Law And Economics

Products Liability and Information Acquisition

Francisco Poggi
University of Mannheim - Fall 2021

Introduction

- In the model of accidents, victim and injurer were strangers.
- Things change when victim and injurer are commercially or otherwise related:
  - Producer and consumer (products liability)
  - Firm and worker (work related injuries)
  - Service provider and customer (e.g. medical malpractice)
- Two opposite views:
  - liability should protect defensless consumers/patients/workers from reckless manufacturers/employers/doctors.
  - Producer liability threatens viability of business and innovation.

Products Liability

Products Liability

- Increasing in importance over the last 50 years.
- Usually, a defendant-manufacturer is held liable if a defective product produces a damage. A defect can mean:
    - Defect in design.
    - Defect in manufacture.
    - Defect in warning.
- We will abstract from this considerations.

Model

- Competitive market (marginal cost c, no fixed costs)
- $b(q)$: inverse demand for safe product.
- p: (exogenous) probability of accident.
- D: damage involved in the accident.

Socially optimal allocation

- Total surplus:

$$TS = \int_0^q b(\tilde{q})\ d\tilde{q} - c \cdot q - qpD$$

- Solution: $\underbrace{b(q^*)}_{\text{wtp}} = \underbrace{c + pD}_{\text{total marginal cost}}.$

Equilibrium

- Equilibrium depends on liability rule: who bears the damages.
- α: proportion of damages that seller bears.

- Competitive Equilibrium:
  - price equals marginal cost.
  - willigness to pay equals price.

$$b(q) - (1 - \alpha)pD = P = c + \alpha pD$$

Independence result

Independence

The equilibrium output in the model is independent of the liability rule. Moreover, it is efficient.

- Equilibrium price P does depend on α.

Market Power

- Independence is robust to other competition environments.
  - Instead of a competitive market, consider a single monopolist.
  - Inverse demand for safe product: $1 - a \cdot q$
  - Demand given α: $1 - a \cdot q - (1 - \alpha)p \cdot D$.
  - Profit maximized when marginal income equals marginal cost.

Breaking the Independence Result

- What can then break the independence result?
- Some ideas:
  - Unobservable care.
  - Fixed price.
  - Strategic delegation.
  - Risk missperception.

Endogenous probability of accident

- x safetiness of the product (choice variable).
- $p(x)$: probability of damage.
- $c(x)$: marginal cost.

Two cases:

- Ex-ante observable care.
- Ex-ante unobservable care.

Efficient Allocation

$$\max_{x,q} \quad \int_0^q b(\tilde{q})\ d\tilde{q} - qc(x) - qp(x)D$$

- $b(q^*) = c(x^*) + p(x^*)D$
- $x^* = \arg\min_x \quad c(x) + p(x)D$

Ex-ante observable care

- Profit zero condition:
$$P(x) = c(x) + \alpha \cdot p(x) \cdot D$$
- Individual choosing safetiness:
$$\max_x \quad B - (1-\alpha)p(x)D - P(x)$$
- These two imply that individual will choose x^*.
- Total quantity demanded: until WTP equals price.

Ex-ante unobservable care

- **No liability**:
  - for any price P firms choose minimum safetiness.
  - Equilibrium $x = 0$. Quantity and price determined as in the case of exogenous probability, with $p = p(0)$.

- **Strict liability**:
  - For any price P and quantity q, firm problem:

$$\max_x q[P - c(x) - p(x)D]$$

  - Solution at x^*.

Product liability and Innovation

TBA

Strategic Delegation

Sometimes, firms don't maximize profits.

- One reason is that, for strategic considerations, having a CEO that has a different objective function turns out to be more profitable.
- Strategic Delegation.
- e.g. CEOs maximize total income.
- In that case, the independence breaks.
    - *'Product Liability and Strategic Delegation: Endogenous Manager Incentives Promote Strict Liability'* by Tim Friehe, Cat Lam Pham and Thomas Miceli.

