DEPARTMENT OF FINANCE AND STATISTICS
Pricing of Financial Securities and Derivatives (Vasa)

Exam on May 10th, 2010. 12 points for each question.

Time 5h
Can be taken away
Calculator allowed

1. Give a short description of the following concepts:

   a. FRA-rate
   b. Duration of a bond
   c. EURIBOR
   d. Underlying security
   e. Rho
   f. Uncovered interest parity

2. What is meant by day count conventions for the quotation of bonds. Which are the most important day count conventions? Explain the difference between the conventions with some numerical examples.

3. Show how a futures contract should be priced assuming...

   a. ...You are using a simple interest rate and the underlying security pays no income.
   b. ...You are using a continuously compounded interest rate and the underlying security pays no income.
   c. ...You are using a simple interest rate and the underlying security pays two dividends during the lifetime of the futures contract.
   d. ...You are using a continuously compounded interest rate and the underlying security pays a continuous dividend yield.

4. What is meant by the concept "The Greeks for options"? Describe the "Greeks" discussed in the course-literature.

5. Discuss how option pricing theory can be used to value and to estimate the default probabilities of leveraged firms. What is the "recovery rate"?

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1. Assume that you want to buy a Certificate of Deposit with a par value of €1 000 000 that sells at the quote 2.797% (day count: Actual/360). The CD matures in 102 days.

a) How much will the CD cost you?

b) Assume that you sell the CD after 67 days to the quote 2.622%. What is the annualized return on your 67 day investment?

2. You have agreed to manage a liability portfolio that is to pay 1 million after 3 years and 3 million after 5 years. You have decided to immunise this liability using 5-year bullet bonds with 8% annual coupons and a face value of 100 000.

Year	1	2	3	4	5
Liability	0	0	-1 000 000	0	-3 000 000
CF from one bond	8 000	8 000	8 000	8000	108 000

a) How much money must be invested today if you are going to be able to meet your liabilities if the rate is 5%?

b) Calculate the duration of the liability and the bond. Assume a flat yield curve at 5%.

c) How many bonds would you buy in order to immunise the liability? Assume a flat yield curve at 5%. Note: the amount of money invested in bonds does not necessarily match the cash needed according to a).

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1. Today (April 29th) you have sold EUR 1 million against AUD 1,442,900 with a forward maturing on July 29th. The short-term (< 1 year) risk free rates have a flat term-structure and are 0.65% for EUR and 4.50% for AUD. The spot rate is AUD/EUR 1.4292. After one month (May 29th) the July forward rate is AUD/EUR 1.3939 and the spot rate AUD/EUR 1.3850. The interest rates are unchanged. Assume all month = 1/12 years.

   a) Show how you could replicate the forward rate using the money markets.
   b) What is the market value of the July forward in May?

2. You are currently short in 10 000 stock option calls with the exercise prise 100. The call premium is 1.94, the call's delta 0.55 and the gamma 0.10. How would you construct a delta and gamma neutral position by combining your call position with 1) a position in an otherwise similar call but with X=105 (premium 0.35, delta 0.16 and gamma 0.05) and 2) a position in the underlying stock?

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