

# Michigan Law Review

---

Volume 86 | Issue 6

---

1988

## The Economics of Accidents

Michelle J. White  
*University of Michigan*

Follow this and additional works at: <https://repository.law.umich.edu/mlr>

Part of the [Law and Economics Commons](#), and the [Torts Commons](#)

---

### Recommended Citation

Michelle J. White, *The Economics of Accidents*, 86 MICH. L. REV. 1217 (1988).  
Available at: <https://repository.law.umich.edu/mlr/vol86/iss6/14>

This Review is brought to you for free and open access by the Michigan Law Review at University of Michigan Law School Scholarship Repository. It has been accepted for inclusion in Michigan Law Review by an authorized editor of University of Michigan Law School Scholarship Repository. For more information, please contact [mlaw.repository@umich.edu](mailto:mlaw.repository@umich.edu).

# THE ECONOMICS OF ACCIDENTS

*Michelle J. White\**

ECONOMIC ANALYSIS OF ACCIDENT LAW. By *Steven Shavell*. Cambridge, Mass.: Harvard University Press. 1987. Pp xii, 312. \$30.

This year marks the sixteenth anniversary of the publication of Richard Posner's landmark *Economic Analysis of Law*, first published in 1972. It also marks the eighteenth anniversary of Guido Calabresi's *The Cost of Accidents*, published in 1970. Both books posed important legal questions, and then studied them using economic analysis. Together, they opened up the common law to economic inquiry. But because both Posner and Calabresi are trained as lawyers rather than economists, their efforts invited economists to jump in and continue working on these issues using more formal economic theory. The two books presented a long list of interesting new questions for economists to work on — a happy circumstance for a field with more good problem-solvers than good problems. Calabresi and Posner in effect set the research agenda in law and economics from the early 1970s to the late 1980s.

While sixteen and eighteen aren't round numbers, they suggest the passage of an academic generation. Thus when Steven Shavell's new book, *Economic Analysis of Accident Law*, echoes Posner's title and Calabresi's subject, it immediately raises the question of what a generation of economic scholarship has accomplished in the core area of law and economics. Shavell's book seems to signal the end of the chapter opened in the 1970s. The research that Shavell summarizes shows what we can learn from applying standard microeconomic theory to the problems in tort law first set out by Posner and Calabresi. To me, it symbolizes the coming of age of the field of law and economics. The "new" law and economics of the common law (differentiated from the "old" law and economics of antitrust and regulatory issues, where the application of economic theory to legal issues has a much longer history) has now progressed to the point at which numerous law schools have courses in the area, and many universities offer courses for undergraduate and graduate economics students. For anyone wanting to learn where we stand concerning economic analysis of accident law, Shavell's book provides an authoritative and fairly com-

---

\* Adjunct Professor of Law and Professor of Economics, University of Michigan. A.B. 1967, Harvard University; M.Sc. (Econ.) 1968, London School of Economics; Ph.D. 1973, Princeton University. — Ed.

I would like to thank Henry Hansmann for helpful comments.

prehensive summary of the state of the art. Since Shavell is one of the key players in the "new" law and economics, much of what is summarized in the book is his own prior work. But he also discusses the research of others, and provides a quite comprehensive bibliography.

One especially attractive feature of the book is that it is essentially two textbooks in one. Each chapter, except for the introduction and conclusion, is divided into two parts. One part is nontechnical and uses examples and intuition to make the relevant points. The other part uses technical economic theory to make the same points, and works carefully through Shavell's and others' contributions on the same topics. Thus the book serves two extremely valuable purposes. First, it makes economic analysis of accident law accessible to lawyers, economists, and students, regardless of their mathematical sophistication. Second, it brings together much of Shavell's and others' research into the economics of tort law, which is scattered across professional journals. This should make the field accessible to anyone who wants to learn about it.

In Part I of this review, I try to give the flavor of the economic analysis of law by summarizing some of the field's major ideas as well as some of the many interesting variations on the themes which Shavell's book contains. Both efforts should be understood to be highly noncomprehensive. In Part II, I consider the questions of how realistic are economic models of the law, and whether and when their conclusions can be relied on for considering changes in the law. In Part III, I gaze into my crystal ball and think about where the field of law and economics will head in the next sixteen to eighteen years.

