Høgskolen i Østfold

EXAMINATION

Course code: SFB 12604	Course: **International Finance (10 ECTS)**	
Date: 14th of May 2013	Duration of exam: 09:00 – 13:00 (4 hours)	
Permitted sources: English – mother tongue dictionary Mother tongue – English dictionary Calculators		Lecturer: Roswitha M. King
The examination: Solutions are to be written in English language. The examination papers consist of 4 (four) pages inclusive this page. The exam consists of 4 (four) exercises. You are to do all four exercises. Please check that the examination papers are complete before you start answering the questions. The numbers in square brackets [.] indicate the maximum amount of points obtainable for the exercise.		
Date of delivery of the examination results: June 6, 2013 Results are accessible to students on the student web two days after the date specified above. Follow instructions given at: http://www.hiof.no/index.php?ID=7027		

Final Exam Questions

Course code: SFB 12604
Course title: International Finance. **Semester:** Spring 2013.

Show all your calculations and interpret their meaning. Explain all symbols that are not already explained in the given text. Label all items in graphs including the axes. If formulas are involved, first write down the general formula, before filling in numbers. Give opening and concluding statement.

Good luck!

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1. [25] Central Concepts

Please explain the following concepts:

a) Direct and Indirect Quote
b) Exchange Rate and Quote
c) Spot exchange rate, and Forward exchange rate
d) Forward Premium (Discount)
e) Purchasing Power Parity

2. [25] Triangular Arbitrage

Suppose you have USD 1 million and you see on your computer screen the following exchange rate quotes from three different institutions:

Institution A announces EUR/USD = 0.8631

Institution B announces EUR/GBP = 1.4600

Institution C announces USD/GBP = 1.6939

Here EUR denotes Euro, USD denotes US dollar and GBP denotes British Pound.

a) Explain how we can see that there exist arbitrage opportunities, given the above three exchange rates, BEFORE actually starting buying and selling currencies.

b) Explain in words the concept of 'triangular arbitrage'

c) Explain precisely how triangular arbitrage works in the given case and calculate the profit from arbitrage. Show all your steps.

3. [25] Option Strategy Payoff

Multinational corporations typically buy and sell currency options simultaneously, so that they act as both buyers and sellers in the currency options market. One can sum over all option activities of a corporation to determine the overall gain or loss from the firm's options market activities. Here we consider a situation where the spot exchange rate, S_t, between a currency A and a currency B is expressed as "number of units of currency A per one unit of currency B".

Suppose the spot exchange rate, S_t, on a currency A to a currency B may vary between 120 and 280 in the next time period. This range of the spot rate is given in column [1] below. This introduces considerable uncertainty over cash flow and you decide to use options to reduce the uncertainty You consider to buy a currency call option with exercise price $E_1 = 160$, and sell a currency call option with exercise price $E_2 = 240$. The premium on the 160 ($E_1 = 160$) call option is 20, on the 240 ($E_2 = 240$) call option it is 10. Suppose your strategy is to buy one call option with exercise price 160 ($E_1=160$) and sell one call option with exercise price 240 ($E_2=240$). Show the payoff of the combined strategy in a table like the one below, for the various spot rates listed in column [1] of the table.

In column [2] you are to write the premium associated with *buying* a call option. In column [3] you are to write gain or loss resulting from *buying* a call option excluding the premium. In column [4] you are to write the premium associated with *selling* a call option. In column [5] you are to write the gain or loss associated with *selling* a call option, excluding the premium. In column [6] you are to (horizontally) sum the gains and/or losses associated with buying and selling a call option to obtain the total payoff on the entire portfolio. **Show all your calculations to back up your entries in the respective columns.**

S_t	Buy a call option (Premium)	Payoff from buying a call $E_1 = 160$ (Gain or Loss)	Sell a call option (Premium)	Payoff from selling a call $E_2 = 240$ (Gain or loss)	Total Payoff of Portfolio (Total Gain or Loss)
[1]	[2]	[3]	[4]	[5]	[6]
120					
140					
160					
180					
200					
220					
240					
260					
280					

4. [25] Profit Diagrams: *Buyer of a Put Option*

You and your twin brother agree on almost everything, except financial hedging strategies, especially when it comes to financial derivatives.
After long discussions you decide, against the advice of your brother, to buy a *put option* that is defined on a treasury bond future. So, the *underlying* for your put option is a *treasury bond future*. Your brother advised you to purchase a treasury bond future instead of a put option defined on a treasury bond future. Your brother thinks you are silly and he cannot understand why you are willing to pay an expensive premium for your put option, when, as he says, a treasury bond future would give you the same kind of protection against uncertainty.
Your put option is traded on the Chicago Board of Trade and quoted in points, with 1 point = USD 1000.

Assumptions on your Put Option

• On 'purchase date' you **buy** one of the above described put options defined on a Treasury bond future.
• You **pay** a premium of USD 4000.
• The exercise price, E, (also called 'strike price') that is specified in your option contract is 230 points.
• We now consider three scenarios for the market (spot) price, S_T, of the underlying at the expiration date T of the option :
(i) $S_T = 230$ points,
(ii) $S_T = 220$ points,
(iii) $S_T = 240$ points.

Your task is as follows:

a) Draw an accurate profit diagram with "Profit" on the vertical axis and "Market Spot Price S_T" on the horizontal axis, using the assumptions of the three scenarios, (i), (ii), (iii), for the spot price at expiration date. Explain in detail the reasoning behind the points that you draw in the diagram, i.e. the "how" and "why" of the calculation of profit. Show all your calculations.

b) Explain the shape of the graph.

c) Your brother is still giving you a hard time about your put option. Explain the perceived advantages of an *option* relative to a *future*.

d) What, in general, is meant with the *underlying* of an option?