Strict Liability versus Negligence

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I. INTRODUCTION AND DISCUSSION

T HE aim of this article is to compare strict liability and negligence rules on the basis of the incentives they provide to "appropriately" reduce accident losses. It will therefore be both convenient and clarifying to abstract from other issues in respect to which the rules could be evaluated. In particular, there will be no concern with the bearing of risk—for parties will be presumed risk neutral—nor with the size of "administrative costs"—for the legal system will be assumed to operate free of such costs—nor with distributional equity—for the welfare criterion will be taken to be the following aggregate: the benefits derived by parties from engaging in activities less total accident losses less total accident prevention costs.

Because the analysis of the rules will employ a mathematical model, it seems desirable to consider first in an informal way the points to be made and the logic behind them. Since this discussion will not serve as a complete summary, readers will probably also want to at least look at the statements of the propositions in the later parts of the paper and will almost certainly wish to read the concluding comments (which are not focused on the details of the model).

Accidents will be conceived of as involving two types of parties, "injurers" and "victims," only the latter of which are assumed to suffer direct losses. The category of accidents that will be examined initially are *unilateral* in nature, by which is meant that the actions of injurers but not of victims are assumed to affect the probability or severity of losses. The unilateral case is studied for two reasons. First, it is descriptive of situations in which whatever changes in the behavior of victims that could reasonably be expected to result from changes in liability rules would have only a small influence on accident losses.[1] The second reason is pedagogical; it is easier to understand the general *bilateral* case after having studied the unilateral case.

[1] Examples of accidents occurring in such situations and which therefore might be considered

Unilateral Case

This case (as well as the bilateral case) will be considered in each of several situations distinguished by the nature of the relationship between injurers and victims.

Accidents between strangers (see Proposition 1): In this subcase it is supposed that injurers and victims are strangers, that neither are sellers of a product, and that injurers may choose to engage in an activity which puts victims at risk.

By definition, under the negligence rule all that an injurer needs to do to avoid the possibility of liability is to make sure to exercise due care if he engages in his activity.[2] Consequently *he will not be motivated to consider the effect on accident losses of his choice of whether to engage in his activity or, more generally, of the level at which to engage in his activity;* he will choose his level of activity in accordance only with the personal benefits so derived. But surely any increase in his level of activity will typically raise expected accident losses (holding constant the level of care). Thus he will be led to choose too high a level of activity;[3] the negligence rule is not "efficient."

Consider by way of illustration the problem of pedestrian-automobile accidents (and, as we are now discussing the unilateral case, let us imagine the behavior of pedestrians to be fixed). Suppose that drivers of automobiles find it in their interest to adhere to the standard of due care but that the possibility of accidents is not thereby eliminated. Then, in deciding how much to drive, they will contemplate only the enjoyment they get from doing so. Because (as they exercise due care) they will not be liable for harm suffered by pedestrians, drivers will not take into account that going more miles will mean a higher expected number of accidents. Hence, there will be too much driving; an individual will, for example, decide to go for a drive on a mere whim despite the imposition of a positive expected cost to pedestrians.

However, under a rule of strict liability, the situation is different. Because

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unilateral are not hard to imagine: a water main breaks and floods the basement of a home; a plane crashes into a house; a surgeon performs the wrong procedure on an anaesthetized patient. Concededly, even in these examples the victim could have taken *some* protective action (the surgeon's patient could have hired another surgeon to watch over the operation), but, we may plausibly assume, not at a cost nearly low enough to make it worthwhile.

[2] It is assumed for ease of exposition that courts have no difficulty in determining if a party did in fact exercise due care; the reader will have no trouble in appropriately modifying the arguments to be made so as to take into account relaxation of such simplifications as this.

[3] Specifically, while he will choose to engage in the activity just up to the level at which the personal benefit from a marginal increase would equal zero, it would be best from society's viewpoint for him to engage in the activity only up to the level at which his benefit from a marginal increase would equal the (positive) social marginal cost in terms of accident losses.

an injurer must pay for losses whenever he is involved in an accident,[4] he will be induced to consider the effect on accident losses of both his level of care *and* his level of activity. His decisions will therefore be efficient. Because drivers will be liable for losses sustained by pedestrians, they will decide not only to exercise due care in driving but also to drive only when the utility gained from it outweighs expected liability payments to pedestrians.

Accidents between sellers and strangers (see Proposition 2): In this subcase it is assumed that injurers are sellers of a product or service and that they conduct their business in a competitive market. (The assumption of competition allows us to ignore monopoly power, which is for the purposes of this article a logically tangential issue.) Moreover, it is assumed that victims are strangers; they have no market relationship with sellers either as their customers or as their employees.

Under the negligence rule the outcome is inefficient, but the reasoning is slightly different from that of the last subcase. While it is still true that all a seller must do to avoid liability is to take due care, why this results in too high a level of activity has to do with market forces. Because the seller will choose to avoid liability, the price of his product will not reflect the accident losses associated with production. This means that buyers of the product will face too low a price and will purchase too much, which is to say that the seller's level of activity will be too high. Imagine that the drivers are engaged in some business activity—let us say that they are taxi drivers. Then, given that they take due care, the taxi drivers will not have liability expenses, will set rates equal to "production" cost (competition among taxi drivers is assumed), will experience a greater demand than if rates were appropriately higher, and will therefore carry too many fares and cause too many accidents.

Under strict liability, the outcome is efficient, and again the reasoning is a little different from that in the last subcase. Since sellers have to pay for accident losses, they will be led to take the right level of care. And since the product price will reflect accident losses, customers will face the "socially correct" price for the product; purchases will therefore be appropriately lower than what they would be if the product price did not reflect accident losses. Taxi drivers will now increase rates by an amount equal to expected accident losses suffered by pedestrians, and the demand for rides in taxis will fall.

Accidents between sellers and customers—or employees (see Proposition 3 and Part III. B (iii)): It is presumed here that victims have a market relationship with sellers as either their customers or their employees; and since both situations are essentially the same, it will suffice to discuss only that when victims are customers. In order to understand the role (which is important)

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[4] Causal or other reasons for limiting the scope of liability are ignored.

of customers' knowledge of risk, three alternative assumptions will be considered: customers know the risk presented by each seller; they do not know the risk presented by each seller but they do know the average seller's risk;[5] they misperceive even this average risk.