#### I. CARE INCENTIVES, ACTIVITY LEVELS AND RISK-BEARING — THE THREE-PART FRAMEWORK

Economic analysis of law has focused almost exclusively on questions of economic efficiency. It has asked the positive question of whether legal doctrines actually lead to economically efficient results. It has also asked the normative question of whether alternative legal doctrines (borrowed from other areas of the law, or from other countries, or dreamed up by economists) would lead to more economically efficient results than the legal rules which are commonly used. But the framework within which economic efficiency questions are posed has broadened over the years from its early emphasis only on the differences between liability rules in the incentives each creates to take care to avoid accidents. Instead, a three-part efficiency inquiry has developed, focusing not only on incentives to avoid harm, but also on the levels of economic activity resulting under particular legal rules, and on whether risk is borne efficiently under particular legal rules. In the subsections below, I examine ideas in each of the three areas.

### A. Care Incentives

Economists assume that accidents occur less often and involve less damage when potential injurers and victims use higher levels of care. For example, drivers of automobiles can reduce the probability of causing accidents and/or the severity of accidents by driving more slowly.<sup>1</sup> Each extra mile per hour that a driver reduces her speed can be thought of as using one more unit of care. Higher care levels are costly: when a driver drives more slowly, the trip will take longer, and time, as we all know, is money.

Figure 1, on the following page, reproduces Figure 2.1 in Shavell's text.<sup>2</sup> The cost of care rises at a constant rate as more care is taken. Expected accident losses, which equal the probability of accidents occurring times accident damage, always fall as more care is taken. But expected losses fall quickly with increasing levels of care when care levels are low, and fall more slowly with increasing care when care levels are high.<sup>3</sup> Total accident costs are shown in the figure by the dashed line, which graphs the sum of care costs plus expected accident losses. The economically efficient level of care is the level which leads to the lowest total accident costs. It is labelled  $x^*$ . Higher or lower levels of care than  $x^*$  are economically inefficient because they result in higher total accident costs. This illustrates a point frequently made by economists. The most economically efficient level of care is almost never the minimum amount of care (driving at top speed) and is almost never the maximum amount of care (driving at a crawl). Normally, the most efficient level of care occurs at some intermediate point. While this point may seem obvious, it is frequently overlooked in legislation calling for the "best available technology" regardless of cost — for example, to reduce air or water pollution, or to ban absolutely a product suspected of causing cancer, even if only in one laboratory animal at an extremely high dose.

What choice of care level will the driver make under different liability rules and under what conditions will it equal the economically efficient level of care?<sup>4</sup> Under strict liability, the driver has an incentive to use the economically efficient level of care. The basic argument is that the driver pays for both the cost of care and for all damages from accidents when they occur. Therefore she has an incentive to choose her care level to minimize the sum of care costs plus her ex-

---

1. Other aspects of care, such as paying attention while driving, refraining from drinking before driving, and keeping one's car in good repair, are also important.

2. But with a few additions, discussed below.

3. The shape of this curve, which implies diminishing effectiveness of extra care in reducing expected losses, reflects a frequent assumption made in economic models — one which is thought to represent the real world fairly accurately. For discussion of the role of assumptions in economic models, see Part II *infra*.

4. This question was the first in the "new" law and economics subject to extensive analysis by economists. See Shavell's discussion of the literature, pp. 20-21.

