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Final Exam
Financial Management (5077)
WS 2007/2008

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Examiner: Prof. Dr. Roland Kirstein / Dipl. Vw. Dirk Matzner

You are required to answer all four (4) questions 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: (20)

Consider two companies A and B. A is considering to issue a 3 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 €):

$$\hat{\theta}_0^A(3-0) = 9\% \quad \hat{\theta}_0^A(4-0) = 13\%$$
$$\hat{\theta}_0^B(3-0) = 10\% \quad \hat{\theta}_0^B(4-0) = 12\%$$

Assume a risk free and flat interest rate of 7% and that the (possible) 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 - explain why.

Q2: (10+5)

Let's assume that for the **END** of the first year you receive an inflow of x € which then becomes half the outflow at the **END** of the following year (i.e. at the end of the second year you pay $\frac{1}{2}x$ €). In general, $x_{t+1} = -\frac{1}{2}x_t$ for $t = 1 \ldots n$.

(a) What is the present value of this stream of cash flows for n years? (i.e. cash flow is zero after the end of the n^{th} year)

(b) Determine the equivalent annuity paid out at the **BEGINNING** of the year (i.e. the constant payment that you receive at the beginning for each of the n years for which the present value is the same as under (a)).

Q3: *(10+5)*

Consider a company that owns three production facilities P_1, P_2, P_3. The company has 5 million € and five (5) 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:

Facility	P_1			P_2		P_3	
Cost in Mill. €	0	1	3	0	1	0	$\frac{3}{2}$
Time in Years	0	1	$\frac{3}{4}$	0	2	0	1
Capacity Gain	0	$\frac{3}{2}$	$\frac{5}{2}$	0	3	0	1

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

(a) How can the combined capacity gain for all three production facilities be maximized given that total investment does not exceed 5 million € and no more than five (5) workers are being used ?

(b) Let's say instead of only using five (5) workers, you may actually use six (6) workers (everything else unchanged). How much additional capacity gain will that extra worker get you ?

Q4: *(20)*

Suppose you have a liability of 2 million € in three (3) years from now. Assume the following discrete risk free interest rates for two and four year investments.

$$\hat{\theta}_0(2-0) = 7\% \qquad \hat{\theta}_0(4-0) = 12\%$$

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

Bond A has a face value of 1000€ a remaining lifespan of 2 years and a coupon of 8.5%. 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 of 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 2 million € in three (3) years is immunized against immediate and parallel interest rate changes.