

# The New Palgrave Dictionary of Economics Online

## liability for accidents

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### Abstract

Legal liability for accidents determines the circumstances under which injurers must compensate victims for harm. The effects of liability on incentives to reduce risk, on risk-bearing and insurance (both direct coverage for victims and liability coverage for injurers), and on administrative expenses are considered. Liability is also compared with other methods of controlling harmful activities, notably, with regulation and corrective taxation.

### Keywords

accident insurance; contributory negligence; corrective taxes; damages; due care; judgment-proof problem; liability for accidents; liability insurance; moral hazard; negligence rule; product liability; risk aversion; safety regulation; strict liability

### Article

Legal liability for accidents governs the circumstances under which parties who cause harm to others must compensate them. There are two basic rules of liability. Under *strict liability*, an injurer must always pay a victim for harm due to an accident that he causes. Under the *negligence rule*, an injurer must pay for harm caused only when he is found negligent, that is, only when his level of care was less than a standard of care chosen by the courts, often referred to as *due care*. (There are various versions of these rules that depend on victims' care, as will be discussed.) In fact, the negligence rule is the dominant form of liability; strict liability is reserved mainly for certain especially dangerous activities (such as the use of explosives). The amount that a liable injurer must pay a victim is known as *damages*. Our discussion of liability begins by examining how liability rules create incentives to reduce risk. The allocation of risk and insurance is next addressed, and, following that, the factor of administrative costs. Then a number of topics are reviewed. Comprehensive economic treatments of accident liability are presented in Landes and Posner (1987) and Shavell (1987); an early, insightful informal, economically oriented treatment of liability is presented in Calabresi (1970). Empirical literature is surveyed in Kessler and Rubinfeld (2007) and is not considered here.

### Incentives

In order to focus on liability and incentives to reduce risk, we assume in this section that parties are risk neutral. Further, we suppose that there are two classes of parties – injurers and victims – who do not have a contractual relationship. For example, injurers might be drivers and victims pedestrians, or injurers might be polluting firms and victims affected residents.

### Unilateral accidents and the level of care

Here we suppose that injurers alone can reduce risk by choosing a level of *care*. Let  $x$  be expenditures on care (or the money value of effort) and  $p(x)$  be the probability of an accident that causes harm  $h$ , where  $p$  is declining in  $x$ . Assume that the social objective is to minimize total expected costs,  $x + p(x)h$ , and let  $x^*$  denote the optimal  $x$ .

Under strict liability, injurers pay damages equal to  $h$  whenever an accident occurs, and they naturally bear the cost of care  $x$ . Thus, they minimize  $x + p(x)h$ ; accordingly, they choose  $x^*$ .

Under the negligence rule, suppose that the due care level  $\hat{x}$  is set equal to  $x^*$ , meaning that an injurer who causes harm will have to pay  $h$  if  $x < \hat{x}$  but will not have to pay anything if  $x \geq \hat{x}$ . Then the injurer will choose  $x^*$ : he will not choose  $x > x^*$ , for that will cost him more and he escapes liability by choosing merely  $x^*$ ; he will not choose  $x < x^*$ , for then he will be liable (in which case the analysis of strict liability shows that he would not choose  $x < x^*$ ).

Thus, under both forms of liability, injurers are led to take optimal care, as first shown in Brown (1973).

Note that under the negligence rule courts need to be able to calculate optimal care  $x^*$  and to observe actual care  $x$ , in addition to observing harm. Under strict liability courts need only to observe harm.

It should also be noticed that, under the negligence rule with due care  $\hat{x}$  equal to  $x^*$ , negligence is never found, because injurers are induced to be non-negligent. Findings of negligence may occur, however, under a variety of modifications of our assumptions. Courts might make errors in observing injurers' care, so that an injurer whose true  $x$  is at least  $x^*$  might mistakenly be found negligent because his observed level of care is below  $x^*$ . Similarly, courts might err in calculating  $x^*$  and thus might set due care  $\hat{x}$  above  $x^*$ . If so, an injurer who chooses  $x^*$  would be found negligent (even though care is accurately observed) because  $\hat{x}$  exceeds  $x^*$ . As emphasized by Craswell and Calfee (1986), error in the negligence determination leads injurers to choose incorrect levels of care, and under some assumptions, to take excessive care in order to reduce the risk of being found negligent by mistake. Other explanations for findings of negligence are that individuals may not know  $x^*$  and thus take too little care, the judgment-proof problem (see below), which may lead individuals to choose to be negligent, and the inability of individuals to control their behaviour perfectly at every moment or of firms to control their employees.

