Chapter 2
An Economic Model of Tort Law

The Basic Accident Model

Unilateral Care Model. Let

x = the dollar expenditure on care by the injurer;
$L(x)$ = expected accident losses suffered by the victim; $L'<0$, $L''>0$.

(Note that $L(x)\equiv p(x)D(x)$, where p is the probability of an accident, and D is actual damages in the event of an accident. Since both of these functions are decreasing at a decreasing rate, the product L is also decreasing at a decreasing rate.)

The social problem is to choose x to minimize $x+L(x)$. The first order condition defining optimal care, x^*, is

$$1 + L'(x) = 0. \tag{2.1}$$

Under a rule of *no liability*, the injurer chooses x to minimize his private costs, which simply equals his cost of care. Thus, he chooses x=0. In contrast, under *strict liability*, he faces the victim's actual damages, so his private costs coincide with social costs, and he chooses x^*. Finally, under *negligence*, the injurer avoids liability if he chooses $x \geq x^*$. To see that x^* is his optimal solution in this case, note first that he would never choose x strictly greater than x^* because that is costly but yields no further benefits. At the same time, he would never choose $x<x^*$ because

$$x^* < x^* + L(x^*) \leq \min_{x<x^*} x + L(x). \tag{2.2}$$

Bilateral Care Model. Let

y = dollar spending on care by the victim;
$L(x,y)$ = expected accident losses, $L_x<0$, $L_y<0$, $L_{xx}>0$, $L_{yy}>0$, $L_{xy}>0$.

The social problem in this case is to choose x and y to minimize $x+y+L(x,y)$. The first order conditions are

$$1 + L_x = 0 \tag{2.3}$$

$$1 + L_y = 0. \tag{2.4}$$

Equation (2.3) defines the function $x^*(y)$ and equation (2.4) defines the function $y^*(x)$. Jointly, they determine the social optimum (x^*,y^*), where $x^*\equiv x^*(y^*)$ and $y^*\equiv y^*(x^*)$. Differentiating (2.3) and (2.4) implies

$$\partial x^*/\partial y = -L_{xy}/L_{xx} < 0, \quad \text{and} \quad \partial y^*/\partial x = -L_{xy}/L_{yy} < 0. \qquad (2.5)$$

These results reflect the substitutability of injurer and victim care, as shown in the graph below.

Consider the Nash equilibrium choices of x and y under the various liability rules. First, under *no liability*, the injurer will choose x=0 for any y. The victim thus faces her full damages and so chooses $y^*(0)>y^*$. The victim, therefore, takes more than the first, best level of care to compensate for the injurer's lack of care (though her care is efficient, given x=0). The situation is reversed under *strict liability*. Specifically, the victim is fully compensated and so chooses y=0, while the injurer faces full damages and so chooses $x^*(0)>x^*$ (See the graph).

Now consider a *negligence rule*. We will show that (x^*, y^*) is a Nash equilibrium. First, suppose that $y=y^*$. The injurer then chooses x^* because

$$x^* < x^* + L(x^*,y^*) \leq \min_{x<x^*} x + L(x,y^*). \qquad (2.6)$$

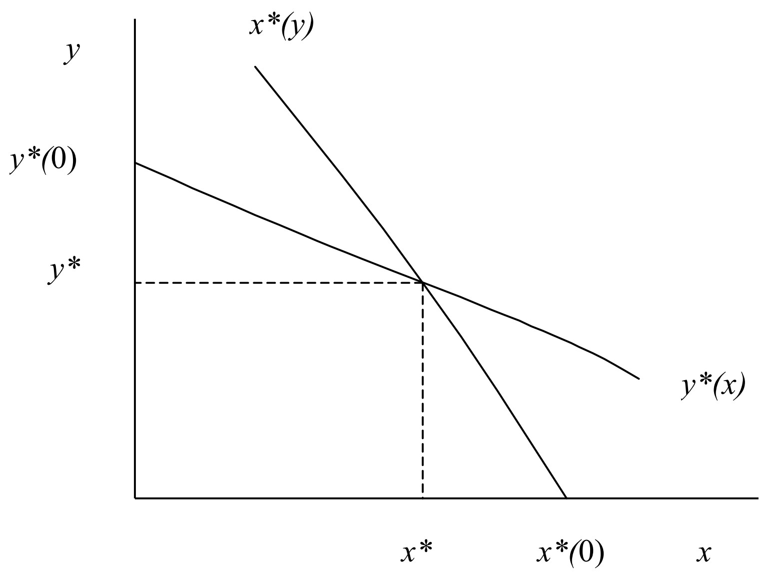
Now suppose that $x=x^*$. The victim then bears her own losses and so chooses y to minimize $y+L(x^*,y)$, which yields $y^*(x^*)=y^*$. The logic is the same for any of the various negligence rules: namely, negligence with a defense of contributory negligence, strict liability with contributory negligence, and comparative negligence with a due standard at x^*.

Sequential Care Accidents

Injurer Moves First. Suppose the injurer moves first and chooses $x<x^*$. The socially optimal response of the victim is to choose $y^*(x)>y^*$. That is, the victim should take *compensating precaution*. Note that simple negligence does not achieve this outcome because the injurer has violated the due standard and thus is fully liable. The victim, therefore, chooses y=0. *Contributory negligence* can induce the victim to take care in this case, but the due standard must be set at $y^*(x)$. Note, however, that this requires the victim to be able to observe the injurer's care choice before making her own choice.

Victim Moves First. Now suppose that the victim moves first and chooses $y<y^*$. The optimal response of the injurer is $x^*(y)>x^*$. Again, this involves compensating precaution. Note that simple negligence does induce efficient care in this case, but again, the due standard must be set at $x^*(y)$ rather than x^*. In contrast, contributory negligence will result in no care by the injurer because $y<y^*$ bars victim recovery.

Last Clear Chance (LCC). This doctrine can be interpreted as requiring compensating precaution by the second mover, whether that is the injurer or the victim. When the victim moves second, LCC augments the contributory negligence standard. When the injurer moves second, LCC augments the simple negligence standard and defeats contributory negligence.


x*(y)
y
y*(0)
y*
y*(x)
x*
x*(0)
x