

Note also that if the court incorrectly estimates the value of performance to the breached-against party, then the conclusions regarding the effects of the expectation remedy on the breach decision and on the reliance decision would have to be modified. Similarly, if the breached-against party's reliance expenditures are likely to be incorrectly determined, the conclusions regarding the effects of the reliance remedy would also have to be modified.

The discussion in this chapter has shown that, in general, there does not exist a breach of contract remedy that is efficient with respect to both the breach decision and the reliance decision. With respect to breach, the expectation remedy is ideal, whereas with respect to reliance, the restitution remedy is ideal. Thus, which remedy is best overall depends on whether the breach decision or the reliance decision is more important in terms of efficiency. For example, in the example used in this chapter an inefficient breach occurred when *S* sold the widget to *B2* when *B2*'s value was \$180. Since *B1* valued the widget at \$200, there was an efficiency loss of \$20 from inefficient breach. Inefficient reliance occurred when *B1* spent the additional \$24 in reliance. Since the expected benefit of reliance was only \$20, there was an efficiency loss of \$4 from inefficient reliance. Thus, in this example the breach decision was more important than the reliance decision and therefore, on balance, the expectation remedy would be preferred.

An important assumption in the discussion in this chapter was that the parties were neutral with regard to risk. In Chapter 8 we will reconsider breach of contract remedies when the parties are assumed to be averse to risk and see that, in general, none of the remedies discussed here is ideal.

## CHAPTER 6

### THIRD APPLICATION — AUTOMOBILE ACCIDENTS

In both of the applications discussed thus far — nuisance law and breach of contract — it was reasonable to consider the possibility that bargaining among the parties could lead to the efficient solution. Thus, the framework of the Coase Theorem was directly applicable to these kinds of disputes. In the next application that we will examine — automobile accidents involving pedestrians — bargaining obviously cannot lead to the efficient outcome since neither drivers nor pedestrians know in advance with whom to bargain. The Coase Theorem may be helpful nonetheless. Efficient legal rules for dealing with driver-pedestrian accidents can still be derived by imagining what rules a driver and a pedestrian would have chosen if they could have costlessly gotten together before the accident. As in the other applications, the parties would have agreed to remedies that would lead them to behave so as to maximize their joint benefits net of their joint costs.

A simple example will be used to investigate the efficiency of different legal remedies in driver-pedestrian accidents. In this example, it is assumed that drivers and pedestrians are risk neutral; the discussion will therefore be in terms of the *expected* accident cost to a pedestrian — the magnitude of the harm if an accident occurs multiplied by its probability of occurrence. It is also assumed initially that only the speed of drivers affects the pedestrians' expected harm. (The example will be extended later in this chapter to include the possibilities that the number of miles driven or the care exercised by pedestrians also can affect the expected harm.) The driver has three choices: drive rapidly,



TABLE 3 Expected

## Automobile Accident Example — Driver's Care Affects Expected Accident Cost

Behavior of Driver	Total Benefit to Driver	Total Expected Accident Cost to Pedestrian	Total Benefit Minus Total Cost
Drive rapidly	\$120	\$100	\$20
Drive moderately	\$80	\$40	\$40
Drive slowly	\$50	\$20	\$30

drive moderately, or drive slowly. Each choice results in some benefit to the driver and some expected accident cost to the pedestrian. The driver's benefit from driving faster might be the dollar value he places on saving time. The pedestrian's harm is also assumed to have a monetary value.<sup>23</sup>

The data for the example are described in Table 3. For each choice of the driver, the table lists the benefit to the driver and the expected accident cost to the pedestrian. The efficient outcome requires that the driver act so as to maximize total benefit less total cost. Given the data in Table 3, it is efficient for the driver to drive moderately. Relative to this outcome, driving rapidly is inefficient because it increases the pedestrian's expected losses by \$60 while increasing the driver's benefits by only \$40. And driving slowly is inefficient because it lowers the driver's benefits by \$30 while lowering the pedestrian's expected losses by only \$20.

### The Driver's Care

We will now consider the effects on the driver's behavior of two alternative rules of liability in accident law — *strict liability*

23. As suggested in note 6 above and in the accompanying text, economic analysis also can be used to analyze accidents in which the harm is not equivalent to the loss of money (as is the case with pain and suffering). However, the discussion would be considerably more complicated.

ity and *negligence*. Under each, the driver will choose the action that maximizes his benefits net of his expected liability payments. Under the rule of *strict liability*, the driver will be made liable for the pedestrian's accident losses regardless of the driver's care. Thus, for each action, the driver's benefit net of his expected liability payments is the same as the last column in Table 3. The driver therefore will choose to drive moderately — the efficient outcome. In essence, the rule of strict liability induces efficient behavior because it forces the injurer — in this example, the driver — to take into account all of the adverse effects of his behavior on the victim — the pedestrian.

