Econ 252 - Financial Markets

Spring 2011

Professor Robert Shiller

Midterm Exam #1

Instructions:

- The exam consists of a total of seven pages including this coversheet.

- There are two parts to this exam.

- In Part I, answer any eight of the ten questions, five minutes each.
  The total for Part I is 40 minutes.

- In Part II, answer all three questions.
  The total for Part II is 30 minutes.

- For the exam, there are 70 question minutes total, each question minute corresponding to 1 point.

- You have 75 minutes to do the exam.

- Exam is CLOSED BOOK.

- You are allowed to use a non-programmable calculator.

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Part I.

Answer eight of the ten questions (5 points each - 40 points total).

1. Why has it seemed reasonable, from the standpoint of financial theory, that stock prices are approximately a Random Walk? Does the theory suggest a Random Walk is more likely than an AR-1 (First-Order Autoregressive) Process? Explain.

2. What is the price discovery process? How did Charles Conant, in his 1904 essay "The Function of Stock and Produce Exchanges," describe the importance of price discovery?

3. Was David Swensen against trying to improve investment management returns by trying to pick which stocks or bonds pay more? If so, how did he claim to produce the high returns he has achieved on Yale's portfolio?

4. How, according to Gary Gorton, did the banking panics of the 19th and 20th century differ from the panic of the 21st century?

5. The old investing adage "don't put all your eggs in one basket" sounds very simple: Don't put your entire portfolio in one stock. But, is the mean-variance portfolio theory of Markowitz so simple? Does Markowitz' theory suggest putting one share of each stock in one's portfolio? What kinds of factors does Markowitz's theory imply that one must consider, and why?

PART I CONTINUES ON THE NEXT PAGE.

CONTINUATION OF PART I.

6. An annuity is often described as "a mutual fund in an insurance wrapper." Explain.

7. What are "fat tails" and what is their theoretical relevance to portfolio managers?

8. According to the mean-variance theory of Markowitz and the CAPM model, is it possible that rational people would ever want to include a short position in a stock that has an expected positive return in their portfolios? Explain.

9. What is systemic risk? Additionally, name some new agencies that have been created, since the latest financial crisis, to prevent damage from such risk.

10. What is Value at Risk (VaR) and how did it fail us during the financial crisis?

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Part II.

Answer ALL THREE of the following questions (10 points each - 30 points total).

Question 1 (10 points)

Some Yale Students have lent $100 to each of three different people with the promise that they will be paid back tomorrow: Honest Abe, Bonnie, and Clyde.

Throughout this problem, assume that the present value discounting between today and tomorrow is negligible.

The Yale students have decided to turn the IOUs into tradable bonds. Honest Abe will always repay the loan. Bonnie and Clyde are somewhat less trustworthy, and they will each either repay the loan in full, or skip town without paying anything. The probability that Bonnie and Clyde repay is as follows:

	Clyde pays	Clyde runs
Bonnie pays	.4	.1
Bonnie runs	.1	.4

(a) **(2 points)** What are the expected values of the Honest Abe bond, Bonnie bond, and Clyde bond?

(b) **(3 points)** What are the variances of the Honest Abe bond, Bonnie bond, and Clyde bond?

QUESTION 1 CONTINUES ON THE NEXT PAGE.

CONTINUATION OF QUESTION 1.

(c) **(2 points)** What is the covariance of the Bonnie and Clyde bonds?

(d) **(3 points)** Deciding to diversify, you buy ½ the Honest Abe bond, ¼ of the Bonnie bond and ¼ of the Clyde bond. What is the expected value and variance of this portfolio?

Question 2 (10 points)

Consider the following two assets:

- Asset A's expected return is 5.5% and return standard deviation is 31%.

- Asset B's expected return is 3% and return standard deviation is 55%.

The correlation between assets A and B is 0.2.

The table below indicates the expected return and the return standard deviation for portfolios that put weight w on asset A and weight 1-w on asset B.

Weight	Expected Return	Return Standard Deviation
w=0.9	5.25%	
w=0.5	4.25%	34.16%
	3.50%	45.65%

(a) **(2 points)** Complete the above table.

For parts (b) through (e), impose the assumption that short-selling is prohibited.

(b) **(3 points)** Draw a careful sketch of the portfolio frontier associated with assets A and B. Clearly indicate assets A and B as well as the three portfolios from the above table.

(c) **(2 points)** Now, suppose that the correlation between assets A and B is changed to 0. Sketch the new portfolio frontier associated with assets A and B in the same graph as in part (b).

You do not have to re-compute the above table for the new correlation-value. A clean sketch of the new portfolio frontier is sufficient.

QUESTION 2 CONTINUES ON THE NEXT PAGE.

CONTINUATION OF QUESTION 2.

(d) **(2 points)** Repeat part (c) when the correlation between assets A and B is -0.7.

(e) **(1 point)** What does the analysis in parts (b) through (d) tell you about the connection between the correlation of two assets and diversification?

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Question 3 (10 points)

Consider the following two portfolios on a tangency line:

- Portfolio 1 has 5.5% expected return and 15% return standard deviation.

- Portfolio 2 has 8.5% expected return and 25% return standard deviation.

Throughout this problem, there are no restrictions on short-selling.

(a) **(3 points)** Compute the Sharpe ratio of the Tangency Portfolio associated with the given tangency line.

(Hint: In an (x,y)-diagram, the slope of a straight line connecting points (x_1,y_1) and (x_2,y_2) is given by $(y_2-y_1)/(x_2-x_1)$.)

(b) **(2 points)** Compute the risk-free rate that is located on the given tangency line.

(Hint: If you cannot solve part (a), use a Sharpe-ratio of 0.25.)

(c) **(3 points)** Suppose that there is a second tangency line, corresponding to a risk-free rate of 2% and a market portfolio with 6% expected return and 20% return standard deviation. With the risk-free rate of 2%, what is the maximum expected return that you can generate given 25% return standard deviation?

(d) **(2 points)** Given the usual μ-σ-preferences, suppose you wanted to form a portfolio with 25% return standard deviation. Which of the two tangency lines would you prefer, the original tangency line or the second tangency line?