Lecture 4. Introduction to the economics of tort law
Lecture outline

• What are torts?
• The elements of an actionable tort
• Different liability rules
• Properties of different liability rules
• Errors
• Risk aversion and insurance
• Administrative costs
• Competition
• Valuing irreplaceable assets
• Punitive damages
What are torts?

• Tort is a “a private or civil wrong or injury resulting from a breach of a legal duty that exists by virtue of society's expectations regarding interpersonal conduct, rather than by contract”

• Loosely speaking, torts cover interactions when negotiations between parties involved are infeasible; mostly, torts are about liability for accidents

• Torts impose externalities. A goal of tort liability is to provide appropriate incentives for both the injurers and victims to take care of (internalize) these externalities, i.e., to take precautions against accidents
How is tort law different from contract law or property law?

- Contract law involves interaction between parties who enter into (negotiate) a contract; no contract typically exists between parties involved in an accident (although there are situations where such contracts do exist, e.g., workplace accidents, but these are not contracts about the accident itself).

- Property law typically deals with situations where negotiations are at least in principle feasible; also, accidents often involve damages to things that are not “property” (e.g., bodily injury).
Elements of a tort

• The essential elements of an actionable tort are
  – breach of a legal duty, owed by the defendant to the plaintiff (may or may not be necessary, depending on the liability rule);
  – the resulting damage (harm) to the plaintiff;
  – a causal relationship between the defendant's conduct and the resulting damage
Harm or damage

• In order to be able to sue under tort law the plaintiff must have suffered actual harm; potential harm is not usually actionable

• Compensation for damages might take both in-kind form (e.g., provision of health care or repair of property) and/or monetary compensation

• Some losses might not be replaceable; we will talk about compensating for such losses later
Cause

• Tort liability does not arise unless there is proof of causation
• Difficulties in demonstrating causality in individual cases under some circumstances; class-action suit approach
• Lawyers often use “cause-in-fact” concept (“but-for” test)
• Proximity of causality
Horseshoe nail

For want of a nail the shoe was lost.
For want of a shoe the horse was lost.
For want of a horse the rider was lost.
For want of a rider the battle was lost.
For want of a battle the kingdom was lost.
And all for the want of a horseshoe nail.
Breach of duty

- Depending on the liability rule, harm and cause may be enough for an actionable tort case
- Strict liability (e.g., ultra hazardous activities)
- Negligence
- Reasonable care standard (care that a reasonable person would have taken under the circumstances)
Driver-pedestrian example (Polinsky)

A driver can drive rapidly, moderately, or slowly. The probability of injuring a pedestrian depends on driver’s speed. We assume that the amount of damage caused by the injury is constant.

Assume first that the probability of an accident is independent of the pedestrian’s behavior and assume that both driver and pedestrian are risk-neutral (see “Driver-pedestrian example”:

http://mypage.iu.edu/~malexeev/e351_class_handouts.html)
### Driver-pedestrian accident (pedestrian’s behavior does not affect accident probability)

<table>
<thead>
<tr>
<th>Behavior of Driver</th>
<th>Probability of accident $p$</th>
<th>Expected Benefit to Driver BD</th>
<th>Cost of accident to Pedestrian</th>
<th>Expected cost of accident to Pedestrian</th>
<th>Net expected social benefit</th>
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<tbody>
<tr>
<td>Drive rapidly</td>
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<tr>
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<th>Cost of accident to Pedestrian $A$</th>
<th>Expected cost of accident to Pedestrian</th>
<th>Net expected social benefit ($B=BD-p*A$)</th>
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Incentives under different liability rules

- No liability
- Pure strict liability
- Negligence
Driver-pedestrian accident (pedestrian’s behavior affects accident probability)

- Suppose now that the pedestrian can either walk or run
- When pedestrian runs, his benefit (assuming no accident) increases from 0 to 5, but the probability of an accident increases by 0.001 no matter how fast the driver drives
- (See Driver-pedestrian example in the handout)
Incentives under different liability rules

- No liability
- Strict liability
- Negligence
- Strict liability with the defense of contributory negligence
- Negligence with the defense of contributory negligence
- Comparative negligence
Comparative negligence

• Let $X_i^*$ be the standard of care for the injurer and $X_v^*$ -- the standard of care for the victim

• Let $X_i$ and $X_v$ be actual precaution levels by the injurer and victim, respectively

