

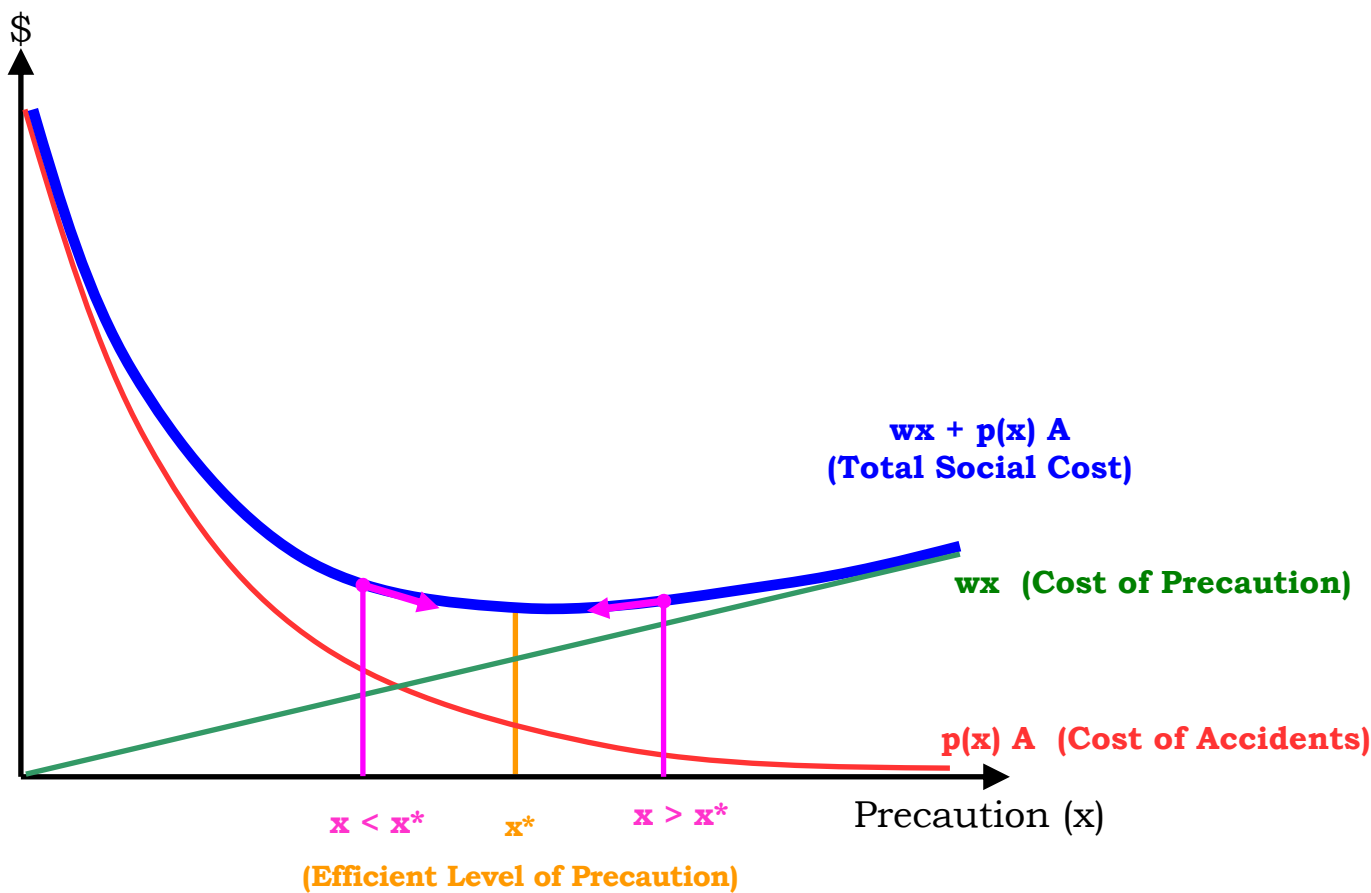
EE403

Law & Economics

Tort III



Model of unilateral care : Efficient precaution



Efficient precaution

$$\min_x [wx + p(x) A]$$

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

$$w = - p'(x) A$$

Marginal social cost
of precaution

Marginal social
benefit of precaution

x	level of precaution
w	marginal cost of precaution
p(x)	probability of an accident
A	cost of an accident

What about activity level?

