DEPARTMENT OF FINANCE AND STATISTICS

Pricing of Financial Securities and Derivatives (Vasa) **Time 5h**

Can be taken away

Exam on May 9th, 2009. 12 points for each question. Calculator allowed

1. Give a short description of the following concepts:

    a. Option's intrinsic value
    b. Money market instrument
    c. Moody's
    d. International Fisher relation
    e. Gamma
    f. Merton's model

2. What is meant by an option's delta? Between which maximum and minimum values must a call option's delta be? Which are the max and min values for the delta of a put? Rank the following options with respect to their delta (from highest to lowest): An in-the-money call, an out-of-the money call, an at-the money put and an in-the money put.

3. What is meant by clean and dirty bond prices? How would you go about to calculate the dirty price of a bond assuming you know the clean price?

4. Describe the following theories of the term structure of interest rates
    a. The unbiased expectations hypothesis
    b. The liquidity preference theory
    c. The market segmentation theory
    d. The preferred habitat theory

5. Describe how trades on limit order book markets are carried out. Use a hypothetical limit order book (with numerical values) for stocks on a hypothetical firm for illustratione.

GOOD LUCK !!!

Test 1. 10 points for each question.
A maximum of two attempts are allowed for Test 1.

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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 2 millions each in 3 and 4 years. You have decided to immunise this liability using 4-year bullet bonds with 12% annual coupons and a face value of 100 000.

Year	1	2	3	4
Liability	0	0	-2 000 000	-2 000 000
CF from one bond	12 000	12 000	12 000	112 000

a) How much money must be invested today if you are going to be able to meet your liabilities if the rate is 7%?

b) Calculate the duration of the liability and the bond. Assume a flat yield curve at 7%.

c) How many bonds would you buy in order to immunise the liability? Assume a flat yield curve at 7%. Note: the amount of money invested in bonds does not necessarily match the cash needed according to a).

GOOD LUCK !!!

Test 2. 10 points for each question.
A maximum of two attempts are allowed for Test 2.

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1. Suppose that on September 15th, you have sold GBP 1 million against CHF 3.0525 million with a forward maturing on December, 15th. The risk-free rates have a flat term structure and are 4.5% for CHF and 4.0% for GBP. The spot rate is CHF/GBP 3.0487. On October 15th, the December forward rate is CHF/GBP 3.0375 and the spot rate is CHF/GBP 3.0350. Assume that all months are 1/12 years.

a) How would you replicate the forward using the money markets?
b) What is the market value of the forward in October.

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?

GOOD LUCK !!!