• Then liability of the injurer would be:

$$\frac{X_i^* - X_i}{(X_i^* - X_i) + (X_v^* - X_v)}$$

(similarly, for the victim, *mutatis mutandis*)
General rule

• When the victim’s behavior matters for the expected accident cost, strict liability does not result in efficient precaution but given perfect compensation and efficient standards of care, every form of the negligence rule (including strict liability with the defense of contributory negligence) provides incentives for efficient precautions to both victim and injurer
Activity level

• In practice it is usually difficult to ascertain the activity level

• The above “general rule” fails if the expected accident cost is affected by the activity level

(go back to the handout)
Really general rule

• If activity level is important, then no liability rule generates socially efficient incentives (assuming that the liability rule is not based on the activity level)
Generalization to continuous variables

Social cost = $SC = wx + p(x)A$

Min$_x\{wx + p(x)A\}$, where $w$ is (constant) cost per unit of precaution

First-order condition (FOC):

$w + p'(x)A = 0$ or $w = -p'A$

(i.e., marginal cost of precaution=marginal benefit of precaution); note that $p'(x) < 0$

Example: if $p(x) = \frac{1}{x+1}$, $x = \sqrt{A/w} - 1$
Socially Optimal Precaution (and precaution under strict liability)

Cost of precaution, Expected accident cost

\[ wx + p(x)A \]

\[ wx \]

\[ p(x)A \]

\[ x^* \]
Precaution under negligence

Cost of precaution, Expected accident cost

\[ \text{Expected liability (cost) of injurer} = wx + p(x)A \]

\[ x < x^* \]

\[ x > x^* \]

Amount of precaution
Bilateral precaution

\[ SC = w_v x_v + w_i x_i + p(x_v, x_i)A, \]
where \( w_v, w_i \) are costs per unit of precaution for victim and injurer; \( x_v \geq 0, \ x_i \geq 0; \)

FOCs for minimizing SC w.r.t. \( x_v, x_i \), respectively:

\[ w_v + \frac{\partial p}{\partial x_v} A = 0 \quad \text{and} \quad w_i + \frac{\partial p}{\partial x_i} A = 0 \]

Example: \( p(x_v, x_i) = \frac{1}{2} \left( \frac{1}{1+x_v} + \frac{1}{1+2x_i} \right) \rightarrow \)

\[ x_i = \frac{1}{2} \left( \sqrt{\frac{A}{w_i}} - 1 \right) ; \quad x_v = \left( \sqrt{\frac{A}{2w_v}} - 1 \right) ; \]

What if these solutions yield negative \( x \)'s?

What if \( p(x_v, x_i) = \frac{1}{2x_i+x_v+1} \)?
Bilateral precaution (cont.)

What happens under strict liability?

\[ \text{Cost}_i = w_i x_i + p(x_v, x_i)A ; \]

FOCs for minimizing \( \text{Cost}_i \) w.r.t. \( x_i \) is: \( w_i + \frac{\partial p}{\partial x_i} A = 0 \)

What happens to victim’s effort?

Example:

\[ p(x_v, x_i) = \frac{1}{2} \left( \frac{1}{1+x_v} + \frac{1}{1+2x_i} \right) \Rightarrow x_i = \frac{1}{2} \left( \sqrt{\frac{A}{w_i}} - 1 \right) ; \ x_v = 0; \text{ Let} \]

\( A=9,000; w_i = 10 \rightarrow x_i = 14.5 \rightarrow SC = 4795. \)

What if \( x_v \) were at socially optimal level? It turns out that SC would have been slightly more than 709.

What about negligence rule with standard of care \( x_i^* = 14.5? \)
Precaution with activity level

• Assume again that the potential victim doesn’t affect expected accident costs, and let the activity level increase the cost of precaution and expected accident costs linearly

• Let the potential injurer have activity level $h$ and let the payoff to potential injurer in the absence of an accident be $f(h)$. Then net social benefit is $SB = f(h) - h(wx + p(x)A)$

  FOCs for maximizing SB: $f' - wx - pA = 0; w + p'A = 0$

• Example: $f(h) = \sqrt{h}; p = 1/(x + 1) \Rightarrow$ socially efficient $x = \sqrt{A/w} - 1; \quad h = (4\sqrt{Aw} - 2w)^{-2}$.