- ♦ With no liability, injurer don't consider cost of accidents when deciding **how fast** to drive...
 - ♦ also don't consider cost of accidents when deciding **how much** to drive
 - ♦ So injurer drive too recklessly, **and drive too much**

With no liability, injurer's activity level is inefficiently high

- ♦ Under strict liability, injurer internalizes cost of accidents
 - ♦ Weighs benefit from driving against cost of accidents
 - ♦ Takes **efficient activity level**

Strict liability leads to the efficient level of injurer's activity

- ♦ Under negligence: injurer is only liable if he was negligent
 - Leads injurer to take efficient precaution, so injurer expects to not be liable for any accidents that do occur.
 - ♦ So injurer ignores cost of accidents when deciding on activity level (how much to drive) Injurer drives carefully, but still drives too much

Negligence leads to the inefficient level of injurer's activity

Bilateral precaution model

- ◆ When we analyze how injurer / victim makes decision of choosing x^i and x^v . We're thinking of it just “one at a time”
- ◆ “Hold fixed” one party's action and consider the other
- ◆ For example : From injurer's perspective

Holding x^v fixed (given victim's level of care), injurer

$$\min_{x^i} \{ p(x^i, x^v) A + w^i x^i + w^v x^v \}$$

This has same solution as

$$\min_{x^i} \{ p(x^i, x^v) A + w^i x^i \}$$

- ◆ Our result will generally be “efficient given what the other guy is doing”
- ◆ The same logic applies for victim's perspective.

Bilateral model: (assume that $w^i = w^v = w$ so we can analyze both parties on the same diagram)