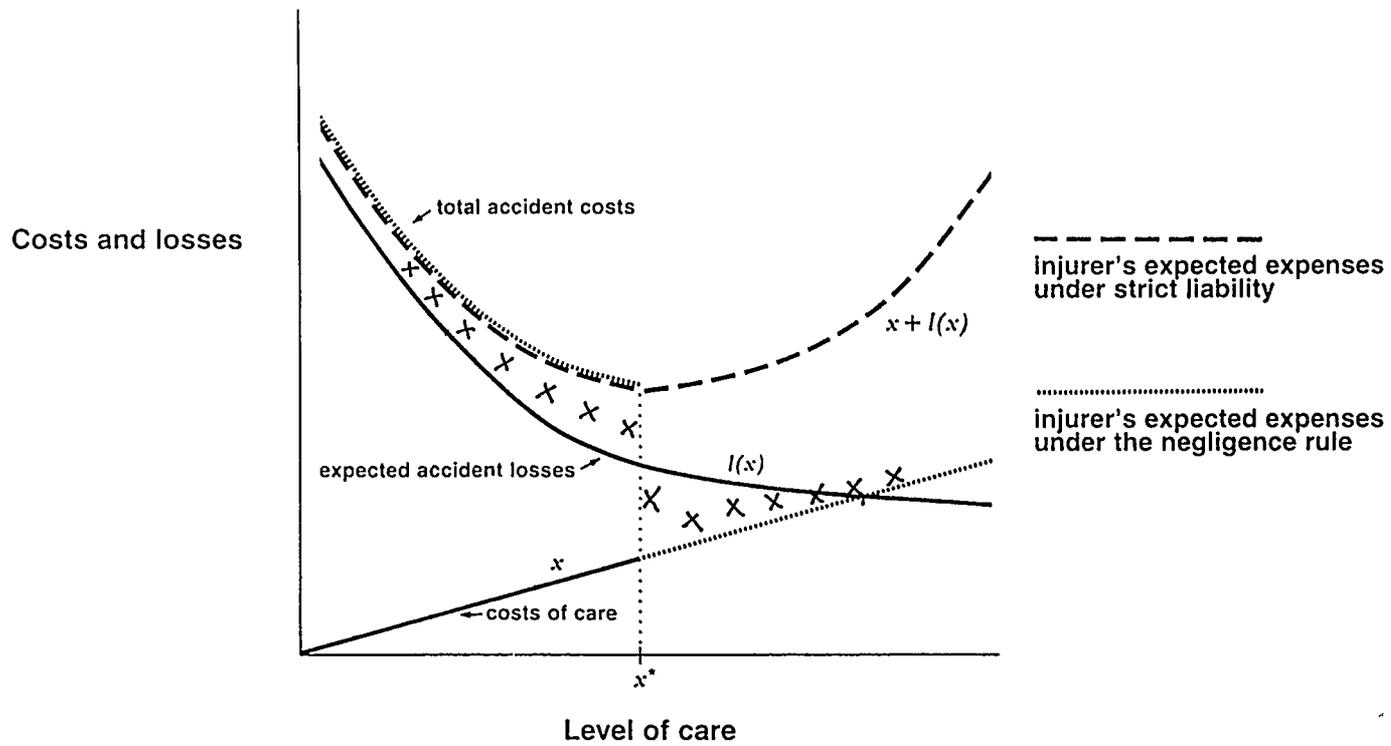


Figure 1

pected liability for damage. Since her private costs include all the components of total accident costs, she has an incentive to choose the economically efficient care level.<sup>5</sup>

Under the negligence rule, the driver also has an incentive to adopt a level of care equal to the economically efficient level of care, as long as the negligence standard is interpreted economically. Suppose the economically efficient level of care is  $x^*$ . A court will judge the driver to be negligent if she uses less care than  $x^*$ , and to be nonnegligent if she uses a care level of  $x^*$  or more. In the figure, the dotted line is the driver's private cost under the negligence rule. If she uses a level of care below  $x^*$ , she will be judged negligent and she must pay both for care and for damage due to accidents when they occur. But if she uses a level of care of  $x^*$  or more, she will be judged nonnegligent when accidents occur, so her costs include only the cost of care. The figure shows a drop in the injurer's costs at  $x^*$  — the "negligence notch." The driver will not use less care than  $x^*$ , since doing so would make her liable for accident costs. And she will not use more care than  $x^*$ , since extra care is costly and generates no benefit for the injurer.

Thus, both strict liability and negligence rules give drivers incentives to maintain economically efficient levels of care. So do a variety of other legal rules, such as negligence with the defense of contributory negligence and strict liability with contributory negligence — as Shavell shows. This means that there is no reason for preferring one of these rules over another when considering only whether the injurer's care incentives are efficient. However, when other issues are introduced, such as encouraging efficient levels of care by accident victims, the rules have different consequences.

Even the basic result that both the strict liability and negligence rules cause injurers to have incentives to take economically efficient levels of care is sensitive to a number of simplifying assumptions. These include assumptions that the injurer is always in perfect control of her level of care; that the injurer actually pays for damages whenever she is found liable for an accident; that the injurer's liability is for exactly the level of damages sustained by the victim (no more, no less); that litigation costs are zero; and, in the case of the negligence rule, that no errors are made by the court in judging whether the injurer is negligent. Shavell discusses modifications to the basic care model that incorporate all of these complications.

