OTTO-VON-GUERICKE-UNIVERSITÄT MAGDEBURG
Faculty of Economics and Management

Professorship of Business Economics

PD Dr. Roland Kirstein

Final Exam

Financial Management (5077)
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Examiner: PD Dr. Roland Kirstein / Dipl. Vw. Dirk Matzner

*You are required to answer all **five** (5) question within the allotted time of 120 minutes. You may use the lecture script as well as your individual notes and any textbook as a reference. Calculators and any other electronic equipment are only permitted in accordance with the regulations enacted by the board of examiners (Prüfungsausschuss).*

Good speed!

Q1: *10+5+5*

(a) For the project:

$$a_t = \begin{cases} -10p^t \text{ for } t = 0,2,4,...,100 \\ 12p^t \text{ for } t = 1,3,5,...,101 \end{cases}$$

(T = 101) compute the PV with i=10% and p=1.05.

(b) With your result from (a) compute the annuity paid at the end of each period for T = 101, let E=0.

(c) Suppose that in (a) a_0 changes to $a_0 = -20$; everything else stays the same. When does this modified project amortize?

Q2: *20*

Consider a company that owns three production facilities P_1,P_2,P_3. The company has 5,000,000€ and four (4) years available to expand combined production capacity.

Given the following discrete options with respect to the cost and time needed and the resulting capacity gain for each production facility:

	P_1			P_2		P_3	
Cost in Mill.€	0	1	3	0	1	0	2
Time in Years	0	2	1	0	2	0	1
Capacity Gain	0	2	2,5	0	3	0	2

How can the combined **capacity gain** for all three production facilities be **maximized** within four (4) years, given that total investment does not exceed 5,000,000€?
(Hint: Use transition matrices)

Q3: *20*

Consider two companies **A** and **B**. **A** is considering to issue a 2 year coupon bond while **B** contemplates a 4 year coupon bond. Both bonds have a face value of 1000€ and annual interest (coupon) payments. Market conditions dictate the following interest rates for **A** and **B** (for a corporate bond issue up to 1000€):

$\hat{\theta}^{A}{}_{0}(2-0)=14\%$ $\hat{\theta}^{A}{}_{0}(4-0)=16\%$

$\hat{\theta}^{B}{}_{0}(2-0)=8\%$ $\hat{\theta}^{B}{}_{0}(4-0)=12\%$

Assuming a **risk free and flat interest rate of 7%** and that the spread differential is split evenly between **A** and **B**, can both companies improve their situation using a **interest rate swap**?

If your answer is Yes – compute the present value of savings for both.

If your answer is No – determine the least amount A has to pay B so B would be willing to swap.

Q4: *20*

Suppose you have a liability of 1,000,000€ in three (3) years from now. Assume the following discrete interest rates:

$\hat{\theta}_{0}(3-0)=10\%$

$\hat{\theta}_{0}(4-0)=12\%$

There are two bonds available, **Bond A** and **Bond B**:

Bond A has a face value of 1000€, a remaining lifespan 3 years and a coupon of 8%. The coupon payments are annual with the first coupon paid out one year from now.

Bond B has a face value of 1000€, a remaining lifespan 4 years and a coupon of 7%. The coupon payments are annual with the first coupon paid out one year from now.

Determine the amount of **Bond A** and **Bond B** you need to purchase so that the liability of 1,000,000€ in three (3) years is immunized against immediate und parallel interest rate changes?

Q5: *15*

For the extended Beranek model as discussed in the lecture let:

$$r_{M}=1\%\ \ r_{CD}=6.5\%\ \ r_{CF}=2\%\ \ r_{LC}=7.5\%\ \ \delta=4\%$$

and let $A=A(\omega)\sim U(100,500)$ and K=410, compute W_{0}^{*} and L^{*}.