Financial Management (5077) - Summer Term 2008

You are required to answer all four (4) questions within 120 minutes. You may use the lecture notes from Winter Term 2007/08 as well as your individual notes, and any Financial Management textbook. The usage of pocket calculators and other electronic equipment is only permitted in accordance with the regulations enacted by the Examination Office.

Use the terminology and the mathematical models taught in class. Make clear how you derive your results, and explain the derivation if necessary. Undecipherable scribbling will not be graded. Leave a margin for comments.

1. Consider two investment projects, labeled $i \in \{1; 2\}$, that are characterized by the following time series (C_t denotes the cash flow in period $t \in \{1; 2; 3\}$):

	C_0	C_1	C_2
P_1	-36	41	0
P_2	-36	20	24

Person A likes immediate consumption more than future consumption, while this is reversed for person B. Both A and B have an initial fund of 36 at their disposal. For the following scenarios, derive who would prefer which project:

a) **4 points** No other investment or financing opportunities exist.

b) **6 points** An alternative investment yields an interest rate $r = 0.1$ per period, an alternative funding source costs an interest rate $i = 0.2$ per period.

c) **5 points** Assume for now $i = r = 0.1$.

d) **10 points** Assume $C_0(P_1) = -31.4$ (instead of -36), and again $i = 0.2, r = 0.1$.

e) **15 points** Now assume that three projects exist:

	C_0	C_1	C_2
P_1	-36	20	24
P_2	-32	20	16
P_3	-8	0	16

Again, $i = 0.2, r = 0.1$. Derive the combination of projects, loans and investments preferred by each parties.

— See overleaf —

2. 30 points Name, define formally, and explain verbally five decision rules under uncertainty.

3. 20 points Consider a company that has a 5year time horizon. Within this time horizon the company plans to produce a certain item. This item is produced on a machine which has a maximal lifespan of 3 years. The cash flows a_t and the liquidation values L_t (where t denotes the age of the machine) are given by the table below. The interest rate is $i = 0.10$. Derive the firm's optimal investment plan.

t	0	1	2	3
a_t	-30	18	15	3
L_t	30	21	12	9

4. A decision-maker faces (no more than) one risk-free and two risky assets from which she can buy or short sell, as long as her budget W_0 is not exceeded. Let $\mu_0 = 0.1$ be the return of the risk-free asset, whereas the risky assets yield an expected return of $\mu_1 = 0.12$ and $\mu_2 = 0.2$, respectively. The variances and covariances are given as $\sigma_1^2 = 2.5$, $\sigma_2^2 = 3$, and $\sigma_{12}^2 = 2.5$. The decision-maker wants to create a portfolio that yields an expected return of $\overline{\mu}$.

a) **10 points** Use the CAPM to determine the minimal portfolio variance for a given $\overline{\mu} = 0.15$. How should W_0 be split up between the available assets?

b) **10 points** Given your results from part a), determine for each of the risky assets the degree at which they are under-/overvalued.

c) **10 points** Determine all efficient portfolios as a function of $\overline{\mu}$.