Under the negligence rule, the outcome is efficient only if customers correctly perceive risks. As before, when the victims were strangers, sellers will take due care in order to avoid liability, so that the product price will not reflect accident losses. However, now the accident losses are borne by the customers. Thus, the "full" price in the eyes of customers is the market price plus imputed perceived accident losses. Therefore, if risks are correctly perceived, the full price equals the socially correct price, and the quantity purchased will be appropriate. But if risks are not correctly perceived, the quantity purchased will be inappropriate; if customers underestimate risks, what they regard as the full price is less than the true full price and they will buy too much of the product, and conversely if they overestimate risks.[6]

Think, for example, of the risk of food poisoning from eating at restaurants. Under the negligence rule, restaurants will decide to avoid liability by taking appropriate precautions to prepare meals under sanitary conditions. Therefore, the price of meals will not reflect the expected losses due to the (remaining) risk of food poisoning. If customers know this risk, they will correctly consider it in their decisions over the purchase of meals. But if they underestimate the risk, they will purchase too many meals; and if they overestimate it, too few.

Under strict liability, the outcome is efficient regardless of whether customers misperceive risks. As in the last subcase, because sellers have to pay for accident losses, they will decide to take appropriate care and will sell the product at a price reflecting accident losses. Thus customers will face the socially correct price and will purchase the correct amount. Their perception of the risk is irrelevant since it will not influence their purchases; as they will be compensated under strict liability for any losses, the likelihood of losses will not matter to them. Restaurant-goers will face a price that reflects expected losses due to food poisoning when meals are prepared under sanitary conditions; they will buy the same—and appropriate—number of meals whether they think the probability of food poisoning is low or high, for they will be compensated for any losses suffered.[7]

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[5] If sellers are assumed to be identical (as they are in the formal model) and therefore to act identically, the average risk will in fact be the risk presented by each seller. But it will be seen from the discussion of the situation when sellers are not liable that the first and second assumptions are nevertheless different.

[6] It may be instructive to mention the parallel situation in regard to employee victims. If employees correctly perceive risks at the workplace, then they will (appropriately) choose to work for a firm only if the "net" wage—the market wage less the expected accident losses they bear—is at least equal to their opportunity elsewhere. But if, say, they underestimate risks, they might choose to work for a firm when the net wage is in fact below their opportunity elsewhere.

[7] However, it is worthwhile noticing that if they could not possibly be compensated for a kind

When sellers are simply not liable for accident losses, then the outcome is efficient only if customers know the risk presented by each seller. For, given this assumption, because customers will seek to buy products with the lowest full price (market price plus expected accident losses), sellers will be induced to take appropriate care (since this will lower the accident-loss component of the full price). While it is true that if a restaurant took inadequate precautions to prevent food poisoning, it could offer lower-priced meals, it is also true that customers would respond not just to the market price of meals but also to the likelihood of food poisoning—which they are presumed to know. Therefore customers would decide against giving the restaurant their business. Consequently, restaurants will be led to take adequate precautions and to charge accordingly. Moreover, because customers will base purchases on the correctly perceived full price, they will buy the correct amount.

If, however, customers do not know the risk presented by individual sellers, there are two sources of inefficiency when sellers are not liable. The first is that, given the risk of loss, the quantity purchased by customers may not be correct; of course, this will be true if customers misperceive the risk. The second source of inefficiency is that sellers will not be motivated by market forces to appropriately reduce risks. To understand why, consider the situation when customers do correctly perceive the average risk (when they do not correctly perceive this risk, an explanation similar to the one given here could be supplied). That is, assume that customers know the risk presented by sellers as a group but do not have the ability to "observe" the risk presented by sellers on an individual basis. Then sellers would have no inducement to exercise adequate care. Suppose that restaurant-goers know the risk of food poisoning at restaurants in general and it is, say, inappropriately high. Then if a *particular* restaurant were to take sufficient precautions to lower the risk, customers would not recognize this (except insofar as it eventually affected the average risk—but under the assumption that there are many competing restaurants, this effect would be negligible). Thus the restaurant could not charge a higher price for its meals—customers would have no reason not to go to the cheaper restaurants. In consequence, a situation in which sellers take inadequate care to reduce risks would persist; and similar reasoning shows that a situation in which they take adequate care would not persist. (Notice, however, that since customers are assumed to correctly perceive the average risk, at least they will purchase the correct number of meals—correct, given the high risk.)

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of loss from food poisoning, then misperception of risk certainly would matter. For instance, if there were a risk of death from food poisoning and if restaurant-goers underestimated it, then they would expose themselves to a higher risk of death by eating restaurant meals than they would truly want to bear. Thus, the conclusion of this paragraph that misperception of risk does not matter under strict liability holds only in respect to risks compensable by payment of money damages.

Finally, it should be observed that the discussion of liability in the present subcase bears on the role of tort law in a contractual setting. When customers make purchases, they are willingly entering into a kind of contract—in which they agree to a price and pay it, receive goods, and expose themselves to a risk (in the absence of liability).[8] Therefore, our conclusions may be generally expressed by the statement that, when customers' knowledge of risks is perfect, the rule of liability does not matter; the "contractual" arrangement arrived at in the market is appropriate. But when the knowledge is not perfect, there is generally scope for the use of liability, and the relative performance of liability rules depends on the precise nature of the imperfection in knowledge. The force of this point, and the fact that it is not always an obvious one, is perhaps well illustrated by the situation described in the previous paragraph. In that situation, customers did correctly perceive average risk, so that there was "assumption of risk," but this did not lead to a desirable result. The situation was one therefore in which, under our assumptions, courts ought not to allow the defense of assumption of risk to be successfully asserted.

Bilateral Case

In this case, account is taken of the possibility that potential victims as well as injurers may influence the probability or magnitude of accident losses by their choices of both level of care and of level of activity.

Accidents between strangers (see Propositions 4 and 5):[9] Under the negligence rule,[10] the outcome is not efficient. As was true in the unilateral case, since all that an injurer needs to do to avoid liability is to exercise due care,

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[8] It should be remarked that the possibility of contractual arrangements that go beyond mere agreement on price is not considered here; for example, the possibility that sellers might give customers some form of guarantee is not allowed for in the discussion or in the analysis. However, our conclusions do have some relevance to what contractual arrangements might be made. This is because what is "efficient" is, by definition, what maximizes benefits minus costs, which is in turn what is in the mutual interest of the sellers and customers to do. (To illustrate, if customers *realize* that they do not know the risk of loss, then they might wish for, and insist on, a blanket guarantee, in effect making the seller strictly liable, and thereby giving him an incentive to reduce the risk of loss.) Of course, the reason this is not considered here is that a satisfactory treatment would require us to study at the least the value of explicit arrangements over the arrangements that inhere in the applicable tort and contract law, the costs of making explicit arrangements as opposed to the expected costs of reliance on the applicable law, and the willingness of courts to enforce what is at variance with the applicable law.

