Examination in Financial Management (5077) **Winter Term 2008/9**

Examiner: Prof. Dr. Alfred Luhmer

Examinee: Student Number:

This examination contains 11 problems on 9 pages. Please check that you have got the complete set.
Please enter your answers in the space immediately below each question. Only answers given there will be graded.
Admissible aids: Pocket calculator, language dictionary

Useful formulas:
The present value of a series of n equal payments a due at the end of each period at a discount rate r (per period) is: $PV = \frac{a}{r}\left(1 - \frac{1}{(1+r)^n}\right)$.

The two solutions of the quadratic equation $ax^2 + bx + c$ are: $x_{1,2} = \frac{1}{2a}\left(-b \pm \sqrt{b^2 - 4ac}\right)$.

Take your time, you have plenty of it. Think about solutions carefully.

1	2	3	4	5	6	7	8	9	10	11	Σ	Grade
/6	/8	/8	/6	/12	/10	/10	/15	/10	/15	/20		

Problem 1: During 2003 Sotheby's sold the Edgar Degas bronze sculpture *Petite Danseuse de Quatorze Ans* at auction for a price of $10,311,500. Unfortunately for the previous owner, he had purchased four years ago at a price of $12,377,500. What was his annual rate of return r on his investment? (6 Points)

a) Set up an equation that can be solved for the annual compound interest factor q $(:= 1 + r)$:

b) Solve the equation:

$$r =$$

Problem 2: An interest-only bond with face value $10,000, annual coupon of 5% and two years to maturity is available at a price of $10,500. Determine the yield to maturity. (8 points)

a) Give an equation that can be solved for the YTM:

b) Solve the equation:

Problem 3: Trader Joe buys a used truck for his business at a price of $50,000. The auto dealer offers payment by equal monthly installments over 5 years at an effective annual interest rate of 9%. Determine the monthly payment.
(8 Points)

a) Determine the monthly discount factor for a yearly interest rate of 9%.

b) Give an equation that can be solved for the monthly payment:

c) Solve for the monthly payment:

Problem 4: A zero bond (face value $10,000) is available at $3,450. The long run market interest rate for the issuer is 8% p.a. Determine the time to maturity. (6 points)

a) Give an equation that can be solved for the time to maturity:

b) Solve it:

Problem 5: On 15th of September you purchased a bond at a quoted price of $1,038.80, the bond has a 7% coupon rate paid annually on July 1st. The face value is $1,000. (12 points)

a) How much will you have to pay for it?

b) What is the current yield of the bond?

c) Assume the yield to maturity is 5.2%, constant over time. What is the capital gains yield for the year to come?

d) Which quoted price do you expect in one year?

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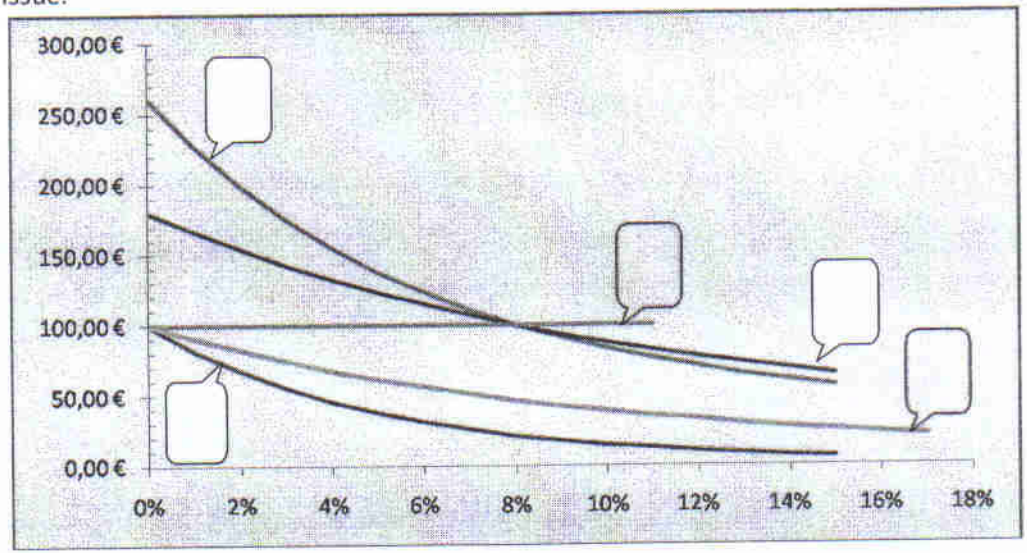
Problem 6: A Mortgage Bank issued three different bonds at the same date, all three at par: a floater F and two coupon bonds A and B. Bond A has a longer time to maturity than B. Furthermore bonds A and B are also traded as stripped bonds a and b, respectively, i.e. without their coupons. (a denotes A stripped, b denotes B stripped.)

