ECON 100A FALL 2006
University of California, Berkeley
Homework 6

Long Question Guide

A mutually beneficial deal from the guy who is going to grade your solutions

Remember: **1. Due date is 2006.11.30 (Thursday) in Lecture**
2. Please write your GSI's *name* (either first or last) instead of section time on the first page of your solutions. This is necessary for accurate entrance of your grade into our record.

Problem 2: We consider strategic interactions between LTCM partners and their "potential rescuers" (i) Buffett (Berkshire Hattaway, American International Group and Goldman Sachs) (ii) consortium (14 major banks and brokerage firms, which would have been affected by the LTCM bankruptcy)

Please, read the following articles:
http://socrates.berkeley.edu/~gamma/ECON100A/buffettoffer.txt
and
http://socrates.berkeley.edu/~gamma/ECON100A/bailoutoffer.txt

a) In a paragraph or two summarize the story of LTCM.
(You just need to demonstrate that you know what the scenario is about to get full credit)

A sample outline:
1. What is LTCM? What is so special about its personnel and trading strategy?
2. How did LTCM performed?
3. What happened in 1998?
5. What happened in the end?

b) List the conditions of each scenario (how much each player receives, etc.)

Two parties, Fed Consortium and Buffet, are competing for LTCM. For each party, find
- A. Payoff of LTCM investors
  1. Cash offering to these investors, if any (a small number)
  2. Percentage of LTCM's equity these investors get to keep (percentage)
  3. Amount of capital obtained (a large number)
- B. Payoff of rescuer
  1. Cash offered to LTCM investors, if any (= A1)
  2. Percentage of LTCM's equity obtained (= 1 minus A2 above)
  3. Amount of capital injection (= A3)

See below for the formulas for total payoff.

c) Let L denote the LTCM partner expectations of the LTCM liquidation value. Assume that all the cash funds of the rescuers (in both scenarios, Buffet and Consortium) were indeed injected. Use the data from the articles to fill in the player payoffs in the following payoff matrix (as a function of L):

		Rescuers
LTCM Partners	Accept Buffet Accept Consortium	

Liquidation value is the money one gets from selling off everything LTCM owns and paying off all its debts; denote this by *L*.
The total payoff of LTCM investors/partners is
Cash received + % ownership of LTCM * L
= A1 + A2 * L

The total payoff of a rescuer is
Cash offered + % ownership of LTCM * L - capital injected
= B2 * L – B1 - B3

Please put LTCM investor's payoff first, followed by a comma and rescuer's payoff.

d) Let L_0 denote the lowest L consistent with the LTCM partners' actual choice. Calculate L_0.

Which offer, Fed Consortium's or Buffet's, did LTCM partners accepted in the end? Assume that monetary payoff is all that matters, this tells you that the payoff received by LTCM partners has to be greater in one than the other. Use the equations in part c to setup the inequity and solve for L.

e) Assume that the LTCM liquidation takes one year (i.e., in one year, the LTCM positions will be fully liquidated and the injected funds returned). Calculate the lower bound of the return on investments r_B and r_C for Buffett and Consortium. Use your payoff matrix (part c) and your estimate for L (i.e., L_0 from part d), and assume that all the rescuers' funds (in both scenarios, Buffett and Consortium) were indeed injected.

Return is a *percentage*— $r = \dfrac{(\text{payoff in time } t+1) - (\text{money invested in time } t)}{\text{money invested in time } t}$

Note the payoff in time t + 1 is B2 * L, while money invested in time t is B1 + B3.

f) Assume that the required return on capital is the same for Buffett and Consortium. Let r_B and r_C denote return on capital for Buffett and Consortium that you received in part e). Use your r_B and r_C and the CAPM model to find the constant of proportionality β for the underlying "asset" (i.e., LTCM portfolio) for Buffett and Consortium. To simplify, use $r_{free} = 4\%$ and $r_{market} = 10\%$

This is a simple exercise of substituting in numbers. Refer to the CAPM formula in lecture slide of textbook p.559, you should see that the only unknown in this case is β.

g) How could you rationalize that for the LTCM portfolio, its asset beta is different for Consortium and for Buffet? (Hint: What makes the liquidation process differ under Buffett and Consortium?)