For the rule of strict liability to be efficient, it is generally necessary for the court to be able to obtain correct information about the victim's damages. To see why, suppose in the example that the court estimates damages to be one-half of the victim's actual damages. Then, referring to Table 3, the driver's benefits net of his expected liability payments would be \$70 if he drives rapidly (\$120 — \$50), \$60 if he drives moderately (\$80 — \$20), and \$40 if he drives slowly (\$50 — \$10). He would therefore choose to drive rapidly — faster than is efficient.<sup>24</sup> Similarly, suppose the court estimates damages to be twice what they actually are. Then the driver's benefits net of his expected liability payments would be, respectively, —\$80 (\$120 — \$200), \$0 (\$80 — \$80), and \$10 (\$50 — \$40). Thus, the driver would choose to drive slowly — too slow relative to desired driving behavior. In order to focus on other considerations, it will be assumed hereafter that the court has accurate information about the victim's damages.

Under the rule of *negligence*, the driver will be made liable for the pedestrian's accident losses only if the driver does not meet some standard of care. Suppose this standard is determined by the care that would be taken if the driver acted efficiently. In the example, this corresponds to driving moderately. Thus, the driver would be liable for the pedestrian's accident losses only if the driver chooses to drive rapidly. Therefore, if he drives rapidly his benefit net of his expected liability payments is \$20 (a \$120 benefit less a \$100 expected liability payment). If he drives

24. For similar reasons, the driver would also generally drive faster than is efficient if, given his income or wealth, he does not expect to be able to pay the full amount of the victim's damages.



moderately, it is \$80 (just the benefit since there is no liability), and if he drives slowly it is \$50 (again, just the benefit). Consequently, under the rule of negligence with this standard of care, the driver will choose the efficient outcome of driving moderately. In essence, the rule of negligence leads to the efficient outcome because the injurer is induced to meet the standard of care — since liability increases from zero to the victim's damages if the standard is violated — and the standard is selected to correspond to the desired behavior.

For the rule of negligence to be efficient, it is necessary for the court to have enough information to determine the efficient outcome so that the standard of care can be chosen to correspond to it. To see why, suppose in the example that the court mistakenly believes that it is efficient for the driver to drive slowly and therefore makes this behavior the standard of care. In other words, the driver is liable for the pedestrian's losses if he drives rapidly or moderately, but not if he drives slowly. Then, referring to Table 3, the driver's benefit net of his expected liability payments is \$20 if he drives rapidly (\$120 - \$100), \$40 if he drives moderately (\$80 - \$40), and \$50 if he drives slowly (\$50 - \$0). Thus, the driver would choose to drive slowly, an inefficient outcome. Similarly, if the court were to make the standard of care too lenient rather than too strict, the driver would choose to drive faster than would be efficient. In order to focus on other considerations, it will be assumed hereafter that the court has enough information to select the standard of care that corresponds to the efficient outcome.

The discussion thus far illustrates a general principle in the economic analysis of accident law: In accident situations in which the only problem is to induce the injurer to take appropriate care, both strict liability and negligence are efficient, provided that liability equals actual damages if strict liability is used and that the standard of care corresponds to the efficient outcome if negligence is used.

### The Pedestrian's Care

In many accident situations, however, the problem is not just to control the injurer's behavior. In general, both the injurer

and the victim can affect the probability or the magnitude of the harm. For example, a pedestrian can walk rather than run when crossing a street, or a cyclist can wear a protective helmet. When both the injurer and the victim can affect the expected harm, the problem is to induce both parties to take appropriate care. We will now reexamine the rules of strict liability and negligence with respect to this additional consideration.

To allow for the expected harm to be determined by the behavior of both the driver and the pedestrian, it is necessary to extend the example used above. It will now be assumed that the pedestrian has one choice — whether to walk or to run. If he walks, then his expected accident loss is \$100 if the driver drives rapidly, \$40 if the driver drives moderately, and \$20 if the driver drives slowly. These are the same values used in Table 3. If the pedestrian runs, his corresponding expected accident losses are \$110, \$50, and \$30. In other words, running is assumed to raise the expected harm by \$10 regardless of the driver's behavior.<sup>25</sup> The data for the extended example are summarized in Table 4, where it is also assumed that the driver's benefits from driving are the same as in Table 3.