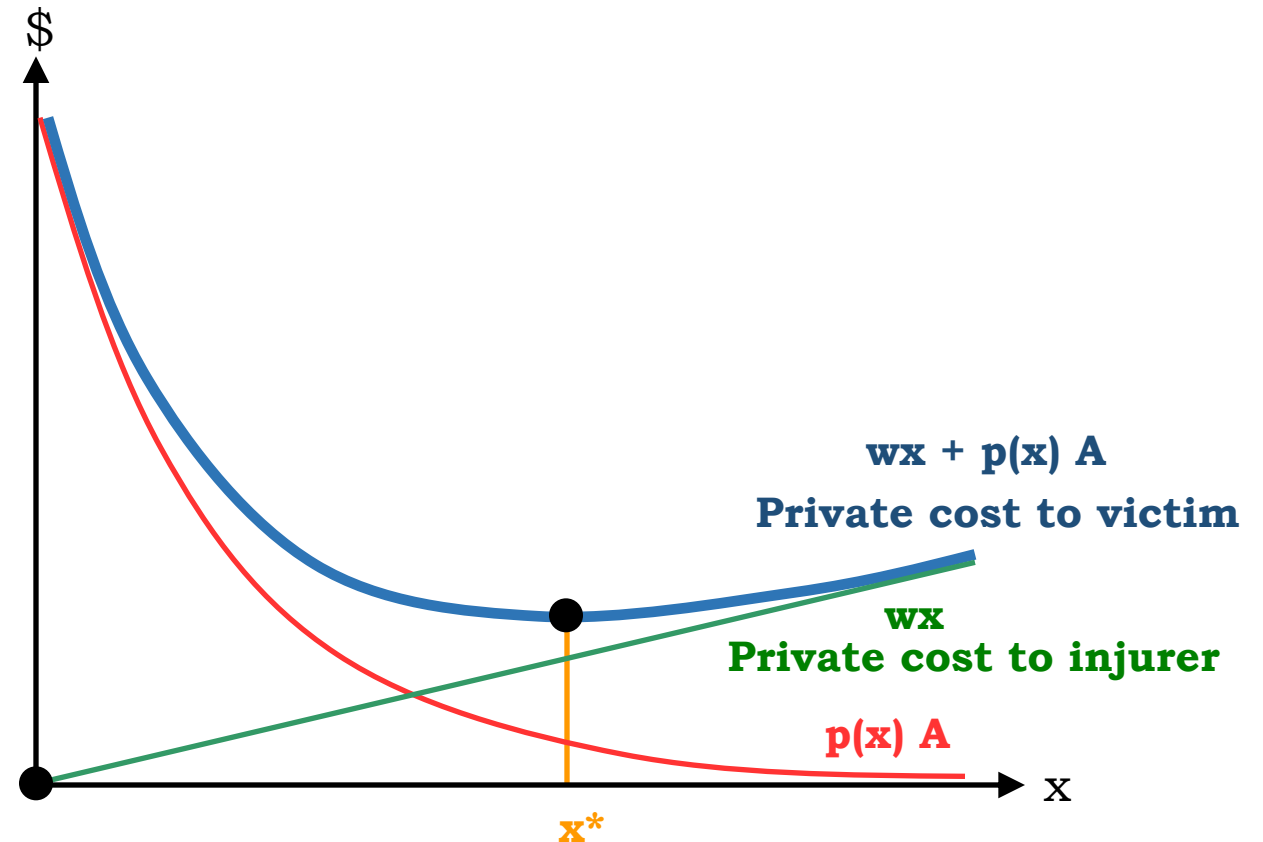
Benchmark: No Liability

- ♦ Injurer's private cost is .

- ♦ Minimized at $x =$.

- ♦ Victim's private cost is .

- ♦ Minimized at efficient precaution level .



- ♦ So rule of no liability leads to **efficient precaution by victims,**
no precaution by injurers

Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>
No Liability	Zero	Efficient

No liability : Activity level

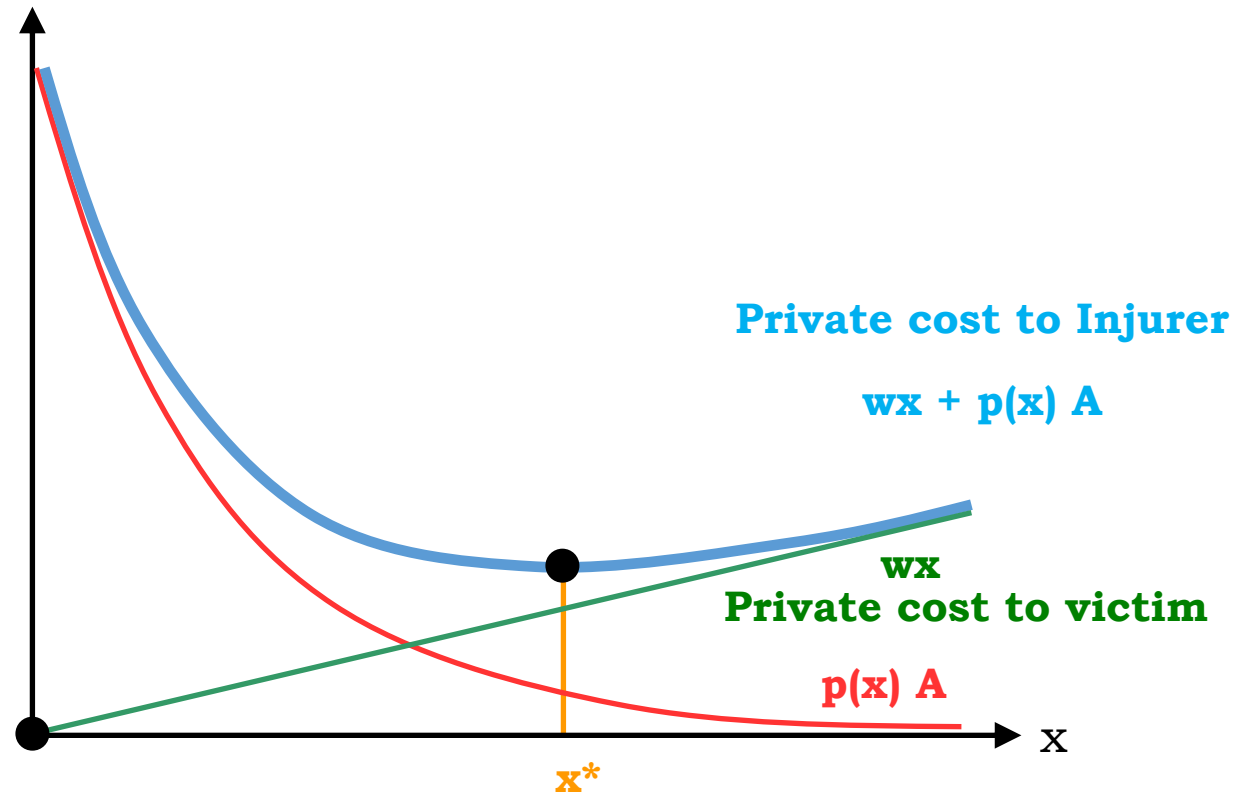
- ♦ Injurer don't consider cost of accidents when deciding how much to drive
- ♦ Victim weighs cost of accidents when deciding how carefully to ride, and when deciding how much to ride
- ♦ Victim takes efficient level of precaution, and efficient level of activity
- ♦ A rule of no liability leads to an inefficiently high level of injurer activity, but the efficient level of victim activity

Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient

Strict Liability

- ◆ Damages = A
- ◆ Injurer's private cost is w
 - ◆ Minimized at efficient precaution level $x = x^*$
- ◆ Victim's private cost is $p(x)A$
 - ◆ Minimized at $x = 0$
- ◆ Strict liability leads to **efficient precaution by injurers, no precaution by victims**



Strict Liability

- ◆ Perfect compensation: damages $D = A$
- ◆ Under strict liability...
 - ◆ Injurer bears cost of accidents, plus his own precaution
 - ◆ Injurer internalizes externality his actions $\rightarrow$ chooses efficiently
 - ◆ Victim is fully insured, no incentive for precaution

Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero		

What about activity level?

- ◆ Under strict liability, injurer internalizes cost of accidents
 - ◆ Weighs benefit from driving against cost of accidents
 - ◆ Takes **efficient activity level**
- ◆ Under strict liability, victim does not bear cost of accidents
 - ◆ Ignores cost of accidents when deciding how much to bike
 - ◆ Sets **inefficiently high activity level**
- ◆ A rule of **strict liability** leads to the **efficient** level of **injurer activity**, but an **inefficiently high level** of **victim activity**

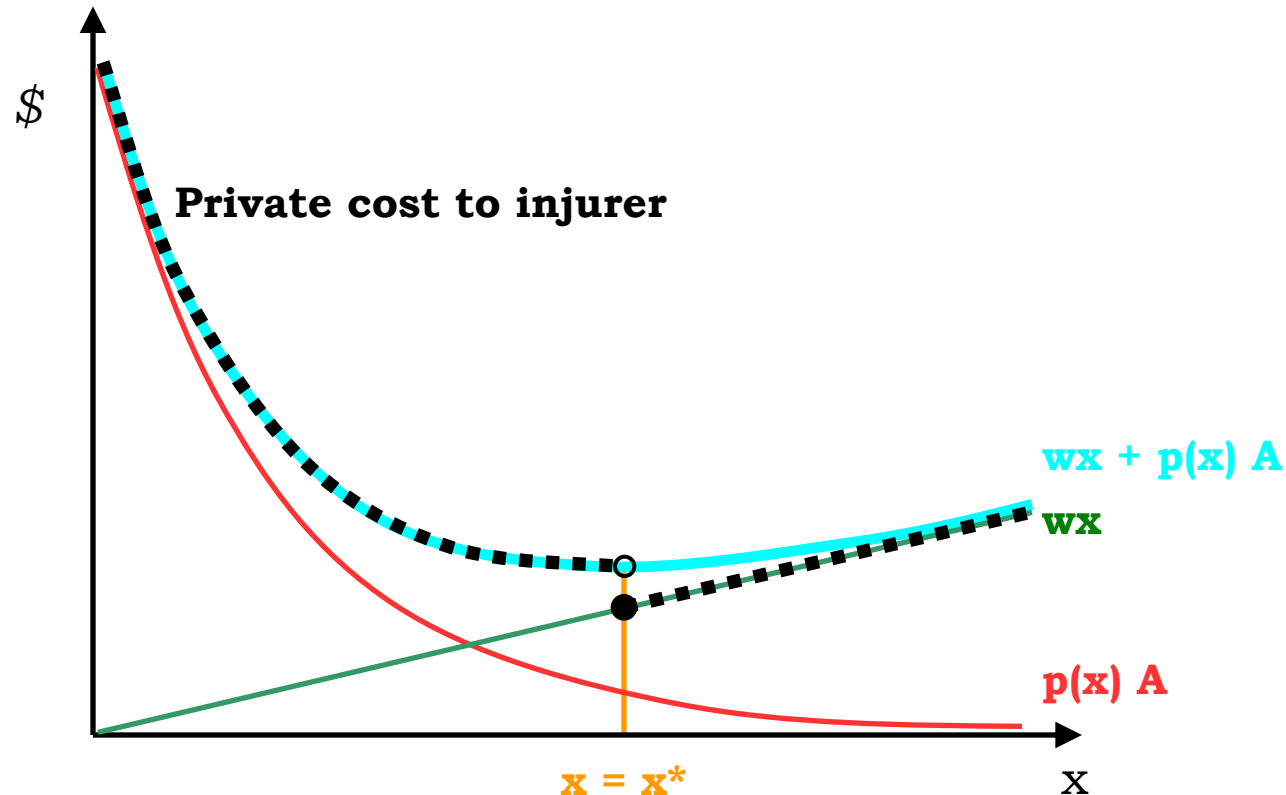
Strict Liability

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High

Negligence Rule

- ♦ Simple Negligence rule: injurer is only liable **if he breached the duty of due care** [victim's level of care doesn't matter]
- ♦ Within our model:
 - ♦ Legal standard of care is set at the optimal $x = x^*$
 - ♦ Injurer owes damages if precaution level was below that level
 - ♦ $x < x^* \rightarrow D = A$
 - ♦ $x > x^* \rightarrow D = 0$
- ♦ So on our graph from before, private cost to injurer is...
 - ♦ $w x + p(x) A$ for $x < x^*$
 - ♦ $w x$ for $x > x^*$

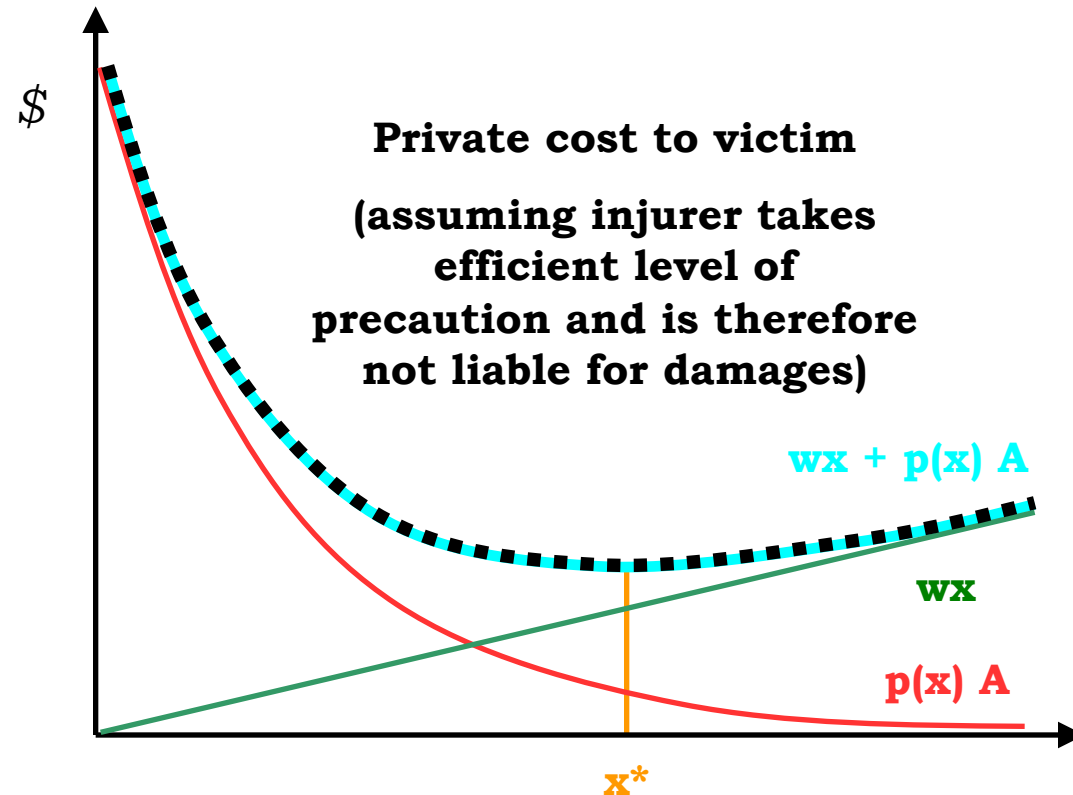
“Simple Negligence”: **Injurer** precaution