The discussion of the effects of different liability rules when litigation is costly rather than free is particularly interesting. Suits by victims provide the enforcement mechanism for injurers' incentives to take care, since if injurers are sometimes not sued by victims when they would be liable, their incentive to take care will be too low. If

---

5. This assumes that no insurance is available and that the driver is risk-neutral. See Part II *infra* for definition and discussion.

litigation were free, victims would always sue when injurers were liable. But when litigation is assumed to be costly, victims sue only if the expected damage award exceeds the cost of litigating. Shavell shows that under the strict liability rule, victims may sue either too much or too little. The reason is that while victims' private incentives to sue depend on their own litigation costs relative to their expected damage awards, the social gain from litigation depends on whether it gives injurers an incentive to take precautions which are economically efficient. There may be too little litigation if injurers do not take cost-effective precautions, because victims do not sue. But there may be too much litigation if injurers take precautions which are not cost effective, because doing so makes victims' damages slight enough that they cross the boundary between suing and not suing, allowing injurers to avoid liability. This means that the strict liability rule under costly litigation may encourage either too much or too little care by injurers.

Conversely, the negligence rule potentially appears to work better when litigation is costly. Under a negligence rule, injurers have an incentive to use an economically efficient level of care because doing so allows them to avoid liability. Thus a negligence system in which no one makes mistakes does not require litigation by victims to provide injurers with efficient incentives to take care. In theory, no lawsuits should occur. Only when injurers make mistakes and are negligent does the rule require enforcement by victims' willingness to sue. Thus the negligence rule may work better than the strict liability rule in that victims always sue too little and never too much. Shavell discusses the question of whether there should be social intervention in this case to encourage suits by victims (pp. 262-76) — a consideration that may seem strange to those who have been reading in the popular press about the excessive propensity of Americans to litigate!

### B. *Activity-Level Incentives*

The activity-level issue concerns the effect of various liability rules on the amount of the economic activity in question. In the context of our driving example, the question is under what liability rules will the driver choose to make the economically efficient number of trips? Here the strict liability rule has an advantage over the negligence rule, since strict liability forces the injurer to take account of whatever increase in the expected number of accidents she causes by choosing to take one more trip. She will therefore weigh the benefits of the trip against its full costs. In contrast, when the negligence rule is in effect, the driver escapes liability for the additional accidents she causes when she makes an extra trip (as long as she drives slowly enough to avoid being found negligent). Thus, under the negligence rule, the private

cost of taking extra trips is too low, causing drivers to make too many trips.

The solution to this dilemma, as Shavell points out, would be to make the level of activity a part of the court's determination of negligence.<sup>6</sup> Thus a driver who took the economically efficient level of care could nonetheless be judged negligent if she took too many trips. But making the activity level part of the negligence determination would appear to present insuperable practical problems. The court would have to judge how many trips the driver took in a time period (which might be difficult if the injurer's car were used by more than one driver), and whether her trips were generally cost-justified.

Shavell discusses a number of interesting extensions to the model of care and activity. There is a chapter on models of causation, in which the effects of different models on the efficient care and activity levels and on injurers' incentives to behave efficiently are explored (pp. 105-26). In his model of necessary causation, whether some particular precaution reduces accident losses depends on which of two states of nature prevail (p. 106). An example discussed in the book is that of a town which might or might not build a seawall. The wall is effective in preventing flooding when a moderate storm strikes, but not when a severe storm strikes (p. 106). In his model of coincidental accidents, the probability of an accident occurring is unaffected by the injurer's care level (pp. 110-15). Assuming a strict liability rule to prevail, Shavell explores in each of these models what the effect of a narrower versus wider scope of liability (such as making the town liable for flood damage only when the storm is moderate, or when any type of storm occurs) would be on the economic efficiency of injurers' behavior. He shows that, in general, the scope of liability has no effect on injurers' incentives to take care; they act efficiently in either case. However, activity levels may be inefficiently affected by a wider definition of the scope of liability. For example, if the town in the example can decide whether or not to take jurisdiction over the shoreline, a wider scope of liability might make it prefer not to take jurisdiction, but this outcome might be economically inefficient.