The efficient solution to the accident problem now involves a specific action by both the driver and the pedestrian. If the pedestrian walks, the problem is the same as before, and the efficient outcome with respect to the driver's behavior is for him to drive moderately. If the pedestrian runs, it can be seen from Table 4 that total benefits minus total costs also are maximized when the driver drives moderately. Thus, regardless of the pedestrian's behavior, the efficient solution involves the driver's driving moderately. Whether it is efficient for the pedestrian to walk or to run depends on the relevant costs and benefits. Running rather than walking increases the pedestrian's expected harm by \$10 (regardless of the driver's behavior). It will be

25. In general, the effect of the pedestrian's care on expected accident losses would depend on the driver's behavior. For example, suppose the pedestrian's decision whether to walk or to run determines the probability of an accident, while the driver's speed determines the magnitude of the harm if an accident occurs. Then the faster the driver drives, the more the expected harm will be raised by the pedestrian's decision to run. The assumption made in the text — that running raises the expected harm by an amount that does not depend on the driver's behavior — allows for great simplification of the subsequent analysis without affecting the general conclusions.

both  
strict liability  
negligence



TABLE 4

Automobile Accident Example — Driver's Care and Pedestrian's Care Affect Expected Accident Cost

Behavior of Driver	Total Benefit to Driver	Total Expected Accident Cost to Pedestrian (Depending on Pedestrian's Behavior)	Total Benefit Minus Total Cost (Depending on Pedestrian's Behavior)
Drive rapidly	\$120	\$100 (walks)	\$20 (walks)
		\$110 (runs)	\$10 (runs)
Drive moderately	\$80	\$40 (walks) ✓	\$40 (walks)
		\$50 (runs)	\$30 (runs)
Drive slowly	\$50	\$20 (walks)	\$30 (walks)
		\$30 (runs)	\$20 (runs)

assumed that running provides additional benefits to the pedestrian valued at \$5 — for example, due to the saving of time. Thus, given these costs and benefits, the efficient solution involves the pedestrian walking.

Now reconsider the rule of strict liability. The driver's benefit net of his expected liability payments corresponds to the last column in Table 4. If the pedestrian walks, the relevant values are \$20, \$40, and \$30, depending on whether the driver drives rapidly, moderately, or slowly. The driver therefore would choose to drive moderately. If the pedestrian runs, the corresponding values are \$10, \$30, and \$20, and the driver also would choose to drive moderately. Thus, regardless of the pedestrian's behavior, the rule of strict liability will lead the driver to behave efficiently in this example. However, the rule of strict liability will not be efficient with respect to the pedestrian's behavior. Since the pedestrian will be fully compensated for his losses, he will ignore these losses when deciding whether to walk or to run. He will consider only the \$5 extra benefit from running. The pedestrian therefore will choose to run even though running increases expected accident costs by \$10.

The problem of controlling the victim's behavior under the rule of strict liability can be solved by adding a defense of contributory negligence. In other words, the injurer is strictly liable unless the victim is contributorily negligent. This rule will result in the desired behavior of both parties.

To see this in the example, let the standard of care applicable to the pedestrian correspond to the efficient behavior of the pedestrian — walking. Thus, if the pedestrian walks, he is not contributorily negligent, so the driver would be strictly liable. If he runs, he is contributorily negligent, so the driver would be free of liability. The pedestrian then has to bear his own losses. Thus, while running rather than walking provides benefits valued at \$5, it increases the expected accident cost borne by the pedestrian from zero to \$110, \$50, or \$30, depending on whether the driver drives rapidly, moderately, or slowly (see Table 4). Clearly, the pedestrian will choose to walk in order to avoid having to bear his own losses. Given this choice by the pedestrian, the driver will be strictly liable. We have already seen that this will lead the driver to choose to drive moderately. Thus, the rule of strict liability with a defense of contributory negligence will lead both parties to take an efficient amount of care.

