LESE 306
Agribusiness Finance
Fall 2008
Han and Penson

Final Examination
December 17, 2008

NAME:___ ***ANSWER KEY*** _____

This examination consists of 10 questions. Please read each question carefully. You must show all work to receive full credit for questions involving calculations. ***Make sure you answer all aspects of the question.*** Good luck!

Question 1 _____ of 20 points

Question 2 _____ of 20 points

Question 3 _____ of 10 points

Question 4 _____ of 15 points

Question 5 _____ of 15 points

Question 6 _____ of 20 points

Question 7 _____ of 40 points

Question 8 _____ of 40 points

Question 9 _____ of 10 points

Question 10 _____ of 10 points

TOTAL _____ of 200 points

1. Please define or illustrate each of the following terms: ***(20 points; 2 points each)***

   a. Maximum bid price

      The maximum bid price is the maximum value you can afford to pay for a tract of real estate, or the price that results in a net present value of zero.

   b. Financial risk premium

      Financial risk is associated with the use of leverage. The greater the use of leverage, the greater the potential loss in equity capital. The financial risk premium is the additional rate of return required for the exposure to financial risk. The student could draw the risk return preference function and show the shift is this function as a result of financial risk exposure.

   c. Implicit costs

      Implicit costs on the other hand are those expenses such as depreciation or opportunity costs that do not involve the payment of money.

   d. Terminal value

      This value is what you expect to be able to sell these assets at the end of the project's life.

   e. Financial intermediation

      Process of transferring the savings and investments of others into loan funds borrowed by agribusinesses.

f. Credit scorecard
A credit scorecard or scorecard lending is based upon the summation of key financial indicators weighted by their relative importance to the bank's performance and risk aversion standards.

g. Benchmark analysis
Benchmark analysis is a form of comparative financial statement analysis. More specifically, this involves comparing key financial indicators for your firm with values associated with a specific benchmark values for your industry.

h. Internal rate of return
The value of the discount rate in the net present value model that results in a net present value of zero.

i. Portfolio segments
Portfolio segments refer to unique groups of loans in a bank's loan portfolio. This segment or groups of loans should be comprised of borrowers of similar size and production of similar products.

j. Credit standards
Credit standards are a quantitative statement of the minimum or maximum values acceptable for measures of liquidity, solvency, debt coverage ratios and credit scores for loan approval.

2. Consider the following entries in a firm's balance sheet and income statement: ***(20 points)***

Interest payments on long term loans	3,000
Principal payments on long term loans	5,000
Other current assets	15,000
Allowance for income taxes	6,000
Cash	20,000
Depreciation	5,000
Cash receipts from sales	90,000
Cash operating expenses	55,000
Value of machinery and equipment	90,000
Value of buildings	50,000
Value of land	210,000
Fuel expenses	6,000
Long term loan less current payment	40,000
Other long term liabilities	3,000

Given this information, please ***calculate and evaluate*** measures of the firm's liquidity, solvency, profitability, and debt repayment capacity.

(SHOW ALL WORK FOR FULL CREDIT)

Liquidity:
Current ratio (equation 1 –p.12) = 35,000/14,000 = 2.50
The firm is therefore highly liquid.

Solvency:
Debt ratio (equation 3 – p.13) = 54,000/385,000 = 0.14
Leverage ratio (equation 6 – p.13) = 54,000/331,000 = .173
The firm is therefore highly solvent.

Profitability:
ROA (equation 7 – p.13) = 6.23% (the firm is profitable)
ROE (equation 8 – p.13) = 6.34% (the firm is profitable)

Debt repayment capacity
Debt coverage ratio (equation 15 – p.15) = 24,000/8,000 = 3.0
The firm therefore has a strong debt covage capacity.

3. Assume you are considering borrowing $50,000 over a 5-year period and your lender is willing to make you a loan at 8 percent interest. ***(10 points)***

   a. If the maximum annual principal and interest payment you can afford to make on this loan is $13,000, is this loan feasible from a cash flow perspective?

   b. What if your lender instead charged an interest rate of 12 percent on this loan?