### Bilateral accidents and levels of care

We now assume that victims also choose a level of care  $y$ , that the probability of an accident is  $p(x,y)$  and is declining in both variables, that the social goal is to minimize  $x + y + p(x,y)h$ , and that the optimal levels of care  $x^*$  and  $y^*$  are positive.

Under strict liability, injurers' incentives are optimal conditional on victims' level of care, but victims have no incentive to take care because they are fully compensated for their losses. However, the usual strict liability rule that applies in bilateral situations is strict liability with a defense of *contributory negligence*, meaning that an injurer is liable for harm only if the victim's level of care was not negligent, that is, his level of care was at least his due care level  $\hat{y}$ . If victims' due care level is  $y^*$ , then it is a unique equilibrium for both injurers and victims to act optimally: victims choose  $y^*$  in order to avoid having to bear their losses, and injurers choose  $x^*$  since they will be liable because victims are non-negligent.

Under the negligence rule, optimal behaviour is also the unique equilibrium. Injurers choose  $x^*$  to avoid being liable, and, since victims therefore bear their losses, they choose  $y^*$ . Two other variants of the negligence rule are negligence with the defence of contributory negligence (under which a negligent injurer is liable only if the victim is not negligent) and the comparative negligence rule (under which a

negligent injurer is only partially liable if the victim is also negligent). These rules also induce optimal behaviour.

Thus, all of the negligence rules, and strict liability with the defence of contributory negligence, support optimal care, on the assumption due care levels are chosen optimally. Courts need to be able to calculate optimal care levels for at least one party under any of the rules, and in general this requires knowledge of the function  $p(x,y)$ . The main conclusions of this section were first proved by Brown (1973) (see also Diamond, 1974, for closely related results).

#### Unilateral accidents, level of care, and level of activity

Now let us reconsider unilateral accidents, allowing for injurers to choose their level of *activity*  $z$ , which is interpreted as the (continuously variable) number of times they engage in their activity (or, if injurers are firms, the scale of their output). Let  $b(z)$  be the benefit from the activity, and assume the social object is to maximize  $b(z) - z(x + p(x)h)$ ; here  $x + p(x)h$  is assumed to be the cost of care and expected harm each time an injurer engages in his activity. Let  $x^*$  and  $z^*$  be optimal values. Note that, as before,  $x^*$  minimizes  $x + p(x)h$ , and that  $z^*$  satisfies  $b'(z) = x^* + p(x^*)h$ , the marginal benefit from the activity equals the marginal social cost, comprising the sum of the cost of optimal care and expected accident losses. Under strict liability, injurers choose both the level of care and the level of activity optimally, as their objective is the social objective.

Under the negligence rule, injurers choose optimal care  $x^*$  as before, but their activity is socially excessive. Because an injurer escapes liability by taking care of  $x^*$ , he chooses  $z$  to maximize  $b(z) - zx^*$ , so that  $z$  satisfies  $b'(z) = x^*$ . The injurer's cost of raising his activity level is only his cost of care  $x^*$ , which is less than the social cost, as that also includes  $p(x^*)h$ . The excessive level of activity under the negligence rule is more important the larger is the expected harm  $p(x^*)h$  from the activity.

The failure of the negligence rule to control the level of activity arises because negligence is defined here (and for the most part in reality) in terms of care alone. A justification for this assumption is that courts might face informational difficulties were they to include the activity level in the definition of negligence. The problem with the activity level under the negligence rule is applicable to any aspect of behaviour that would be difficult to incorporate into the negligence standard (including, for example, research and development activity). The distinction between levels of care and levels of activity was developed in Shavell (1980).

#### Bilateral accidents, levels of care, and levels of activity

If we consider levels of care and of activity for both injurers and victims, then none of the liability rules that we have considered leads to full optimality (on the assumption that activity levels are unobservable). The reason that full optimality cannot be achieved is in essence that injurers must bear full accident losses to induce them to choose the right level of their activity, but this means that victims will not choose the optimal level of their activity.