Next, reconsider the rule of negligence in terms of the incentives it creates for both parties to take appropriate care. Assume, as before, that the driver is negligent only if he drives rapidly. If the pedestrian walks, the driver's benefits net of his expected liability payments are the same as discussed earlier under the negligence rule, so the driver will choose to drive moderately. If the pedestrian runs, the driver's benefits net of his expected liability payments are \$10 if he drives rapidly (\$120 — \$110), \$80 if he drives moderately (\$80 — \$0), and \$50 if he drives slowly (\$50 — \$0). Thus, the driver will choose to drive moderately regardless of what the pedestrian does. Since the driver will therefore not be negligent, the pedestrian will bear his own losses. He will then compare the \$5 extra benefit from running to the \$10 increase in expected accident costs and therefore will choose to walk. Thus, the rule of negligence will lead both parties to take an efficient amount of care.

Note that under the negligence rule it is not necessary to add a defense of contributory negligence to get the victim to take proper precautions. If a contributory negligence defense were



added, it would not affect the conclusion that both parties will take an efficient amount of care. The victim would meet the standard of care applied to him to avoid being contributorily negligent and having to bear his own losses. Given that the victim is not contributorily negligent, the injurer will meet the standard of care applied to him to avoid being negligent and having to compensate the victim for his losses.

The preceding discussion of the accident problem when both parties can affect the expected harm illustrates another general result in the economic analysis of liability rules: In accident situations in which the problem is to induce both the injurer and the victim to take appropriate care, a rule of strict liability with a defense of contributory negligence or a rule of negligence — with or without a defense of contributory negligence — is efficient.

### The Activity-Level Issue

In many accident situations, however, expected accident losses depend not only on the care exercised by each party, but also on the extent to which each party participates in the activity that is the source of the dispute. For example, the number of driver-pedestrian accidents depends in part on how much drivers drive and on how frequently pedestrians travel by foot (rather than, say, by bus). The efficient level of participation in the dispute-creating activity is determined by comparing the benefits a party would obtain from greater participation — for example, from the greater use of one's car — to the resulting increase in expected accident costs. In general, then, the problem to be solved by liability rules is how to induce both parties to take appropriate care *and* to engage in the activity to an appropriate extent.

To examine whether the rules of strict liability and negligence will lead to the efficient level of participation in the activity, the simple version of the driver-pedestrian example — the version in which only the driver's speed affects the pedestrian's expected accident costs — will be extended to include the number of miles driven. (The more general case in which ex-

TABLE 5  
Automobile Accident Example — Driver's Care and Activity Level Affect Expected Accident Cost

Behavior of Driver	Total Benefit to Driver (Depending on How Much Driver Drives)	Total Expected Accident Cost to Pedestrian (Depending on How Much Driver Drives)	Total Benefit Minus Total Cost (Depending on How Much Driver Drives)
Drive rapidly	\$120 (a little)	\$100 (a little)	\$20 (a little)
	\$140 (a lot)	\$130 (a lot)	\$10 (a lot)
Drive moderately	\$80 (a little)	\$40 (a little)	\$40 (a little)
	\$100 (a lot)	\$70 (a lot)	\$30 (a lot)
Drive slowly	\$50 (a little)	\$20 (a little)	\$30 (a little)
	\$70 (a lot)	\$50 (a lot)	\$20 (a lot)

pected losses also are affected by the pedestrian's care and level of participation in the activity will be discussed below.) Now suppose that expected accident costs depend not only on whether the driver drives slowly, moderately, or rapidly, but also on whether he drives "a little" or "a lot." If he drives a little, then the relevant data are assumed to be the same as in the simple version of the example — that is, the same as in Table 3. If he drives a lot, then his benefits are assumed to increase by \$20 and the pedestrian's expected accident costs are assumed to rise by \$30, regardless of the speed at which he drives.<sup>26</sup> The data for the extended example are summarized in Table 5.

Since the additional benefits from driving a lot are less than the increase in expected accident costs, the efficient solution involves the driver's driving a little. If the driver drives only a little, the problem is the same as that discussed in the simple version of the driver-pedestrian example, where it was efficient for the driver to drive moderately. Put differently, driving

26. A point analogous to the one made in note 25 above applies here.



moderately and only a little maximizes total benefits less total costs. This can be seen directly in the last column of Table 5.

Under strict liability, the driver's benefit net of his expected liability payments corresponds to the last column in Table 5. Thus, the driver will choose to drive moderately and only a little. As in the earlier versions of the driver-pedestrian example, strict liability induces the injurer to behave efficiently because it forces him to take into account the adverse effects of his behavior on the victim. The only difference now is that one relevant aspect of his behavior is the extent of his participation in the activity.

