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EE431 Economics of Financial Markets and Institutions

Exercise 4: Capital Asset Pricing Model (CAPM)

Please submit at the BE office, 5th floor department of Economics building.

Deadline of submission : Thursday 25, 2015, before 15.00 hrs.

1. Use the following information to answer all parts. Assume that all assumptions of CAPM hold.
An investor want 4 % rate of return

Assets	Expected Return (%)	Standard Deviation (%)
Market Portfolio	7	10
Risk-free Asset	1	

- Market port folio consists of 0.7 of risky asset X and 0.3 of risky asset Y.

- (a) What are the portfolio weights the investor put on risk free asset and the market portfolio?

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- (b) What is the standard deviation of the portfolio in quation (a)?

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2. Company X has a beta of 1.45. The expected risk-free rate of interest is 2.5% amd the expected return on the market as a whole is 10%. Using the CAPM, what is Stock X's expected return?

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3. Suppose CAPM holds. Given the following data, calculate the betas and the expected rates of reuturns of the two securities.

	Expected rate of returns (%)	Standard deviation (%)	Correlation with the market portfolio
Security 1	$ER_1?$	20	0.9
Security 2	$ER_2?$	9	0.8
Market portfolio	12	12	$=? *$
Risk free asset	5	0	0

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4. Consider an economy with just two assets. The details of these are given below.

Stock	Number of shares	Price (\$)	Expected return (%)	Standard deviation (%)
A	100	1.5	15	15
B	150	2	12	9

The correlation coefficient between the returns on the two assets is $\frac{1}{3}$ and there is also a risk free asset. Assume the CAPM model is satisfied.

- (a) What is the expected rate of return on the market portfolio?

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- (b) What is the standard deviation of the market portfolio?

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(c) What is the beta of stock A?

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Hint: By definition, $\beta_A = \frac{r_{A,m}\sigma_A\sigma_m}{\sigma_m^2} = \frac{COV(R_A, R_m)}{\sigma_m^2}$.

Find $COV(R_A, R_m)$.

$$\begin{aligned}
 COV(R_A, R_m) &= E[(R_A - E(R_A))(R_m - E(R_m))] \\
 &= E[(R_A - E(R_A))(w_A R_A + w_B R_B - w_A ER_A - w_B ER_B)] \\
 &= E[(R_A - E(R_A))\{(w_A R_A - w_A ER_A) + (w_B R_B - w_B ER_B)\}] \\
 &= E[w_A(R_A - E(R_A))^2 + w_B(R_A - ER_A)(R_B - ER_B)] \\
 &= w_A\sigma_A^2 + w_B COV(R_A, R_B) \\
 &= w_A\sigma_A^2 + w_B r_{AB}\sigma_A\sigma_B
 \end{aligned}$$

(d) What is the risk free rate of return?

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(e) Construct the capital market line (CML) and the security market line (SML).

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