#### Risk-bearing and insurance

We next examine the implications of risk aversion and the role of insurance in the liability system (see Shavell, 1982a). A number of general points may be made.

First, the socially optimal resolution of the accident problem now involves not only the reduction of losses from accidents but also the protection of risk-averse parties against risk. Risk bearing is relevant for two reasons: not only because potential victims may face the risk of accident losses, but also because potential injurers may face the risk of liability. The former risk can be mitigated through accident insurance, and the latter through liability insurance.

Second, the incentives associated with liability do not function in the direct way discussed in the previous section, but instead are mediated by the terms of insurance policies. To illustrate, consider strict liability in the unilateral accident model with care alone variable, and assume that insurance is sold at actuarially fair rates. If injurers are risk averse and liability insurers can observe their levels of care, injurers will purchase full liability insurance coverage and their premiums will depend on their level of care; their premiums will equal  $p(x)h$ . Thus, injurers will want to minimize their costs of care plus premiums, or  $x + p(x)h$ , so they will choose the optimal level of care  $x^*$ . In this instance, liability insurance eliminates risk for injurers, and the situation reduces to the previously analysed risk-neutral case.

If, however, liability insurers cannot observe levels of care, ownership of full coverage could create severe moral hazard, so would not be purchased. Instead, as is known from the theory of insurance, the typical amount of coverage purchased will be partial, for that leaves injurers with an incentive to reduce risk. In this case, therefore, the liability rule results in some direct incentive to take care because injurers are left bearing some risk after their purchase of liability insurance, but their level of care tends to be less than first best.

This last situation, in which liability insurance dilutes incentives, leads to a third point, concerning the question whether the sale of liability insurance is socially desirable. (We note that, because of fears about incentives, the sale of liability insurance was delayed for decades in many countries and that it was not allowed in the Soviet Union; further, in the United States liability insurance is sometimes forbidden against certain types of liability, such as against punitive damages.) The answer to the question is that, even though it may dilute incentives, sale of liability insurance is socially desirable, at least in basic models of accidents and some variations of them. In the case just considered, for example, injurers are made better off by the presence of liability insurance, as they choose to purchase it, and victims are indifferent to its purchase by injurers because victims are fully compensated for any harm suffered. This argument must be modified in other cases, such as when the damages injurers pay are less than harm because injurers are judgment-proof.

Fourth, consider how the comparison between strict liability and the negligence rule is affected by risk bearing. The immediate effect of strict liability is to shift the risk of loss from victims to injurers, whereas the immediate effect of the negligence rule is to leave the risk on victims (as injurers tend to act non-negligently). However, the presence of insurance means that victims and injurers can substantially shield themselves from risk, attenuating the relevance of risk bearing for the comparison of strict liability and negligence.

Finally, the presence of insurance implies that the liability system cannot be justified primarily as a means of compensating risk-averse victims against loss. Rather, the justification for the liability system must lie in significant part in the incentives that it creates to reduce risk. To amplify, although both the liability system and the insurance system can compensate victims, the liability system is much more expensive than the insurance system (see the next section). Accordingly, were there no social need to create incentives to reduce risk, it would be best to dispense with the liability system and to rely on insurance to accomplish compensation.

### **Administrative costs**

The administrative costs of the liability system are the legal and other costs (notably the time of litigants) involved in bringing suit and resolving it through settlement or trial. These costs are substantial; a number of estimates suggest that, on average, administrative costs of a dollar or more are incurred for every dollar that a victim receives through the liability system (Shavell, 2004, p. 281).

### **Strict liability versus negligence**

The factor of administrative costs affects the comparison of liability rules. On one hand, we would expect the volume of cases – and thus administrative costs – to be higher under strict liability than under

the negligence rule. On the other hand, given that there is a case, we would anticipate administrative costs to be higher under the negligence rule because due care will be at issue. Hence, it is not clear which liability rule is administratively cheaper.

