Ludwig-Maximilians-Universität München
Staatswirtschaftliches Institut
Seminar für Versicherungswissenschaft
Übung Versicherungsmärkte WS 2003/2004

Übungsblatt 7

- **7-1 choice of care**
  Assume that the loss probability varies continuously with care a: $\pi = \pi(a)$, $\pi'(a) < 0$, $\pi''(a) > 0$.

  a) Model the insured's choice of care for a given contract (P, C).

  b) How does optimal care vary with the y, L, P and C?

  c) What restrictions must be placed on preferences and the probability function for it to be true that increases in cover reduce care?

- **7-2 Moral Hazard in insurance markets**
  Consider an individual who owns a ware house that is subject to a fire danger. If it burns she suffers a damage that is uniformly distributed over the range from $\$10,000$ to $\$190,000$. The owners choice of care affects the probability of the loss while it does not affect its extent. If the owner takes care the probability equals π_c and if she is negligent it equals π_n where $\pi_n > \pi_c$ holds. If she takes care that imposes a cost of $E = \$10,000$ on her. If she is negligent E equals zero.

  The insurance contract has the following form. She pays a premium P up front and if she sustains a loss L the contract specifies an amount $C(L)$ that is returned to the owner. The owners utility is $u[y - L + C(L) - E - P]$ if there is a fire and $u[y - E - P]$ if there is none. The insurers are regulated by the state and have to offer contracts that will on average net zero profits.

  a) Assume the contracts offer complete coverage $C(L) = L$. What will be the results in terms of the insurance policy that is offered and the level of care the warehouse owner will take?

  b) Could it be that the warehouse owner was better off if the insurers would offer coinsurance $C(L) = \gamma \cdot L$ with $\gamma \in [0, 1]$ than if the insurers offer full coverage?

  c) Does the result from **b)** hold even for a contract with a deductible $C(L) = \max\{L - D, 0\}$?

  d) How would it change your results if we would assume that the owner can no longer affect the loss probability but the loss size?

- **7-3 Moral Hazard: Random Contracts**
  Consider a situation where the agent can choose the Probability of no loss π directly. As she faces costs of $C(\pi)$ with$C'(0) = 0$ and $C'(1) = \infty$, and her effort choice is not verifiable we have a MH Problem. (It is socially beneficial to implement $0 < \pi < 1$)

  a) What does the only contract that offers full insurance look like, if the insurance has to break even?

  b) Would a contract of the following form mitigate the problem, i.e. would effort $\pi > 0$ be implementable: If the agents incurs a loss the Insurance pays the cover $C = L$ only with probability p. With probability $1 - p$ she gets nothing. (i.e. the insuree buys a lottery where she wins / is insured only with probability p)

  c) Can this contract ever be second best efficient?