[9] The explanation given in this and in the next subcase for why neither strict liability with a defense of contributory negligence nor the negligence rule results in an efficient outcome is in its essence that given by Richard Posner, Economic Analysis of Law 139-40 (2d ed. 1977). See also Duncan Kennedy, A History of Law and Economics or the Fetishism of Commodities (1979) (unpublished mimeographed paper at Harvard University) which makes related points at 54-63.

[10] In the present discussion, it will make no difference whether or not the reader thinks of this rule as incorporating the defense of contributory negligence.

he will choose too high a level of activity. In regard to victims, however, the situation is different. Since a victim bears his accident losses, he will choose an appropriate level of care *and* an appropriate level of his activity, given the (inefficient) behavior of injurers. The drivers will exercise due care but will go too many miles. And the pedestrians, knowing that they must bear accident losses, will exercise due care (in crossing streets and so forth) and they will also reduce the number of miles they walk in accordance with expected accident losses per mile.

Under strict liability with a defense of contributory negligence, the outcome is symmetrical to the last—and again inefficient.[11] Because all that a victim needs to do to avoid bearing accident losses is to take due care, he will have no motive to appropriately reduce *his* level of activity; this is the inefficiency. However, because injurers now bear accident losses, they will take the appropriate amount of care and choose the right level of activity, given the inefficient behavior of victims. Drivers will exercise due care and go the correct number of miles. Pedestrians will also exercise due care but will walk too many miles.

From this discussion it is apparent that the choice between strict liability with a defense of contributory negligence and the negligence rule is a choice between the lesser of two evils. Strict liability with the defense will be superior to the negligence rule when it is more important that injurers be given an incentive through a liability rule to reduce their activity level than that victims be given a similar incentive; that is to say, when it is more important that drivers go fewer miles than that pedestrians walk fewer miles.

Because neither of the familiar liability rules induces efficient behavior, the question arises, *"Is there any conceivable liability rule depending on parties' levels of care and harm done that induces efficient behavior?"* It is proved below (Proposition 5) that the answer is *"No."* The problem in essence is that for injurers to be induced to choose the correct level of activity, they must bear all accident losses; and for victims to choose the correct level of their activity, they also must bear all accident losses. Yet it is in the nature of a liability rule that both conditions cannot hold simultaneously; clearly, injurers and victims cannot each bear all accident losses.[12]

Accidents between sellers and strangers (see Proposition 6): Because the reader will be able to appeal to arguments analogous to those already made and in order to avoid tedious repetition, explanation of the results stated in this and the next subcase will be abbreviated or will be omitted.

[11] It is of course clear that under strict liability without the defense the outcome is inefficient, for victims would have no motive to take care.

[12] However, when other means of social control are also employed, it is possible to achieve an efficient outcome. For example, if use of the negligence rule were supplemented by imposition of a tax on the level of injurer activity, an efficient outcome could be achieved.

Under both the negligence rule and strict liability with a defense of contributory negligence, the outcome is inefficient, as was true in the last subcase. Under the negligence rule, sellers will take appropriate care, but since the product price will not reflect accident losses, too much will be purchased by customers. Also, since victims bear accident losses, they will take appropriate care and choose the right level of activity. Under strict liability with the defense, sellers will take appropriate care and the product price will reflect accident losses, so the right amount will be purchased. Victims will exercise due care but will choose too high a level of activity. In addition, as in the last subcase, there does not exist any liability rule that induces efficient behavior.

Accidents between sellers and customers—or employees (see Propositions 7a and 7b and Part IV.B (iii)): As before it will be enough to discuss here only the situation when victims are customers. If customers have perfect knowledge of the risk presented by each seller, then the outcome is efficient under strict liability with a defense of contributory negligence or the negligence rule or if sellers are not subject to liability at all. For instance, in the latter situation, since customers wish to buy at the lowest full price, sellers will be led to take appropriate care; and since customers will make their purchases with the full price in mind, the quantity they buy will be correct; and since they bear their losses, they will take appropriate care.

There is, however, a qualification that needs to be made concerning the way in which it is imagined that customers influence accident losses. If one assumes that customers influence losses only by their choice of level of care and of the amount purchased, then what was stated in the previous paragraph is correct; and in regard to services and nondurables (such as meals at restaurants) this assumption seems entirely natural. But in regard to durable goods, it might well be thought that customers influence accident losses not only by their choice of level of care and of purchases, but also by their decision as to frequency of use per unit purchased. The expected number of accidents that a man will have when using a power lawn mower would seem to be influenced not only by whether he in fact purchases one (rather than, say, a hand mower) and by how carefully he mows his lawn with it, but also by how frequently he chooses to mow his lawn. In order for customers to be led to efficiently decide the frequency of use, they must bear their own accident losses. Thus, in regard to durables, the outcome is efficient under the negligence rule or if sellers are not liable, but the outcome is inefficient under strict liability with a defense of contributory negligence; for then if the man buys a power lawn mower, he will have no motive to appropriately reduce the number of times he mows his lawn.

Now suppose that customers correctly perceive only average risks. Then, subject again to a qualification concerning durables, the results are as fol-

lows. The outcome is efficient under strict liability with a defense of contributory negligence or under the negligence rule, but the outcome is not efficient if sellers are not liable, for then they will not take sufficient care. The qualification is that if the sellers produce durables, strict liability with the defense is inefficient, leaving the negligence rule as the only efficient rule.

Last, suppose that customers misperceive risks. Then the outcome is efficient only under strict liability with a defense of contributory negligence; and the qualification to this is that, if sellers produce durables, even strict liability with the defense is inefficient, so that there does not exist a liability rule which is efficient.

II. The Model

The assumptions here are much as described in the introduction. There is a single physical good, called "income." The utility (or disutility) of any action which a party takes is assumed to have a well-defined equivalent in terms of income; and, henceforth, when reference is made to income, what will be meant is the amount of literal income plus income equivalents. The (von Neumann-Morgenstern) utility of income is assumed to be equal to income. Thus, parties are risk-neutral; expected utility is expected income. Since the social-welfare function is taken to be the sum of expected utilities, social welfare is the sum of expected incomes.

Accidents are assumed to involve two types of parties, injurers and victims. The number of injurers is assumed equal to the number of victims (and equal to the number of customers in the market case described below); this assumption is inessential and could obviously be modified. In the absence of liability rules, all accident losses fall on victims. The class of injurers and the class of victims are themselves each comprised of identical parties.

