

**Management V/Financial Management**

**Summer Term 2010**

**Final Exam – (11065)**

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Solve the 2 problems below. Each problem is worth up to 30 points. The bold figures (in parentheses) indicate the maximum points per question.

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.

**Problem 1**

Today's price of stock X amounts to €50. The price in a year from now is predicted to be either €80 or €40. A stock option allows you to buy then at today's price. The interest rate for a one-year loan is  $r=20\%$ .

- What type of option is this?(2)
- Explain under which condition such an option will not be exercised.(2)
- Set up a table that shows the state-contingent payoffs for the stock and for the option.(4)
- Explain the idea of a "levered hedging portfolio" (LHP).(4)
- Use the state contingent payoffs to set up two equations that allow you to derive the LHP for the above option.(4)
- Derive the amount of stock needed for the LHP.(6)
- Derive the amount of credit that completes the LHP.(4)
- What is the option value today according to this method?(2)
- Why is it impossible to apply the net present value method here?(2)

**Problem 2**

Two investment opportunities, A and B, which require the same initial investment, yield state-dependent profits according to the following table (which also indicates the respective probability of the states):

| State | probability | Investments A | Investments B |
|-------|-------------|---------------|---------------|
| i     | 1/2         | 90            | 200           |
| ii    | 1/3         | 80            | 0             |
| iii   | 1/6         | 50            | 120           |

- Compute the expected value and the variance of each investment's profit.(8)
- Compute the covariance between the two investments.(6)
- Assume the following standard deviations:  $\sigma_A=31.6$  and  $\sigma_B=144.2$ ; compute the correlation coefficient.(2)
- Suppose you want to invest 50% of your wealth into A and B each. Compute the portfolio expected return and the standard deviation of your portfolio.(4)
- Which shares invested into A and B, respectively, would minimize the portfolio risk?(6)
- Explain why it is not risk minimizing to buy only the less risky asset?(4)