

Pricing of Financial Securities and Derivatives

Time: 5 hours

Calculator may be used

Minimum to pass:

1. Final exam only: min. 50 p

2. Midterm + Final exam: Midterm min 25p and theory section in Final Exam min 20p, altogether min 50p

Final Exam 13.1.2012

Examinator: Henrik Palmén

PART I: Calculation (If you have passed the midterm then you can skip this. You may try to increase your points from the midterm in which case the better result of those two will be credited in the final grading.)

1. Pension funds pay lifetime annuities to recipients. If a firm will remain in business indefinitely, the pension obligation will resemble a perpetuity (infinite maturity). Suppose, therefore, that you are managing a pensions fund with obligations to make perpetual payments of 2 million per year to beneficiaries. The yield to maturity on all bonds is 16%. (If you do not remember how to calculate the duration on a perpetuity, assume it to be 7.)
 - a) If the duration of 5-year maturity bonds with coupon rates of 12% (paid annually) is 4 years and the duration of 20 year maturity bonds with coupon rates of 6% (paid annually) is 11 years, how much of each of these coupon bonds (in market value) will you want to hold to both fully fund and immunize your obligation?
 - b) What will be the par value of your holdings in the 20-year coupon bond? (BKM 16.13) 15p
2. A \$100 million interest rate swap has a remaining life of 10 months. Under the terms of the swap, six-month LIBOR is exchanged for 7% per annum (compounded semi-annually). The average of the bid-offer rate being exchanged for six-month LIBOR in swaps of all maturities is currently 5% per annum with continuous compounding. The six-month LIBOR rate was 4.6% per annum two months ago. What is the current value of the swap to the party paying floating? What is its value to the party paying fixed? (Hull 7.3) 20p
3. A one-month European put option on a non-dividend-paying stock is currently selling for \$2.50. The stock price is \$47, the strike price is \$50, and the risk-free interest rate is 6% per annum. What opportunities are there for an arbitrageur? (Hull 10.12) 15p

PART II: Theory

1. Briefly explain the following words and expressions
 - a) Repo
 - b) CDO
 - c) Cost of carry
 - d) Deep in the money
 - e) Market segmentation theory 10p
2. Briefly (no more than 10 lines / answer!) answer the following questions. Remember to explain your answers!
 - a) What type of trading order might you give to your broker if you want to buy shares of a stock, but you believe that current stock price is too high given the firm's prospects. If the shares could be obtained at a price 5% lower than the current value, you would like to purchase shares for your portfolio. (BKM cc 3.3)
 - b) The term structure of interest rates is upward sloping. Put the following in order of magnitude: The five-year zero rate, the yield on a five-year coupon-bearing bond, and the forward rate corresponding to the period between 4.75 and 5 years in the future. (Hull 4.7)
 - c) Explain carefully the difference between hedging, speculation, and arbitrage. (Hull 1.2)
 - d) What does it mean to assert that the delta of a call option is 0.7? How can a short position in 1,000 options be made delta neutral when the delta of each option is 0.7? (Hull 18.2)
 - e) What changes to the basic Black-Scholes option pricing model is needed if you want to determine the price of a call option on a stock index like the SP 500? 20p

When answering the following two essay-type questions, start with a table of contents!

3. Recent trends. According to BKM four important trends have changed the contemporary investment environment? Which are the trends and how have they changed the financial sector? (BKM ch. 1.7) 10p
4. Passive bond management. Discuss what is meant by passive management, the main classes of strategies, the main purposes of them, and main drawbacks or limitations. (BKM ch. 16.3) 10p