### C. *Efficient Risk Bearing*

The third criterion for economic efficiency is efficient risk bearing. Shavell provides a lucid discussion of risk aversion and the theory of insurance, as the background for considering whether the various liability rules lead to incentives for economically efficient risk bearing. The basic idea here is that people who are risk-averse dislike facing

---

6. P. 25. Shavell points out that there is an analogy to this result in the care model, when there are multiple facets of care, but only one is used to determine negligence. Then injurers will drive slowly when the driving speed determines negligence, but they may daydream while driving, since the court cannot observe this. P. 9.

uncertain losses. The driver faces uncertainty if she will have to use her wealth to compensate the victim for damage when an accident occurs and the victim faces uncertainty if he will have to bear his own accident losses when they occur. To avoid facing uncertainty, risk-averse parties wish to buy insurance policies, which transfer the risk of loss from the buyer to the insurance company. They are willing to pay *more* than the expected value of their losses in return for insurance policies which reduce the uncertainty they face. If given a choice between full and partial coverage against losses at a price equal to the expected value of the losses, they will choose to buy full coverage.

To return again to our driving example, suppose no insurance is available for either drivers or victims. The strict liability rule then places all the risk of loss on the driver (assuming that liability is for the actual level of damages suffered by the victim in the accident). The strict liability rule in effect provides full insurance for the victim. In contrast, the negligence rule places all the risk of loss on the victim, as long as the driver is nonnegligent (*i.e.*, uses the economically efficient level of care). The negligence rule thus provides full insurance for the driver.

If no insurance were available, the determination of which liability rule would lead to economically efficient risk-bearing would depend on such factors as whether drivers versus victims tended as a class to be more risk-averse. However, in the United States, insurance is commonly sold by third parties — private insurance companies. Therefore the decision as to which liability rule is more economically efficient need not depend on whether injurers or victims are more risk-averse. Neither group needs to bear risk, since it can be transferred to third party insurers.<sup>7</sup> This means that the choice of the best liability rule can be made exclusively on the basis of considerations other than risk-bearing — such as encouraging efficient levels of care and/or efficient activity levels.

Shavell provides a very clear discussion of the effect of insurance on injurers' incentives to take care (pp. 210-15, 222-27). When risk-averse injurers are strictly liable and cannot purchase accident insurance, they tend to take too much care, since higher levels of care reduce expected accident liability and therefore reduce uncertainty. However, purchase of full insurance may cause injurers to take too little care if the insurance premium remains the same even if injurers start to drive too fast and cause more accidents. Thus, the historic resistance in a number of countries to allowing liability insurance for drivers, due to fears that the availability of insurance would lead insured drivers to be careless.

Yet a number of factors restore at least some incentive to take care.

---

7. Insurers are risk-neutral rather than risk-averse. The law of large numbers makes accident losses very predictable when insurance companies cover many statistically independent risks.

First, insurance companies often offer only partial rather than full insurance, so that even insured drivers have to pay for part of the damage they cause. Furthermore, insured persons may have their premiums raised in the future if they cause accidents. Insurance companies also are able to obtain information concerning care levels and they use it to encourage insured parties to use more care. An example is the reduction in insurance premiums offered to drivers with accident-free driving records over a number of years. Shavell ultimately argues strongly that liability insurance is socially beneficial, because it protects risk-averse persons from uncertainty, while maintaining incentives for them to take care (p. 213).

The book discusses a number of interesting extensions to this basic model. One of these is the possibility that potential accident victims might choose to insure only against the possibility of pecuniary losses, and not buy insurance against nonpecuniary losses such as loss of a family heirloom, loss of a limb, or grief due to the death of a family member. In this case, victims would choose to buy partial rather than full insurance. (The technical condition for this is that the marginal utility of money not be affected by the nonpecuniary loss.) If so, then the optimal level of compensation received by the accident victim may be different from the optimal level of damages paid by the injurer. But even though only partial compensation for victims might be efficient, it would still be necessary for injurers to be liable for the full amount of damage (pecuniary plus nonpecuniary) in order for them to have an incentive to take economically efficient levels of care. Shavell explores the possibility that a system of fines payable to the state might be used to supplement liability by injurers as a means of increasing their incentives to take care (pp. 233-34). Fines might also be useful as a supplementary system when injurers underinsure because their wealth, and therefore their ability to pay, is smaller than the damage they cause when an accident occurs. In that case the liability system alone causes injurers to take too little care and to engage in too much activity.