Part a:
Verify that $50,000/(EPIF$_{.08,5}$) < $13,000
$50,000/3.993 = $12,522 < $13,000
Therefore the loan is cash flow feasible.

Part b:
Verify that $50,000/(EPIF.12,5) < $13,000
$50,000/3.605 = $13,870 > $13,000
Therefore the loan is not cash flow feasible.

4. Suppose a firm is considering undertaking one of the two projects. Project A generates an annual net cash flow of $2,600 annually over the three year life of the project and costs $5,000. Project B generates an annual net cash flow of $3,300 over the four-year life of that project and costs $6,000. Assuming no increase in the cost of the assets acquired by these two projects over time, which project would you rank highest? Why? Assume a required rate of return of 6 percent and a 34 percent tax bracket. ***(15 points)***

	Project A		***Project B***	
Year	***Net investment***	***Net cash flow***	***Net investment***	***Net cash flow***
0	***$5,000***	***$2,600***	***$6,000***	***$3,300***
1		***2,600***		***3,300***
2		***2,600***		***3,300***
3	***$5,000***	***2,600***		***3,300***
4		***2,600***	***$6,000***	***3,300***
5		***2,600***		***3,300***
6	***$5,000***	***2,600***		***3,300***
7		***2,600***		***3,300***
8		***2,600***	***$6,000***	***3,300***
9	***$5,000***	***2,600***		***3,300***
10		***2,600***		***3,300***
11		***2,600***		***3,300***
12		***2,600***		***3,300***

$$NPV_A = -5{,}000+2{,}600(EPIF_{.06,12})-5{,}000(PIF_{.06,3}-5{,}000(PIF_{.06,6})-5{,}000(PIF_{.06,9})$$
$$= -5{,}000+2{,}600(8.384)-5{,}000(.840)-5{,}000(.705)-5{,}000(.592)$$
$$= -5{,}000+21{,}798-4{,}200-3{,}525-2{,}960$$
$$= 6{,}113$$

$$NPV_B = -6{,}000+3{,}300(EPIF_{.06,12})-6{,}000(PIF_{.06,4})-6{,}000(PIF_{.06,8})$$
$$= -6{,}000+3{,}300(8.384)-6{,}000(.792)-6{,}000(.627)$$
$$= -6{,}000+27{,}668-4{,}752-3{,}762$$
$$= 13{,}154$$

I would rank project B over project A since the net present value is higher.

5. Suppose you are considering investing in a $30,000 capital improvement to your business, which has an economic life of 20 years. Assume further that you plan to sell this improvement 10 years from now. Assume there is no capital gain involved. If the expected net cash revenue generated by this investment is $4,000 annually and you choose a discount rate of 10%, would you make this investment if: ***(15 points)***

a. The market value of the purchased improvement was only $10,000 ten years from now?

Let the value 10 years from now be represented by T:

$$NPV = NCF(EPIF_{.10,10}) - C + T(PIF_{.10,10})$$
$$= 4{,}000(6.145) - 30{,}000 + 10{,}000(.386)$$
$$= 24{,}580 - 30{,}000 + 3{,}860$$
$$= -\$1{,}560 \Rightarrow NO$$

b. What would this market value have to be 10 years from now before you would be indifferent between making and not making this investment?

Set equation in part a equal to zero and solve for T

$$T = [C - NCF(EPIF_{.10,10})]/(PIF_{.10,10})$$
$$= [30{,}000 - 24{,}580]/.386$$
$$= 5{,}420/.386$$
$$= \$14{,}041$$

Check your answer:

$$NPV = 24{,}580 - 30{,}000 + 14{,}041(.386)$$
$$= 24{,}580 - 30{,}000 + 5{,}420$$
$$= \$0.00$$

6. Assume a firm is considering investing in the following project. The economic life of the project is three years. ***(20 points)***

	Year 1	Year 2	Year 3
Expected net cash flow	15,000	16,000	17,000
Standard deviation	1,500	1,760	2,380
Risk free rate of return	0.05	0.06	0.07
Slope of risk/return curve	0.20	0.23	0.25
Shift coefficient for leverage	0.05	0.06	0.07
Total assets	200,000	225,000	240,000
Total equity	120,000	110,000	100,000

If the net capital outlay for this project is $40,000, no additional working capital is needed, and the market value of assets required under this project is $5,000 at the end of the third year, would you make the investment? Why?

