Otto-von-Guericke-University Magdeburg
Faculty of Economics and Management
- Management Science -
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Management II (5072): Decision Theory

End-Term Test

July 26, 2005

Last name: ..... **First name:** ..... **Matriculation No.:** .....

Course: Decision Theory SS 2005
Examiner: Prof. Dr. G. Wäscher

General remarks:

1. Write your name and matriculation number on this cover sheet and on every other sheet that has been issued to you.
2. Leave a minimum of 4 cm as correction space on the outside margin of each page.
3. Make sure that you have a complete copy of the test. The test consists of **3 assignments**, all of which have to be dealt with. It is not permitted to remove the retaining clip; doing so will be treated as fraudulent behaviour.
4. Please write legibly and number the pages which have been used. For each assignment, put down your answers on a separate sheet. Only pens with permanent ink may be used, while correction pens or ink erasers are not permitted. Make sure that you don't write in red.
5. Always make clear how you have determined your solution (solution path). Isolated solutions without traceable origin will not be accepted.
6. The following aids may be used: writing utensils, non-programmable pocket calculators without communicating and/or data processing functions, dictionaries (without any added remarks only).

Assignment 1 (8 points)

Paul is offered a choice between

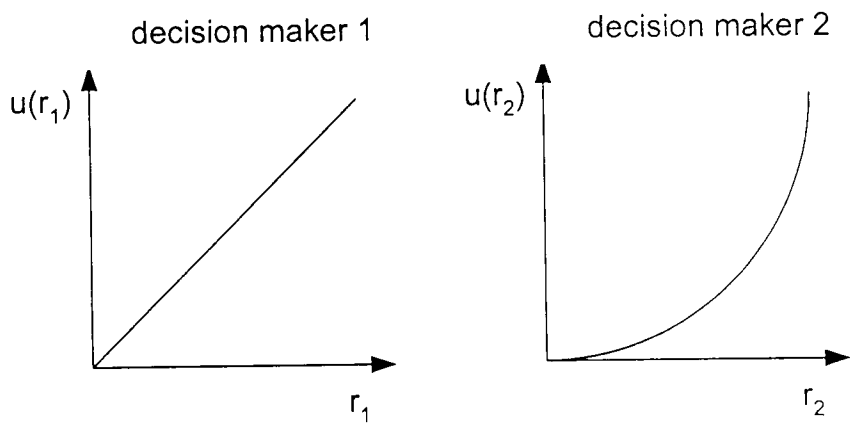
- a lottery with a 25 % chance of winning 300 € and a 75 % chance of winning 75 €,
- and a certain reward of 100 €.

He has decided to take the certain reward.

a) His subjective utilities of 300 € and 100€ are 0.5 and 0.2 respectively. What is his subjective utility of 75 €?
b) What can you conclude about his risk attitude? Give reasons for your answer!
c) Assume now that Paul is indifferent between the lottery and receiving a certain payment of 120 €. What is his risk premium?

Assignment 2 (12 points)

a) Let the following utility functions of two decision makers be given:



What can be said about the decision makers' risk attitudes?

b) Let a risk-neutral decision maker be given. Prove formally that it is compatible with the Subjective Expected Utility Theory if she/he uses the μ-principle to choose between uncertain alternatives!

Assignment 3 (30 points)

Max is a risk-neutral decision maker who intends to go on a trip around the world. The trip should start in two years from now. At the moment, he has 10,000 € in cash that he wants to invest in such a way that he has as much money as possible available when he leaves for his trip.

One investment option that has been offered to him consists of investing the whole amount of money into a security portfolio (SP 1) for one year. This investment is only available if he buys the security portfolio now.

For the second year, he can choose between two investment options. The first option (security portfolio SP 2.1) includes an investment of 13,000 €, the second one (security portfolio SP 2.2) of 11,000 €, respectively, for one year. Furthermore relevant information about the security portfolios is given in the following tables:

Year 1: security portfolio (SP1)		
investment	10,000 €	
probability	0.4	0.6
return	14,000 €	11,000 €

Year 2: security portfolio (SP2.1)		
investment	13,000 €	
probability	0.4	0.6
return	16,000 €	11,000 €

Year 2: security portfolio (SP2.2)		
investment	11,000 €	
probability	0.4	0.6
return	13,000 €	11,000 €

Money that has not been invested in security portfolios can be put in a savings bank account at any time. The corresponding interest rate of the savings bank account is 5 % per year.

a) Represent the decision problem in a decision table!
b) Represent the decision problem in a decision tree!
c) Find the optimal strategy for Max by application of the roll-back method!
d) What returns are possible if the optimal strategy is used?