

**EC372 Economics of Bond and Derivatives Markets****Multiple Choice Test**

Spring Term 2010

- Time allowed: 40 minutes.
- There are TWENTY questions, ALL of which should be answered.
- ***DO NOT START UNTIL YOU ARE ASKED TO BEGIN.***
- Enter your registration number on the answer sheet.
- For each question, mark the *most appropriate* option, A, B, C, or D, on the answer sheet.
- Calculators (hand held, containing no textual information) are permitted.
- Only the answer sheet is to be returned. You should keep the question paper (this document).
- The purpose of the test is solely formative for students to gauge their understanding of the course material. The mark will carry no weight in your overall result for the course.



1. A zero-coupon bond with current market price equal to \$81 matures two years from the present at which time its holder will receive \$100.
  - A. The bond's spot yield is greater than its yield to maturity.
  - B. The bond's current spot yield equals 19%.
  - C. The bond's current spot yield is greater than 9%.
  - D. The bond's current spot yield is less than 9%.
  
2. A bond with market price  $p$ , pays a coupon of \$10 for each of the next 12 years, at which time its holder also receives its face-value, \$100. The bond's *yield to maturity* measures:
  - A. The rate of return such that  $p$  equals the Net Present Value of the stream of coupons plus \$100 after 12 years.
  - B. The rate of return guaranteed to an investor who holds the bond for the entire 12 years.
  - C. The rate of return such that  $p$  equals the Net Present Value of \$100 after 12 years, excluding the coupons.
  - D. The rate of return such that  $p$  equals the Net Present Value of the bond's stream of coupons, excluding its face value.
  
3. A bond promises to pay a coupon of £5 at the end of each of the next four years, together with payment of its face value of £100 at the end of the fourth year. The bond's yield to maturity is 7%. The Macaulay duration of the bond is:
  - A. Equal to its coupon rate, 5% ( $= 5/100$ ).
  - B. Equal to its time to maturity, 4 years.
  - C. Greater than its time to maturity, 4 years.
  - D. Smaller than its time to maturity, 4 years.
  
4. The following information is provided for bonds  $A$ ,  $B$  and  $C$ :
 

	Bond $A$	Bond $B$	Bond $C$
Payoff after 1 year:	£25	£100	0
Payoff after 2 years:	£100	0	£100
Today's price:	Not traded	£96	£90

  - A. Today's 'fair value' of bond  $A$  equals £125.
  - B. Today's 'fair value' of bond  $A$  equals £114
  - C. Today's 'fair value' of bond  $A$  equals £120.
  - D. Today's 'fair value' of bond  $A$  equals £93.

5. Two zero-coupon bonds each have face value \$100, maturing 1 year and 5 years, respectively, from today. The 1-year bond has a spot yield of 3%. The 5-year bond has a spot yield of 7%.
- A. An investor could make a certain gain (arbitrage profit) by short-selling 5-year bonds, then buying 1-year bonds at the start of each of the following four years.
  - B. An investor could make a certain gain (arbitrage profit) by short-selling 1-year bonds and buying 5-year bonds to hold for just one year.
  - C. The information is incompatible with the pure expectations hypothesis of the term structure of interest rates, which predicts that the yield curve must be flat.
  - D. The information is compatible with the liquidity preference theory of the term structure, which allows for positive term premia.
6. A forward contract is made for the delivery of wheat 10 months from today at a forward price of \$6 per bushel of the commodity. Futures contracts for the same commodity and delivery date are also available.
- A. The purchaser of the forward contract pays the forward price, \$6, immediately but must wait for 10 months to receive the wheat.
  - B. The seller of the forward contract has an obligation to deliver wheat 10 months from today in return for \$6 per bushel, payable on delivery.
  - C. The seller of the forward contract has an obligation to deliver wheat 10 months from today in return for the spot (cash) price on the delivery date (i.e., a price that may differ from \$6 per bushel).
  - D. The holder of a forward contract always has the right to exchange it for an identical futures contract at any time before the delivery date.
7. Jazza takes a *short* position for 10 futures contracts at a price of \$200 per contract.
- A. If the futures contract price rises from \$200 to \$210 per contract, marking-to-market lowers by \$100 the funds in the Jazza's margin account.
  - B. If Jazza offsets the position when the contract price has fallen to \$190, the result will be a loss of \$100 (ignoring transaction costs).
  - C. If Jazza offsets the position when the contract price is \$205, then Jazza will make a profit of \$50 (ignoring transaction costs).
  - D. If the contracts are held until the delivery date, Jazza will be required to deliver (i.e., supply) the underlying commodity (asset) in return for the spot (cash) price of the commodity at the delivery date.