### **Social desirability of the liability system and private motives to sue**

The existence and the surprisingly high magnitude of administrative costs raise rather sharply the question whether the liability system is socially worthwhile. Moreover, the private motive to sue is not in alignment with the social reasons for using the liability system. First, the private benefit of suit is the amount of money that would be obtained from it, whereas the social benefit is the deterrence that would be created. Second, the private cost of suit is the victim's cost, whereas the social cost includes also the injurer's and the state's cost. These differences give rise to the possibility of socially excessive or socially insufficient suit. To illustrate the former, suppose that care has no effect on the accident probability, so that it is socially undesirable for suit to be brought. Yet under strict liability a victim will bring suit as long as his cost is less than the harm suffered, so the volume of litigation activity could be high. To illustrate the possibility of socially inadequate suit, suppose that an expenditure on care of only one hundredth of harm will eliminate the possibility of otherwise certain harm, and suppose also that the magnitude of harm is less than the cost of suit. Then no suit will be brought. However, it would be desirable for victims to have an incentive to bring suit, for that would induce care to be taken, and, since no harm would then occur, no suit would ever occur. The private versus the social motive to make use of the legal system was first developed in Shavell (1982b, 1997); see also Polinsky and Rubinfeld (1988).

## **Topics**

### **Damages**

Under strict liability, damages must equal harm  $h$  for incentives to be optimal. Under the negligence rule, however, damages higher than  $h$  also would induce injurers to take optimal care of  $x^*$ . Higher damages will increase the incentive to be non-negligent; they will not lead injurers to take excessive care because injurers can escape liability merely by taking care of  $x^*$ . But when there is uncertainty in the negligence determination, damages higher than  $h$  may lead to problems of excessive care. Damages exceeding  $h$  are desirable if injurers sometimes escape liability, as when injurers may be hard to identify (the origin of pollution may be difficult to trace). If the probability of liability for harm is  $q$ , then, if damages are raised to  $(1/q)h$ , expected liability will be  $h$ . Thus, the more likely an injurer is to escape liability, the higher should be damages. On these points and others about punitive damages, see Cooter (1989) and Polinsky and Shavell (1998).

### **Causation**

A fundamental principle of liability law is that a party cannot be held liable unless he was the cause of losses. For example, if cancer occurs in an area where a firm has polluted, the firm will be liable only for the cancer that it caused, not for cancer due to other carcinogens. This principle is necessary to achieve social efficiency under strict liability, because otherwise incentives would be distorted. Socially desirable production might be rendered unprofitable if the firm were held responsible for all cases of cancer. Under the negligence rule, restricting liability to accidents caused by an actor may be less important than under strict liability: if negligent actors were held liable for harms they did not cause, they would only have greater reason to act non-negligently. On causation and incentives, see Calabresi (1975), Kahan (1989), and Shavell (1987).

### **Judgment-proof problem**

The possibility that injurers may not be able to pay in full for the harm they cause is known as the judgment-proof problem and is of substantial importance, for individuals and firms often cause harms significantly exceeding their assets. When injurers are unable to pay fully for the harm they may cause, their incentives to reduce risk are inadequate, and their incentives to engage in risky activities excessive. Policy responses to the judgment-proof problem include vicarious liability (imposed on a party who has some control over the judgment-proof party), minimum asset requirements for participation in harmful activities, safety regulation, and criminal liability. On the judgment-proof problem and responses to it, see Kornhauser (1982), Pitchford (1995), Shavell (1986; 2005), and Sykes (1984).

### **Product liability**

When victims are customers of firms, the role of liability in providing incentives may be attenuated or even non-existent. If customers have perfect knowledge of product risks, then they will pay less for risky products, and incentives to reduce risk will be optimal without liability. If, however, customer knowledge of risk is imperfect, liability is potentially useful in reducing risk. In the latter case, a question of interest is whether court-determined liability or market-determined liability, namely, warranties, is likely to be better, on which see Priest (1981), Rubin (1993), and Spence (1977).

### **Liability versus other means of controlling risk**

Liability is only one method of controlling harm-causing behaviour; safety regulation and corrective taxes are among the alternatives. Liability harnesses the information that victims have about the occurrence of harm, and thus may be advantageous when victims, rather than the state, naturally observe how harm comes about; whereas when harm-causing behaviour and its occurrence requires state effort to be ascertained, regulation and taxation may be advantageous. In order for liability to function well as an incentive device, injurers must have assets approximating the harm they might cause, whereas regulation and taxation (based on expected harm rather than actual harm) do not require injurers to have substantial assets. Liability, however, may enjoy an administrative cost advantage over regulation and taxation, in that administrative costs are incurred under the liability system only when harm comes about, whereas such costs generally are incurred more often under regulation and taxation. On the comparison of the liability system and other means of controlling risk, see Calabresi and Melamed (1972), Kolstad, Ulen and Johnson (1990), and Shavell (1993).

