EC372 Economics of Bond and Derivatives Markets

Multiple Choice Test

Spring Term 2011

- 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 bond with market price p, pays a coupon of \$5 for each of the next 10 years, at which time the bond is redeemed with payment of its face-value, \$100. The bond's *yield to maturity*:

   A. Measures the rate of return guaranteed to an investor who holds the bond for the entire 10 years (assuming no default).

   B. Measures the rate of return such that p equals the Net Present Value of \$100 after 10 years, excluding the coupons.

   C. Measures the rate of return such that p equals the Net Present Value (NPV) of the stream of coupons plus the NPV of \$100 received at maturity.

   D. Is equal to 5% (i.e. 5/100) no matter what the price, p.

2. A zero-coupon bond with market price p matures two years from the present at which time its holder will receive \$100.

   A. If today's market price for the bond equals £90, the bond's spot yield is 10%.

   B. If today's market price for the bond equals £110, the bond's spot yield is 10%.

   C. The bond's spot yield, y, is defined by $y = \dfrac{100}{(1+p)^2}$.

   D. The bond's spot yield, y, is defined by $y = \left(\dfrac{100}{p}\right)^{1/2} - 1$.

3. The following information is provided for bonds A, B and C:

	Bond A	Bond B	Bond C
Payoff after 1 year:	£50	£100	0
Payoff after 2 years:	£100	0	£100
Today's price:	Not traded	£98	£95

   A. Today's 'fair value' of bond A equals £193.

   B. Today's 'fair value' of bond A equals £144.

   C. Today's 'fair value' of bond A equals £100.

   D. Today's 'fair value' of bond A equals £96.50.

4. Two zero-coupon bonds each have face value \$100 but one matures 6 years from today and the other 7 years from today. The current market price of each 6-year bond equals \$77, while that for each 7-year bond equals \$70.

   A. The implied forward rate between years 6 and 7 equals 10%.

   B. The implied forward rate between years 6 and 7 equals 7%.

   C. The spot yield on 6-year bonds equals 10%.

   D. The spot yield on 7-year bonds equals 7%.

5. The main difference between forward and futures contracts is:

   A. For a futures contract there is never any obligation to deliver, or to receive, the underlying asset.

   B. Forward contracts always have delivery dates further from the present than futures contracts.

   C. The underlying assets in forward contracts are always physical commodities (e.g., wheat, oil or silver), while for futures contracts the underlying assets could be anything (e.g. weather indices or notional bank deposits).

   D. Futures contracts are traded daily (potentially at least once every day) in organised exchanges prior to the delivery date specified in the contract.

6. Suppose that: (i) the spot price of cocoa today is \$3000 per ton, (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 cocoa is zero. Arbitrage opportunities are absent. The forward price of cocoa for delivery six months from today:

   A. Equals \$2950 if cocoa is available for storage at \$50 per ton (payable upon delivery, in six months).

   B. Equals \$3050 if cocoa is available for storage at \$50 per ton (payable upon delivery, in six months).

   C. Equals \$3030 if cocoa is available for storage at zero cost.

   D. Will be less than \$3000 if cocoa is available for storage at zero cost.

7. The process of 'marking to market' in futures markets:

   A. Refers to changes in the futures contract price that occur in response to changes in the spot price of the underlying asset.

   B. Refers to the mechanism by which gains (or losses) resulting from changes in futures prices are credited (or debited) to the investor's margin account

   C. Implies that the futures price must change (increase or decrease) at least once each trading day.

   D. Refers to changes in the underlying asset's spot price that occur in response changes in the futures contract price.

8. Sasha takes a *short* position for 20 futures contracts at a price of \$10 per contract.

   A. If Sasha offsets the position when the contract price is \$13, then Sasha will make a profit of \$60 (ignoring transaction costs).

   B. If Sasha offsets the position when the contract price has fallen to \$8, the result will be a loss of \$40 (ignoring transaction costs).

   C. If the futures contract price rises from \$10 to \$15 per contract, marking-to-market lowers by \$100 the funds in Sasha's margin account.

   D. If the futures contract price falls from \$10 to \$7 per contract, marking-to-market lowers by \$60 the funds in Sasha's margin account.

9. Suppose that the Exchange Delivery Settlement Price (EDSP) at the end of September 2010 equalled 5590 for FTSE-100 stock index futures .

   A. The value of the FTSE-100 index used for settling FTSE-100 futures for delivery in September 2010 was 5590 (for those contracts remaining open at the delivery date).

   B. The difference between the FTSE-100 index and the price of FTSE-100 futures for delivery in September 2010 was 5590, when all open contracts were settled at the end of September 2010.

   C. The FTSE-100 futures contract price at the end of September 2010 for delivery *after* this date equalled 5590.

   D. All FTSE-100 futures contracts were marked-to-market at 5590 at the end of September 2010 (no matter what the delivery date).

10. At the end of trading on 21 December 2010 the *open interest* equalled 104,363 contracts for Wheat futures for delivery in July 2011 (Chicago Board of Exchange, CME Group).

    A. The open interest refers to market's expectation (on 2010 December 2010) of the volume of wheat that will be held in storage immediately before delivery in July 2011.

    B. The open interest refers to the volume of Wheat held in storage as of 21 December 2010 scheduled for delivery in July 2011.

    C. During trading on 21 December 2010 104,363 contracts were traded (i.e. purchased and sold) for delivery of Wheat in July 2011.

