Economics 134A Fall 2008, 5pm

Final
December 11, 2008

This exam consists of 8 pages with 6 multiple choice, 3 short and 4 long questions. Please show all your work including equations used and where numbers are used. You have 3 hours. There are a total of 150 points.

Name : _____

Perm # : _____

TA:

Section:

1. (5 pts) An efficient capital market is one in which:
   A. brokerage commissions are zero.
   B. taxes are irrelevant.
   C. securities always offer a positive rate of return to investors.
   D. security prices are guaranteed by the U.S. Securities and Exchange Commission to be fair.
   E. security prices reflect available information.

2. (5 pts) An investor discovers that for a certain group of stocks, large positive price changes are always followed by large negative price changes. This finding is a violation of the:
   A. moderate form of the efficient market hypothesis.
   B. semistrong form of the efficient market hypothesis.
   C. strong form of the efficient market hypothesis.
   D. weak form of the efficient market hypothesis.
   E. None of the above

3. (5 pts) The unlevered cost of capital is:
   A. the cost of capital for a firm with no equity in its capital structure.
   B. the cost of capital for a firm with no debt in its capital structure.
   C. the interest tax shield times pretax net income.
   D. the cost of preferred stock for a firm with equal parts debt and common stock in its capital structure.
   E. equal to the profit margin for a firm with some debt in its capital structure.

4. (5 pts) You have decided that you would like to own some shares of GH Corp. but need an expected 12% rate of return to compensate for the perceived risk of such ownership. What is the maximum you are willing to spend per share to buy GH stock if the company pays a constant $3.50 annual dividend per share?
   A. $26.04
   B. $29.17
   C. $32.67
   D. $34.29
   E. $36.59

5. (5 pts) The internal rate of return may be defined as:
   A. the discount rate that makes the NPV cash flows equal to zero.
   B. the difference between the market rate of interest and the NPV.
   C. the market rate of interest less the risk-free rate.
   D. the project acceptance rate set by management.
   E. None of the above.

6. (5 pts) The beta of a security is calculated by:
   A. dividing the covariance of the security with the market by the variance of the market.
   B. dividing the correlation of the security with the market by the variance of the market.
   C. dividing the variance of the market by the covariance of the security with the market.
   D. dividing the variance of the market by the correlation of the security with the market.
   E. None of the above.

7. (5 pts) If you own a put option with a strike price of $36 and the stock is trading at $25 and the option expires today, how much is the option worth?

8. (10 pts) Suppose you need to have $25,000 dollars in 4 years. If you save quarterly and the interest rate you receive from the bank is 4% SAIR compounded monthly what will your quarterly payments need to be?

9. (10 pm) What is the price of a $1000 bond with a 10% coupon that matures in 4 years if the correct discount rate is 6% SAIR compounded semi-annually, and the bond just paid a coupon?

10. (20 pts) You are trying to decide between two machines that will need to be replaced in perpetuity when they break. The costs of the machines are shown in the table. Note the lifetime of Machine 1 is 5 years while the lifetime of Machine 2 is four years. If the correct discount for the project these machines will be used in is 10%, which machine should be chosen?

	Year 1	Year 2	Year 3	Year 4	Year 5
Machine 1	-$400	-$100	-$75	-$50	-$150
Machine 2	-$350	-$80	-$50	-$120	

$NPV_1 = -629.92$

$NPV_2 = -503.32$

$-629.92 = C_1 A^{5}_{10\%} \Rightarrow C_1 = -166.17$

$503.82 = C_2 A^{4}_{10\%} \Rightarrow C_2 = -158.94$

Machine 2

11. (25 pts) There are three possible states of the world, Recession, Normal and Boom. The returns for Stock A and the market, along with the probabilities of each state are shown in the table below. Calculate Beta for Stock A. If the risk-free rate is 4%, what is the correct return for A using CAPM (using the beta calculated in (a))

	Probability	Return of A	Market Return
Recession	.2	10%	-3%
Normal	.5	5%	10%
Boom	.3	15%	20%

$E(A) = 2 + 2.5 + 4.5 = 9\%$ 3

$E(M) = -0.6 + 5 + 6 = 10.4\%$ 3

$V(M) = 0.2(-3-10.4)^2 + 0.5(10-10.4)^2 + 0.3(20-10.4)^2$

$= 35.912 + 0.08 + 27.648$

$= 63.64$ 4

$Cov(A,M) = 1 - 2.68 + 0.8 + 17.28$

$= 15.4$ 4

$\beta_A = \frac{Cov(A,M)}{V(M)} = \frac{15.4}{63.64} = 0.24$ 5

$E(R_A) = 4 + 0.24[10.4 - 4]$ 6

$= 5.54\%$

12. (25 pts) The Hoosic Company has $285 million of risk free debt outstanding at the same time its common stock is worth $665 million. Analysis indicates that the firm's equity has a beta of 1.25. Ignore taxes. The risk free rate is 6% (which is what Hoosic can borrow at) and the return on the market is 14%.

a. What is the firm's asset beta?
b. What is Hoosic's weighted average cost of capital?
c. Now assume Hoosic pays taxes at a rate of 35% and the cost of equity is 14.95%. What is Hoosic's weighted average cost of capital?
d. What is the net present value of a project that costs $275,000 and returns $34,900 a year forever that has the same risk as Hoosic?

$B = 285$

$S = 665$

$V_L = 950$

(a) $\beta_{equity} = \beta_{asset}\left(1 + \frac{B}{S}\right)$

$1.75 = \beta_{asset}\left(1 + \frac{285}{665}\right)$

$\beta_{asset} = \frac{1.25}{1.43} = 0.875$

(b) $R_{WACC} = \frac{665}{950} \times 16 + \frac{285}{950} \times 6 = 13$

(c) $R_{WACC} = 0.7 \times 14.95 + 0.3 \times 6\,(1 - 0.35$

$= 11.635$

$R_E = 6 + 1.25(8)$

$= 16$

(d) $NPV = -275 + \frac{34.9}{0.1163} = -275 + 299.96 = 24.96$

13. (25 pts) The Locomotive Corporation expects perpetual earnings before interest and taxes (EBIT) of $6 million per year. The firm's after-tax all-equity discount rate (r_0) is 18%. Locomotive is subject to a corporate tax rate of 35%. The pretax cost of the firm's debt capital is 10% and the firm has $14 million of debt in its capital structure.

8 a. What is Locomotive's value?
6 b. What is Locomotive's cost of equity (r_s)?
5 c. What is Locomotive's weighted average cost of capital?
5 d. How much less would Locomotive be worth if its capital structure was all equity?

EBIT = 6
R_0 = 18%
t = 35%
R_B = 10%
B = 14

(a) $V_L = \frac{6(1-0.35)}{0.18} + 14 \times 0.35$

$= 26.57$ < 14 (D)
12.57 (E)

(b) $R_S = 18 + (18-10)\frac{14}{12.57}(1-0.35) = 23.79$

(c) $WACC = 23.79\ \frac{12.57}{26.57} + 10\ \frac{14}{26.57}(1-0.35)$

$= 14.68$

5 (d) $V_U = 21.67$

Loss in value $(4.9) = 14 \times 0.35$