There is also an interesting discussion of the economic effects of rules concerning collateral insurance benefits, such as whether or not insurance payments to victims are subtracted from liability judgments against injurers, and whether insurers have subrogation rights (pp. 235-40). Shavell argues that the different arrangements have little economic effect, since risk-averse victims prefer to have full coverage of accident losses, but no more. Depending on the rule that prevails, victims therefore will vary their purchase of insurance so that they have full coverage but no more.

## II. ON THE USE OF ECONOMIC MODELS OF LAW: A CAUTIONARY NOTE

An ever-present problem in applying economic models to legal

questions is that in order to construct economic models, we must make simplifying assumptions. While these may enable us to reach clear, simple answers which are very intuitively appealing, the answers that economic models give us are only as good as their assumptions. Thus, we must always approach these answers skeptically, particularly if we plan to use them as arguments for possible changes in the law or in related institutions. When the assumptions made are reasonable, then the answers will also be reasonable. But there has been so little empirical research in law and economics that we are often in the dark concerning which assumptions are reasonable and which are not. Most economists would probably agree that the general shapes of the curve depicting the costs and benefits of care in Figure 1<sup>8</sup> are quite robust; that most individuals are risk-averse rather than risk-neutral; and that individuals respond to economic incentives. So the basic predictions of the care, activity level, and risk-bearing models would probably not generate much dispute. But some of the models discussed by Shavell involve situations in which several different sets of assumptions seem equally attractive. Thus, a note of caution is useful.

To take an example, Shavell (in sections 4.3 and 4A.3) (pp. 79-83, 93-99), analyzes the effect of courts making errors in deciding whether injurers are negligent on the incentives of injurers to take care. He argues that when courts make mistakes in determining negligence, injurers have an incentive to use too much care. This example is shown as example 1 of Table 1 on the following page. Shavell assumes that there are three possible levels of care: none, moderate, and high. No care costs nothing and generates an accident probability of .15; moderate and high levels of care cost \$3 and \$5, respectively, and generate accident probabilities of .10 and .09, respectively. Accidents, when they occur, always cost \$100. The total cost to society if no care is exercised therefore equals  $0 + (.15)(100)$ , or \$15; total social costs under moderate care and high care are \$13 and \$14, respectively. The economically efficient level of care is therefore moderate care, since it has the lowest sum of care costs plus expected accident costs.

If no errors were made, courts would find injurers nonnegligent if they used moderate or high care, and negligent if they used no care. However, courts make errors in judging injurers' levels of care. In particular, there is assumed to be a 33% chance that the court will misjudge the injurer's care by one level and a 5% chance that the courts will misjudge care by two levels. Therefore, if injurers take no care, they will mistakenly escape liability .33 of the time (when courts judge them to have taken moderate care) plus .05 of the time (when courts judge them to have taken high care). In total they will be liable .62 of the time ( $1.00 - .33 - .05$ ). Their total private costs under no care will therefore be  $(.62)(.15)(100)$  or \$9.30. If injurers take moder-

---

8. See text at note 2 *supra*.

TABLE 1: INJURERS' CHOICE OF CARE LEVEL WHEN COURTS MAKE ERRORS

	No care	Moderate care	High care
Example 1: (Shavell)			
Cost	0	3	5
Accident probability	.15	.10	.09
Expected accident losses	\$15	\$10	\$9
Total social cost	\$15	\$13	\$14
Probability of liability	.62	.33	.05
Probability of no liability	.38	.67	.95
Total private cost	\$9.30	\$6.30	\$5.45
Example 2:			
Probability of liability		.33	.165
Probability of no liability		.67	.835
Total private cost		\$6.30	\$6.48
Example 3:			
Probability of liability	.41	.33	
Probability of no liability	.59	.67	
Total private cost	\$6.15	\$6.30	

ate care, they will still mistakenly be found liable .33 of the time (when the courts judge them to have taken no care), so their total private costs will be  $3 + (.33)(.10)(100)$  or \$6.30. If injurers take high care, they will mistakenly be found liable .05 of the time (when the courts judge them to have taken no care), so their total costs will be  $5 + (.05)(.09)(100)$  or \$5.45. Injurers choose the level of care that minimizes their total private costs, which is high care. Thus, when the fact that courts do make mistakes is taken into account, injurers have an incentive to take an inefficiently high level of care.<sup>9</sup>