    D. As of 21 December 2010, there were 104,363 contracts in existence (i.e., outstanding) promising to deliver Wheat in July 2011.

11. McVaill takes a *long* position in 5 futures contracts at a price of \$100 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.

    A. If McVaill offsets the position when the contract price equals \$95 per contract, the margin account will reflect an overall gain of \$25.

    B. An increase of \$7 in the contract price raises the margin account balance by \$35.

    C. Suppose that the margin account balance equals \$120. An increase of \$10 in the contract price will trigger a margin call for \$130.

    D. A fall of \$8 in the contract price raises the margin account balance by \$40.

12. Normal backwardation in futures markets.

    A. Normal backwardation occurs when a trader seeks to profit from selling a futures contract at a *lower* price than at which it was purchased.

    B. A 'normal backwardation' is said to occur when today's futures price exceeds today's spot price for the asset underlying the futures contract i.e., $f(t, T) > p(t)$.

    C. Normal backwardation refers to the prediction that the futures price, $f(t, T)$, tends to be lower than $\mathrm{E}[p(T), |\Omega_t)]$ (today's expectation of the spot price that will be observed on the futures' delivery date).

    D. Normal backwardation occurs as a result of arbitrage, which makes the futures price equal to the expected spot price of the underlying asset.

13. An investor chooses a *long*-hedging strategy using a futures contract.

    A. 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.

    B. 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.

    C. 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).

    D. 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).

14. In February 2011 an investor *buys* Stock Index futures contracts at a price of 5300 points with delivery date December 2011. 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 5500, cash settlement results in a *loss* equal to £2000 per contract.

    B. If the position is held until trading ceases in December when the Stock Index equals 5500, cash settlement results in a *gain* equal to £2000 per contract.

    C. If the contract price happens to be 5000 in October 2011, the investor could offset (i.e., close) the position with a gain of £3000 per contract.

    D. If the position is held until trading ceases in December, settlement requires the investor to take delivery of (i.e., receive) a portfolio of stocks with proportions identical to the composition of the Stock Index.

15. An *American put option* on Centrica ordinary shares expires on 30 September, with exercise price 300p per share. This option contract:

    A. permits the option *holder* (owner) to *sell* Centrica shares for 300p any time before or on 30 September.

    B. requires the option *holder* (owner) to *buy* Centrica shares for 300p any time before or on 30 September, at the discretion of the option writer.

    C. requires the option *writer* to *sell* Centrica shares for 300p on 30 September (but not before), at the discretion of the option holder (owner).

    D. permits the option *writer* to *buy* Centrica shares for 300p on 30 September.

16. A *European call option* on Tesco ordinary shares, with exercise price 400p per share, expires on 30 June. This option contract:

    A. requires the option *writer* to *buy* Tesco shares for 400p any time before, or on, 30 June, at the discretion of the option holder (owner).

    B. permits the option *writer* to *buy* Tesco shares for 400p on 30 June.

    C. permits the option *holder* (owner) to *sell* Tesco shares for 400p on 30 June.

    D. permits the option *holder* (owner) to *buy* Tesco shares for 400p on 30 June.

17. Let p and P denote today's premiums (prices) for European and American style *put* 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:

    A. $p \geqq \max\left[0,\, S - \dfrac{X}{R(t,\, T)}\right]$

    B. $p \geqq \max\left[0,\, \dfrac{X}{R(t,\, T)} - S\right]$

    C. $p > P$

    D. $P < X - S$

18. At the expiry date for a *European call* option on Alcoa Inc. shares with exercise price $\$14$, the price of a share in Alcoa equals $\$10$. Assume that markets are frictionless and that Alcoa paid no dividend during the life of the option.

    A. An investor who had *purchased* the option when the premium was $\$2.00$ exercises the option to make a profit of $\$2.00 = \$14.00 - \$10.00 - \$2.00$ per option.

    B. An investor who had *purchased* the option when the premium was $\$2.00$ exercises the option but incurs a loss (payoff) of $-\$6.00 = \$10.00 - \$14.00 - \$2.00$ per option.

    C. The option will be allowed to die, unexercised, no matter what premium had been before the expiry date.

    D. An investor who had *written* the option when the premium was $\$1.00$ incurs a loss (payoff) of $-\$3.00 = \$1.00 + \$10.00 - \$14.00$ per option.

19. An *American put* option on Pfizer Inc. shares has an exercise (strike) price of \$20, and expires six months from today. Pfizer's stock price today is \$16. Assume that markets are frictionless and that Pfizer pays no dividend during the life of the option.

    A. 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.

    B. 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.

    C. There is an arbitrage opportunity if the option premium is *less* than \$4: *write* one option and allow it to die, unexercised, at expiry.

    D. 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.

20. Today's price for a share in Chevron Corp. equals \$77. Today's premium is \$2 for a *European call* option on Chevron shares expiring 12 months from today, with exercise price \$84. Assume that (i) Chevron 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 p = premium on a *European put* option on Chevron shares with exercise price \$84, expiring 12 months from today.

    A. In the absence of arbitrage opportunities, $p = \$5$.

    B. In the absence of arbitrage opportunities, $p = \$7$.

    C. In the absence of arbitrage opportunities, $p = \$9$.

    D. If $p = \$5$, there is an arbitrage opportunity: write one call, buy one put, borrow $\$80$, and buy one share, to ensure a certain positive payoff when the option is exercised.

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