Conditions under which this exam will take place.

You have 75 minutes to answer the following 5 questions (max. number of points: 50). You may also elect to answer the bonus questions (5 points each), although no points will be subtracted if you do not or if you make mistakes trying to answer it. When asked to explain briefly, do so in no fewer than 3 lines but no more than 10. Financial calculators are allowed, as well as one single-sided cheat sheet. No hand-held computers, data transmitters and other walkie-talkies will be permitted 😊. Good luck!

In accordance with the AU-Kogod Honor Code, I, the undersigned, hereby certify that I have neither given nor received any help during this exam.

Name ______________________ Signed _______________________
Data for Questions 1 to 4.

Consider the following term structure of futures prices and trading data for natural gas (NG) on the NYMEX. All prices are quoted in US dollars per million British thermal units or $/MMBtu; the standard contract size is for 10,000 MMBtu).

3/6/2008 Session Overview

<table>
<thead>
<tr>
<th></th>
<th>Open</th>
<th>High</th>
<th>Low</th>
<th>Settle</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>9.750</td>
<td>9.855</td>
<td>9.733</td>
<td>9.741</td>
<td>+0.009</td>
</tr>
<tr>
<td>May</td>
<td>9.780</td>
<td>9.884</td>
<td>9.767</td>
<td>9.776</td>
<td>+0.004</td>
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<tr>
<td>June</td>
<td>9.819</td>
<td>9.891</td>
<td>9.812</td>
<td>9.819</td>
<td>0.000</td>
</tr>
<tr>
<td>July</td>
<td>9.880</td>
<td>9.922</td>
<td>9.875</td>
<td>9.884</td>
<td>-0.004</td>
</tr>
</tbody>
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Question 1 (2.5 points)

At what prices did the July 2008 settle on March 6? On March 5? When answering, choose a letter and highlight the numbers in the table.

(i) 9.922 and 9.875, respectively;  
(ii) 9.880 and 9.884, respectively;  
(iii) 9.880 on both days;  
(iv) 9.884 and 9.880, respectively;  
(v) None of the above four combinations;  
(vi) Not enough information.
Question 2 (10 points)

Consider again the same data. At the market open on March 6, you took a short position in a July 2008 futures. Your broker, a clearing member of the NYMEX, asked for an initial margin of $3,000; for simplicity, assume that the maintenance margin is also $3,000. His brokerage fees are $25 for a “round-trip”, i.e., to buy and sell a contract.

(a) What delivery price have you “locked in”? (2 points)

(i) 9.922
(ii) 9.875
(iii) 9.884
(iv) 9.880
(v) None of the above;
(vi) Not enough information.

(b) If you decided to close out your position at the end of the day, what was your profit or loss on March 6? Explain briefly. Remember that the contract size is 10,000 MMBtu. (3 points)

(c) Assuming that there was no intra-daily marking to market (intra-day marking to market would only happen on an extremely volatile day, which was clearly not the case on March 6), please detail all your cash-flows. Does your profit or loss (computed in part b above) match your total cash-inflow or cash-outflow at the end of the day? Explain briefly why – or why not. (5 points)
Question 3 (10 points)

Consider again the same data. Please use the settlement prices on March 6 to answer parts a and b of this question.

(a) What is the price of the nearby futures? (2.5 points)

(i) 9.741
(ii) 9.776
(iii) 9.819
(iv) 9.884
(v) None of the above;

(b) On March 6, a practitioner would have said that the term structure of futures prices for natural gas was: (1.5 points)

(i) in contango
(ii) backwardated
(iii) Not enough information

Explain briefly. (1 point)

(c) Assume that NG storage costs are 1% (annualized) and that the spot price of natural gas is $9.70 per MMBtu. U.S. interest rates, for maturities up to 3 months, stand at 3% (LIBOR). Using the May 2008 contract (which matures in about 2 months), can you compute the convenience yield? If so, explain and show your work. If not, explain why not. (5 points)
**Question 4 (10 points)**

Consider again the same data. Please use the *settlement prices* on March 6 to answer the following questions.

(a) What should be the OTC (over-the-counter) price of 10,000 MMBtu of NG for forward delivery in late April – i.e., 6 weeks from now. Explain briefly, and state any assumptions you make to arrive at your conclusion. **(2.5 points)**

(Hint: Don’t make the question more complicated than it is)

(b) Use your answer in part (a) to answer this question (I won’t penalize you twice if that answer was incorrect). If you sell 10,000 MMBtu of natural gas forward (OTC), for actual delivery in 6 weeks, what will be your cash-flow today? At delivery? Between today and the contract’s delivery date? Assume that this OTC forward contract is commodity-settled. **(2.5 points)**

(c) Would your answer change if the OTC contract were cash-settled (i.e., if it were an NDF or “non-deliverable forward”)? If it does, please detail your cash-flows using the NDF. **(5 points)**

(Hint: At this point, you don’t know the spot price at maturity; so, just call it ST.)
Question 5 (7.5 points)

1) Sallie Mae borrows long-term with bonds and lends shorter-term. If it enters a hedge position in a single Euro$ futures at 5%, if it holds the hedge until the futures expiration date, and if the contract expires with a rate of 4%, Sallie Mae will
   a. profit by receiving cash of $2,500.
   b. own a 5% dollar denominated CD in a European bank.
   c. lose by having to pay cash of $2,500.
   d. have to issue a 5% dollar-denominated CD.

   (Hint: Short term IRFs have sizes of $1m. )

2) If a risk-neutral speculator wants to bet that interest rates are going to fall by more than the market consensus would indicate, (s)he should
   a. go long T-bill or T-bond futures
   b. short stock index futures
   c. not enough information
   d. go long the distant gold contracts

3) If you hedge one rollover of $30 million in 6-month CDs with Euro$ futures, you should use approximately ____ contracts. Explain briefly.
   a. 10    b. 30    c. 60    d. 90    e. 120    f. >120
**Bonus Question. (5 points)**

1) Circle which of the following is (are) example(s) of spread positions:
   a. being long Russel-2000 futures and short S&P-500 futures (same notional in both cases).
   b. being long an S&P 500 stock index mutual fund and short S&P 500 futures.
   c. being both long and short the same number of March T-bill futures.
   d. being short June T-bond futures and a matching amount of June T-bill futures.

2) You observe the following: Spot market palladium is selling for $800, the one-year T-bill rate is 6%, and palladium futures for delivery in one year are at $820. Which of the following transactions would you expect an arbitrageur to be most likely to undertake?
   a. Short T-bills and spot market palladium, go long palladium futures.
   b. Go long spot market palladium and short palladium futures.
   c. Go long T-bills and palladium futures, short spot market palladium.
   d. Short T-bills and palladium futures, go long spot market palladium.