What would be individually rational $x$ and $h$ under
(1) strict liability and
(2) negligence with standard of care $x^* = \sqrt{A/w} - 1 > 0$?
Court errors in estimating damages

• No liability (no effect)
• Strict liability (effect of overestimation? Effect of underestimation?)
• Negligence (effect of overestimation? Effect of underestimation?)
• The same conclusions hold if instead of court decisions we would consider errors of the injured about the likely amount of liability
• Uncertain errors in estimating damages (risk neutral parties) – only average error matters
Errors in who caused the accident

• Would this matter under strict liability?
• What if injurers are not held liable?
• What if innocent people are held liable?
Errors in the standard of care

• Deterministic errors in setting the standard of care (unless errors are large, precaution moves with the standard of care)

• Uncertain errors in setting the standard of care – may matter even if parties are risk neutral (for the example, go to handout: http://mypage.iu.edu/~malexeev/e351_hand_uncertain_std&market_forces.pdf)
Risk allocation

• No liability; who bears the risk?
• Strict liability; who bears the risk?
• Negligence; who bears the risk?
Attitudes toward risk

- Lottery: $x_1$ occurs with probability $p$; $x_2$ occurs with probability $(1-p)$
- Expected value of a lottery: $x_1p + x_2(1 - p) = \mu$
- One measure of risk of a lottery:
  $$(x_1 - \mu)^2p + (x_2 - \mu)^2(1 - p) = \sigma^2$$
- Risk neutrality; risk aversion; risk loving
- Most people are risk-averse. That is, most people do not like risk and having a choice between two lotteries with the same expected value, they would choose the one with least risk
Expected utility hypothesis

• Why are people risk averse?
• Presumably because of declining marginal utility of money (more on this later)

**Expected utility hypothesis**: given a lottery with outcomes $x_1$ and $x_2$ with probabilities $p$ and $(1-p)$, the person’s expected utility of this lottery is given by

$$E[U(x_1, x_2)] = (1 - p)U(x_1) + pU(x_2)$$
Example for expected utility

• Consider person A whose utility of money is $U = \sqrt{W}$. Suppose A’s initial wealth is $10,000 and A faces a possibility of a loss of $3,600 with probability $p = 0.1$. Would A want to buy insurance against this loss and how much would he be willing to pay for it?
Example (cont.)

• Assume that A uses **expected utility** to make his decisions. Then, without insurance his utility is:

\[ E(U_0) = (1 - p)U(10000) + pU(6400) = 0.9 \times 100 + 0.1 \times 80 = 98 \]

• He would be willing to pay up to \( X \) such that

\[ U(10000 - X) = E(U_0) \Rightarrow \sqrt{10000 - X} = 98; \text{ that is, } X = 396 \]

• How much would a risk-neutral party need to be paid to insure A against this loss?

• Insurance premium=0.1 \times 3600 = 360 < 396
Intuition for insurance

• The reason people are willing to pay more than expected loss to insure themselves against a loss is that under decreasing marginal utility of money, a person pays for insurance in the state of the world when he is relatively rich (i.e., with “cheap” dollars) but he gets reimbursed for a loss in the state of the world when he is relatively poor and is being paid with relatively more valuable (to him) dollars.
Why would anybody sell insurance?

• If there is a risk-neutral party, they can benefit themselves (and society) by selling insurance

• But if most people are risk averse, who would sell insurance?

• Why are insurance companies or insurance cooperatives (almost) risk-neutral?
Moral hazard and adverse selection

- When insurance is provided, the insured person might not undertake appropriate actions to reduce risk (moral hazard)
- When insurance company offers insurance, it is likely to attract people who expect particularly large losses, because insurance is most beneficial for these people (adverse selection)
Back to liability rules: the effect of risk attitudes

• How do different attitudes towards risk affect the relative efficiency of pure strict liability and negligence rules?

• (1) Injurer is risk-neutral; victim is risk averse

• (2) Injurer is risk-averse; victim is risk neutral
Ideal insurance

• Ideal insurance is available when insurance company can observe behavior of the insured
• How much would ‘break-even’ ideal insurance cost and who would buy it?
  – injurer is risk-neutral, victim is risk averse;
    • No liability
    • Strict liability
    • Negligence
  – injurer is risk-averse, victim is risk neutral;
• Does ideal insurance change the relative efficiency of strict liability and negligence?
Imperfect insurance (both parties are risk averse)

- Real world insurance (there are moral hazard and adverse selection) – tradeoff between risk allocation and incentives
- No liability
  (in our example, driver drives rapidly, pedestrian buys insurance for 100)
- Strict liability
  (either driver buys insurance for 100 and drives rapidly or doesn’t buy insurance and bears risk)
- Negligence
  (driver meets standard of care, pedestrian buys insurance); subrogation clause
- Negligence is likely to work better than strict liability
Conclusion about risk & insurance

Risk allocation considerations could provide reasons for choosing one liability rule over another. If the behavior of the victim does not influence the expected cost of an accident, then risk allocation argues for strict liability if the injurer is risk neutral and victim is risk averse.