Under negligence, suppose, as in the earlier versions of the example, that the driver is negligent only if he drives rapidly. Then, if his participation in the activity corresponds to driving a little, his benefit net of his expected liability payment is \$20 ( $\$120 - \$100$ ) if he drives rapidly, \$80 ( $\$80 - \$0$ ) if he drives moderately, and \$50 ( $\$50 - \$0$ ) if he drives slowly. If he drives a lot, the comparable values are \$10 ( $\$140 - \$130$ ) if he drives rapidly, \$100 ( $\$100 - \$0$ ) if he drives moderately, and \$70 ( $\$70 - \$0$ ) if he drives slowly. The driver therefore will choose to drive a lot and to drive moderately. In other words, the negligence rule with this standard of care is efficient with respect to the injurer's care but not with respect to his level of participation in the activity.

Recall from the discussion of the negligence rule in the simple version of the driver-pedestrian example that this rule is efficient only if the standard of care corresponds to the efficient behavior of the injurer.<sup>27</sup> The negligence rule is not efficient in the present version of the example precisely because the standard of care does not take into account one relevant aspect of the injurer's behavior — the extent of his participation in the activity. If the standard of care were to correspond to the efficient outcome of driving moderately and only a little — so that the driver *would* be negligent if he drives a lot even if he drives moderately — then the negligence rule also would lead to the efficient outcome.

In practice, however, it is usually not feasible to include the level of participation in the activity as an aspect of the standard

27. See pp. 39-40 above.

of care. For example, it would be virtually impossible for a court to determine how many miles a particular person drives each year since that person might drive a car that is shared with other family members or he might drive different cars owned by the household. If the injurer's level of participation in the activity is omitted from the standard of care, then a negligence rule generally will lead him to participate in the activity to an excessive degree. The reason for this is straightforward. If the care he exercises meets the standard of care, he will not be liable for any damages. Therefore, in deciding how much to participate in the activity, he will consider the additional benefits from greater participation but not the increase in expected accident costs. This problem with the negligence rule was illustrated by the driver-pedestrian example. Given a standard of care based only on the driver's speed, the driver chose to meet the standard by driving moderately. But he also chose to drive a lot, exceeding the efficient level of participation in the activity.

The discussion thus far of the activity-level issue can be summarized as follows: In accident situations in which the problem is to induce the injurer both to take appropriate care and to participate in the activity at an appropriate level, strict liability is efficient. Negligence also is efficient if the standard of care encompasses both the injurer's care and his level of participation in the activity. However, if the standard does not include the injurer's activity level, then the negligence rule will lead to excessive participation in the activity. In practice, the negligence rule is likely to be inefficient for this reason.

In some accident situations, the expected accident losses may depend not only on the injurer's care and activity level, but also on the victim's care and activity level. In this more general accident situation, results analogous to those just discussed would occur. Strict liability with a defense of contributory negligence would be efficient if the standard of care applicable to the victim encompasses both the victim's care and his activity level. However, if it includes only his care, then the victim will engage in the activity to an excessive degree. Similarly, negligence would be efficient if the standard of care applicable to the injurer includes both aspects of his behavior. If it includes only his care, then he will participate in the activity too much. Thus, if it is not feasible to include either party's activity level in the



standard of care, the preferred liability rule depends on whether it is more important to control the injurer's or the victim's activity level. If the injurer's activity level is of greater concern, then strict liability with a defense of contributory negligence should be used. If the victim's activity level is more important, then negligence is preferable.

The final consideration in the economic analysis of liability rules that will be discussed in this chapter is the effect of each rule on the administrative costs of resolving accident disputes. These costs depend both on the number of cases litigated and on the cost of resolving each case.<sup>28</sup> The negligence rule might be expected to generate less litigation than the strict liability rule for the following reason. Consider the negligence rule in an accident situation in which the injurer's care was very likely to have satisfied the standard of care. Given the cost to the victim of litigating, he might not find it worthwhile to bring an action against the injurer because of the low probability of success. Yet, under the strict liability rule, he might be willing to bring an action in this accident situation because the injurer's care is not a bar to a successful suit.

