

Chapter 3

Applying the Economic Model of Tort Law

An Economic Model of Products Liability

Social optimum. First consider the social optimum in a bilateral care model of products liability. This differs from the model of accidents involving “strangers” from Chapter 2 in the sense that potential injurers and victims have a market relationship prior to the occurrence of an accident.

Let

$L(x,y)$ = expected damages per unit of output;
 x = manufacturer’s (injurer’s) spending on care per unit;
 y = consumer’s (victim’s) spending on care per unit;
 q = number of units of output sold;
 n = number of firms;
 $c(q)$ = total cost of production per firm, where $c' > 0$, $c'' > 0$;
 $v(q)$ = marginal consumption benefit of the good, where $v' < 0$, reflecting diminishing marginal benefits.

Social welfare is given by

$$W = \int_0^{nq} v(z)dz - nc(q) - nq[x + y + L(x, y)] \quad (3.1)$$

which is the sum of gross consumption benefits of the good (the integral term), minus total costs, including production costs ($nc(q)$), and care plus accident costs. Note that, as in the model of activity levels in the previous chapter, the scale of production (i.e., total number of units of the good produced) affects total accident costs linearly.

The first-order conditions for x , y , q , and n , respectively, are

$$1 + L_x(x,y) = 0 \quad (3.2)$$

$$1 + L_y(x,y) = 0 \quad (3.3)$$

$$v(nq) = c'(q) + x + y + L(x,y) \quad (3.4)$$

$$v(nq) = c(q)/q + x + y + L(x,y) \quad (3.5)$$

Conditions (3.2) and (3.3) define optimal care on a per unit basis, given constant returns to scale in care by both injurers and victims. Condition (3.4) says that the good should be produced to the point where marginal consumption benefits equal total marginal costs,

including safety and damages. Condition (3.5) says that firms should enter until the marginal consumption benefits equal average costs. Combining (3.4) and (3.5) gives the usual condition that firms should operate at the point where marginal costs equal average costs, or $c'(q) = c(q)/q$. Finally, note that neither the *price* of the product, nor the *assignment of liability* enters these optimality conditions.

Market outcomes

Let p be the price of the product and s the share of damages borne by firms, where $0 \leq s \leq 1$. (Thus, consumers bear a fraction $1-s$ of damages.) Consumer demand (willingness to pay) per unit is thus

$$D = v(Q) - y - (1-s)L(x,y)$$

where $Q = nq$ is aggregate output. Consumers will purchase the good up to the point where $D = p$, or

$$v(Q) = p + y + (1-s)L(x,y) \quad (3.6)$$

Also, for each unit of the good purchased, consumers will choose care to minimize their costs, $y + (1-s)L(x,y)$, yielding the first-order condition

$$1 + (1-s)L_y(x,y) = 0. \quad (3.7)$$

Each firm will choose its output and care to maximize profits:

$$\pi = pq - c(q) - q[x + sL(x,y)],$$

where individual firms take the price as given. The first-order conditions for q and x are therefore

$$p = c'(q) + x + sL(x,y) \quad (3.8)$$

$$1 + sL_x(x,y) = 0. \quad (3.9)$$

Free entry of firms implies that the profit for each firm is zero, or

$$pq = c(q) + q[x + sL(x,y)]. \quad (3.10)$$

Now combine (3.6) and (3.8) to get

$$v(Q) = c'(q) + x + y + L(x,y) \quad (3.11)$$

and combine (3.6) and (3.10) to get

$$v(Q) = c(q)/q + x + y + L(x,y) \quad (3.12)$$

Comparing (3.11) and (3.12) to (3.4) and (3.5) shows that output and the number of firms are efficient for any s , given x and y . This illustrates the irrelevance of the liability rule for these variables. In other words, given that the market functions well, output will be efficient regardless of the assignment of liability. This is an illustration of the Coase Theorem.

The care choices of consumers and firms, however, will not necessarily be efficient. By (3.7) and (3.9), consumers will only choose efficient care if $s=0$ (no liability), while firms will only choose efficient care if $s=1$ (strict liability). As we saw in Chapter 2, however, both parties will choose efficient care under an appropriately structured negligence rule.

Theoretically, the market can yield x^* and y^* regardless of the liability rule if bargaining is costless (again, by the Coase Theorem). For example, under no liability, firms will choose efficient care if consumers offer a higher price in return for a safer product, and this bargaining exhausts the gains from increased firm investments in care. Similarly, under strict liability, consumers will take efficient care if firms lower their prices in return for the lower accident risk. However, these bargains will not be likely to occur in actual markets due to transaction and monitoring costs. Specifically, consumers may not be able to accurately assess the risk of an accident when negotiating with firms over increased product safety, and firms will not be able to verify that consumers are in fact using the product safely after purchase. Given these market failures, it is likely that the choice of a liability rule will affect overall accident risk, as in the model of accidents between strangers.