(SHOW ALL WORK FOR PARTIAL CREDIT)

Leverage ratio 0.67 1.045 1.40

Business risk premium:
Year 1 = .20(.10) = .02
Year 2 = .23(.11) = .0253
Year 3 = .25(.14) = .035

Financial risk premium:
Year 1 = .05(.67) = .0335
Year 2 = .06(1.045) = .0627
Year 3 = .07(1.40) = .098

Required rate of return:
Year 1=.05+.02+.0335=.1035
Year 2=.06+.0253+.0627=.148
Year 3 =.07+.035+.098=.203

FV interest factors:
Year 1=1.1035
Year 2=(1.1035)(1.148) =1.2668
Year 3=(1.2668)(1.203)=1.524

NPV=15,000/1.1035+16,000/1.2668+17,000/1.524+5,000/1.524 -40,000
NPV=659

Yes, if this is the only project I am considering because the NPV for this project is positive.

7. Assume you are the owner of a firm considering expansion of its existing productive capacity. Suppose the value of your assets currently $400,000 and you owe you owe your creditors $175,000. Please ***fully*** discuss the steps you would take to evaluate the expansion opportunity. In addition, describe the information you expect to provide the banker when seeking a loan. ***(40 points)***

Step 1: ***measure the annual net cash flows associated with the expansion project. This involves projection of the annual product prices expects to receive and unit costs of production the firm expects to pay.***

Step 2: ***measure the terminal value of the assets acquired under this project, or the market value of these assets you expect to realize at the time of their sale at the end of the final year of the project even if they are not sold.***

Step 3: ***develop the annual values for the required rates of return reflecting the risk free rate of return, a business risk premium and a financial risk premium given the rather high existing leverage position of the firm.***

Step 4: ***compute the risk-adjusted net present value of the project. If the net present value is positive, the project is said to be economically feasible. Finally, compare it with other opportunities available to determine its ranking.***

Step 5: ***examine the effects that this project, if made, has upon the firm's key financial indicators to see the effect on the firm's liquidity, solvency, profitability and debt repayment capacity. Be prepared to present your historical and pro forma financial statements and financial indicator trends along with your feasibility analysis (NPV) of this project.***

8. Assume you are a credit officer at a bank specializing in loans to agri-businesses. A potential borrower has contacted you seeking a loan to expand an existing agribusiness operation. Please ***fully*** discuss the steps you would utilize to decide whether or not to approve the loan request. Assume the presence of risk associated with making this loan. ***(40 points)***

   Step 1: ***validate the information supplied to you by the lender, including the assumed prices received and unit costs paid reflected in pro forma financial statements. Your bank may have its own, more conservative values for these variables.***

