UNIVERSITY OF ESSEX

FINAL YEAR EXAMINATIONS 2012

EC372-6-SP ECONOMICS OF BOND AND DERIVATIVES MARKETS

Time allowed: 2 hours.

Section A: Answer any TEN questions

Section A contains TWELVE questions.

Section B: Answer ONE question.

Section B contains THREE questions.

Each section is worth 50% of the marks: 5% per question in Section A, and 50% per question in Section B.

Candidates are allowed to bring into the examination room:
calculators (hand held, containing no textual information).

Please do not leave your seat unless you are given permission by an invigilator.

Do not communicate in any way with any other candidate in the examination room.

Do not open the question paper until told to do so.

All answers must be written in the answer book(s) provided.

All rough work must be written in the answer book(s) provided. A line should be drawn through any rough work to indicate to the examiner that it is not part of the work to be marked.

At the end of the examination, remain seated until your answer book(s) have been collected and you have been told you may leave.

Section A Answer TEN questions.

1. A bond with face value \$100 will mature one year from the present, at which time the holder will receive the face value plus a single coupon of \$32. Define and calculate the bond's spot yield if its market price today is \$120.

2. Define and interpret the 'Macaulay duration' for a coupon-paying bond with n years to maturity.

3. Suppose that the spot price of wheat today is \$8.00 per bushel and that the risk-free interest factor for the next 6 months is 1.10. Making any additional assumptions you need, show how to obtain the forward price of wheat for delivery 6 months from today in the absence of arbitrage opportunities.

4. Explain what is meant by 'marking-to-market' in the context of futures contracts.

5. Describe a 'long perfect hedge' strategy, using an example with a forward (or futures) contract as the hedge instrument.

6. What are the differences between 'European' and 'American' style 'call' and 'put' option contracts?

7. Explain how the payoff at expiry on a European put option with exercise price 200p varies with the underlying asset price, for an investor who *writes* the option when the premium equals 15p.

8. Describe, using a diagram, the relationship between the premium on a *European call* option and the price of the underlying asset.

9. What is meant by 'portfolio insurance'? Give an example of how it can be achieved.

10. Describe, using an example, a *plain vanilla* interest rate swap.

11. Explain how a *swap agreement* can be interpreted as a 'bundle of forward contracts'.

12. Briefly explain why 'moral hazard' may arise in the relationship between a financial intermediary and the firms (borrowers) to which it lends.

Section B Answer one question.

13. Two zero-coupon bonds, labelled N (nominal) and R (real) each mature four years from today. At maturity, bond N pays £100. At maturity, bond R pays £100 adjusted for the increase in the price index of goods and services between today and the maturity date, i.e. the payoff will be increased to take account of inflation.

    (a) [20 marks] Define and interpret the following four yields:

        (i) nominal and real spot-yields on bond N;
        (ii) nominal and real spot-yields on bond R.

    (b) [15 marks] Being careful to state your assumptions, discuss the inferences that could be drawn from the spot-yields in (a) for the average rate of inflation over the coming four years.

    (c) [5 marks] Suppose that today's market price of bond N is £75 while today's price of R is £90. In view of your answer to (b), what, if anything, does this information imply about the change in the price index of goods and services over the coming four years?

    (d) [10 marks] Suppose that an investor expects the price index of goods and services to increase from 360 today to 450 four years from today.

    Discuss how, if at all, the investor could profit from this expectation by trading in N and R. Does the investor face an 'arbitrage opportunity'? Explain.

14. Answer *both* parts (a) and (b).

    (a) [28 marks] Define, and discuss the implications of, the following motives for trading in futures markets:

        (i) Arbitrage,
        (ii) Speculation,
        (iii) Hedging.

    (b) A manufacturer, for which copper is an input, seeks to hedge against fluctuations in the spot price of copper that it needs to acquire several months from the present. Assume that a market exists for copper futures contracts.

        (i) [12 marks] Explain how the manufacturer could use futures contracts to accomplish the hedge.
        (ii) [10 marks] Why is the manufacturer's hedging strategy unlikely to be entirely risk-free? How could the risks be minimised?

15. Answer both (a) and (b).

    (a) [25 marks] The shares of Blanko plc currently trade for 205 pence each. European style call and put options on Blanko's shares are also traded, both with one period to expiry and both with an exercise price of 210 pence per share. The current option prices, per share, are observed to be 25 pence for each call and 10 pence for each put. Assume: the risk-free interest rate is 5% per period; interest is compounded only once per period; Blanko plc pays no dividends over the coming period; markets are frictionless.

    Use an arbitrage argument to show that a risk-free payoff using zero initial capital can be obtained at the security prices given above. Hence, state the put-call parity relationship for European style options. [A formal derivation of the put-call parity relationship is not required.]

    (b) Suppose that the underlying security for call and put options is a futures contract. Assume that the call and put options are both of European style, with the same exercise price and delivery date.

        (i) [20 marks] Describe the distinctive characteristics of options contracts in which the underlying security is a futures contract. Illustrate your answer with examples, one for a call option, the other for a put option.

        (ii) [5 marks] How, if at all, should the put-call parity relationship be modified when the security underlying the options is a futures contract? [A formal derivation is not required.]

End of Paper

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