Pricing of Financial Securities and Derivatives Final Exam 16.12.2016
Time: 4 hours Examinator: Henrik Palmén
Own 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. January 1, you sold short one round lot (that is, 100 shares) of a company's stock at 21 per share. On March 1, a dividend of 2 per share was paid. On April 1, you covered the short sale by buying the stock at a price of 15 per share. You paid 0,5 (50 cents) per share commission for each transaction. What is the value of your account on April 1? **15p**

2. Companies A and B have been offered the following rates per annum on a $20 million five-year loan:

	Fixed Rate	*Floating Rate*
Company A	5.0%	LIBOR+0.1%
Company B	6.4%	LIBOR+0.6%

Company A requires a floating-rate loan; company B requires a fixed-rate loan. Design a swap that will net a bank, acting as intermediary, 0.1% (ten basis points) per annum and that will appear equally attractive to both companies. How much will each of the parties profit or loose in the arrangement. Draw a picture including all periodical interest rates paid and received by all parties. **15p**

3. A stock price is currently $100. Over each of the next two six-month periods it is expected to go up by 10% or down by 10%. The risk-free interest rate is 4% per annum with continuous compounding.
   a) What is the value of a one-year European call option with a strike price of $100?
   b) What is the value of a one-year American put option with a strike price of $100? **20p**

PART II: Theory

1. Briefly explain the following words and expressions
   a) Eurobond
   b) Systemic risk
   c) Intermarket spread swap
   d) Hedge ratio
   e) Protective put **10p**

2. Briefly (no more than 10 lines / answer!) answer the following questions. Remember to explain your answers!
   a) What is meant by a "bottom-up investment style? Give three disadvantages of this investment style.
   b) A bond has a current yield of 9% and a yield to maturity of 10%. *a)* Is the bond selling above or below par? *b)* Is the coupon rate more or less than 9%?
   c) Which are the five rules of duration?
   d) The party with a short position in a futures contract sometimes has options as to the precise asset that will be delivered, where delivery will take place, when delivery will take place, and so on. Do these options increase or decrease the futures price?
   e) *a)*Why is an American call option on a dividend-paying stock always worth at least as much as its intrinsic value. *b)* Is the same true of a European call option? **20p**

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

3. Theories on the relationship between future prices and expected future spot prices. (Hull, 121-123, BKM 685-687) **10p**

4. Derivative mishaps and the lessons to be learned: what lessons are primarily relevant to non-financial institutions? (Hull ch. 35.3) **10p**

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

$$d_2 = d_1 - \sigma\sqrt{T}$$