Risk Missperception

- Behavioral observation: individuals tend to overestimate the probability of low probability events.
- Model:
  - p true probability of faulty product.
  - $p^* = \gamma p$ perceived probability of faulty product.

Information acquisition and product liability

Learning about Product's risk

- Firms can invest in learning about the safetiness of their products before launching them to the market.

- Shavell, S. (1992). Liability and the Incentive to Obtain Information about Risk. ***The Journal of Legal Studies*, 21(2):259–270**.

Model

- c: cost of acquiring information aobut whether there is a risk or not.
- s: binary variable that takes value 1 if information is acquired.
- p: ex-ante probability of risk, exogenous and unknown.
- x: investment in care.
- $D(x)$: expected damage size. (Decreasing and convex in x)

Social Optimum

- **Case 1**: Information is not acquired.

$$\min_x x + p \cdot D(x)$$

$$D'(x_0^*) = \frac{-1}{p}$$

- **Case 2**: Information was acquired and there is a risk.

$$\min_x x + \cdot D(x)$$

$$D'(x^*) = -1$$

- **Case 3**: Information was acquired and there is no risk. Optimal care is zero.

Social Optimum

- What is the social value of information?

$$v = x_0^* + pD(x_0^*) - p(x^* + D(x^*))$$

$$v = p \cdot \underbrace{\left[(x_0^* + D(x_0^*)) - (x^* + D(x^*)\right]}_{\text{advantage when risky}} \quad + \quad (1-p) \cdot \quad \underbrace{x_0^*}_{\text{advantage when safe.}}$$

Social Optimum

- It is socially optimal to acquire the information when $v > c$.

Behavior under different Liability Rules

- No liability: Agent will not take care and will acquire no information.
- Strict liability: Agent will take optimal care and optimal information acquisition.
- Negligence Rules:
  - **N0** (Complete Negligence): Party liable if failed to exercise optimal care or obtain information when she should have done so. (Knew or should have known.)
  - **N1**: Negligence based on the optimal level of care *given optimal information acquisition.*
  - **N2**: Negligence based on the level of care that was optimal *given the information that the party actually possesses.*
  - **N3**: Negligence based on the level of care that was optimal *assuming that a party has obtained information.*

Behavior under N0 (Complete Negligence)

Claim

Under N0 (Complete Negligence), the firm acquires information efficiently and takes the efficient level of care.

- If it is efficient not to acquire information, the firm is in a similar situation as in the model of unilateral care, where negligence was efficient.
- If information was acquired (sunk cost), the firm will choose the efficient level of care.

$$x^* < x^* + D(x^*) < x + D(x)$$

- If it is efficient to acquire information, the individual will do so:

$$px^* + c < p[x^* + D(x^*)] + c < x_0^* + pD(x_0^*)$$

- Requires to know if the firm acquired information or not.

Behavior under N1

- Suppose it was efficient to acquire information ($v > c$).
  - What is the value of information for the firm?

$$\tilde{v} = \max\{x^* - px^*, x_0^* + pD(x_0^*) - px^*\}$$

  - Definitely, $\tilde{v} > x^*(1-p)$.
  - One can show that $\tilde{v} > x^*(1-p) > v$.
- Firm does not acquire information to avoid liablity (as in the case of Complete Negligence).
- Instead, firm acquires information because if not, it doesn't know whether she has to take care or not to avoid liability.

Behaviour under N2 and N3

Claim

Under N2, firm might fail to acquire information when it was optimal to acquire (never the contrary). Level of care will be optimal given information acquisition.

Claim

Under N3, firm might acquire information when it was optimal to not do so ($v < c$). If firm obtains information, takes optimal level of care given information. But when firm does not obtain information it might choose excesive care level.

References

Shavell, S. (1992). Liability and the Incentive to Obtain Information about Risk. *The Journal of Legal Studies*, 21(2):259–270.