Examination: Finance (Management III) / Summer Term 2001

Examiner: Prof. Dr. Peter Reichling

The following aids can be used: pocket calculator

Examination questions:

Question 1 (Internal Rate of Return, Net Present Value) (20 points)

An investments has the following cash flows:

	t_0	t_1	t_2
I_1	-900	1935	-1039.5

The market rate of return is 7.0 per cent.

a) Make a decision about the realization of the investment according to
   i. the net present value method,
   ii. the internal rate of return method?
   iii. Do both methods always lead to the same result? Explain!

b) Show graphically how the net present values depend on the rate of return used for their computation.

c) Which rate of return maximizes the net present value (NPV)?

d) What is the maximum NPV?

Question 2 (Stock Valuation) (20 points)

A company will pay a dividend of 8€ per share in the next year. The management of the corporation forecasts that dividends will grow 2.5% each year. The risk-adjusted interest rate in the relevant market amounts to 8%.

a) Why would it not be appropriate to use the risk-free rate of return to discount the cash flows?

b) What is the current price of the share?

c) What change of price (in per cent) results within one year?

d) How is the price of a share affected if the growth rate increases to 3.5 per cent immediately?

e) How is the price of a share affected if the forecasted dividends can only be realized in the first two periods and the growth rate then reduces to 1.5 per cent?

Question 3 (Term Structure) **(20 points)**

The following prices of coupon bonds can be observed in the market:

	maturity	Coupon	Price	Face Value
CB_1	1 year	8.00%	1039.70 €	1000 €
CB_2	2 years	6.50%	1043.30 €	1000 €
CB_3	3 years	6.75%	1065.90 €	1000 €

a) Calculate the one-year, two-year and three-year spot rates r_1, r_2 and r_3 and show the result in a graph. How is this kind of term structure called?

b) Calculate the forward rates f_1, f_2 and f_3.

c) How are spot rates and forward rates related to each other?

d) Calculate the yield-to-maturity of CB_1 and CB_2.

Question 4 (Capital Asset Pricing Model) **(20 points)**

a) Make a graph of the security market line (SML) for the case where the expected return of the market portfolio M is 12 per cent and the risk-free rate of return is 4.5 per cent. What is the risk premium of the market and what is the beta of the risk-free rate of return r_f?

b) Suppose that an asset A has a beta of (-0.5) and an expected return of 4 per cent. Calculate the expected return in market equilibrium and compare. What are the implications for A according to the CAPM? Show in the SML-graph!

c) Suppose that an asset B has a beta of 1.75 and an expected return of 14 per cent. Calculate the expected return in market equilibrium and compare. What are the implications for B according to the CAPM? Show in the SML-graph!

d) Explain why the security market line (SML) is an upward sloping line.

Question 5 (Portfolio Selection) **(20 points)**

Suppose there are 2 risky assets which are characterized by their expected rate of return μ_A and μ_B, their standard deviation σ_A and σ_B and their correlation coefficient ρ_{AB}.

a) Compute the expected return and the standard deviation for a portfolio consisting of x_A shares of asset A and x_B shares of asset B ($x_A + x_B = 1$).

b) Compute x_A and x_B for a portfolio consisting of the assets A and B where the variance of the portfolio's expected return is minimal (minimum variance portfolio).

c) Compute x_A, x_B and the variance of the MVP for the case where $\rho_{AB} = 0$.

d) Calculate x_A and x_B as well as μ_P and σ_P of the minimum variance portfolio for $\mu_A = 9\%$, $\sigma_A = 7\%$, $\sigma_B = 14\%$ and $\mu_B = 14\%$ ($\rho_{AB} = 0$).