Legal Errors and Efficiency of Liability Rules

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September 17, 2015

OPTIONAL READING

1 Legal Errors

For simplicity we will assume that the care is unilateral. That is, we suppose that only the injure can take care. However, you should note that the results presented below are true for bilateral care accidents as well.¹ In that case the total accident cost (TAC) will be

$$x + \pi(x)D(x) = x + L(x)$$

Suppose TAC is minimized at x^* , assume that $x^* > 0$. Mathematically speaking, x^* solves the following first order condition

$$-\frac{\partial L(x)}{\partial x} = 1. \tag{1}$$

[To ensure, that x^* is a unique minimum point, assume that L(.) is a decreasing but convex function of x.]

From social efficiency perspective, we want the injurer to choose x^* as care level. However, injurer will act to minimize her costs. So, depending on liability rule she may or may not choose x^* .

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¹For a general analysis of legal errors see Singh(2003), which is a strictly optional reading.

1.0.1 Legal Determination of Due Care and the Compensation

Three options are available to courts or juries to fix the legal (due care) standard for the injurer, i.e., x^* :

- Court can determine, the legal (due care) standard for the injurer, on a case-by-cases. However, this option puts huge information burden on courts, So, they end up using what is called the 'reasonable care standard'.
- Court can use the due care standard provided by the public or regulatory law as the legal (due care) standard. Courts generally use due care standards set up by the public law, such as the traffic rules, environmental standards, etc.
- Court can use use the care standards practiced by the 'community of potential injurers' as the legal standards of care. For instance, courts tend hold the doctors to standards/norms set by the medical council. Similarly, courts use norms set by the community of the auditors, lawyers, etc.

Note that the 'reasonable care standard' will generally be different than the efficient care level, unless the judge is an economist and has all the information to solve the TAC minimization problem. Similarly, the public law and the community provided standards of care will generally be different from the efficient care level.

As to the issue of assessment of Harm, courts and juries tend to assess the harm on the case-by-case basis, with the help of experts.

The point is that courts or juries are vulnerable to making errors

- In determination of the due care, and therefore the negligence/non-negligence of the injurer and the victim
- In assessment of the Harm suffered by the victim
- In both of the above

As a result, the parities at accident dispute face uncertainty regarding their liability obligations and entitlements. Legal errors in determination of the due care can be totally random without bias, or these errors could be biased. For example, the Due care level can be fixed at level greater than x^* . We say the error is unbiased if on an average the Due care level is fixed at x^* . Formally, let

 \hat{x} denote the due care level chosen by the court.

 $E(\hat{x})$ denote expected value the due care level chosen by the court.

Note that from the point of view of an accident, \hat{x} is fixed after the accident during the trial. So, the injurer's action will be guided by $E(\hat{x})$.

Definition 1 We say the legal error w.r.t. due care is unbiased if $E(\hat{x}) = x^*$. It is upward-biased if $E(\hat{x}) > x^*$. It is downward-biased if $E(\hat{x}) < x^*$.

Similarly, court-provided compensation can be greater than or less than the harm actually suffered by the victim.

1.0.2 Harm related Uncertainty: RON

We say the error is unbiased if on an average, court-provided compensation is equal to the harm actually suffered by the victim. Formally, let

C be the compensation amount granted to the victim

E(C) denote expected value the due care level chosen by the court.

The injurer's actions will be guided by E(C).

Definition 2 We say the legal error is unbiased w.r.t Harm if E(C) = D. It is upward-biased if E(C) > D. It is downward-biased if E(C) < D.

Proposition 1 Assume that due care standard is at x^* . If legal errors w.r.t. harm are unbiased, i.e, E(C) = D, then the outcome will be efficient, under the RON. The injurers will take efficient care

Proof: Note that under the rule of negligence, in the presence of legal errors, the injurer's expected costs are

$$x \quad \text{if } x \ge x^*$$
$$x + \pi(x)E(C) = x + \pi(x)D = x + L(x) \quad \text{if } x < x^*$$

Since $x + L(x) \ge x^* + L(x^*)$, always. Moreover, $x^* + L(x^*) > x^*$. So, the injurer's expected costs are uniquely minimum at x^* , so this is what he will choose.

