ECON 818                                                                                    07-1
MIDTERM EXAM

**Rules for Submitting Final Exam:** Answers to questions are to be typed, single spaced, of length 1 page *each* for all questions, 8"x11" standard paper, with 1" margin and type point not less than 12. (This assignment is typed in 12 point.)  For questions with a) and b) parts, answer both parts. Violations will be subject to deductions.  Assignment is due on in class on Thurs. Mar. 15, 2007.

**Do any 3 of 4 Questions; be sure to answer all parts of the question. (Total length 3 pages)**

**1.** a) Explain the <u>arbitrage</u> underlying the covered interest parity theorem discussed in Sec. 4.2 of the text.  What assumptions are being made about both the execution of the arbitrage and the underlying securities?

b) From the information in the attached table of forward rates and interest rates, calculate all possible interest rates implied by the covered interest parity condition.  (Hint: When possible, be sure to identify bids and offers.)

**2.** a) Derive the profit profile for a spread trade with equal position sizes.  What factors determine the profitability of this trade?  Derive the profit profile for a tailed spread and explain how this trade is different from one with one-to-one position sizes.  Does your answer depend on the commodity under consideration?

b)  What factors determine the profitability of: a butterfly in gas; a currency tandem; a metal stereo.

**3.** a)  Are forward prices unbiased predictors of future spot prices?  Hint:  Assuming mean-variance agents, <u>derive</u> an expression for the optimal speculative position size.  What happens to this position as the sensitivity of the agent to risk diminishes?  Based on this, what can you conclude about the equilibrium in a market dominated by risk-neutral speculators?

b)  If futures prices are at full carry, as in the gold futures market, is this inconsistent with the hypothesis the futures prices are unbiased predictors and are there zero expected profits to speculation?  If not, what type of trading strategy could be used to profit from this discrepancy?

c) Derive a "closed-form" expression for the risk-minimizing hedge ratio.  In what sense is this ratio an optimal hedge ratio?   How is your answer affected if the commodity being hedged is undetermined at the time the hedge is "put on", e.g., a wheat farmer hedging the output for a crop which has just been planted.

**4.** a) Outline appropriate questions to be addressed by a oil and gas producer developing a risk management philosophy to guide a hedging program.

b)  Explain in detail the appropriate hedging strategies for the following:
i) A Canadian bond dealer expects US interest rates to rise and wants to protect itself against Canadian dollar capital losses on its US Tbond inventory.
ii) In June, a metals refinery wants to "lock-in" today's price on a purchase of 50,000 lbs. of copper cathodes due to take place in September.

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|  | USD/unit | CAD/unit |
|---|---|---|
| **Britain   Spot Pound** | 1.9456 | 2.2867 |
| 1 month forward | 1.9455 | 2.2844 |
| 3 months forward | 1.9450 | 2.2798 |
| 6 months forward | 1.9429 | 2.2713 |
| **Europe   Spot Euro** | 1.3181 | 1.5492 |
| 1 month forward | 1.3201 | 1.5500 |
| 3 months forward | 1.3230 | 1.5507 |
| 6 months forward | 1.3269 | 1.5511 |
|  | Y/US$ | C$/Y |
| **Japan   Spot Yen** | 116.84 | 0.010059 |
| 1 month forward | 116.38 | 0.010089 |
| 3 months forward | 115.48 | 0.010150 |
| 6 months forward | 114.18 | 0.010238 |
|  | C$/US$ | US$/C$ |
| **U.S.   dollar** | 1.1753 | 0.8508 |
| 1 month forward | 1.1742 | 0.8516 |
| 3 months forward | 1.1721 | 0.8532 |
| 6 months forward | 1.1690 | 0.8554 |

**International Interest Rates on 2007.03.02**
Euro-Deposit Rates (Bid)

| | | |
|---|---|---|
| US$ | 1-month | 5.26 |
| | 3-month | 5.23 |
| | 6-month | 5.19 |
| C$ | 3-month | 4.18 |
| euro | 3-month | 3.80 |
| Yen | 3-month | 0.65 |
| £ | 3-month | 5.44 |

London Interbank Offer Rate US$

| | | |
|---|---|---|
| US$ | 1-month | 5.32 |
| | 3-month | 5.35 |
| | 6-month | 5.32 |