8. The Exchange Delivery Settlement Price (EDSP) in futures markets.
- The EDSP is the price of the underlying asset used to settle each Exchange of Futures for Physicals (EFP) prior to (i.e., before) the delivery date for the futures contract.
  - For each day during the life of a futures contract the EDSP is the price that is used when contracts are ‘marked-to-market’.
  - The EDSP equals the difference between the futures contract price and the price of the underlying asset at the delivery date specified in the futures contract.
  - The EDSP equals the price of the asset underlying the futures contract at the delivery date specified in the contract.
9. A REPO contract promises to pay £1050 at a future date  $T$  for the return of bonds sold for £1000 cash today, date  $t$ . Assume that the interest factor for borrowing and lending between  $t$  and  $T$  is  $R(t, T) = 1.02$ , and that markets are frictionless.
- An investor who pays £1000 via the REPO to acquire bonds at  $t$ , would receive £1020(=  $1000 \times 1.02$ ) in return for the bonds when they are returned at  $T$ .
  - An investor who uses the REPO to obtain £1000 at  $t$ , would have to pay £1071 (=  $1050 \times 1.02$ ) when the bonds are repurchased.
  - An investor would gain by using borrowed funds to obtain bonds at  $t$  via the REPO, returning the bonds at  $T$  in exchange for £1050.
  - An investor would gain by using borrowed bonds to obtain cash at  $t$  via the REPO. The cash is loaned at interest until  $T$ , when the bonds are repurchased to complete the REPO.
10. Kamel acquires a *long* position in 10 futures contracts at a price of \$80 per contract. The initial margin is \$40 per contract, the maintenance margin is \$20 per contract, and, if a margin call is made, the margin must be restored to its *initial* level. Assume that no interest is paid on margin account balances and transaction costs are zero.
- If Kamel offsets the position when the contract price equals \$85 per contract, the margin account will reflect an overall gain of \$50.
  - Suppose that the margin account balance equals \$280. A rise of \$5 in the contract price will trigger a margin call for \$170.
  - An fall of \$7 in the contract price increases the margin account balance by \$70.
  - If Kamel offsets the position when the contract price equals \$90 per contract, the margin account will reflect an overall loss of \$100.
11. An investor undertakes a *short*-hedging strategy using a futures contract.
- The investor seeks to reduce the uncertainty about the price at which an asset (e.g. a commodity or a security) is to be *purchased* at a later date.
  - The investor seeks to reduce the uncertainty about the price at which an asset (e.g. a commodity or a security) is to be *sold* at a later date.
  - The objective of the strategy to profit from an *expected fall* in the futures price between today and the date when the contract is sold (i.e., offset).
  - The objective of the strategy to profit from an *expected increase* in the futures price between today and the date when the contract is purchased (i.e., offset).

12. Fisher Inc is accused of cornering the market in soya-bean futures. Evidence of such market manipulation would be that:
- A. Fisher Inc holds a very low (or zero) inventory of soya-beans at the same time as taking *short* positions in a large proportion of existing futures contracts for soya-beans.
  - B. Fisher Inc holds a very low (or zero) inventory of soya-beans at the same time as taking *long* positions in a large volume of futures contracts for soya-beans.
  - C. Fisher Inc has acquired substantial stocks of soya-beans at the same time as holding *long* positions in a large proportion of existing futures contracts for soya-beans.
  - D. Fisher Inc has acquired substantial stocks of soya-beans at the same time as holding *short* positions in a large proportion of existing futures contracts for soya-beans.
13. Suppose that: (i) the spot price of gold today is \$1000 per ounce, (ii) markets are frictionless, (iii) the interest factor for borrowing and lending over the next six months is 1.01, and (iv) the convenience yield for holding gold is zero. Arbitrage opportunities are absent.
- A. The forward price for gold will equal \$1005 if gold is available for storage at \$5 per ounce (payable upon delivery, in six months).
  - B. The forward price for gold will equal \$985 if gold is available for storage at \$5 per ounce (payable upon delivery, in six months).
  - C. The forward price for gold will be less than \$1000 if gold is available for storage at zero cost.
  - D. The forward price for gold will be equal to \$1010 if gold is available for storage at zero cost.
14. In March 2010 an investor *sells* contracts in Stock Index futures at a price of 5200 points with delivery date December 2010. Assume that: (i) each point is worth £10; (ii) no interest is paid on margin account balances; (iii) transaction costs are zero.
- A. If the position is held until trading ceases in December when the Stock Index equals 5400, cash settlement results in a *loss* equal to £2000.
  - B. If the position is held until trading ceases in December when the Stock Index equals 5400, cash settlement results in a *gain* equal to £2000.
  - C. Unless the position is offset before trading ceases in December, settlement requires the investor to deliver a portfolio of stocks with proportions identical to the composition of the Stock Index.
  - D. The investor could achieve a risk-free *hedge* against fluctuations in BP share price, if BP is one of the companies included in the Stock Index.