An example will be helpful here. Suppose, in the event of accident the victim will suffer a harm of 10, i.e., D = 10. The relationship between the care level by in the injurer, i.e., x, the probability of accident, $\pi(x)$, the expected accident cost, and the total accident costs (TAC) is as follows:

x	=	0	1	2	3
$\pi(x)$	=	1	0.7	0.58	0.52
$\pi(x)D$	=	10	7	5.8	5.2
$TAC = x + \pi(x)D$	=	10	8	7.8	8.2

clearly, $x^* = 2$. Now, assuming that the legal standard of care is set at $x^* = 2$, in the presence of unbiased legal errors under the RON, the Injurer's total costs for various care levels are as follows:

That is, the injurer can minimize his cost by simply opting for care level 2, which is efficient care level.

Remark 1 You should draw the graphs of the Injurer's total costs curve. If you do, you will find them similar what you saw in the class.

Next, consider the upward biased errors. For the ease of illustration, suppose $E(C) = \delta D$. Let $\delta = 2$, so E(C) = 2D, i.e., the expected compensation is double the amount of actual harm. With such errors, assuming that the legal standard of care is set at $x^* = 2$, under the RON, the Injurer's total costs for various care levels will be as follows:

$$\begin{array}{rcrcrcrc} x & = & 0 & 1 & 2 & 3 \\ \pi(x) & = & 1 & 0.7 & 0.58 & 0.52 \\ \text{expected liability } \pi(x)E(C) = \pi(x)2D & = & 20 & 14 & 0 & 0 \\ \text{Injurer's total costs} & = & 20 & 15 & 2 & 3 \end{array}$$

Again, the injurer can minimize his cost by simply opting for care level 2. So, he will do so and there will be no inefficiency. So, we can claim the following

Proposition 2 Assume that due care standard is at x^* . If legal error are upward biased - on an average the compensation is greater than the actual harm, *i.e.*, E(C) > D, then the outcome will be efficient, under the RON. The injurers will take efficient care.

Formal Proof: Note that under the rule of negligence, in the presence of upward-biased legal errors, the injurer's expected costs are

 $\begin{aligned} x & \text{if } x \geq x^* \\ x + \pi(x) E(C) > x + \pi(x) D = x + L(x) & \text{if } x < x^* \end{aligned}$

Since $x + \pi(x)E(C) > x + L(x) \ge x^* + L(x^*)$, always. Moreover, $x^* + L(x^*) > x^*$. So, the injurer's expected costs are uniquely minimum at x^* , so this is what he will choose.

Question 1 Will the above results be true if the injurer is risk-averse? Answer is 'YES.'

Let's go back to our example. But now consider downward biased errors. For the ease of illustration, suppose $E(C) = \delta D$. Let $\delta = 0.15$, so E(C) = 0.15D. With such errors, you can easily verify that the injurer's costs are lower if he chooses 0 rather than 2 as care level. So, he will do so but this means inefficiency. So, we can claim the following

Proposition 3 Assume that due care standard is at x^* . If legal error are downward biased - on an average the compensation is less than the actual harm, i.e., E(C) < D, then the outcome will generally NOT be efficient under the RON. The injurers will take less than efficient care, especially if the downward bias is large

Now, the injurer's expected costs are

$$x \quad \text{if } x \ge x^*$$
$$x + \pi(x)E(C) < x + \pi(x)D = x + L(x) \quad \text{if } x < x^*$$

The downward biased errors means, $x + \pi(x)E(C)$ can be very small. For sufficiently small value of E(C), it can even be small than x^* . So, the injurer may find it profitable to be negligent.

1.0.3 Harm related Uncertainty: Rule of Strict Liability

Proposition 4 If legal error are unbiased, i.e., E(C) = D, then under the rule of strict liability the outcome will be efficient. The injurers will take efficient care

Proof: Under the rule of strict liability, due the legal errors, the injurer's expected cost will be

$$x + \pi(x)E(C) = x + \pi(x)D = x + L(x)$$

Since x + L(x) is uniquely minimum at x^* , the injurer will choose x^* in his own interests.

Proposition 5 If legal error are upward biased - on an average the compensation is greater than the actual harm, i.e., E(C) > D, then under the rule of strict liability, the outcome will NOT be efficient. The injurers will take excessive - more than efficient - care.

For simplicity, let $E(C) = \delta D$, where $\delta > 1$. For the ease of illustration, suppose $\delta = 2$, so E(C) = 2D, i.e., the expected compensation is double the amount of actual harm. With such errors, the Injurer's total costs for various care levels will be as follows:

x	=	0	1	2	3
$\pi(x)$	=	1	0.7	0.58	0.52
expected liability $\pi(x)E(C) = \pi(x)2D$	=	20	14	11.6	10.4
Injurer's total costs	=	20	15	13.6	13.4

You can see that the injurer will minimize his cost by opting for care level 3, i.e., $\bar{x}(2) = 3$, a care level that is inefficiently high.

