



Management V/Financial Management

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Final Exam – (11065)

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Solve 2 out of the 3 problems below. Each problem is worth up to 30 points.

If you solve more than 2 problems, the first two which appear on your answer sheets will be graded (so make sure to delete clearly and unambiguously what you don't want to be graded). The bold figures (in parentheses) indicate the maximum points per question.

You are allowed to use a non-programmable pocket calculator. The usage of textbooks, lecture notes, dictionaries, or programmable pocket calculators is **not** permitted. Notes on this exercise sheet will be disregarded during the grading. Give answers exclusively in your working sheets; leave a margin of 3cm.

Undecipherable scribbling will not be graded. Use the terminology and the mathematical tools presented in the lecture and the tutorial; **make clear how you derive your results.**

- 1) Consider a bond with a face value of \$100, and annual interest rate payment of \$15 (in December). The bond matures in 5 years (in December). The bond is rated AAA. The market offers you an interest rate for riskless corporate asset investments of 10%.
 - a) What is the value of the bond today? (4)
 - b) Alternatively to issuing bonds, the firm can get a loan of 100 € at 10% p.a. interest rate from a bank to be repaid in 5 years as an annuity (payments made in the end of each year). Calculate the annually annuity payment. (2)
 - c) Assume that the annual payment amounts to 26.5€. How much interest and how much of the principal does the firm pay in the first year? (2)
 - d) If a firm anticipates the interest rate to increase in future, would the firm prefer to repay debt (with flexible interest rates) as an annuity or as an only interest loan? Explain why. (3)

The following table shows the prices of a sample of strips of government bonds (riskless) in January 2013. Each strip makes a single payment of €100 at maturity.

Maturity	Price
December 2015	91,946
December 2018	80,565
December 2019	76,405
December 2020	72,583
December 2043	19,334

- e) Calculate the annually compounded spot interest rate for each year. (5)
- f) Is the term structure upward- or downward-sloping? (2)
- g) Explain an upward sloping term structure in terms of the expectations theory. (4)
- h) Explain why an investor could have a preference for liquidity and how this would explain an upward sloping term structure. (4)
- i) Calculate the annually compounded, one-year forward rate of interest for December 2018 and for December 2019. (4)

- 2) Consider the following return scheme (measured in %):

Probability	Asset A	Asset B	Market Portfolio
1/2	0	-15	-10
1/2	10	40	30

- a) Calculate the expected return of each stock and the market portfolio. (3)
- b) Calculate the variance and standard deviation for each stock and the market portfolio. (3)
- c) Compute the covariance and correlation coefficient between both stocks! (4)
- d) If you form a portfolio with 50% of stock A and 50% of stock B, what would be the expected return of the portfolio, the variance and the standard deviation? (4)
- e) Explain the diversification effect, what is a necessary condition. Could you diversify risk in a portfolio with stock A and B? Why/Why not? (4)
- f) Now consider the return of the market portfolio (assets A and B are not included in the market portfolio). Calculate the market betas of the assets A and B. (4)
- g) If the risk free interest rate is 4%, calculate the required return of asset A and B under the assumption that beta A is 0.25 and beta B is 1.38 (4)
- h) Compare the expected return and the required return of both assets. Following CAPM would you recommend investing in asset A or B? (4)

- 3) In an economy with three equally likely states of nature the company A makes the following operating income in each state of the economy:

Operating Income	State of the Economy		
	Recession	Normal	Boom
15,000	30,000	45,000	

- The company has no debt and all its operating income is paid as dividends to the shareholders. There are currently 20000 shares, traded at a price of 10€ per share. (There are no taxes in this economy.)
- a) Calculate the expected return on assets. (2)
 - b) Calculate the variance and the standard deviation of the returns per share. (4)
 - c) Calculate the variance and the standard deviation of the returns per share. (4)
 - d) The CEO proposes a restructuring by issuing €150,000 of debt at an interest rate of 10 percent and using the proceeds to repurchase shares. How does this affect the total value of River Cruises? Why? (2)
 - e) How are the earnings per share and return on shares affected? Calculate both for each state of nature? (4)
 - f) Calculate the variance and standard deviation of the returns per share of the levered firm. (4)
 - g) Compare your results of d) and e) to a) and b). Using the second Modigliani Miller theorem explain the effect that you can observe. What is the necessary condition for this effect? (4)
 - h) In order to "undo" the change in A's capital structure, how much would a conservative investor invest in shares and deposit at a bank to replicate his income without leverage? (4)
 - i) Show how this investment strategy (answer in h) gives him the same return on investment as he had before the CEO's decision? (2)