

# Exam

## *Insurance Economics*

**Please note:**

- **Answer all three questions.**
- You have **90 minutes** for a total of **90 points**.
- You may use a non-programmable calculator.
- **Best of success!**

### 1. [40 points] Insurance demand

We usually assume that individuals only suffer monetary losses, or at least that a monetary compensation for loss is possible. In real life, this often seems to be a rather heroic assumption. Being in hospital with a broken leg and having received a fair monetary compensation may not be as good as going skiing. Let us now consider state-dependent utility functions that capture the idea that individuals may value things differently when in different states of the world.

- [15 points] Consider an individual with initial endowment  $W$ , probability  $\pi$  for loss  $L$  in state 2 and utility functions  $u_1(y)$  and  $u_2(y)$  for states 1 and 2 respectively. The individual can buy fair insurance for a premium rate  $p = \pi$ , and for any income level she derives a higher marginal utility from this income in state 1 than in state 2, i.e.,  $u'_1(y) > u'_2(y)$ . Calculate the slope of the individual's indifference curve where it crosses the security line. Compare this slope to the slope of the insurance line. What does this mean for the optimal demand for insurance? Draw your result into a two-states-of-the-world diagram.
- [10 points] Now, consider a different individual whose utility functions are state dependent with  $u_2(y) = \alpha + \beta u_1(y)$ , with  $\alpha < 0$  and  $\beta > 0$ . Once again, the initial endowment is  $W$  and there is a probability of  $\pi$  for loss  $L$  in state 2. Insurance cover is available at rate  $p$ . Set up the individual's maximization problem, derive the first-order condition of and identify the expected marginal benefits and costs of buying insurance cover  $C$ .
- [15 points] What happens to the demand for insurance in scenario (b) if  $\alpha$  increases. And what happens to the demand for insurance in scenario (b) if  $\beta$  increases? Use the Implicit Function Theorem to answer both questions. You only need to derive effect directions (positive, negative, or no change).

**2. [20 points] Insurance supply**

Standard economic theory suggests that firms are risk neutral agents.

- (a) [10 points] In real life, however, firms typically buy insurance cover. What are possible explanations for this?
- (b) [10 points] Especially noteworthy is the existence of reinsurance companies, which insure insurance firms. What are plausible explanations for their existence?

**3. [30 points] Behavioural insurance**

- (a) [7 points] Nudges are an increasingly popular tool to improve public policy. Explain what nudges are and how they differ from standard policy instruments such as regulation (bans and mandates), economic incentives, and information provision.
- (b) [7 points] Two particular types of nudges are so-called “dark nudges” and “sludges”. Explain what these are and how they differ from general nudges.
- (c) [7 points] Give one example each for a nudge, a dark nudge and a sludge in insurance markets.
- (d) [9 points] What are the two basic components of Thaler and Benartzi’s so-called *Save More Tomorrow* scheme? Explain why these components can be viewed as nudges and which behavioural biases they aim to exploit.