We can provide a formal mathematically proof as well.². The injurer will choose x to minimize his expected costs, i.e., to solve

$$\min_{x} \{x + \pi(x)E(C) = x + \pi(x)\delta D = x + \delta L(x)\}$$

²You can choose to prove your claim either mathematically or with the help of a numerical example. Choice is yours!

So, the injurer will choose \bar{x} that solves the following first order condition

$$-\delta \frac{\partial L(x)}{\partial x} = 1. \tag{2}$$

So, from (2) it is easy to see that \bar{x} is a function of δ . Moreover, a comparison of (1) and (2), in view of the fact that $\delta > 1$ implies that $\bar{x} > x^*$. In fact, in view of our assumptions on L(.), (2) implies that \bar{x} is an increasing function of δ .

$$\frac{\partial \bar{x}(\delta)}{\partial \delta} > 0. \tag{3}$$

By the symmetric logic we can prove the following result.

Proposition 6 If legal error are downward biased - on an average the compensation is less than the actual harm, i.e., E(C) < D, then under the rule of strict liability the outcome will NOT be efficient. The injurers will take to little - less than efficient - care.

For the ease of illustration, now suppose $\delta = \frac{1}{2}$, so $E(C) = \frac{1}{2}D$, i.e., the expected compensation is double the amount of actual harm. With such errors, the Injurer's total costs for various care levels will be as follows:

x	=	0	1	2	3
$\pi(x)$	=	1	0.7	0.58	0.52
expected liability $\pi(x)E(C) = \frac{1}{2}\pi(x)D$	=	5	3.5	2.9	2.6
Injurer's total costs	=	5	4.5	4.9	5.6

You can see that the injurer will minimize his cost by opting for care level 1, i.e., $\bar{x}(\frac{1}{2}) = 1$, a care level that is inefficiently low.

You can draw the graphs of Injurer's total costs curve under the rule of strict liability and convince yourself that the shape is as we discussed in the class.

1.0.4 Punitive Damages: Implications

Damages/comensation is called punitive if³

C >> D

In view of the above, you can easily prove the following:

Proposition 7 Assume that due care standard is at x^* . If court awards punitive damages, i.e., C >> D, then the outcome will be efficient, under the RON. The injurers will take efficient care.

Proposition 8 If court awards punitive damages, i.e., C >> D, then under the rule of strict liability the outcome will NOT be efficient. The injures will take excessive - more than efficient - care.

Question 2 Suppose the injurers are 'judgment proof' - have low wealth. Between RON and Strict Liability, which rule is better?

Answer: RON.

1.0.5 Uncertain Due Care Standards: Implications

Proposition 9 If legal error are random, then the outcome will NOT be efficient under the RON. The injurers will take more than efficient care, especially when they are risk-averse

The basic idea is as follows. Under the RON the injurer becomes liable for accident costs once he is declared negligent. So, his cost curves jumps upward suddenly on being declared negligent. He can reduce the risk of being found negligent and therefore the burden of the accident cost by increasing his care level.

Proposition 10 If legal error are downward biased - on an average the due care is set at less than x^* then the outcome will NOT be efficient under the RON. The injurers will take less than efficient care, especially if the downward bias is large.

³For more on Punitive Damages, see the book by Cooter and Ulen

The proposition is self explanatory.

Proposition 11 If legal error are upward biased - on an average the due care is set at higher than x^* then the outcome will generally NOT be efficient. under the RON. The injurers will take more than efficient care, especially if the bias is small. However, If the bias is large, the injurers will take efficient care

To see the last claim, note that a very high due care standard means that the injurer will be held liable most of the time, even if he was very vigilant. So, from the injure's point view, *de-facto* the rule becomes the rule of strict liability. But, we know that under the rule of strict liability, the injure takes efficient care. (note here, we are not considering any error in assessment of harm).

Exercise 1 With the help of a suitable model, try to provide mathematical proof for the claims in this subsection.

1.0.6 Weak enforcement of liability rules: Implications

Weak enforcement of liability rules means:

- Weak or no enforcement of liability rules
- Judicial delays
- High Litigation costs, especially for the victims
- 'Judgment Proof' Injurers

Some implications are predictable, others may be not.