Injurers either engage in a nonmarket activity—the "nonmarket" case—or are sellers of a product or service—the "market" case. In the market case, sellers are expected to be profit-maximizing price takers and to face constant production costs per unit. Thus, they earn zero profits in competitive equilibrium. Victims are either strangers, customers, or employees. If victims are customers or employees, three alternative assumptions (which were discussed in the introduction) are made about their knowledge of accident risks.

Parties take liability rules as given; they do not circumvent the rules by contractual arrangement.[13] They also take the behavior of others as given.

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[13] The justification is the familiar one, that some "transaction cost" stands in the way. In the nonmarket case and the market case involving strangers, it is that it would be very difficult for each potential injurer to get together with and make a contractual arrangement with each of his potential victims. In the market case, the assumption is that the costs of

Under these assumptions, the (Nash) equilibrium associated with the use of a liability rule can be determined.

An analysis of equilibrium outcomes under liability rules for the nonmarket and market cases is made both in the part of the paper concerned with unilateral accidents and in the one dealing with bilateral accidents. In the nonmarket case, victims are assumed to engage in their activity at a fixed level and to exercise a fixed level of care. Their only role in the market case is, if they are customers, to decide how much to buy or, if they are employees, to decide where to work. The liability rules examined are no liability, strict liability, and the negligence rule. In the bilateral case, two additional liability rules are considered, strict liability with a defense of contributory negligence and the negligence rule with that defense.

If a liability rule results in the outcome that maximizes social welfare, it will be called efficient. The efficient values of variables will be denoted with an "*".

Because the notation used changes somewhat in the different cases analyzed, it will be easiest to present it and to modify it as needed.

III.   Unilateral Accidents

Define the following variables,

$x \geqq 0$ care level of an injurer.
$y \geqq 0$ activity level of an injurer,
$l(x)$ expected accident losses per
         unit of injurer activity level.[14]

Expected accident losses are assumed to fall with care, so $l' < 0$, but at a decreasing rate, so $l'' > 0$. Notice that the model allows for the possibility that injurers may choose not to engage in their activity at all; this corresponds to $y = 0$.

Under strict liability, an injurer is assumed to pay for all accident losses suffered by victims of accidents in which he is involved. Under the negligence rule an injurer has to pay for accident losses only if his care level is less than a due care level. Define

$$\bar{x} = \text{injurer's due care level.}$$

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bargaining and perhaps of recording an agreement make it easier for the involved parties to rely on a liability rule.

[14] We are implicitly assuming that increasing the activity level corresponds to a physical repetition of an activity and causes a proportional rise in expected accident losses. For example, doubling the activity level would double expected accident losses (the level of care held constant). This assumption often seems to be the natural one to make, but it will be clear that the qualitative nature of our results would not be altered if expected accident losses were a more general function of x and y.

Thus, as emphasized in the introduction, y does not enter into a determination about negligence.

A. *The Nonmarket Case: Accidents between Strangers*

Recall that in this case, injurers are not sellers of a product or service but they may decide to engage in an activity which puts victims at risk. Define

$$a(x,y) = \text{income equivalent of the utility to}$$
$$\text{an injurer of engaging in his activity at}$$
$$\text{level } y \text{ and exercising care } x. [15]$$

Assume that taking more care reduces this, so $a_x < 0$.[16] Assume also that, given the care level, increases in the activity level up to some point result in increases in utility; beyond that point, however, utility falls with increases in the activity level. Specifically, for any x, $a_y(x,y) > 0$ for $y < y(x)$ and $a_y(x,y) < 0$ for $y > y(x)$. Here $y(x)$ is (uniquely) defined by either $a_y(x,y) = 0$ or, if this never holds, by $y(x) = 0$.

Social welfare W is given by[17]

$$W(x,y) = a(x,y) - yl(x). \tag{1}$$

Note that what enters into W is not only expected accident losses (through yl) and prevention costs (through a_x), but also the benefits of participating in the activity (through a_y). The efficient values x^* and y^* maximize W.

Since under strict liability an injurer must pay for accident losses to possible victims, an injurer's position is

$$a(x,y) - yl(x). \tag{2}$$

The injurer's problem, maximizing (2) over x and y, is the social problem. Strict liability is therefore efficient.

Under the negligence rule, assume that the due care level $\bar{x}$ is sufficiently low so that injurers decide to act in a nonnegligent way, that is, to choose $x = \bar{x}$.[18] Thus, the injurer's problem becomes one of choosing y to maximize

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[15] The reader might find it convenient to think about the case $a(x,y) = z(y) - v(x)y$, where $z(y)$ is the benefit of engaging in the activity at level y and $v(x)$ is the cost of taking care x per unit of activity.

[16] Subscripts denote partial derivatives. The arguments of derivatives will frequently be suppressed in the notation.

[17] We need only consider social welfare for a "representative" injurer and victim pair—recall that we have assumed for simplicity that their numbers are equal. An injurer's expected income is $a(x,y)$ − expected liability payments, and a victim's is expected liability payments − $yl(x)$. Adding these gives W.

[18] If $\bar{x}$ were so high that injurers decided to be negligent, they would be, in effect, strictly liable. It does not seem natural to analyze this possibility as one having to do with the negligence rule.

$$a(\bar{x},y). \tag{3}$$

The injurer therefore increases y to the point at which it yields no marginal benefit; in other words, he selects $y(\bar{x})$. Let $y^*(\bar{x})$ be the efficient y given $\bar{x}$ (that is, $y^*(\bar{x})$ maximizes W over y given $\bar{x}$). Then the injurer's activity level is excessive in the sense that $y(\bar{x}) > y^*(\bar{x})$, and for this reason one can immediately conclude that the negligence rule is not efficient.[19] The socially optimal due care level, say $\bar{x}^*$, is determined by maximizing

$$W(\bar{x},y(\bar{x})) = a(\bar{x},y(\bar{x})) - y(\bar{x})l(\bar{x}) \tag{4}$$

over $\bar{x}$ (where $\bar{x}$ must be in the range low enough so that injurers decide to set $x = \bar{x}$). Under fairly weak assumptions, it is true that $\bar{x}^* > x^*$.[20] The optimal due care standard exceeds the efficient care level because it is socially desirable to compensate for inability to control the activity level by forcing injurers to exercise special care (and because this in itself reduces the value of the activity, inducing injurers to lower the activity level).

If there is no liability, the outcome is generally worse than that under the negligence rule (with $\bar{x}^*$ as the due care standard), since injurers exercise no care. That is, $x = 0$ and $y = y(0)$ is the outcome.[21]

The conclusions about the welfare comparison of liability rules may be summarized as follows.

