

Final Examination (150 minutes)

No calculators allowed; if calculations are needed, write the explicit equation(s). Do not write “ $Y = aX$; solve for X .” You can write “ $100 = 10X$; solve for X .” The price of extra time is 1 point/minute; e.g., if your test is handed in 5 minutes after the scheduled finish time, 5 points will be subtracted from your test score.

1. After 32-year-old Albert Pujols signed a \$250 million 10-year contract with the LA Angels two weeks ago, an ESPN commentator said that it made economic sense for the Angels because the owner, Arturo Moreno, bought the team in 2005 for a bargain price. Explain why you either agree or disagree with this logic.

2. In May 1992, a Japanese newspaper, *The Nikkei Weekly*, reported that Japanese life insurance companies were placing “more emphasis on the overall yields of their bond investments, including capital gains as well as income....[Previously] life insurers had concentrated on high-coupon bonds, disregarding those with coupon rates of less than 6%.” Tadao Nishioka, section chief at Nippon Life Insurance Co., says, “We used to buy bonds with coupon rates of 6% or more even if their prices were ¥10 above face value of ¥100.”
 - a. Why might a bond with a 4% coupon be more attractive than an equally risky bond with an 8% coupon?

 - b. Show how to calculate the yield to maturity on a 10-year bond with a coupon rate of 6 percent and a price 10 percent above its face value. (Assume that the coupons are annual.)

3. Alice Handy recalls when she was managing the endowment for the University of Virginia (UVA):
 - a. In the late 1990s, UVA had invested in several technology startups whose value increased greatly. In 1999, UVA was concerned about the dot-com bubble popping, but UVA was not permitted to sell its technology shares until a mandatory holding period ended. The Virginia State Legislature was persuaded to change a state law that did not allow state institutions to invest in derivatives, and Handy locked in the technology gains by using futures on the tech-heavy NASDAQ Index. Did UVA buy or sell futures?

 - b. In early 2007, UVA couldn't find any stocks that looked attractively priced, so UVA used options that would make money if the S&P 500 fell substantially. Do you think UVA bought calls, sold calls, bought puts, or sold puts?

4. In the 1920s, most investment companies leveraged themselves by borrowing money; on average, they were financed by roughly 40 percent debt and 60 percent equity. How much leverage does an investment company have if it is financed by 40 percent debt and 60 percent equity?

5. A local banker recently said he has a low-interest variable-rate mortgage on his home, but is very concerned that interest rates may rise: “It will take at least a few years for this economy to return to a level where the Fed can raise rates significantly without killing the economy.” His strategy is to “reduce principal as fast as I can while my rate is low so that if interest rates go up, at least the principal balance I am paying the higher rate on will be lower and hence the overall interest paid over the life of the loan will be pretty low—in fact lower than the rate I could get now if I refinanced at a fixed rate.” Evaluate this strategy.

6. Explain why you disagree with this logic: “I invested in this stock because its earnings of \$5.70/share far exceeds the industry median of \$2.48/share.”

7. Company A’s stock is selling for \$60/share and Company B’s stock is selling for \$30/share. Company A acquires Company B by giving each B shareholder one share of A stock for two shares of B. Earnings are unaffected, in that earnings after the acquisition are equal to the sum of the two companies’ pre-merger earnings, yet A’s earnings/share drop after the acquisition. How did this happen?

8. How would you decide whether to put money in a Roth IRA or a traditional IRA?

9. How could a speculator use a swap to bet on the default of Italian Government bonds?

10. The 30 firms in the Dow Jones Industrial average are intended to be “substantial companies—renowned for the quality and wide acceptance of their products or services—with strong histories of successful growth.” The editors of the *Wall Street Journal* periodically alter the composition of the Dow to meet the index’s objectives. Do you think that after a substitution is made, the stocks that are added to the Dow generally do better or worse than the stocks they replace? Explain your reasoning.
11. A Harvard Business School professor wrote that, “The vast scientific evidence on the theory of efficient markets indicates that, in the absence of inside information, a security’s market price represents the best available estimate of its true value.” In what sense does market price represent true value? Why does evidence indicating it is difficult to beat the market not prove that a security’s market price is equal to its true value?
12. Use the expectations hypothesis to explain how a term structure could pivot, for example, change from an upward-sloping term structure to a downward-sloping curve. Specifically, suppose that the interest rate on 5-year zeros is 3% and the interest rate on 10-year zeros is 4%. What would have to happen to the anticipated interest rate on 5-year zeros five years from now for the interest rate on 5-year zeros to rise to 4%, while the interest rate on 10-year zeros falls to 3%?

13. Consider a company that has 1 million shares outstanding, assets of $A_0 = \$100$ million, and a profit rate of $\rho = 10\%$, so that it will earn \$10 million in after-tax profits during the coming year, $E = \$10$ million. The company always retains half of its earnings for investment in new assets and uses the remainder to repurchase shares at the market price at the end of each year. It has no debt and its assets increase each year by the amount of retained earnings. Its market price is always equal to its fundamental value. The shareholders' required rate of return is 10%. What is the current market price per share of its stock? By how much does its market price change each year?
14. Do you think that price of 3-month S&P 500 futures is currently above or below the value of the S&P500? Explain your reasoning.
15. Explain (a) the logic behind the Sharpe ratio; and (b) how it is used.
16. A market observer wrote that, "Frequently, closed-end shares representing \$25 in assets will be selling for \$20. Such profits may be largely illusory, however, because when the time comes to sell, the discount may persist." Is there any advantage to buying a closed-end fund at a discount if the discount never changes, or even widens?

17. In a traditional index fund, the amount of money invested in each stock is proportional to its market value (number of shares times price per share). Robert Arnott (who grew up in Claremont) advocates fundamental indexing, with relatively more money allocated to stocks that have high dividend/price and earnings/price ratios. Which approach do you suppose
- gives heavier weight to growth stocks?
 - is more vulnerable to speculative bubbles?
18. After Qualcomm closed at \$50.14 on November 1, 2011, Goldman Sachs' options trading team suggested a trading idea of buying a \$49/\$52.50 Qualcomm "strangle" by simultaneously purchasing a call option with an exercise price of \$52.50 and buying a put option with an exercise price of \$49, both expiring on November 24, 2011. The total cost of this strangle was \$3.04. Describe this strategy's implicit wager.
19. In July 1993, Walt Disney Co. issued 100-year bonds with 7.5% coupons and 7.5% yields to maturity. Morgan Stanley (the investment bank handling this issue) estimated that "if long-term yields...were to rise one percentage point, investors in the Disney bond would have a total return of negative 4.19% over the [first] year. If long-term rates were to fall one percentage point, however, the return would be nearly 23%."
- Did this bond initially sell at a premium or discount from par value?
 - Estimate the duration of this bond, without using a complicated mathematical formula for the duration.
20. In many state lotteries, the grand prize carries over to the next drawing if there is no winner. In 1992 the Virginia grand prize grew to \$27 million. A ticket cost \$1 and would win the grand prize if the buyer correctly picked 6 of 44 numbers, 1 to 44, not necessarily in order. An Australian syndicate attempted to purchase all 7,059,052 possible ticket combinations in order to ensure that it would win the lottery. Because of the nightmarish logistics, it was only able to buy 5,000,000 tickets, but it did win the \$27 million jackpot, paid in 20 annual installment of \$1,350,000 beginning immediately. What was the implicit annual rate of return on its investment?