### **See Also**

- externalities
- law, economic analysis of

### **Bibliography**

Brown, J.P. 1973. Toward an economic theory of liability. *Journal of Legal Studies* 2, 323–49.

Calabresi, G. 1970. *The Costs of Accidents*. New Haven, CT: Yale University Press.

Calabresi, G. 1975. Concerning cause and the law of torts. *University of Chicago Law Review* 43, 69–108.

Calabresi, G. and Melamed, A.D. 1972. Property rules, liability rules, and inalienability: one view of the cathedral. *Harvard Law Review* 85, 1089–128.

- Cooter, R.D. 1989. Punitive damages for deterrence: when and how much? *Alabama Law Review* 40, 1143–96.
- Craswell, R. and Calfee, J.E. 1986. Deterrence and uncertain legal standards. *Journal of Law, Economics, & Organization* 2, 279–303.
- Diamond, P.A. 1974. Single activity accidents. *Journal of Legal Studies* 3, 107–64.
- Kahan, M. 1989. Causation and incentives to take care under the negligence rule. *Journal of Legal Studies* 18, 427–47.
- Kessler, D. and Rubinfeld, D.R. 2007. Empirical study of the common law and legal process. In *Handbook of Law and Economics*, vol. 1, ed. A.M. Polinsky and S. Shavell. Amsterdam: North-Holland.
- Kolstad, C.D., Ulen, T.S. and Johnson, G.V. 1990. Ex post liability vs. ex ante regulation: substitutes or complements? *American Economic Review* 80, 888–901.
- Kornhauser, L. 1982. An economic analysis of the choice between enterprise and personal liability for accidents. *California Law Review* 70, 1345–92.
- Landes, W.M. and Posner, R.A. 1987. *The Economic Structure of Tort Law*. Cambridge, MA: Harvard University Press.
- Pitchford, R. 1995. How liable should a lender be? The case of judgment-proof firm and environmental risk. *American Economic Review* 85, 1171–86.
- Polinsky, A.M. and Rubinfeld, D.R. 1988. The welfare implications of costly litigation for the level of liability. *Journal of Legal Studies* 17, 151–64.
- Polinsky, A.M. and Shavell, S. 1998. Punitive damages: an economic analysis. *Harvard Law Review* 111, 869–962.
- Priest, G.L. 1981. A theory of the consumer warranty. *Yale Law Journal* 90, 1297–352.
- Rubin, P.H. 1993. *Tort Reform by Contract*. Washington, DC: AEI Press.
- Shavell, S. 1980. Strict liability versus negligence. *Journal of Legal Studies* 9, 1–25.
- Shavell, S. 1982a. On liability and insurance. *Bell Journal of Economics* 13, 120–32.
- Shavell, S. 1982b. The social versus the private incentive to bring suit in a costly legal system. *Journal of Legal Studies* 11, 333–9.
- Shavell, S. 1986. The judgment proof problem. *International Review of Law and Economics* 6, 45–58.
- Shavell, S. 1987. *Economic Analysis of Accident Law*. Cambridge, MA: Harvard University Press.
- Shavell, S. 1993. The optimal structure of law enforcement. *Journal of Law and Economics* 36, 255–87.
- Shavell, S. 1997. The fundamental divergence between the private and the social motive to use the legal

system. *Journal of Legal Studies* 26, 575–612.

Shavell, S. 2004. *Foundations of Economic Analysis of Law*. Cambridge, MA: Harvard University Press.

Shavell, S. 2005. Minimum asset requirements and compulsory liability insurance as solutions to the judgment-proof problem. *Rand Journal of Economics* 36, 63–77.

Spence, M. 1977. Consumer misperceptions, product failure, and producer liability. *Review of Economic Studies* 44, 561–72.

Sykes, A. 1984. The economics of vicarious liability. *Yale Law Journal* 93, 1231–80.

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