If the victim is risk neutral but the injurer is risk averse, risk allocation argues for a negligence rule. Also, if ideal insurance is available, then both strict liability and negligence are efficient.
Administrative costs

• No liability
• Strict liability
• Negligence
• Wholesale rules vs. case-by-case adjudication
• Costs borne by the parties (e.g., litigation costs)
  – Victims
  – Injurers
Market forces and liability rules

• Go to the handout:

http://mypage.iu.edu/~malexeev/e351_hand_uncertain_std&market_forces.pdf

• What is the socially efficient outcome?
Market forces and liability rules (cont.)

• (1) Consumers are perfectly informed about expected accident costs: both “no liability” and strict liability rules would result in socially efficient outcome

• (2) Consumers are not informed
  – Outcome of “no liability” rule depends on consumer errors in estimating accident costs
  – Strict liability always results in socially efficient outcome (manufacturers are assumed to be informed)
Market forces and liability rules (cont.)

• The above is true only if consumer behavior does not affect accident costs and if we disregard the administrative costs of calculating damages
Calculating damages for irrereplaceable assets (life, limb, etc.)

- Does life have infinite value?
- Three main methods for determining the “value of statistical life” (VSL):
  - Discounted future earnings (DFE)
  - Inferring VSL from surveys
  - Inferring VSL from labor markets and other market data
Discounted future earnings

• Basic approach: calculate discounted future income of a person perhaps adjusting for own consumption
• Motivation: the person’s income is his/her value to society
• Pros: simple
• Cons: what about people with little or no income? Pain and suffering? Value of companionship? Anything else?
Survey-based VSL

• Suppose a person says that he is willing to spend up to $2,000 in order to reduce his probability of death by 0.001

• Then, the person trades off (on the margin) $\Delta pV$ and $\Delta W$, implying that $V = \Delta W / \Delta p = $2 mln. (V is value of life, W is wealth, p is probability of death, $\Delta$ denotes change of the variable)

• In general, V depends on W and p, among other things
Survey-based VSL (cont.)

• Pros
  – Can get rather precise numbers
  – Can choose a representative sample and control for various factors

• Cons
  – Never know whether the respondents answer truthfully or whether they understand questions correctly
Market-based VSL

• Pros
  – Method is based on real actions, implying that decisions are taken seriously

• Cons
  – Self-selection of people who value their lives less into riskier activities might lead to underestimation of the average VSL
  – Data may be “contaminated” with multiple possible outcomes (e.g., both fatal and non-fatal accidents are possible), making VSL calculations more difficult
Compensating the victim

• Correctly calculated VSL might provide appropriate incentives for the potential injurers, but it does little to compensate the victim

• How can the victim be compensated adequately?

• To compensate potential victims, they should be paid while they are alive for the accidents that could occur

• It can be done by selling the right to collect damages due to fatal accidents to insurance companies (inchoate claims)
Punitive damages

- Punitive damages are generally awarded for “reckless” or “intentional” torts
- Why have punitive damages? In the standard examples we studied, possibility of punitive damages results in too much precaution by the potential injurers
Punitive damages (cont.)

• Reason 1: not all legitimate victims get compensated
• Reason 2: no efficient reckless or intentional torts (or are there? – sparks from a train)
Safety regulations

• If tort law works so well, why do we need to have safety regulations?

• Reasons:
  – Mistakes by potential injurers (more likely for those new to the activity)
  – Limited ability to pay by some injurers
  – Not all victims might sue due to litigation costs
  – If litigation costs (or costs of subversion of the law) are proportional to the liability, it may be more efficient to impose small ex ante fines for safety violations than litigate over accidents or risk attempts at subverting the law ex post
Why does negligence occur?

• If standards of care are reasonable, every rational person would meet them; why then does negligence occur so often?

• Reasons:
  – Irrationality, mistakes
  – Limited liability of the injurers
  – Stochastic element in outcomes
  – Uniformity of standards of care (some people might find it too costly to meet them relative to expected liability)