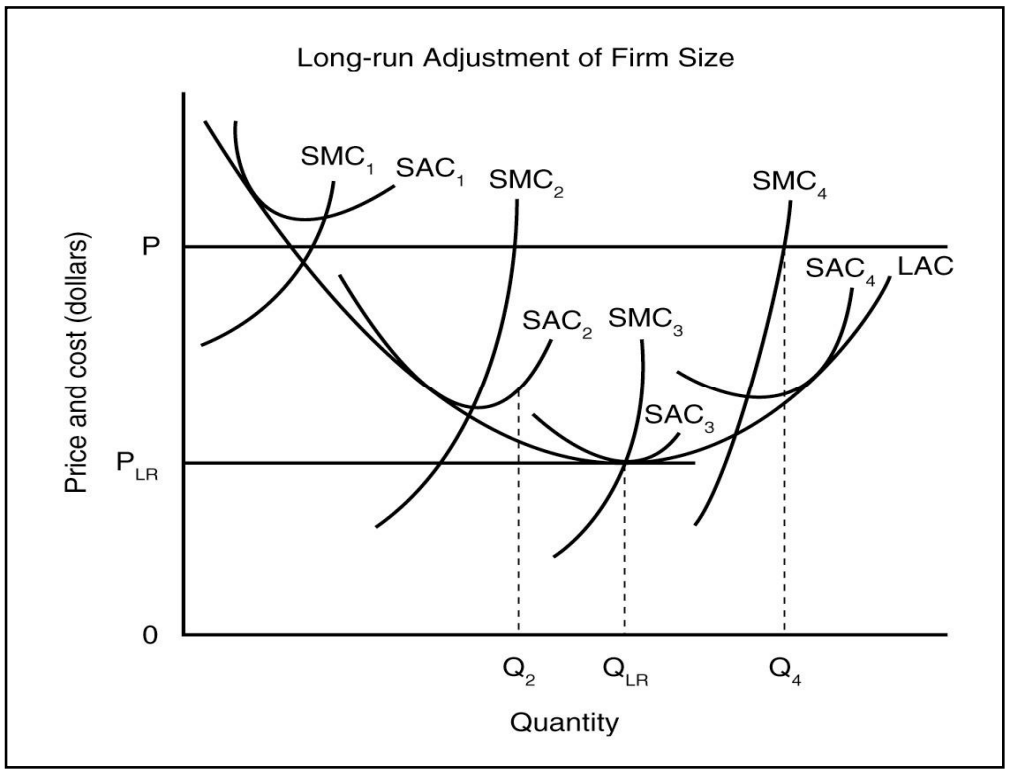
   Step 2: obtain credit score information for this borrower from available sources to see how the borrower has performed in meeting recent debt repayment obligations to others. If the borrower is an existing customer at your bank, examine the firm's historical financial performance and debt repayment record against existing benchmark operations in your portfolio for similar type and size of operations.

   Step 3: compare the borrower's historical and pro forma financial indicators with your bank's credit standards to see if the borrower meets or exceeds these standards. Also consider the six C's for creditworthiness, which includes non-financial factors.

   Step 4: assess the firm's projected financial performance by examining the effects of alternative scenarios or shocks that have a significant probability of occurring, including the effects on liquidity and debt coverage. Based upon this assessment, consider the interest rate to charge on this loan given the degree of risk and credit scorecard totals. Also consider the collateral you require as security for making the loan.

   Step 5: state the requirements for granting the loan to the borrower, including periodic reporting requirements indicating the performance of the borrower's operations after the loan is made.

9. Given the graph below, please discuss the implications for ***all four*** firms if the price in this market falls from P to P_{LR}**.** What must each firm do as a result of this decline in price? ***(10 points)***



Firm 1: ***this firm cannot cover its operating costs at both price levels and is forced to cease operations.***

Firm 2: ***this firm covers its costs at price P, but not if prices fell to price*** P_{LR}***. This firm must attempt to increase the size of its operations to quantity*** Q_{LR} ***to take advantage of economies of size efficiency. If it cannot, it will be forced to cease operations.***

Firm 3: ***this firm covers its costs at price P and price*** P_{LR}***. It would earn a profit at the higher price but would just breakeven if price fell to*** P_{LR}***. This firm will be at long run equilibrium.***

Firm 4: ***this firm covers its costs at price P, but not if prices fell to price*** P_{LR}***. This firm must downsize the size of its operations by laying off employees and idling fixed assets to reduce its operations to quantity*** Q_{LR} ***since it is experiencing diseconomies of size. If it does not, it will be forced to cease operations.***

10. One of the key steps in pro forma analysis is projecting annual net cash flows over the life of an investment. Please describe the various approaches available to projecting future commodity prices for an enterprise in your firm. ***(10 points)***

We discussed several approaches to projecting future commodity prices:

<u>Market outlook information:</u>
Government and trade associations typically hold conferences were outlook information is presented for future trends in commodity prices.

