Problem Set 1

Law and Economics - Fall 2021

Problem 1: Escaping Liability

Consider the Unilateral Care Model from class. In that model the injurer chooses how much to invest in precautions. Imagine that the injurer can also invest in a technology to escape liability. Formally, let z be the amount invested in the escaping technology. In case that there is an accident, the injurer gets away with probability $q(z)$ where $q(\cdot)$ is increasing in z. If the injurer gets away he doesn't pay any damages.

1. Assume that z is chosen ex-ante (at the same time as the level of care x) and that z is observable by the authorities ex-post.
    (a) Write down the problem of the injurer for a generic liability function, using functions p and q.
    (b) Is there a liability rule for which efficiency is achieved? If so, explain carefully under what conditions. If not, prove the impossibility carefully.
2. Assume that z is chosen ex-ante and that z is not observable ex-post.
    (a) Write down the problem of the injurer for a generic liability function, using functions p and q.
    (b) Is there a liability rule for which efficiency is achieved? If so, explain carefully under what conditions. If not, prove the impossibility carefully.
3. Assume that z is chosen ex-post (after the accident happened) and not observable by the authorities.
    (a) Write down the problem of the injurer for a generic liability function, using functions p and q.
    (b) Is there a liability rule for which efficiency is achieved? If so, explain carefully under what conditions. If not, prove the impossibility carefully.

Problem 2: Limited Liability

Consider the Unilateral Care Model, where $x \in [0, 1]$, $p(x) = \frac{1}{2x}$, and the distribution of damage conditional on accident is uniform on $[0, 1]$. The injurer has an upper bound on liability $\bar{\psi}$.

1. **Strict Liability**. Suppose that the designer chooses strict liability rule.
   (a) Write down the total cost of the injurer (as a function of x, a, D, and $\bar{\psi}$).
   (b) What is the expected amount that the injurer pays when $\bar{\psi}$ is not binding, i.e. when $\bar{\psi} > 1$?
   (c) How much care would the injurer choose if $\bar{\psi}$ was not binding?
   (d) What is the expected liability that the injurer has to pay when $\bar{\psi} = 1/2$?
   (e) How much care would the injurer choose for $\bar{\psi} = 1/2$.

2. **Reverse liability.** Suppose that, instead of the injurer compensating the victim, the victim had to pay an amount s to the injurer if there is no accident.
   (a) Write down the problem of the injurer in this case.
   (b) What is the transfer s^* that achieves the socially optimum level of care? Does it depend on the bound $\bar{\psi}$?

3. **Negligence**. Suppose that the designer chooses a negligence rule in which the injurer is fully liable[1] if the level of care is below a threshold $\bar{x}$ and not liable otherwise.
   (a) How much would the injurer pay as a function of $x, \bar{x}, D$, and $\bar{\psi}$.
   (b) Consider the case of $\bar{\psi} = \frac{1}{2}$. Can efficiency be implemented with a negligence rule? If so, for what $\bar{x}$? Prove your answer carefully.

[1] Notice that this is different that the way we presented negligence rules in class, in which the injurer was liable for the expected damages given the level of care taken.