PROPOSITION 1. *Suppose that injurers and victims are strangers. Then strict liability is efficient and is superior to the negligence rule, which is superior to not having liability at all.*

B. *The Market Case: Accidents between Sellers and Victims*

Injurers are now assumed to be sellers of a product or service. The precise interpretation of care x will be explained in the various subcases, which are distinguished by whether the victims are strangers, customers, or employees. The activity level y will be interpreted as the seller's output.

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[19] Assume that W is concave in y, that $\bar{x} > 0$, and that $y(\bar{x}) > 0$. Then $y(\bar{x})$ is identified by the first-order condition $a_y = 0$. But $y^*(\bar{x})$ is determined by $a_y = l$. Since $l > 0$ and W is concave, $y^*(\bar{x}) < y(\bar{x})$. Note, however, that the concavity assumption is not needed to show that the negligence rule is not efficient; without it we can still conclude that $y^*(\bar{x}) \neq \bar{y}(\bar{x})$.

[20] Let $[0, \hat{x}]$ be the range of $\bar{x}$ such that injurers would choose $x = \bar{x}$. It is easy to show that $\hat{x} > x^*$. Thus, assuming concavity of (4) in $\bar{x}$, we need only argue that $dW/d\bar{x} > 0$ when evaluated at x^*. But $dW/D\bar{x} = W_x - y'l$ and it is plausible that both terms should be positive at x^*. Assuming that W is concave in x and that the optimal x given $\bar{y}(x^*)$ exceeds x^*, we have $W_x > 0$. Also, assuming that $y' < 0$, $-y'l > 0$.

[21] To show that the negligence rule would be better, we need only demonstrate that $\bar{x}^* > 0$ (for $\bar{x} = 0$ corresponds to no liability). This is plausible for the reasons given in the previous footnote: A sufficient condition for $dW/d\bar{x} > 0$ at $\bar{x} = 0$ is that $W_x(0,y(0)) > 0$ and $y'(0) < 0$.

Before considering the subcases, additional notation is needed, as is a description of competitive market equilibrium. Define

$$c(x) = \text{production cost per unit given } x,$$
$$p = \text{product price},$$

and assume that $c' > 0$ and $c'' > 0$. The seller's full cost per unit produced and sold is

$$c(x) + \text{expected liability payments per unit.} \tag{5}$$

Since sellers maximize expected profits and are price takers,

$$x \text{ is chosen by sellers to minimize } c(x) + \text{expected}$$
$$\text{liability payments per unit.} \tag{6}$$

Also, in equilibrium, price must equal full cost,

$$p = c(x) + \text{expected liability payments per unit.} \tag{7}$$

(However, (6) and (7) will be slightly modified when the victims are customers and can observe x.) Now define

$$b(y) = \text{income equivalent of gross benefits enjoyed by}$$
$$\text{a customer who purchases } y.$$

These benefits are gross of any expected accident losses he has to bear. We assume $b' > 0$ and $b'' < 0$. The customer's position u is

$$u(y) = b(y) - py - \text{any expected accident losses he}$$
$$\text{has to bear.} \tag{8}$$

The customer's demand is therefore determined by

$$u(y) \text{ is maximized over } y. \tag{9}$$

Equilibrium p, x, and y are determined by (6), (7), and (9).
  Social welfare W is given by

$$W = b(y) - yc(x) - yl(x), \tag{10}$$

the gross value of output to customers minus production costs—note that the increase in c with x corresponds to prevention costs—minus expected accident losses. As in the nonmarket case, maximizing W requires taking into account the benefits of y as well as accident costs and prevention costs. From (10), it is clear that the efficient value x^* is determined by

$$\text{minimize } c(x) + l(x) \text{ over } x \tag{11}$$

and that y^* is then determined by

$$\text{maximize } b(y) - y(c(x^*) + l(x^*)) \text{ over } y. \tag{12}$$

(i) *Victims are strangers.* Here x is interpreted as the care the seller exercises in the conduct of his operations.

Under strict liability sellers are induced to choose the care level that minimizes production costs plus accident losses. Moreover because customers pay a price that reflects production costs plus accident losses, they are induced to purchase the socially correct output. To prove this, note that full cost per unit is $c(x) + l(x)$, which (see (6)) sellers minimize. Hence (see (11)), x^* is the care level. Therefore (see (7)), price p equals $c(x^*) + l(x^*)$. Hence (see (8) and (9)), consumers maximize $b(y) - py = b(y) - (c(x^*) + l(x^*))y$. This implies (see (12)) that y^* is chosen. Consequently, strict liability is efficient.

Under the negligence rule, an efficient outcome is not achieved. This is because sellers escape liability by acting nonnegligently. Hence the price charged customers reflects production costs but not accident losses. Since customers face too low a price, output is too high. To demonstrate this, assume (for the reason given in the nonmarket case) that $\bar{x}$ is low enough so that sellers decide to be nonnegligent. Then production cost and price must be $c(\bar{x})$. Consequently, customers choose y to maximize $b(y) - py = b(y) - c(\bar{x})y$. Let $y(\bar{x})$ be the customers' choice and $y^*(\bar{x})$ the efficient y given $\bar{x}$. Then $y(\bar{x}) > y^*(\bar{x})$, output is excessive, which also implies that the negligence rule cannot be efficient. The optimal due care level $\bar{x}^*$ is determined by maximizing

$$W(\bar{x}, y(\bar{x})) = b(y(\bar{x})) - c(\bar{x}) - y(\bar{x})l(\bar{x}) \tag{13}$$

over $\bar{x}$ (in the range such that sellers choose to be nonnegligent). As in the nonmarket case, it can be shown that $\bar{x}^* > x^*$, and for analogous reasons.[22]

If there is no liability, sellers have no motive to prevent accidents nor do customers have a motive to buy a socially appropriate quantity, since price does not reflect accident losses. Therefore, the outcome is worse than under the negligence rule. Specifically, production cost and price are $c(0)$ and customers choose $y(0)$.[23]

In summary, the conclusions are just as in the nonmarket case.

PROPOSITION 2. *Suppose that injurers are sellers and that victims are strangers. Then strict liability is efficient and is superior to the negligence rule, which is superior to not having liability at all.*

(ii) *Victims are customers.* In this subcase x might still be interpreted as the care the seller exercises in the conduct of his operations. This would be

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[22] This and other claims made in this paragraph can be proved using arguments analogous to those in notes 19 & 20 *supra*.