The figure below shows the Present Value of the three bonds as a function of the market interest rate. (Assume a flat term structure).

a) Fill the empty labels in the figure with the name of the bond (A, B, F, a, b) to which the respective curve belongs. (5)

b) What was the market interest rate at the time of issue? (1)

c) Infer from what you see in the figure the times to maturity of A and B at the time of the issue. (4)



Problem 7: GE's shares sell at $16, last year's dividend was $1.24. GE's beta is estimated at 0.83, the risk-free interest rate at 3.8% p.a. and the market risk premium at 7.6%. What would be the implied growth rate of dividends according to the Gordon dividend growth model? (10 points)

a) Set up the equation of the dividend growth valuation model for the data given:

b) Solve for the growth rate (percentage growth rate two digits behind the decimal point)

c) Interpret your results.

Problem 8: Quarry Inc. is considering the acquisition of new crushing equipment. Two alternative models are on offer:

Alternatives	Acquisition cost	Useful life	Yearly operating cost	Salvage value
I	\$1 million	1 year	\$0.4 million	\$0.3 million
II	\$2 million	2 years	\$0.3 million	\$0.5 million

The capacity of either type of equipment allows for \$5 million yearly sales revenues from crushed stones. The demand is expected to be constant forever. (15 points)

a) Specify a sequence of cash flows for each alternative in order to determine which one creates more value. (Be careful: you will not earn points by processing false cash flow sequences in what follows.)

Time line: 0 — 1 — 2

CF(I) :

CF(II):

b) Which alternative is best from the point of view of shareholder value if the required rate of return is 10%? (Show your calculations!)

c) Determine the rate of return at which one would be indifferent between the two alternatives.

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d) Determine the annuity (due at year's end) equivalent to the cash flow stream of each of the alternatives at the required rate of return of 10%.

Problem 9: Company Y's share price is $5.50 while company Z's stock is traded at a price of $10 per share. Y has a beta of 1.4, Z's beta is 0.75. Company Y announced a dividend of $0.50 while Z will pay no dividend. The market risk premium is 7.5% and the risk-free rate of return is 4%. What are the share prices of the two companies one year from now, predicted by the CAPM? (10 points)

a) Set up equations that can be solved for the share prices:

b) Solve:

c) Determine expected capital gains yield and dividend yield for both stocks:

	Capital gains yield	Dividend yield
Stock Y:		
Stock Z:		

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Problem 10: Stock X has an expected rate of return of 10% and a beta of 0.8, stock Y has 15% expected rate of return and a beta of 1.25. The risk-free rate is 4%. Which portfolio of stocks X and Y and the riskless asset has maximum expected rate of return, if the portfolio beta is constrained to 0.8?

(15 points)

a) Determine the reward-to-risk ratios of the two stocks

b) What are the portfolio weights that maximize the return?

c) What is the rate of return of that portfolio?

d) Are both stocks correctly priced? What must be the riskless rate if this would be so?

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Problem 11: Consider the following market value balance sheet:

Circular File Company (Market Values)			
Net W.C.	10	17	Bonds outstanding
Fixed assets	15	8	Common stock
Total assets	25	25	Total liabilities

The bonds of this firm pay 8% p.a. interest. The market value equals the book value. The corporate income tax rate is 25%. The cost of equity currently is 12%. (20 points)

a) Calculate the after-tax weighted average cost of capital.

After-tax WACC =

b) Calculate the opportunity cost of capital by unlevering.

r =

c) Assume the firm downsizes its entire business by reducing NWC by 2 and fixed assets by 3 and repurchases bonds of a market value of 5. After that the cost of debt falls to 7%. Calculate the new cost of equity. Comment on your result.

d) Calculate the new after-tax WACC.

r_E =