Although there may be fewer cases under the negligence rule, the administrative cost of resolving each case may well be higher than under the strict liability rule. The justification for this conclusion is easiest to see when the only problem is to induce the injurer to take appropriate care. To apply a strict liability rule, the court needs to know the victim's damages. But to apply a negligence rule, the court needs to know not only the victim's damages and the injurer's benefits at different levels of the injurer's care, in order to choose a standard of care that corresponds to the efficient outcome, but also how the injurer behaved, in order to determine whether he met the standard. (When the problem is to induce both the injurer and the victim to take appropriate care, this argument does not apply because the strict liability rule then requires a defense of contributory

28. Although the following discussion is concerned with disputes that are litigated, similar points could be made with respect to disputes that are settled after costly negotiation.

negligence to be efficient.) On balance, therefore, administrative cost considerations do not clearly favor either rule. While the negligence rule is likely to lead to fewer cases being litigated than the strict liability rule, it may well generate higher administrative costs in each case.

This chapter has shown that in accident situations in which the only problem is to create incentives for the parties to take appropriate care, both strict liability with a defense of contributory negligence and negligence are efficient. If the problem is also to induce the parties to engage in the dispute-creating activity to an appropriate extent, then both rules are still efficient provided that the relevant standards of care — the victim's under the contributory negligence defense and the injurer's under the negligence rule — incorporate the activity-level decision of the party to whom the standard is applied. In practice, however, this is not likely to be feasible. If the standard of care refers only to the relevant party's level of care, then strict liability with a defense of contributory negligence will lead to excessive participation in the activity by the victim, and negligence will lead to excessive participation by the injurer. In many accident situations it may be apparent that one party's activity level matters more than the other's, in which case the superiority of one of the rules will be clear.

An important assumption in the discussion in this chapter was that both drivers and pedestrians were risk neutral. When accident law is reconsidered in Chapter 9 under the assumption of risk aversion, it will be seen that strict liability and negligence are no longer both efficient even in accident situations in which only the injurer's care determines the victim's expected losses:



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**FIFTH APPLICATION —  
AUTOMOBILE ACCIDENTS AGAIN**

In the earlier discussion of automobile accidents, it was assumed that the injurer (the driver) and the victim (the pedestrian) were neutral with respect to risk. One of the principal conclusions there was that both strict liability and negligence are efficient if the only problem is to induce the injurer to take appropriate care. We will now reexamine these remedies when the parties may be averse to risk. We will also consider the relevance of insurance to the accident problem. If risk allocation is a consideration, it no longer will be true that both liability rules are efficient even when the only other issue is the control of the injurer's care.

The discussion will be based on the simple version of the driver-pedestrian example described in Chapter 6 — that is, the version in which the victim's expected harm is determined solely by the driver's speed. (To consider the possibility that the driver's activity level or the victim's care or activity level can also affect the expected harm would greatly complicate the discussion of the interaction between liability rules, risk allocation, and insurance without adding much additional insight.) The data for the simple version of the driver-pedestrian example were contained in Table 3, which is reproduced here as Table 7. That table included the *expected* accident cost to the pedestrian but did not explain how it was derived from the underlying probability and magnitude of the loss. This omission was irrelevant because it was assumed that the parties were risk neutral; by definition, they cared only about the expected outcome. Now, however, given the assumption that they may be risk



TABLE 7  
Automobile Accident Example — Driver's Care Affects Expected Accident Cost

<i>Behavior of Driver</i>	<i>Total Benefit to Driver</i>	<i>Total Expected Accident Cost to Pedestrian</i>	<i>Total Benefit Minus Total Cost</i>
Drive rapidly	\$120	\$100 (= \$10,000 × 1/100)	\$20
Drive moderately	\$80	\$40 (= \$10,000 × 1/250)	\$40
Drive slowly	\$50	\$20 (= \$10,000 × 1/500)	\$30

averse, not only does the expected value of the loss matter, but so does the particular probability and magnitude of the loss. Suppose, for concreteness, that the loss if an accident occurs is \$10,000<sup>39</sup> and that the probability of an accident is 1/100 if the driver drives rapidly, 1/250 if he drives moderately, and 1/500 if he drives slowly. These numbers are included in Table 7 below the expected accident cost data.

### Private Insurance Not Available

We will first consider the accident problem when private insurance is not available to either party. This assumption may be realistic in some circumstances. For example, because of the administrative cost of running an insurance company, the premium charged might have to be so high that risk-averse persons would not be willing to buy insurance at that price. Consequently, no company would be able to remain in business.

Since we are assuming that only the driver's behavior affects the expected accident loss, only the rules of strict liability and

39. Recall the assumption that all losses are monetary. But see note 23 above.

negligence need to be considered. Under strict liability, although neither party can buy private insurance, the pedestrian is in effect insured since, whenever an accident occurs, the driver must compensate the pedestrian for his full damages of \$10,000. Thus, under this rule, the risk of an accident is borne entirely by the driver.<sup>40</sup>

Under the rule of negligence, the driver will be liable only if he does not meet the standard of care. Assuming that he does meet it — for the reasons discussed in Chapter 6<sup>41</sup> — he will not be liable and therefore the pedestrian will have to bear his own losses. Thus, under the negligence rule, the risk of an accident is borne entirely by the pedestrian.

