Exercises for Chapter 6

The capital asset pricing model

1. The following information is provided for a stock market:

	μ_j	β_j
Asset 1	6.6%	0.4
Asset 2	9.8%	1.2
Asset 3	12.2%	1.8

Notation: $\mu_j =$ expected rate of return on asset j; $\beta_j =$ beta-coefficient for asset j, $j = 1, 2, 3$.

(a) In the context of the Capital Asset Pricing Model (CAPM), define the 'beta-coefficient', β_j, corresponding to asset j. Discuss how assets' beta-coefficients should be interpreted and explain how their values can be obtained in practice.

(b) Assuming that a risk-free asset is available, explain and interpret the Security Market Line (SML) in the context of the CAPM. Construct the SML from the given information and interpret the values of its coefficients.

(c) Now suppose a risk-free asset is *not* available, although the other assumptions of the CAPM remain valid. How should the SML be constructed and interpreted in this case?

(d) You are informed that a fourth asset, with $\beta_4 = 0.8$, is available. Recent observations reveal that its average rate of return is 7.0%. What inferences, if any, would you draw from this information? [Your answer may be in the context of either (b) or (c), above.]

2. The following information is provided for a stock market:

	σ_j	ρ_{j_M}
Security A	50%	0.6
Security B	60%	-0.2
Market Portfolio	20%	1.0

Notation: $\sigma_j =$ standard deviation of the rate of return on asset $j = A$ and $j = B$; $\rho_{j_M} =$ correlation coefficient between the return on asset j and the return on the market portfolio. The mean rate of return on the market portfolio is 8% and the risk-free rate of return is 5%.

(a) In the Capital Asset Pricing Model, explain what is meant by the Security Market Line, SML. Calculate the SML from the given information.

(b) In the Capital Asset Pricing Model, explain what is meant by the beta coefficient, β_j, for a security. Calculate the beta coefficients for the two securities from the given information.

(c) You are told that the mean rates of return for securities A and B are 7.5% and 4.6% respectively. What would you infer from this information in the context of the Capital Asset Pricing Model?

3. What are the main predictions of the Capital Asset Pricing Model (CAPM)? Discuss the role and significance of the assumptions needed to obtain the predictions.

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