Stockholm University

Department of Economics

Course name: **Portfolio Theory**
Course code: **EC7211**
Examiner: **Bo Larsson**
Number of credits: **7.5 credits**
Date of exam: **Sunday, April 19th, 2015**
Examination time: **3 h, 09.00-12.00**
Location: **Ugglevikssalen, Södra huset, hus E**

Write your identification number (the number stated in the upper right hand corner on your exam cover) along with the number of the question on each paper and cover sheet. Do not write answers to more than one question in the same cover sheet. Explain notions/concepts and symbols. You should provide clear, readable, and correct solutions, along with elaborate explanations (unless stated otherwise) in order to be granted full score on the questions. If you think that a question is vaguely formulated: specify the conditions used for solving it.

Exam consists of 3 questions awarding 20 points each and 1 question rewarding 25 points summing to a total of 85 points. The total score will be added to your score for the assignments, which results in a maximum score of 100 points.

Grades will be given according to the following scale of minimum scores, A: 88, B: 75, C: 63, D: 50, E: 45 points. Students who receive a score below 45 points fail the exam with a grade of F.

Results will be posted on mitt.su.se, on May 8th at the latest.

Good luck!

Bo & Emilio

Q1, Efficient markets, 20 points

What is the Efficient Markets Hypothesis?

How efficient are the U.S. financial markets? Is it a sign of probable inefficiency if:

a) The price of a security does not follow a random walk? (What is a random walk?)
b) Capital gains on American Stock Exchange stocks (typically small company stocks are traded here) are regularly larger than those on New York Stock Exchange stocks with the same beta?

Q2 APT, 20 points

Consider the following multi-index model: $R_{i,t} = R_{F,t} + \beta_{i,1} I_{1,t} + \beta_{i,2} I_{2,t} + e_{i,t}$
where:

$R_{i,t}$ is the return on asset i in period t
$R_{F,t}$ is the risk-free rate in period t
$\beta_{i,j}$ is the sensitivity of asset i to factor j
$I_{j,t}$ is the value of factor j in period t
$e_{i,t}$ is a random error term for asset i in period t

a. Assuming the APT holds, what is the expression for the expected return of asset i?
b. How can the APT be used in decision-making?
c. Outline, in list form, the assumptions underlying the APT.

Q3 Diversification 20 points

Under what condition will adding a security with a high standard deviation decrease the risk of a portfolio?

Q4 Mean variance 25 points

The stock returns for firm A and firm B have the following characteristics:

firm	expected return	standard deviation
A	10%	8%
B	12%	20%

a. Assume that the correlation between the two stocks is 0. If there are no restrictions on short sales or borrowing, what are the portfolio weights, expected return and standard deviation on the portfolio of these two assets with the lowest risk (minimum variance)?

b. Now assume that the correlation is instead 1.0. Susan is the chief executive officer of firm A. Under a company stock purchase plan, she currently holds $200,000 worth of A's stock, and this represents her total assets. This stock cannot be sold under her employment contract. Susan can purchase additional amounts of stock A or stock B, and she can sell stock B short. It is illegal for her to sell stock A short. Can Susan eliminate the risk in her holding? Be specific (give numbers).