- ◆ Private cost is $w x + p(x) A$ if $x < x^*$, only $w x$ otherwise
- ◆ If standard of care is set efficiently (x^*), injurer minimizes private cost by taking efficient precaution

“Simple Negligence”: **Victim** precaution

- ♦ What about victim?
- ♦ Given that injurer will take efficient precaution which means injurer will not be liable
- ♦ So victim bears costs of any accidents
- ♦ (Victim bears **residual risk**)
- ♦ So victim's private cost is
 $wx + p(x) A$
- ♦ Victim minimizes private cost by taking efficient level of precaution too!



Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence, $x = x^*$	Efficient	Efficient		

What about **activity levels** under a negligence rule?

- ♦ **Simple negligence**: injurer is only liable if he was negligent
- ♦ Injurer will take efficient precaution, so **injurer expects to not be liable for any accidents that do occur**
- ♦ So injurer ignores cost of accidents when deciding on activity level (how much to drive)
 - ♦ Injurer drives carefully, but still **drives too much**
- ♦ Victim bears “residual risk”
 - ♦ Victim bikes carefully, and **bikes efficient amount**

Adding activity levels to our results on precaution...

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence	Efficient	Efficient	Too High	Efficient

Other negligence rules

- ♦ Rule we just saw is called “simple negligence”
 - ♦ Only consider injurer’s actions in determining liability
- ♦ We could also consider whether victim was negligence in deciding whether injurer is liable
 - ♦ “Negligence with a defense of contributory negligence” – injurer owes nothing if victim was **also** negligent
 - ♦ “Comparative negligence” – if both were negligent, **share** cost
 - ♦ “Strict liability with defense of contributory negligence” – injurer is liable (even if he wasn’t negligence), **unless** victim was negligent
- ♦ **Any of these rules (with efficient standard of care) will lead to efficient precaution by both parties!**

Discrete example of bilateral precaution

A	\$1,000
w	\$20 for either party
p	10% / 6% / 2%

- ♦ No “levels” of precaution – each party can either take precaution or not
- ♦ Each accident causes \$1,000 of harm
- ♦ Precaution costs \$20 for each party
- ♦ Chance of an accident is
 - ♦ 10% if nobody takes precaution
 - ♦ 6% if one party takes precaution
 - ♦ 2% if both parties take precaution
- ♦ Note that precaution is efficient (X^*) for both parties
 - ♦ Costs \$20; reduces expected accidents by $4\% \times \$1,000 = \40

Negligence with a Defense of Contributory Negligence

A	\$1,000
w	\$20 for either party
p	10% / 6% / 2%

- ♦ Injurer is liable if he failed to take precaution...
- ♦ Unless victim did too

Victim

Victim pays for precaution, and any accidents that happen

Injurer pays for precaution, not liable for accidents

		Victim	
		Precaution	None
Injurer	Precaution	-20, -40	-20, -60
	None	-60, -20	0, -100

- ♦ **“Both take precaution” is the only Nash equilibrium** and is the efficient outcome

Comparative Negligence

A	\$1,000
w	\$20 for either party
p	10% / 6% / 2%

- ♦ If both parties were negligent...