[23] That no liability is inferior to the negligence rule can be shown by establishing, as in note 21 *supra*, that $\bar{x}^* > 0$.

appropriate if one is thinking about accidents which occur at the time and place of sale of a product or service. On the other hand, if one is considering accidents which occur after the time of purchase and involve a product that the customer takes away with him (a car, a piece of industrial machinery), then x should be interpreted as an index of the safety and reliability of the product.

Under strict liability, an argument virtually identical to that given in (i) shows that the efficient outcome results. Sellers again choose x in accord with (11). Thus price is $c(x^*) + l(x^*)$, and as customers do not bear accident losses, they select y in accord with (12). Note that this argument in no way depends on customers' knowledge of the risk of accident losses.

However, under the negligence rule, the analysis changes. Assume first that customers know what expected accident losses are either for particular sellers or only on average. Then the efficient outcome results if the due care level $\bar{x}$ is set equal to the efficient level x^*. To prove this, suppose that sellers choose x^*. Then, as they are nonnegligent, price equals $c(x^*)$. Since customers bear losses $l(x^*)$ per unit and know their magnitude, they maximize over y their utility position, $b(y) - py - l(x^*)y = b(y) - (c(x^*) + l(x^*))y$. Thus, they choose y^*. Therefore, to complete the proof, we need only show that sellers would choose x^* or, more precisely, that no seller would have a motive to choose an x other than x^* if there were an equilibrium in which x^* was the commonly chosen care level. To show this, suppose, on the contrary, that some seller chooses $x > x^*$. If customers can't observe *his x*, then he gets no benefit in the price from raising x but does incur greater production costs. On the other hand, if customers can observe his x, it is easy to show they wouldn't purchase from him if he charged his cost of production. If he did that, a customer's utility position would be the maximum over y of $b(y) - (c(x) + l(x))y$ which (since $x \neq x^*$) must be less than $b(y^*) - (c(x^*) + l(x^*))y^*$, the utility position of the customer if he buys from a seller who chooses x^*. Now assume that some seller chooses $x < x^*$. Then, as he will be liable for accident losses, his problem is to minimize full unit costs, namely $c(x) + l(x)$. But this implies that he chooses x^*, a contradiction.

Consider now the outcome under the negligence rule given the assumption that customers misperceive risks. Specifically, suppose that if expected accident losses are really $l(x)$, customers think they are $(1 + \lambda)l(x)$. Thus $\lambda > 0$ means that customers overestimate risk and $\lambda < 0$ that they underestimate risk. Assume that $\bar{x}$ is such that sellers choose $x = \bar{x}$. The price is therefore $c(\bar{x})$ and customer purchases are determined by maximizing over y the perceived utility position $b(y) - py - (1 + \lambda)l(\bar{x}) = b(y) - (c(\bar{x}) + (1 + \lambda)l(\bar{x}))y$. Therefore customers buy too little (less than $y^*(\bar{x})$) if they overestimate risk and too much if they underestimate risk. In particular, an efficient outcome cannot result.

Finally, consider the situation if there is no liability. Assume initially that customers can identify expected accident losses for particular sellers. Then competitive forces would induce sellers to choose an efficient care level and customers' purchases would be efficient. To show this we demonstrate that a situation in which sellers choose x^* is an equilibrium which results in an efficient outcome. Assuming that x^* is chosen by sellers, price must equal $c(x^*)$. Thus, customers (recognizing that they bear $l(x^*)$) choose y to maximize $b(y) - py - l(x^*)y = b(y) - (c(x^*) + l(x^*))y$. Consequently, they choose y^*. If a seller chose $x \neq x^*$, no customer would choose to buy from him. For if the customer were charged the production cost, his utility would be the maximum over y of $b(y) - (c(x) + l(x))y$. Since $x \neq x^*$, this must be less than $b(y^*) - (c(x^*) + l(x^*))y^*$, which is the customer's alternative.

If there is no liability and customers know expected accident losses only on average, then an efficient outcome would not result, for sellers would have no motive to take care. That is, $x = 0$ would hold. Also price would equal $c(0)$. Since they would realize that they bear $l(0)$, customer purchases would be determined by maximizing $b(y) - py - l(0)y = b(y) - (c(0) + l(0))y$. Thus, at least purchases would be efficient given the inefficiently low care level.

When there is no liability and customers misperceive average risks, then, as in the last paragraph, sellers choose $x = 0$, but in this instance customers purchase the wrong amount given that $x = 0$. Thus the outcome is worse than in the previous paragraph.

These results are summarized below.

PROPOSITION 3. *Suppose that injurers are sellers and that victims are customers. Then the relative performance of liability rules depends on the knowledge customers have about risk.* (See Table 1.)

As for the ranking of the inefficient outcomes in Table 1, it was shown that (a) is superior to (c) and it can also be shown that (b) is superior to (c) (using the argument of note 21 *supra*); however there is no necessary relationship between (a) and (b).

(iii) *Victims are employees.* In this subcase the results and their proofs are exactly parallel to those in the last subcase (in Proposition 3 merely substitute the word "employee" for "customer"). Therefore, it will not be necessary to verify all the results. However, it will be described how the model changes and, to provide a pattern for the reader, a proof that strict liability is efficient will be given.

The variable x is interpreted as the care the seller exercises in his production process.

It is assumed that an employee's wage minus the expected accident losses that he has to bear must equal his "opportunity wage," which is set by economy-wide forces of supply and demand and is therefore taken as exogenous. Define

TABLE 1

Knowledge of risk of accident loss	Form of Liability		
	Strict Liability	Negligence	No Liability
Accurate knowledge about each seller's risk	efficient	efficient	efficient
Accurate knowledge only of the average risk	efficient	efficient	inefficient (a)
Misperception of average risk	efficient	inefficient (b)	inefficient (c)

w = wage paid to employee,

$\bar{w}$ = opportunity wage,

so that[24]

$$\bar{w} = w - \text{expected accident losses borne.} \tag{14}$$

The seller's unit cost of production is

$$c(x) = w + k(x), \tag{15}$$

where $k(x)$ are nonlabor production costs given x.

Under strict liability the efficient outcome results because, on the one hand, firms are induced to choose a care level that minimizes nonlabor production costs plus expected accident losses and, on the other, because customers face a price that reflects total production costs plus expected accident losses. To see this, note that since employees do not bear accident losses, $\bar{w} = w$. Hence, firms minimize $c(x) + l(x) = \bar{w} + k(x) + l(x)$, which means that they choose x^*. Price therefore equals $c(x^*) + l(x^*)$ and customers choose y to maximize (12).

