price in relation to its dividend, earnings, cash flow. A company may have high earnings per share simply because it has few shares.
7. A had a lower P/E than B.
8. The main difference is that you pay taxes *before* investing in a Roth IRA and pay taxes *after* withdrawing funds from a traditional IRA. Thus a key question is whether you expect your tax bracket to be higher or lower when you retire than it is currently. (If you have the same tax rate when you put money in and take money out, the after-tax rates of return are the same.) In addition, unlike traditional IRAs, Roth IRAs do not have minimum distribution requirements after you reach a certain age.
9. Buy a credit default obligation, in which the speculator pays a monthly premium and receive the principal on Greek bonds (that they do not own) if the bonds default.
10. Regression to the mean suggests that the companies being replaced may not be in as dire straits as their recent performance suggests and the companies that replace them may not be as stellar as they appear. Investors who are unaware of regression to the mean are likely to underestimate the strength of companies doing poorly and overestimate the strength of companies doing well, causing market prices to be too low for the former and too high for the latter relative to long-run fundamental values. When the performance of companies that had been doing poorly regresses to the mean, their stock prices will correct upward; and when companies that had been doing well regress to the mean, their prices will fall. Therefore, the stocks being replaced can be expected to do better than the stocks that replace them (and they do).

11. It is true value in the sense that there is a balance between investors who think the price is too high and investors who think it is too low. It may be difficult to beat the market, not because the market price is the correct price, but because changes in market prices are due to unpredictable swings in human emotions.
12. According to the expectations hypothesis, the interest rate on 10-year zeros is related to the current interest rate on 5-year zeros and the interest rate on 5-year zeros five years from now in this way

$$(1 + R_{10})^{10} = (1 + R_5)^5 (1 + R_5^{+5})^5$$

$$(1 + R_5^{+5})^5 = \frac{(1 + R_{10})^{10}}{(1 + R_5)^5}$$

In our example, the anticipated 5-year rate is initially:

$$(1 + R_5^{+5})^5 = \frac{(1 + 0.04)^{10}}{(1 + 0.03)^5} \Rightarrow R_5^{+5} = 0.0501$$

It then changes to

$$(1 + R_5^{+5})^5 = \frac{(1 + 0.03)^{10}}{(1 + 0.04)^5} \Rightarrow R_5^{+5} = 0.0201$$

13. The current market price is \$100/share and the price changes by 10% a year. There are many possible ways to obtain these answers. Here are two.

First, since the profit rate is equal to the shareholders' required return, EVA implies that the market value of the company is equal to its assets: \$100 million. Because there is no dividend, shareholders who continue to hold the stock will only receive their requisite 10% required return if the price increases by 10% a year.

Second, imagine that you own all the shares. Your first cash flow is \$5 million, and the annual rate of growth of the cash flow is equal to the fraction of earnings that are reinvested times the profit rate: $g = 0.5(0.10) = 0.05$. The constant-growth dividend-discount model give the present value as $D/(R - g) = \$5,000,000/(0.10 - 0.05) = \$100,000,000$ (and the price per share as $\$100,000,000/1,000,000 = \100). The market value at the end of the year, right before the share repurchase, is equal to the \$5,000,000 cash that the shareholders are about to receive plus the market value of the cash they will receive in the future:

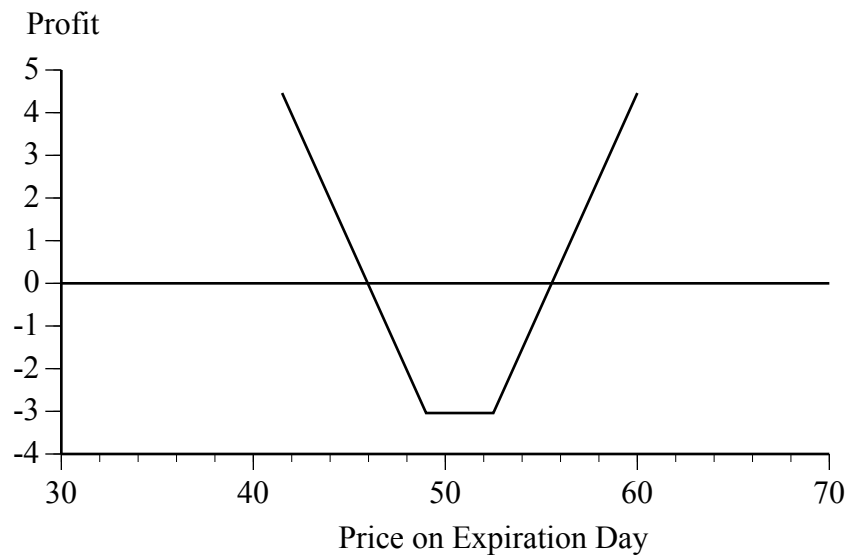
$$\$5,000,000 + \$5,000,000(1.05)/(0.10 - 0.05) = \$110,000,000$$

for a price per share of $\$110,000,000/1,000,000 = \110 (a 10% increase from a year earlier).

Similarly, the conservation of value principle implies that a share repurchase will not affect the price. Specifically here, with \$5,000,000, the firm can repurchase $\$5,000,000/\110 shares, leaving a total number of shares equal to $1,000,000 - 5,000,000/\$110 = 105,000,000/110$. After the repurchase, the market value of the company is $\$5,000,000(1.05)/(0.10 - 0.05) = \$105,000,000$ and the price per share is $\$105,000,000/(105,000,000/110) = \110 .

14. Because of arbitrage possibilities, the price of S&P futures is equal to the spot price plus the cost of carry: the interest rate on 3-month T-bills minus the dividend yield. Because the current T-bill rate is near zero, the cost of carry is negative and the futures price is *below* the spot price.
15. The Sharpe ratio is the average return minus the return on T-bills, divided by the standard deviation of the return.
- In mean-variance analysis, the investment with the highest Sharpe ratio offers investors the most attractive opportunity locus.
 - The Sharpe ratio is used to compare the risk-adjusted performance of different investments, for example mutual funds.

16. Even if the discount persists, you will still be earning the dividends and capital gains on a portfolio worth more than it cost you. If you are buying for keeps, you should not be dismayed by a widening discount; in fact, a widening discount offers an opportunity to buy even more!
17. a. Traditional index funds give more weight to growth stocks since they have relatively high market values relative to their dividends and earnings.
 b. Traditional index funds are more vulnerable speculative to bubbles since stocks whose prices are soaring automatically become a larger part of your portfolio.
18. This strategy is a bet on volatility, in that the strategy is profitable if Qualcomm's price on the expiration day is above $\$52.50 + \$3.04 = \$55.54$ or below $\$49.00 - \$3.04 = \$45.96$.



19. a. Because the yield to maturity is equal to the coupon rate, it sold for par.
 b. The total return is the 7.5% coupon plus the capital gain (or loss):

$$7.5\% + x\% = -4.19\% \text{ implies } x = -11.69\%$$

$$7.5\% + x\% = 23\% \text{ implies } x = +15.5\%$$

The duration is evidently between 11.69 and 15.5 years. (Because of the nonlinearity, the actual percentage changes are not exactly equal to each other or to the duration.) Halfway between is $(11.69 + 15.5)/2 = 13.6$. (The actual duration is 13.8 years.) Alternatively, we can divide the difference in the percentage returns by the two-percentage-point difference in the yield to maturity: $(4.19 + 23)/2 = 13.6$.

20. The implicit annual rate of return can be determined by this present-value equation:

$$\$5,000,000 - \$1,350,000 = \frac{\$1,350,000}{(1+R)^1} + \frac{\$1,350,000}{(1+R)^2} + \dots + \frac{\$1,350,000}{(1+R)^{19}}$$

The answer works out to be 36.89%.