This discussion shows that the rules of strict liability and negligence allocate the accident risks in completely asymmetrical ways. These risk-allocation effects did not matter in terms of efficiency in our initial discussion of automobile accidents in Chapter 6 because both parties were assumed to be risk neutral. If, however, one party is risk averse and the other is risk neutral, then there is a clear preference for one liability rule. When the pedestrian is the risk-averse party, the rule of strict liability leads to the ideal allocation of risks, whereas if the driver is the risk-averse party, the rule of negligence results in ideal risk allocation.

In many accident situations, however, both parties may be risk averse. It would therefore be desirable in terms of risk allocation to share the risks rather than, as under the strict liability and negligence rules, to allocate them entirely to one party. This can be accomplished by modifying the strict liability rule. Rather than setting the driver's liability equal to the pedestrian's losses, as is usually done under strict liability, liability can be set lower than the actual losses, thereby leaving some of the accident risk on the pedestrian. For example, suppose the driver and the pedestrian are equally risk averse, so that the optimal allocation of the risk would be to share it equally. This allocation will result under strict liability if the driver is made liable for one-half of the pedestrian's loss — \$5,000 rather than

40. This statement obviously presumes that the driver has adequate resources with which to compensate the pedestrian. If he does not, then some of the risk will remain on the pedestrian.

41. See pp. 39-40 above.



\$10,000 — every time an accident occurs. Clearly, any other allocation of the risk between the two parties can be achieved by appropriately setting the level of liability somewhere between zero and the pedestrian's actual loss. Recall from Chapter 6, however, that if liability is less than the pedestrian's actual damages, the driver will generally take less than the efficient amount of care.<sup>42</sup> Thus, if both parties are risk averse and insurance is not available, there may be a tradeoff between the desired allocation of the risk and the desired behavior of the driver.

### Ideal Insurance Available

Although the preceding discussion shows that, if both parties are averse to risk, the existing risk can be shared in the best possible way by a version of strict liability, this is less desirable than removing the risk from the parties altogether, as by private insurance. We will now consider the accident problem when *ideal* private insurance is available to both parties — liability insurance to the driver and first-party accident insurance to the pedestrian. Recall from Chapter 7 that an ideal insurance policy would provide full coverage in order to remove all risk from the insured person; it would also charge that person a premium for the insurance that reflects the expected losses resulting from his behavior, to avoid the so-called moral hazard problem.<sup>43</sup>

Under the strict liability rule, the pedestrian does not have any need to purchase insurance since he is effectively insured by the driver. The driver, however, will purchase a liability insurance policy with complete coverage. The insurance company's expected payout to the driver will equal the driver's expected liability payments, which are determined by the driver's behavior. Thus, given the data in Table 7, the premium charged by the insurance company will be \$100 if the driver drives rapidly, \$40 if he drives moderately, and \$20 if he drives slowly.<sup>44</sup> Con-

42. See p. 39 above.

43. See pp. 53-55 above.

44. This statement implicitly assumes that there are no administrative costs of running the insurance company, and that the company just breaks even — that is, has enough premium revenue to just cover its claim payouts. The break-even assumption would be appropriate, for example, if the insurance industry is competitive and in long-run equilibrium; see pp. 85-87 below.

fronted with this premium structure the driver will choose to drive moderately since, relative to this choice, driving rapidly leads to a \$60 increase in his insurance premium and to only a \$40 increase in his benefits, and driving slowly lowers his benefits by \$30 while lowering his insurance premium by only \$20 (see Table 7). Thus, strict liability combined with ideal insurance is efficient both with respect to the care exercised by the driver and the removal of risk from both parties.

Under the negligence rule, the driver would want to buy liability insurance only if he chooses to drive rapidly, since he would not be liable otherwise. The liability insurer would charge the driver a premium of \$100 in these circumstances. Faced with this premium if he drives rapidly and no liability otherwise, the driver will choose to drive moderately since the cost of the insurance policy exceeds the extra benefits from driving rapidly. Thus, the pedestrian will bear his own losses and will purchase a first-party accident insurance policy with full coverage. Given the driver's decision to drive moderately, the pedestrian's expected accident losses are \$40, so this will be the premium charged. Because the pedestrian is assumed not to be able to affect the probability or magnitude of the harm, there is no possibility of moral hazard. Thus, negligence combined with ideal insurance also is efficient both with respect to the care exercised and the removal of risk.