15. A *European call option* on IBM ordinary shares with exercise price \$80.00 per share that expires on 30 June
- requires the option *writer* to *sell* IBM shares for \$80.00 any time before, or on, 30 June, at the discretion of the option holder (owner).
  - permits the option *writer* to *buy* IBM shares for \$80.00 on 30 June.
  - permits the option *holder* (owner) to *buy* IBM shares for \$80.00 on 30 June.
  - permits the option *holder* (owner) to *sell* IBM shares for \$80.00 on 30 June.
16. An *American put option* on DuPont ordinary shares with exercise price \$25 per share that expires on 30 September
- requires the option *holder* (owner) to *buy* DuPont shares for \$25 any time before or on 30 September, at the discretion of the option writer.
  - permits the option *holder* (owner) to *sell* DuPont shares for \$25 any time before or on 30 September.
  - permits the option *writer* to *buy* DuPont shares for \$25 on 30 September.
  - requires the option *writer* to *sell* DuPont shares for \$25 on 30 September (but not before), at the discretion of the option holder (owner).
17. Let  $c$  and  $C$  denote today's premiums (prices) for European and American style *call* options, respectively, each with the same exercise (strike) price,  $X$ , expiry date,  $T$ , and underlying asset. The underlying asset price is  $S$  and the interest rate factor for borrowing and lending between today,  $t$ ,  $T$  is  $R(t, T)$ . If markets are frictionless, the arbitrage principle (absence of arbitrage opportunities) predicts that:
- $c \geq \max \left[ 0, S - \frac{X}{R(t, T)} \right]$
  - $c \geq \max \left[ 0, \frac{X}{R(t, T)} - S \right]$
  - $c > C$
  - $C \geq \max \left[ 0, \frac{X}{R(t, T)} - S \right]$

18. An *American put* option on Microsoft stock has an exercise (strike) price equal to \$35, and expires six months from today. Microsoft's stock price today is \$31. Assume that markets are frictionless and that Microsoft pays no dividend during the life of the option.
- There is an arbitrage opportunity if the option premium is *less* than \$4: *write* one option and allow it to die, unexercised, at expiry.
  - There is an arbitrage opportunity if the option premium is *less* than \$4: *buy* an equal number of options and shares, and exercise the options immediately.
  - There is an arbitrage opportunity if the option premium is *greater* than \$4: *buy* an equal number of options and shares, and exercise the options immediately.
  - There is an arbitrage opportunity if the option premium is *greater* than \$4: *buy* an equal number of options and shares, and exercise the options at the expiry date.
19. At the expiry date for a *European call* option on 3M shares with exercise price \$90.00, the price of a share in 3M equals \$80.00. Assume that markets are frictionless and that 3M paid no dividend during the life of the option.
- An investor who had *purchased* the option when the premium was \$8.00 exercises the option to make a profit of  $\$2.00 = \$90.00 - \$80.00 - \$8.00$  per option.
  - An investor who had *purchased* the option when the premium was \$12.00 exercises the option but obtains a payoff (loss) of  $-\$2.00 = \$90.00 - \$80.00 - \$12.00$  per option.
  - The option will be allowed to die, unexercised, no matter what premium had been before the expiry date.
  - An investor who had *written* the option when the premium was \$8.00 obtains a payoff (loss) of  $-\$2.00 = \$8.00 + \$80.00 - \$90.00$  per option.
20. Today's price for a share in Apple Inc equals \$220. Today's premium is \$10 for a *European put* option on Apple shares expiring 12 months from today, with exercise price \$210. Assume that (i) Apple will pay no dividends over the next 12 months, (ii) the interest factor over the next 12 months is 1.05, and (iii) markets are frictionless. Let  $c$  = premium on a *European call* option on Apple shares with exercise price \$210, expiring 12 months from today.
- If  $c = \$10$ , an arbitrage profit can be obtained by: writing one call, buying one put, borrowing \$220, and buying one share.
  - In the absence of arbitrage opportunities,  $c = \$10$ .
  - In the absence of arbitrage opportunities,  $c = \$40$ .
  - In the absence of arbitrage opportunities,  $c = \$30$ .

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