NORTHWESTERN UNIVERSITY
KELLOGG GRADUATE SCHOOL OF MANAGEMENT

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Investment Tools
EMP 69

Final Exam

This is an open book exam. SHOW ALL YOUR WORK!

You can either drop the exam off in the eMBA office or you can e-mail (k-hagerty@northwestern.edu) or fax (847-467-5775) your exam to me. Exams are due **February 16**.

I. Answer the following questions true or false and explain why.

a. (5 points) Diversification reduces a portfolio's expected return because it reduces a portfolio's total risk.

b. (5 points) The contribution of a stock to the risk of a diversified portfolio depends upon its market risk only.

II. Suppose the forward price for a May 2008 natural gas forward is $9.00/MMbtu. Consider the following position:

   i. short a May 2008 forward on a natural gas
   ii. long a call on natural gas with a strike price equal to $9.00/MMbtu and a May 2008 expiration date.

   Assume the expiration date of the option and the maturity date for the forward are the same.

   a. (5 points) Draw the payoff **at expiration** for the forward and the call and then draw the net payoff at expiration (ignore the initial cost of the position).

   b. (5 points) What option position does the net payoff resemble?

III. The Southwest Airlines plans to buy jet fuel in six months. Their break-even price for fuel is $105/barrel. The firm is considering whether to hedge its position and if so, whether to use futures or options. There is a jet fuel forward contract. The forward price is $107/barrel.

a. (5 points) If the firm wants to hedge with a future, should the firm go long or short a future?

b. (5 points) What profit or loss would the firm have locked in if it hedged with the jet fuel futures contract?

c. (5 points) What are the pros and cons of hedging with a future?

d. (5 points) Suppose the firm wanted a $110 cap. What option position should the firm take to accomplish this? Draw the firm's unhedged position and the position with the cap.

e. (5 points) Give two ways for the firm to lower the cost of the cap.

IV. One investor has two stocks in her portfolio. She invested 30% of her funds in Apple, 40% of her funds in Starbucks and 30% in T-bills (risk free). Suppose she runs the following regression for each stock.

$$R_i = \alpha_i + \beta_i R_M + e_i$$

where R_i = $r_i - r_f$

α_i = the expected return on security i

$\beta_i R_M$ = the component of the return due to economy-wide events

R_M = $(r_{mkt} - r_f)$

e_i = the component of the return due to firm specific events

The relationship between the market portfolio (independent variable) and these stocks (dependent variable) are:

	Apple	Starbucks
Intercept	.02	-.01
Slope	1.1	1.4
Std Deviation of the Residuals	.03	.06

The expected return on the market is 10%, the standard deviation of the market is 15% and the risk-free rate is 4%.

a. (5 points) What should be expected return for each stock?

b. (5 points) Which stock is most correlated with the market?

c. (5 points) Which stock has the most firm specific risk?

d. (5 points) What is the expected return and standard deviation of her portfolio?

e. (5 points) Is there a position in the market portfolio and T-bills which would provide the same expected return with less risk?

V. You are comparing the performance of two investment advisors who manage portfolios by picking undervalued stocks. Consider the following information:

	Advisor A	Advisor B
Return	20%	10%
Beta	2	.5
Standard Deviation	30%	30%

Assume the risk- free rate is 5%, the return on the market index fund is 13% and the standard deviation of the market index fund is 18%.

a. (5 points) Compute the Sharpe measure and the Treynor measure for the two advisors.

b. (5 points) Suppose you currently hold all your wealth in a market index fund and you are considering shifting a small amount of your wealth into either advisor A's or advisor B's fund. Which one would you pick? Explain your answer.

c. (5 points) Is either fund better than the market index fund?