<u>Historical based information:</u>
One approach is the naïve model which assumes the price next year is identical to the price this year.

Another approach is the Olympic average approach, where you drop the high and the low price and average the three remaining prices over the previous five years. This eliminates unusual variability in annual commodity prices.

<u>Structural econometric simulation:</u>
This involves estimating demand and supply equations for the commodity and solve for the market equilibrium price. This requires making assumptions about the factors that will shift the demand and supply curves over the forecast horizon.

LESE 306 Final Exam Equations

(27) $PV = FV_N/(1+R)^N$

(28) $PV = NCF_E(EPIF_{R,N})$

(29) $PV = NCF_1\,[1/(1+R)] + NCF_2\,[1/(1+R)^2] + \ldots + NCF_N\,[1/(1+R)^N]$

(30) $PV = NCF_1\,[1/(1+R_1)] + NCF_2\,[1/\{(1+R_1)(1+R_2)\}] + \ldots$
$+ NCF_N\,[1/\{(1+R_1)(1+R_2)\ldots(1+R_N)\}]$

(31) $PV = NCF_E \div R_E$

(40) $PI = LOAN/(EPIF_{R,N})$

(41) $NPV = NCF_1(PIF_{R,1}) + NCF_2(PIF_{R,2}) + \ldots + NCF_N(PIF_{R,N}) - C$

(42) $NPV = NCF_1[1/(1+R)] + NCF_2[1/(1+R)^2] + .. + NCF_N[1/(1+R)^N] - C$

(50) $NPV = NCF_1(PIF_{R,1}) + NCF_2(PIF_{R,2}) + \ldots + NCF_N(PIF_{R,N}) - C \equiv 0$

(51) $NPV = NCF_E(EPIF_{R,N}) - C \equiv 0$

(58) $NPV = NCF_1(PIF_{R,1}) + NCF_2(PIF_{R,2}) + \ldots + NCF_N(PIF_{R,N}) - C + T(PIF_{R,N})$

(59) $NPV = NCF_1[1/(1+R)] + NCF_2[1/(1+R)^2] + \ldots + NCF_N[1/(1+R)^N] - C + T[1/(1+R)^N]$

(60) $NPV = NCF_E(EPIF_{R,N}) - C + T(PIF_{R,N})$

(65) $NPV = NCF_E(EPIF_{R,N}) - C + T(PIF_{R,N}) - [t_{CG}(T - C)](PIF_{R,N})$

(67) $PV = NCF_E(EPIF_{R,N}) + \{V_0 \div PIF_{G,N}\}(PIF_{R,N})$
$- [t_{CG}(\{V_0 \div PIF_{G,N}\} - V_0)](PIF_{R,N})$

(73) $E(NCF_i) = P_{i,1}(NCF_{i,1}) + P_{i,2}(NCF_{i,2}) + P_{i,3}(NCF_{i,3})$

(75) $SD(NCF_i) = \sqrt{\ } 2[P_{i,1}(NCF_{i,1} - E(NCF_i))^2]$

(76) $CV(NCF_i) = SD(NCF_i) \div E(NCF_i)$

(88) $RRR_i = R_{F,i} + b_i(CV_i) + c_i(L_i)$

(94) $E(ROA_{T,i}) = W_C(E(ROA_{C,i})) + W_{EX}(E(ROA_{EX,i}))$

(95) $SD(ROA_{T,i}) = \{W_C^2(SD(ROA_{C,i}))^2 + W_{EX}^2(SD(ROA_{EX,i}))^2$
$+ [2(W_C)(W_{EX})(\delta)(SD(ROA_{C,i}))\,(SD(ROA_{EX,i}))]\}^{1/2}$

(98) $CV(ROA_{T,1}) = SD(ROA_{T,1}) \div E(ROA_{T,1})$