Pricing of Financial Securities and Derivatives Final Exam 14.1.2015
Time: 4 hours Examinator: Henrik Palmén
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

PART I: Calculation (If you have passed the midterm you can skip this part. 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. Suppose that a 1-year zero-coupon bond with face value 100 currently sells at 94.34, while a 2-year zero sells at 84.99. You are considering the purchase of 2-year bond making annual coupon payments. The face value of the bond is 100 and the coupon rate is 12% per year. (BKM 15.16) **15p**
   a) What is the yield of the 2-year zero, and what is the price of the 2-year coupon bond?
   b) What is the forward rate for the second year?
   c) If the expectation hypothesis is accepted, what are 1) the expected price of the coupon bond at the end of the first year, and 2) the expected holding period return on the bond over the first year?
   d) Will the expected return be higher or lower if you accept the liquidity preference hypothesis?

2. Assume that the risk-free rate of interest is 4% in the U.S. and 5% in the U.K.. The current exchange rate is $2 per pound. What is the arbitrage free futures price for a 1-year contract? Set up an arbitrage strategy and calculate the associated profits if the initial futures price were $2.01 per pound. (BKM cc. 20.1) **15p**

3. A stock price is currently $40. Over each of the next two three-month periods it is expected to go up by 10% or down by 10%. The risk-free interest rate is 12% per annum with continuous compounding. (Hull 12.17)
   a) What is the value of a six-month European put option with a strike price of $42?
   b) What is the value of a six-month American put option with a strike price of $42?

   20p

PART II: Theory

1. Briefly explain the following words and expressions
   a) Repo
   b) Strip bonds
   c) Protective put
   d) Hazard rate
   e) Cross hedging **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) What are the main difference between typical forward contracts and typical future contracts? Describe at least four out of six typical differences. (ch. Hull 2.11)
   d) Explain carefully why the futures price of gold can be calculated from its spot price and other observable variables whereas the futures price of copper cannot. (Hull 5.5)
   e) Explain why margins are required when clients write options but not when they buy options. (Hull 9.4) **20p**

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

3. Types of traders in derivative markets. (Hull ch. 1.6-1.9) **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**

$$p = \frac{e^{r\Delta t} - d}{u - d}, \qquad \begin{aligned} c &= S \times N(d_1) - Xe^{-rT} \times N(d_2) \\ p &= Xe^{-rT} \times N(-d_2) - S \times N(-d_1) \end{aligned}, \qquad \begin{aligned} d_1 &= \frac{\ln\left(S/X\right) + \left(r + \sigma^2/2\right)T}{\sigma\sqrt{T}} \\ d_2 &= d_1 - \sigma\sqrt{T} \end{aligned}$$