IV. BILATERAL ACCIDENTS

Define the following additional notation,

$s \gtreqless 0$ care level of a victim,

$t \gtreqless 0$ activity level of a victim.

Expected accident losses are assumed to fall with victims' care and to rise with victims' activity levels. Also, if victims do not engage in their activity (t

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[24] The wage is normalized so that it is the amount paid per unit of labor time necessary to produce one unit of output.

= 0), then losses are zero. More will be said later about how expected accident losses are related to s and t.

As previously noted, along with the liability rules examined in the last section, both strict liability and the negligence rule will be considered when there is a defense of contributory negligence. Therefore, define

$$\bar{s} = \text{due care level for victims.}$$

However, there will never be need to distinguish between the negligence rule with and without the defense. This is because in this model the two negligence rules are equivalent (as is true in most models which assume that injurers are identical).[25]

The results and proofs of this section closely parallel those of the last. Therefore, although formal statements of the results will be given, proofs will usually either be omitted or only sketched.

A.   *The Nonmarket Case: Accidents between Strangers*

Define

$$h(s,t) = \text{income equivalent of the utility to a}$$
$$\text{victim of engaging in his activity at}$$
$$\text{level } t \text{ and exercising care } s$$

and assume that h has properties analogous to those of the function $a(x,y)$ (namely, assume that $h_s < 0$, $h_t(s,t) > 0$ for $t < t(s)$, etc.). Also define

$$l(x,s) = \text{expected accident losses per victim per}$$
$$\text{unit of injurer activity and of victim ac-}$$
$$\text{tivity,}$$

where $l_x < 0$ and $l_s < 0$. Thus, expected accident losses as a function of x, y, s, and t are $ytl(x,s)$.[26]

Social welfare is

$$W(x,y,s,t) = a(x,y) + h(s,t) - ytl(x,s), \tag{16}$$

the sum of the benefits of engaging in their activities for victim and injurer less the expected cost of accidents.

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[25] While it is true that if an injurer is negligent, whether there is a defense of contributory negligence matters, it turns out that, in the situations which we consider, all injurers decide to act in a nonnegligent way. Therefore, whether there is a defense of contributory negligence is irrelevant.

[26] Expected accident losses have this form if we make the same assumption about the victim's activity level as we have made about the injurer's: an increase in the activity level is a physical repetition of an activity which causes a proportional rise in expected accident costs. This makes analysis easier (principally, the proof to Proposition 5), and it will be clear that the qualitative nature of the results would not change were expected accident costs to depend in a more general way on x,y,s, and t.

Under strict liability with a defense of contributory negligence, an efficient outcome cannot be achieved, for assume otherwise. Then, in particular, it must be that $s = \bar{s} = s^*$. This means victims will never have to bear losses. Consequently they will have no motive to reduce accident losses by lowering their activity level, and t will exceed t^*.

An argument similar to this one (and to the basic argument made in the last part) shows that an efficient outcome cannot be achieved under the negligence rule. Under the negligence rule injurers are not given an incentive to reduce accident losses by lowering their activity level.

Thus, as stated before, the choice between strict liability with a defense of contributory negligence and the negligence rule is a choice in favor of the lesser of two evils.

However, a rule of strict liability without a defense of contributory negligence would never be desirable, as it would always be dominated by strict liability with the defense. (The argument showing this is essentially that of note 21 *supra*). Similarly, it would never be desirable not to have liability, for this would result in an outcome inferior to that under the negligence rule. No welfare comparison can be made between strict liability and not having liability without knowing whether it is more important to control victim or injurer behavior.

In summary,

PROPOSITION 4. *Suppose that injurers and victims are strangers. Then none of the usual liability rules is efficient. Strict liability with a defense of contributory negligence is superior to the negligence rule if it is sufficiently important to lower injurer activity levels. Strict liability without the defense and no liability are each inferior to whichever rule is better: either strict liability with the defense or the negligence rule.*

The next result states that there is no conceivable liability rule that induces parties to act efficiently.

PROPOSITION 5. *Suppose that injurers and victims are strangers and consider any liability rule which may depend on any or all of the following variables: the victim's losses, the care he exercises, the care the injurer exercises. Then the liability rule is not efficient.*

To prove this, note that under a liability rule of the type under consideration, expected payments by the injurer must be of the form $ytq(x,s)$. Now suppose that the rule is efficient. If the injurer is to select the efficient activity level, then y^* must be the solution to

$$\text{maximize } a(x^*,y) - yt^*q(x^*,s^*). \tag{17}$$
$$y$$

On the other hand, since y^* maximizes $W(x^*,y,s^*,t^*)$, y^* must be the solution to

$$\text{maximize } a(x^*,y) - yt^*l(x^*,s^*).\qquad(18)$$
$$y$$

Consequently, it must be that $q(x^*,s^*) = l(x^*,s^*)$. Similarly, if the victim is to choose his efficient activity level, then t^* must solve

$$\text{maximize } h(s^*,t) + y^*t(q(x^*,s^*) - l(x^*,s^*)).\qquad(19)$$
$$t$$

But since t^* must also solve

$$\text{maximize } h(s^*,t) - y^*tl(x^*,s^*),\qquad(20)$$
$$t$$

it must be that $q(x^*,s^*) = 0$, which is a contradiction.

B. *The Market Case: Accidents between Sellers and Victims*

The same assumptions are made about the market as in Part III.B. However, victims now play a role in accidents.

(i) *Victims are strangers.* In this subcase, the results are just like those described in the nonmarket case, and for reasons which combine the arguments given there and in Part III.B(i). (See also the discussion in the introduction.)

PROPOSITION 6. *Suppose that injurers are sellers and that victims are strangers. Then the results are as given in Propositions 4 and 5.*

(ii) *Victims are customers.* In this subcase, the customer care level will have the usual interpretation. However, the customer activity level could be interpreted in several ways. First, think of it as the quantity of the good the customer purchases. This is the interpretation that will be made in regard to purchases of services or of products which are not durables. In this situation, then, the victim's activity level and the injurer's activity level are one and the same, namely, the level of output (so $t = y$); expected accident losses are given by $yl(x,s)$; and the following result holds.