But this result is sensitive to the particular assumptions made. In examples 2 and 3 of Table 1, the probability of accidents, the cost of care, and total social costs remain the same at all levels of care, but the court's pattern of errors is changed. In example 2, the probability of the injurer being held liable when she uses moderate care is still .33, but when she uses high care, it becomes .165 rather than .05. Total social costs are unchanged, as are total private costs with moderate care. But total private costs with high care now become \$6.48. Since

9. It is interesting to note how the model of court error relates to the analysis of the effect of the negligence rule as discussed in the previous section. In Figure 1, the effect of a court's error in determining negligence is a reduction in the private cost to the injurer of taking less care than is economically efficient, and an increase in the private cost to the injurer of taking the economically efficient level (or higher level) of care. These changes erode the "negligence notch" and may make it disappear entirely. A possible private cost curve for injurers given court error is shown as the line of "x's" in Figure 1. As shown, it gives the injurer an incentive to use more care than is economically efficient, but the result could go either way.

total private costs are lower when moderate care is used, the injurer will choose moderate care. The injurer chooses to take the economically efficient level of care in the modified example, despite the errors made by the court.

In example 3, the probability of the injurer being held liable remains .33 when moderate care is used, but becomes .41 rather than .62 when no care is used. The total private costs of taking no care are now \$6.15. Since the total private costs of taking no care are lower than the total private costs of taking moderate care, the injurer now chooses to take no care. Thus the injurer now takes too little rather than too much care.

Examples 2 and 3 suggest the sensitivity of the results in this model to the exact specification of how errors vary depending on the level of care. In example 2, the injurer's gain from using high care rather than moderate care is lower than in Shavell's example, since the probability of being held liable by mistake falls more slowly as the care level is increased. Therefore, the attractiveness to the injurer of using high care is reduced. In example 3, the cost of using no care rather than moderate care is reduced, since the injurer is found liable less frequently when she uses no care than in Shavell's example. Therefore using no care becomes attractive to the injurer.

Whether the care level chosen by the injurer is equal to, greater than, or less than the economically efficient care level depends on a comparison between the rate at which the probability of accidents falls with more care, and the rate at which the probability of the injurer *not* being held liable rises with more care, at the level of care chosen by the injurer.<sup>10</sup> If the two are equal at the care level chosen by the injurer, then the injurer's decision will be economically efficient. If the two are not equal, then the injurer has an incentive to use either too much care or too little care relative to the economically efficient level.

In example 3, the probability of accidents falls from .15 to .10, or by 40% (evaluated at the average value), when the care level increases from no care to moderate care. The probability of the injurer not being held liable (equal to 1 minus the probability of liability) rises from .59 to .67, or by 13%, when the care level increases from no care to moderate care. Since the rate of decrease in the probability of accidents is faster than the rate of increase in the probability of the injurer not being found liable, the injurer has an incentive to use too little

---

10. This comparison is implied by Shavell's Expression (4.9) (p. 94), and is consistent with Shavell's model. However, Shavell interprets the model differently and emphasizes the conditions under which injurers have an incentive to use too much care, rather than the possibility that injurers might have incentives to use *either* too much *or* too little care. He shows that the injurer has an incentive to take too much care when the distribution of court errors is not too dispersed. See proposition 4.4 (pp. 95-96). Example 3, discussed here, has a dispersed distribution by Shavell's criterion, since the probability of the court making errors falls relatively slowly as care is increased.

care. In contrast, Shavell's example demonstrates the opposite case. The probability of accidents falls from .10 to .09, or by 11%, when the care level increases from moderate to high. The probability of the injurer not being liable rises from .67 to .95, or by 36%, when the care level rises from moderate to high care. Since the rate of decrease in the probability of accidents is smaller than the rate of increase in the probability of the injurer not being found liable, the injurer has an incentive to use too much care. Finally, in example 2, the probability of accidents falls again from .10 to .09, or by 11%, when the care level increases from no care to moderate care. The probability of the injurer not being liable rises from .67 to .83, or by 22%, when the care level rises from no care to moderate care. In this case the two rates of change are close enough that the injurer's best care level is the same as the economically efficient moderate care level.<sup>11</sup>