### Imperfect Insurance Available

This analysis shows that when ideal insurance is available, it does not matter whether strict liability or negligence is used in the example under consideration. However, for reasons discussed in Chapter 7, it is not realistic in many, if not most, circumstances to assume that ideal insurance is available: Because of the difficulty or impossibility of monitoring the insured person's behavior, the insurance premium will not respond completely to changes in that behavior. As a result, the insured person will not have an adequate incentive to take precautions that reduce the expected losses. This is the problem of moral hazard. Consequently, the insurance policy may not provide full coverage in order to induce the insured person to take more care. We will therefore complete the discussion of the accident prob-



lem by considering the optimal choice of a liability rule when insurance is imperfect because of the moral hazard problem. For simplicity, it will be assumed that the insurer cannot observe the insured person's behavior at all.<sup>45</sup>

Under the rule of strict liability, the driver will want to purchase liability insurance. If the policy provides complete coverage, the driver will have no incentive to take care since, by assumption, the premium cannot be made to depend on the driver's care. Thus, the driver would choose to drive rapidly. Alternatively, the policy may provide less than full coverage to create some incentive for the driver to drive more slowly. In either case, an ideal outcome will not be achieved under the rule of strict liability. If the coverage is complete, the driver will not exercise appropriate care, and if the coverage is incomplete, he will bear some risk (and generally still will not take enough care).

Under the negligence rule, the driver will want liability insurance only if he chooses to drive rapidly, since he would not be liable for the pedestrian's damages otherwise. If he drives rapidly, the insurance premium would be \$100. Given this premium if he drives rapidly and no liability otherwise, the driver will choose to drive moderately. Note that this is the outcome that occurred when ideal insurance was assumed to be available. The fact that the liability insurer now cannot monitor the driver's care is irrelevant because the driver will meet the standard of care and therefore will not be liable.<sup>46</sup> Given the

45. Since individuals who take less care are more likely to have accidents, an insurance company can indirectly obtain some information about the insured person's behavior from the number of claims submitted. (If the premium charged depends on the number of claims previously paid, the policy is said to be "experience rated.") There may also be some ways to directly monitor the insured person's behavior. For example, many companies providing automobile insurance request information about the number of miles driven annually.

46. Note that this argument implicitly assumes that, although the insurance company cannot monitor the driver's care before the accident, the court can determine the driver's care after an accident. It might therefore be asked why the insurance company cannot also determine the driver's care after an accident. If the company could, this would not affect the discussion in the text because the driver will not have a need for insurance, given his decision to drive moderately.

driver's behavior, the pedestrian will bear his own losses and will want a first-party accident insurance policy with full coverage. Since, by assumption, there is nothing the pedestrian can do to affect the probability or magnitude of the loss, there is no moral hazard problem and therefore no reason to deny full coverage to the pedestrian. Thus, under the negligence rule, the driver will exercise appropriate care and bear no risk, and the pedestrian will be fully insured — the efficient solution. In summary then, when there is a moral hazard problem with respect to the injurer's behavior but not with respect to the victim's behavior, the negligence rule is preferable to the strict liability rule.

The discussion in this chapter has shown that considerations of risk allocation may provide a reason for adopting one automobile accident remedy rather than another. For example, if insurance is not available, we saw in the simple version of the driver-pedestrian example that the strict liability rule is preferred when the victim is risk averse and the injurer is risk neutral, and that the negligence rule is superior when the opposite is true. A modification of the strict liability rule — with liability less than the victim's actual losses — is best with respect to risk allocation when both parties are risk averse, but it generally will lead the injurer to take too little care. If ideal insurance is available to both parties, then the strict liability rule and the negligence rule are both efficient. And if, somewhat more realistically, imperfect insurance is available to the injurer because of the moral hazard problem but perfect insurance is available to the victim, then the negligence rule is efficient but the strict liability rule is not. Obviously, if the simple version of the driver-pedestrian example is not descriptive of the accident situation — that is, if the injurer's activity level or the victim's care or activity level also matter — the specific conclusions in this chapter would have to be modified. However, the basic observations developed here about the interaction between liability rules, risk allocation, and insurance would carry over to other accident situations.