- ♦ ...divide cost proportionally

		<i>Victim</i>	
		Precaution	None
<i>Injurer</i>	Precaution	-20, -40	-20, -60
	None	-60, -20	-50, -50

- ♦ **Again, “both take precaution” is the only equilibrium**
 - ♦ (And the efficient outcome)

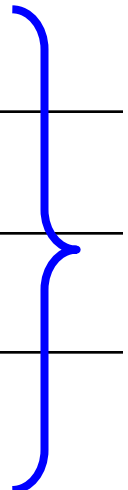
Strict Liability with a Defense of Contributory Negligence

A	\$1,000
w	\$20 for either party
p	10% / 6% / 2%

- ◆ Now, injurer is liable, regardless of whether he took precaution...
- ◆ ...**unless** victim was negligent
- ◆ **Once again, “both take precaution” is the only equilibrium**

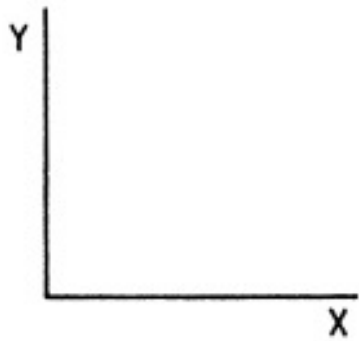
		<i>Victim</i>	
		Precaution	None
<i>Injurer</i>	Precaution	-40, -20	-20, -60
	None	-60, -20	0, -100

Summary

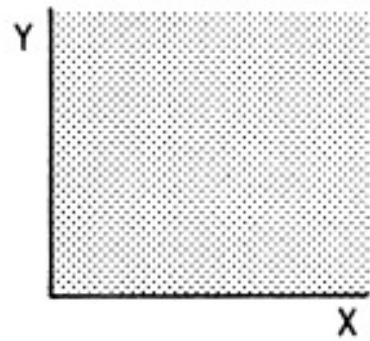
	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence	Efficient	Efficient	 assuming all relevant standards of care are set to the efficient levels	
Negligence with a Defense of Contributory Negligence	Efficient	Efficient		
Comparative Negligence	Efficient	Efficient		
Strict Liability with Defense of Contributory Negligence	Efficient	Efficient		

Injurer's fault (shaded area)

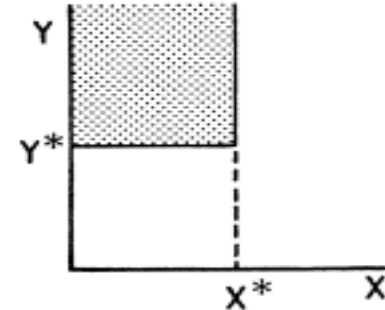
X = injurer's precaution
 Y = victim's precaution



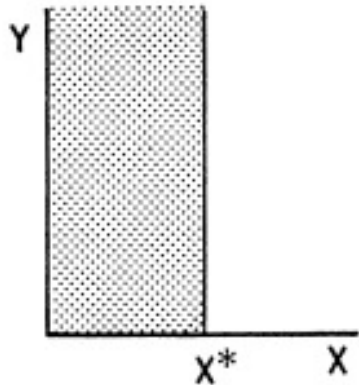
1. NO LIABILITY



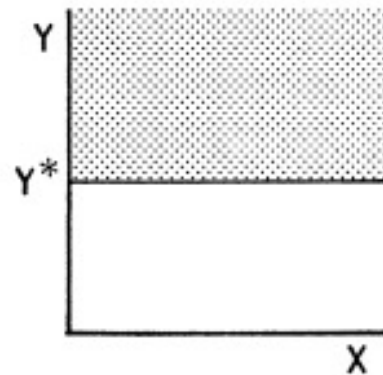
2. STRICT LIABILITY



5. THE NEGLIGENCE RULE
WITH CONTRIBUTORY
NEGLECT



3. THE NEGLIGENCE RULE



4. STRICT LIABILITY WITH
CONTRIBUTORY NEGLIGENCE

What about **activity levels** under a negligence rule? :

Negligence with Defense of Contributory Negligence, and Comparative Negligence

- ♦ Either rule: **efficient precaution** by both parties
- ♦ Either rule: if neither party was negligent, **injurer does not owe damages**
- ♦ So **victim is residual risk bearer** (pays for accidents)
- ♦ So victim weighs cost of accidents against benefits of activity, takes **efficient activity level**
- ♦ Injurer ignores cost of accidents, takes **inefficiently high activity level**

Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence	Efficient	Efficient	Too High	Efficient
Negligence with a Defense of Contributory Negligence	Efficient	Efficient	Too High	Efficient
Comparative Negligence	Efficient	Efficient	Too High	Efficient
Strict Liability with Defense of Contributory Negligence	Efficient	Efficient		

Strict Liability with Defense of Contributory Negligence

- ♦ If victim is not negligent, injurer is liable
- ♦ Leads to efficient precaution by both, so injurer is liable
 - ♦ Injurer is residual risk bearer
- ♦ Injurer weighs cost of accidents against benefits of activity, takes **efficient activity level**
- ♦ Victim ignores cost of accidents, takes **inefficient high activity level**

Summary

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
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Simple Negligence	Efficient	Efficient	Too High	Efficient
Negligence with a Defense of Contributory Negligence	Efficient	Efficient	Too High	Efficient
Comparative Negligence	Efficient	Efficient	Too High	Efficient
Strict Liability with Defense of Contributory Negligence	Efficient	Efficient	Efficient	Too High

1. If you don't bear any of the cost of accidents, you have no incentive to prevent them

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero		Too High	
Strict Liability		Zero		Too High
Simple Negligence				
Negligence with a Defense of Contributory Negligence				
Comparative Negligence				
Strict Liability with Defense of Contributory Negligence				

2. If you **do** bear the cost of accidents,
you'll do whatever you can to prevent them

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence				
Negligence with a Defense of Contributory Negligence				
Comparative Negligence				
Strict Liability with Defense of Contributory Negligence				

3. If you can avoid liability by exercising due care, you'll do it, but then you won't reduce activity

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
No Liability	Zero	Efficient	Too High	Efficient
Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence	Efficient		Too High	
Negligence with a Defense of Contributory Negligence	Efficient		Too High	
Comparative Negligence	Efficient		Too High	
Strict Liability with Defense of Contributory Negligence		Efficient		Too High

4. If the other guy can duck liability with due care, you're the residual risk bearer, and therefore...

	<i>Injurer Precaution</i>	<i>Victim Precaution</i>	<i>Injurer Activity</i>	<i>Victim Activity</i>
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Strict Liability	Efficient	Zero	Efficient	Too High
Simple Negligence	Efficient	Efficient	Too High	Efficient
Negligence with a Defense of Contributory Negligence	Efficient	Efficient	Too High	Efficient
Comparative Negligence	Efficient	Efficient	Too High	Efficient
Strict Liability with Defense of Contributory Negligence	Efficient	Efficient	Efficient	Too High

With each negligence rule...

- ♦ One party can **avoid liability** by taking efficient precaution
 - ♦ Leads to **efficient precaution**
 - ♦ But **inefficient activity level**
- ♦ Other party is the **residual risk bearer** – even when he takes precaution, he is **still liable**
 - ♦ Leads to **efficient precaution**
 - ♦ And also **efficient activity level**
- ♦ Who should bear residual risk?
 - ♦ One way to answer is to ask **whose activity level** has greater impact on efficiency

So which rule is best?

- ♦ “Put the incentive where it does the most good”
 - ♦ Efficient rule depends on which choices have greatest impact
 - ♦ If only injurer’s choices (precaution + activity) matter → strict liability is better rule
 - ♦ If bilateral precaution → negligence
 - ♦ Which negligence rule – depends whose activity level is more important
- ♦ Friedman (citing Posner): this is why very dangerous activities often covered by strict liability
 - ♦ Blasting with dynamite, keeping a lion as a pet
 - ♦ Even with proper precaution, still very dangerous, so injurer activity level is important

Friedman: activity is just unobservable precaution

- ♦ Activity is just another type of precaution, but type where court can't determine efficient level
 - ♦ Court can tell inefficient for me to drive at night with headlights off
 - ♦ Can't tell how many miles it's efficient for me to drive
- ♦ Determination of negligence can only be based on **observable precaution**, not **unobservable**
 - ♦ Negligence rule leads to efficient levels of **observable precaution** by both parties
 - ♦ Simple negligence leads not only to efficient **observable** precaution by injurer, but efficient precaution by victim as well
 - ♦ Strict liability leads to efficient **observable and unobservable** precaution by injurer, but no precaution by victim