

STUDENT NUMBER:

KEELE UNIVERSITY

CLASS TEST, 2008

P3/T3 (PRINCIPAL COURSE)

Tuesday 19th February, 11.05-11.55 (50 minutes)

BUSINESS ECONOMICS
FINANCE
MANAGEMENT SCIENCE

Eco-30004

OPTIONS AND FUTURES

Candidates should attempt to answer **ALL** questions (**100 marks**).

The use of hand-held, battery-operated, electronic calculators will be permitted subject to the regulations governing their use which are displayed outside the examination room.

The type of calculator must be specified on the cover sheet of your answer book.

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Options and Futures ECO-30004

Candidates should attempt to answer ALL questions (100 marks).

1. A British firm has all its assets in Britain and sells all its products in Britain; all its raw materials are produced domestically, as well. Last year the firm borrowed money from a German bank with the fixed interest rate. It must pay both interest and principal in Euros.

(a) Explain what interest rate risk the firm faces and how the firm can use forward contract to manage the risk. **[5 Marks]**

(b) Explain what exchange rate risk (£/€) the firm faces and how the firm can use forward contract to manage the risk. **[5 Marks]**

Suppose that on August 15, 2007, the firm buys €250000 forward, for delivery in five months. On August 15, 2007, the spot price of a euro is £0.60 /€ and the forward price for delivery five months later is £0.55 /€

On September 15, 2007, the following prices are observed: Spot price £0.58 /€ forward price for delivery four months hence is £0.57/€ and forward price for delivery five months hence is £0.59/€

Also on September 15, 2007, the following interest rates are observed (In the United Kingdom): For securities maturing one month hence 4%, for securities maturing four months hence 5% and for securities maturing five months hence 6% per annum.

(c) How big is the value of the position for firm on September 15, 2007? **[5 Marks]**

(d) Is the firm's position an asset or liability? Explain. **[5 Marks]**

(e) What is the theoretical forward price on September 15, 2007 (given that the German interest rate for securities maturing in four months hence is 2.5% per annum)? **[10 Marks]**

(f) Identify an arbitrage opportunity; give the details of all cash flows now and at delivery. **[10 Marks]**

2. Carefully label all elements of the diagram. Discuss.

(a) Consider a portfolio of long stock and short call (covered call). Draw the profit diagram of this portfolio. **[10 Marks]**

(b) Consider a portfolio of long call and short call on the same stock with the same maturity, with long call having lower strike price than the short call. Draw the profit diagram of this portfolio. **[10 Marks]**

(c) Consider a portfolio of long call and long put on the same stock with the same maturity (with the same strike price). Draw the profit diagram of this portfolio. **[10 Marks]**

3. (a) Explain why the lower bound of a European put option on a non-dividend paying stock is $\max[0, K(1+r)^{-T} - S]$. **[10 Marks]**
- (b) Explain why the lower bound of a American put option on a non-dividend paying stock is $\max[0, K - S]$. **[10 Marks]**
- (c) There are European put and call options on an non-dividend paying stock with the strike price of K and a maturity date T . The risk-free rate of interest over the period until maturity is r . Show that buying the put option, buying the stock and selling the risk-free bond (lending) with the face value of K is equivalent to buying the call option. Hence state the put-call parity condition. **[10 Marks]**

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