

# Exam for Economics of Insurance Markets , Part A. 10/12/2003

**You have to answer 2 out of 3 questions.** If you work on more than 2 questions only the worst 2 will be graded. You have 60 minutes for the exam. You find the points roughly achievable attached to every question. Altogether you can reach 60 points.

Note that you have to specify under “Fach” either “VWL” or “VWL der Versicherungen”.

You have to note on each sheet at least your **name** and your **Matrikelnummer**.

You are allowed to use a non-programmable calculator.

**Good luck!**

**1.**

An individual has an income  $y_0$  and faces the risk of a loss  $L < y_0$  with probability  $\pi$ . Her utility function is given by

$$u_2(y) = \ln y \quad (1)$$

$$u_1(y) = a + b \ln y \quad b > 0 \quad (2)$$

where state 1 is the no-loss state.

(a) Under what conditions and in what sense is the utility function state dependent? (6 points)

(b) Derive the demand for insurance cover on the assumption of a fair premium, show the effect of a change in income on the demand for cover, and explain, both analytically and diagrammatically, the effects of assuming respectively  $b < 1$ ,  $b = 1$ ,  $b > 1$ . (12 points)

(c) Assume now that the premium has a positive loading. Derive and discuss the effect of a change in the premium on the demand for cover. Explain how your answer depends on the value of  $b$ . (12 points)

**2.**

A risk averse individual has an income of 200 \$ , and faces the risk of a loss which is uniformly distributed on the interval  $[0, 100]$ . She is offered a choice between two contracts:

Contract A: a premium of 40 \$ and full cover above a deductible of 20 \$ ;

Contract B: a premium of 40 \$ and cover of 80% of loss.

(a) Are the premia in each of these contracts fair? (6 points)

(b) Which contract will she choose? (6 points)

(c) Explain your answer to (b) both numerically and in a diagram, applying the concept of second order stochastic dominance. (18 points)

**3.**

Two individuals face two equally probable states of the world. Their initial endowments are

	<i>State1</i>	<i>State2</i>
<i>Individual1</i>	100	60
<i>Individual2</i>	60	100

Their utility functions are  $u_i = 1 - e^{-r_i y_i}$ ,  $i = 1, 2$ , with  $r_1 = 1$ ,  $r_2 = 2$ .

(a) Find a Pareto efficient risk-sharing contract. (3 points)

(b) Illustrate your answer in a diagram (3 points)

(c) Interpret your answer in terms of insurance contracts. (3 points)

(d) Now suppose that individual 2's endowment in state 2 changes to 80.

Give the answers to (a)-(c) for this case. (12 points)

(e) Now suppose that individual 2's utility function is  $u_2 = y_2$ . Give the answers to (a)-(c) for this case (use either set of initial endowments). (9 points).