What does CAPM β represent? The professor has one answer in mind but I will give credit to any thoughtful and coherent answer that attempts to explain the difference in Consortium's and Buffet's β.

h) Read the following article: http://socrates.berkeley.edu/~gamma/ECON100A/SouthCh98.txt
Let L_B denote the LTCM liquidation value in scenario (i) (Buffet)
Let L_C denote the LTCM liquidation value in scenario (ii) (Consortium)
Assume that moral hazard is present. Which value, L_B or L_C, you expect to be higher? (Hint: How L_B and L_C would be affected by the moral hazard?)

Do you expect $L_B > L_C$ or $L_B < L_C$? Very briefly explain your logic so that I know the answer is not the result of a coin flip.

i) Evaluate the lower bound of efficiency loss in the LTCM liquidation due to agency conflict. Assume that Buffett's expected return on capital is at least as high as for Consortium. Assume that required cash injection Z is equal in both scenarios, i.e., $Z \leq 3.6$.

1. The central assumption here is that efficiency loss is the difference between liquidation value of LTCM under Buffet's control and that under the Consortium's control; let the former be L_B and the later be L_C. Assume that $L_C = L_0$ in part d.
2. By the definition of return for the Consortium,

$$B2_C * L_C = (1+r_C)(B1_C+Z)$$

From which we get the inequality for Buffet

$$B2_B * L_B >= (1+r_C)(B1_B+Z)$$

This inequality represent the notion that Buffet's return is higher than that of the Consortium—$r_B > r_C$.
3. Now you need to put in numbers. $B2_B$, $B1_B$ you have already found in part b; r_C you have found in part e. Just take $Z = 3.6$. Rearrange the inequality and you get $L_B > \{sth\}$.
4. Lastly, subtract L_C from the inequality to find the minimum/lower bound for $L_B - L_C$.

j) The data about the funds injected by the Consortium can be founded in the following article: http://socrates.berkeley.edu/~gamma/ECON100A/payback1999.txt

Use the data on injected funds to calculate a lower bound estimate of the actual (realized or ex post) Consortium returns on their capital.

1. From the article, how much money did the Consortium actually injected?
2. You will also need to find the lowest possible payoff for the consortium, which you have already found in part e--{ $B2_C * L_0$ }
3. Return is $\frac{(\text{payoff in time t}+1)-(\text{money invested in time t})}{\text{money invested in time t}}$

Problem 3: Please, read the following articles "Long-Term Capital Chief Acknowledges Flawed Tactics," *Wall Street Journal*, August 21, 2000, from URL
http://socrates.berkeley.edu/~gamma/ECON100A/Meriwether2000.txt

and "Manager of Hedge Fund Fiasco Seeks to Repair His Reputation," *Wall Street Journal*, August 22, 2000, from URL
http://socrates.berkeley.edu/~gamma/ECON100A/aboutMeri2000.txt

a) The data from the articles leads to the following choices for Mr. Meriwether:

Scenario A Old vision (as LTCM, highly leveraged). Target returns 20 - 30%, capital $ 350 - $400mln
Scenario B New vision (conservative, less leveraged). Target returns 10 - 15%, target capital $1bln.

Use these figures to fill in JWM profits:

		The best case (the most favorable for JWM situation)	**The worst case (the least favorable for JWM situation)**
JWM Partners	Original Strategy (highly leveraged)		
	Conservative Strategy (less leveraged)		

Deep buried inside the articles you should be able to find
1. A percentage management fee on all capital, regardless of return
2. A percentage performance fee on return

In each situation, JWM's profit is
{capital * management fee} + {capital * return * performance fee}
Capital and return depend on whether the situation is favorable or not; favorable situation means high return and high capital. You should use the numbers provided in scenario A & B.

b) Based on your estimates, which strategy (original or conservative) should the JWM partners adopt for their hedge fund? (i.e., which action is optimal for Mr. Meriwether?)

Remember JWM is choosing between original strategy and conservative strategy (rows). If the situation (columns) is favorable it is favorable to either strategy. Looking at your matrix in part a, is there a strategy that always gives higher profit regardless of the situation?

c) The Wall Street Journal article contains the following quotes from Mr. Meriwether:

"Our whole approach was fundamentally flawed," Mr. Meriwether says. *"I feel enormous remorse."*

Based on your knowledge of the situation and on calculations in the part a), Do you believe that Mr. Meriwether really changed his mind? Why or why not? (Hint: Think of whether Mr. Meriwether has a dominant strategy in the game).

If profit is all that matters, do Mr. Meriwether's beliefs play any role in his decision according to your answer in part b?

That said, "Man shall not live by bread alone"—a thoughtful answer that runs contrary to the suggested solution will also receive credit.