

Exam

Insurance Economics

Please note:

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

1. [45 marks] Insurance demand

In capital market theory, a quadratic utility function is a popular choice to describe risk preferences. Consider the following quadratic utility function:

$$u(y) = y - \delta y^2,$$

where y denotes income. Assume that $\delta > 0$ and $y < \frac{1}{2\delta}$.

- (a) [5 marks] Is the individual represented by this utility function risk-averse, risk-neutral, or risk-loving? Justify your answer based on the curvature of the utility function.
- (b) [8 marks] Confirm your answer in (a) by calculating the Arrow–Pratt coefficient of absolute risk aversion for this individual. How does their risk aversion change as income increases? Briefly comment on whether this is a realistic assumption about human behavior.

Assume for the remainder of the question that the above utility function has an IARA property. Further assume that the individual faces a probability π of incurring a monetary loss of size $L > 0$. They can purchase insurance coverage q at a premium rate p per unit of coverage. The individual's demand for insurance, q^* , is:

$$q^* = ay + bL + c$$

where a , b , and c are given by:

$$a = \frac{p - \pi}{p^2(1 - \pi) + \pi(1 - p)^2}, \quad b = \frac{\pi(1 - p)}{p^2(1 - \pi) + \pi(1 - p)^2}, \quad c = \frac{p - \pi}{2\delta [p^2(1 - \pi) + \pi(1 - p)^2]}$$

- (c) [8 marks] What is the demand for insurance, q^* , if $p = \pi$? Show your calculation to get full marks. Provide an intuitive explanation for this result.
- (d) [6 marks] How does insurance demand respond to an increase in income y if $p = \pi$? Show your calculation to get full marks. Provide an intuitive explanation for this result.
- (e) [8 marks] How does insurance demand respond to an increase in income y if $p > \pi$? Show your calculation to get full marks. Provide an intuitive explanation for this result.
- (f) [10 marks] How does insurance demand respond to an increase in income y if $p < \pi$? Show your calculation to get full marks. Provide an intuitive explanation for this result.

2. [25 marks] Insurance supply

The Raviv model assumes that risk-neutral insurers compete in a perfectly competitive market for risk-averse insurance customers. The key idea is that the type of cost structure insurers face plays a central role in determining what insurance contracts look like in equilibrium.

- (a) [4 marks] Given the model assumptions of perfect competition and risk-averse customers, what is the first-best contract in the absence of any insurance cost?
- (b) [7 marks] Suppose the insurer incurs only a fixed cost for offering any insurance contract, regardless of claim size or number. What is the optimal contract structure in this case? Explain the intuition of this result.
- (c) [7 marks] Now assume the insurer's cost increases linearly with the amount covered, meaning each additional euro of coverage carries a constant marginal cost. What is the optimal contract structure in this case? Explain the intuition of this result.
- (d) [7 marks] Finally, suppose the insurer's cost is convex in the amount covered, so marginal costs increase with the level of reimbursement. What is the optimal contract structure in this case? Explain the intuition of this result.

3. [20 marks] Behavioural insurance

Imagine a consumer is in the process of purchasing a smartphone and is offered optional smartphone insurance at checkout for a price significantly higher than the same policy listed on the insurer's own website.

- (a) [8 marks] Identify and explain two behavioral biases that might lead the consumer to accept the over-priced offer at checkout.
- (b) [12 marks] Discuss the pros and cons of regulating this type of pricing practice from a behavioral industrial organization perspective. In your answer, outline three regulatory policies that regulators could use to address consumer biases in this context. Rank these policies in terms of how liberty-preserving they are, and briefly justify your ranking.