

**Hand in written solutions *before* the tutorial on July 2nd.
You may work in groups of at most two students.**

Exercises:

1. Consider the Akerlof framework from the lecture. The quality of a car θ is distributed according to some distribution F on $[\underline{\theta}, \bar{\theta}]$. Recall the definition of a competitive equilibrium:

Definition 1. A competitive equilibrium in the Akerlof model is a price p^* and a set Θ^* of seller types who trade such that

$$\Theta^* = \{\theta | R(\theta) \leq p^*\} \quad \text{and} \\ p^* = \mathbb{E}[\theta | \theta \in \Theta^*].$$

In each of the following scenarios determine the competitive equilibrium.

- (a) F is the uniform distribution on $[0, 1]$ and $R(\theta) = \alpha\theta$ for $\alpha \in (0, 1)$.
 - (b) F is the uniform distribution on $[1, 2]$ and $R(\theta) = \alpha\theta$ for $\alpha \in (0, 1)$.
 - (c) F is the uniform distribution on $[1, 2]$ and $R(\theta) = \theta - \alpha$ for $\alpha \in (0, 1)$.
2. Consider a market, in which a share $0 < \lambda < 1$ of m sellers own a good with quality q_l . The remaining $(1 - \lambda)m$ sellers own a good with quality $q_h > q_l$. A seller offers his good for sale whenever the market price p exceeds αq , where $\alpha \in (0, 1)$. The seller of quality q_h promises to pay a buyer the amount $q_h - q_l$ whenever the quality does not match q_h . Sellers of quality q_l offer their good at a price p_l without a warranty.
 - (a) Compute the equilibrium prices p_h^* and p_l^* under asymmetric information when there are $n > m$ potential buyers.
 - (b) Demonstrate, that in equilibrium a seller with low quality does not gain from mimicking the behavior of a seller with high quality.
 3. On a market for used cars quality for a used car can be described by a number q , which is distributed uniformly over the interval $[0, 1]$. There are n buyers for used cars who are willing to pay αq , $\alpha > 1$, for a car of quality q , and there are $m < n$ sellers who are each willing to sell a car of quality q for a price of at least q . Suppose that each seller knows the quality of the car, but buyers cannot observe the quality.
 - (a) Determine the competitive equilibrium price for $\alpha = 1.5$ and $\alpha = 3$ in this market. Which cars are traded in these cases?

- (b) Assume now, that cars with a quality $q \geq 1/4$ have a “TÜV-Plakette”, a badge confirming that the car is at least roadworthy. What is the equilibrium price under $\alpha = 1.5$ respectively $\alpha = 3$ of cars with/without a badge? Which qualities are traded?