What should we conclude from this exercise? Clearly, one conclusion is that results of economic models should not be used as guidelines for policy unless one is fairly certain that the models' assumptions are realistic and that the models' results are not sensitive to small changes in assumptions. Second, we should probably conclude that there is a great need for empirical work — to investigate what model of court error better describes actual behavior and to determine how quickly the cost of increasing the level of care rises. In the context of models of judicial error, and in a number of other contexts that have been explored by economists, much more empirical work needs to be done before we can be at all confident that we know the shapes of the functions that determine how the results come out. But what we should not conclude is that models are useless as a method of analysis. While some of the models discussed by Shavell and other economists may have their conclusions changed in the future, anyone who reads and understand Shavell's book will be well prepared to understand the implications of whatever set of assumptions turns out to represent the real world best. The method of economic analysis is transferable across sets of assumptions even if the specific models are not.

### III. WHERE IS THE FIELD OF LAW AND ECONOMICS HEADED?

Shavell's book invites us to think about where we stand in law and economics and where we ought to go from here. While the book is entirely concerned with theory rather than empirical work, it has pushed economic models of accident law toward greater realism in a number of dimensions: by introducing the assumption that litigation is costly rather than free; by exploring models in which courts make

---

11. Examples involving a few discrete outcomes are always inexact. If the injurer could change her care level continuously, she would choose exactly the economically efficient level of care where the two rates of change are exactly equal.

errors; by considering the possibility that the injurer's liability for accident damage may differ from the actual level of damage because of inability to pay, inability to identify the injurer, or measurement problems; by treating the role of insurance exhaustively, and by considering the relationship between liability rules and other methods of encouraging care, such as regulations and fines.

The discussion in the previous section suggests my own highest concern — the need for more empirical research to determine which of the models used and assumptions made in law and economics are realistic and which are not. Future research in law and economics will hopefully take on more of a real-world slant, either through laboratory experiments measuring behavior, normal empirical work using government or case data, or cross-country comparisons.

A second item for the research agenda is the need for more research combining the effects of liability rules with other approaches to the control of risk, such as safety regulations, injunctions, fines, taxes, or prison terms. Having convinced us of the difficulties inherent in depending on the liability system to encourage efficient care in reducing accidents, Shavell devotes a final chapter to an interesting comparison of the effects of the liability system versus these other approaches to reducing accidents (pp. 277-86). But the alternatives need to be viewed by economists more as supplements and less as alternatives to the liability system. Shavell's chapter begins this endeavor, but such a large subject calls for further research.

The final item on my future research agenda in law and economics is that economists should widen their modelling focus to address a broader set of issues than they have in the past. One of the failings of economic analysis of accident law is economists' apparent inability to explain a number of recent trends, such as why the comparative negligence rule and the no-fault system have become so popular and spread so widely in recent years, why some liability insurance markets appear to have failed, and why (or if) we have a "litigation explosion." To some extent, this failure results from economists' exclusive focus on normative models analyzing efficiency effects. For example, neither the adoption of the comparative negligence rule nor the no-fault system can be explained by economic efficiency models. Both systems seem to generate higher litigation and administrative costs than the traditional negligence rules, and the no-fault rule leads to incentives for injurers to take too little care. Shavell argues, as have other economists, that the comparative negligence rule leads to the same economically efficient care incentives as other negligence rules; but this conclusion depends on the particular assumptions used, and in any case does not completely justify the rule given its higher administrative costs. While comparative negligence shares risk, and no-fault increases compensation, Shavell points out that compensation is accom-

plished in any case under the traditional fault system by the use of third-party insurance. Thus from an efficiency perspective, there seems to be little to recommend either the comparative negligence rule or the no-fault system. If economists are to be able to explain the adoption of either system, they are probably going to have to formulate models with a broader focus than just economic efficiency.

That said, none of this should be viewed as criticism of Shavell's book. In fact, my only complaint is that I wish Shavell hadn't stopped at accident law, and had also covered the economic analysis of contracts, property, and criminal law.