PROPOSITION 7a. *Suppose that injurers are sellers of a nondurable good or service and that victims are customers. Then the relative performance of liability rules depends on the knowledge customers have about risks. (See Table 2.)*

Now consider the situation when customers buy durable goods—say lawn mowers or, if the customer is a firm, industrial machinery. In this situation,

TABLE 2

Knowledge of risk of accident loss	Form of Liability			
	Strict Liability with Defense of Contributory Negligence	Negligence	Strict Liability	No Liability
Accurate knowledge about each seller's risk	efficient	efficient	inefficient	efficient
Accurate knowledge only of the average risk	efficient	efficient	inefficient	inefficient
Misperception of average risk	efficient	inefficient	inefficient	inefficient

it is assumed that the customer contributes to expected accident losses not only through the choice of care level and quantity purchased but also by the rate of use, denoted by r, of each unit purchased (number of times a mower is used per week, the frequency of operation of a machine). Therefore, the income equivalent of the utility of use to the customer will be written $h(s,t,r)$ (with $h_r > 0$) and the expected accident losses, $yrl(x,s)$. The results must now be modified as follows.

PROPOSITION 7b. *Suppose that injurers are sellers of a durable good and that victims are customers. Then the relative performance of liability rules depends on the knowledge customers have about risks.* (See Table 3.)

The point to be noticed here is (as explained before) that strict liability with a defense of contributory negligence never leads to an efficient outcome. It is true that in order to avoid being contributorily negligent, customers exercise due care and, because price reflects accident losses, they purchase the socially correct amount. However, they have no motive to lower expected accident losses by reducing their frequency of use of the product they buy. In contrast, under the negligence rule, provided that customers have knowledge of accident risks, an efficient outcome is achieved. Sellers exercise due care to avoid being found negligent. Customers choose the socially desirable care level, quantity to purchase, *and* rate of use since they bear accident losses.

(iii) *Victims are employees.* In this subcase, there is some difficulty in interpreting what the activity level would mean. In many situations, there is no obvious aspect of the discretionary behavior of the employee that would not come under the rubric of care. If so, the results turn out to be identical to

TABLE 3

	Form of Liability			
Knowledge of risk of accident loss	Strict Liability with Defense of Contributory Negligence	Negligence	Strict Liability	No Liability
Accurate knowledge about each seller's risk	inefficient	efficient	inefficient	efficient
Accurate knowledge only of the average risk	inefficient	efficient	inefficient	inefficient
Misperception of average risk	inefficient	inefficient	inefficient	inefficient

those reported in Proposition 7a. However, in situations where there is a type of employee decision that fits the description of activity level given here, then the results are those of Proposition 7b.

V. CONCLUDING COMMENTS

1. A question which is in a sense logically prior to the analysis of this article must be mentioned, namely, *"Why isn't the level of activity usually considered in the formulation of a due care standard?"* After all, the inefficiencies discussed here were viewed in the main as deriving from the fact that in order to avoid being found negligent (or contributorily negligent), parties are not motivated to alter their level of activity.[27] The answer to the question appears to be that the courts would run into difficulty in trying to employ a standard of due care expanded in scope to include the level of activity. In formulating such a broadened due care standard, courts would, by definition, have to decide on the appropriate level of activity, and their competence to do this is problematic. How would courts decide the number of

[27] Were the level of activity included in the "due care" standard, a party would, by definition of due care, have to choose both the level of activity and the level of care appropriately in order to avoid liability; thus the inefficiencies analyzed in this article would be eliminated. However, A. Mitchell Polinsky, Strict Liability versus Negligence in a Market Setting (1979) (unpublished mimeographed paper, Stanford University) makes a point of qualification to this. He observes that in the market case it is not enough for the level of activity to be incorporated in the due care standard for each firm within the industry, for then too many firms would enter it; rather, the level of activity would somehow have to be made part of the due care standard for the industry as a whole. He also notes a similar point in respect to the nonmarket case.

miles an individual ought to drive or how far or how often a pedestrian ought to walk?[28] How would courts decide the level of output an industry—much less a firm within an industry—ought to produce? To decide such matters, courts would likely have to know much more than would normally have to be known to decide whether care, conventionally interpreted, was adequate.[29]

2. From the logic of the arguments presented here, it can be seen that what is important about the variable "level of activity" is only that it is not included in the due care standard. Any other variable omitted from the standard would also be inappropriately chosen in many of the circumstances in which we said the same of the level of activity. For example, in regard to accidents involving firms and strangers it has been noted that, if the scale of a firm's research in safety technology is not comprehended by the standard of due care, then under the negligence rule the firm would not be expected to invest sufficiently in such research.[30]

3. Commentators on tort law have in recent years frequently pointed to the reciprocal nature of harm, especially in the sense that the victim must be present in order to suffer harm. This has unfortunately engendered a misleading piece of folklore: that the very concept of harm is rendered ambiguous. While it is undeniable that for harm to occur there must be a victim, I can see no sense in which this truism leads to conceptual problems in instrumentalist analysis. Here, under the heading of bilateral accidents, the situation when victims as well as injurers could vary their level of activity (and of care) was studied; and one such possibility for victims was a level of activity of zero, which is to say, the "victims" are not around to be harmed. Thus, for example, the result (Proposition 4) concerning strict liability (with the defense of contributory negligence) versus negligence in regard to accidents between strangers might be expressed by saying that strict liability is preferable if it is more desirable to control whether injurers are present than it is to control whether victims are present; and the next result (Proposition 5) might be expressed by saying that there is no liability rule which generally induces both victims and injurers to make the efficient decision as to whether they should be present.[31]

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[28] There might also be evidentiary problems. The courts might find it difficult to learn how many miles an individual drives or a pedestrian walks.

[29] On this argument, we would expect that when courts could easily discern what the level of activity ought to be, then it would be incorporated into the standard of due care. One legal doctrine which appears to confirm this is that of "coming to the nuisance," for the doctrine is applied in precisely those situations when the *activity* of coming to the nuisance—which is quite distinct from the level of *care* exercised once one is near the nuisance—may be seen as clearly socially undesirable.

[30] See Posner, *supra* note 9, at 139 & 140.

[31] It should be noted that Proposition 5 holds if one thinks of the level of activity as a binary variable (and/or if there is no variable "care"), for the proof does not depend on the level of activity being a continuous variable (nor on the existence of the variable care).

4. The analysis presented here does appear to help to explain certain features of tort law. A notable example is provided by the so-called pockets of strict liability: for ultrahazardous activities, ownership of wild animals, and so forth. These areas of strict liability seem to have two characteristics. First, they are such that injurer activity has a distinctive aspect (which makes the activity easy for the law to single out) and imposes nonnegligible risks on victims (which make the activity worthwhile controlling). And, second, they are such that victim activity is usually not at all special—on the contrary, it is typically entirely routine in nature, part of what it is to carry on a normal life—and is therefore activity that cannot and ought not be controlled. Consequently, it is appealing to explain the pockets of strict liability by the idea (expressed in Propositions 4 and 6) that strict liability is preferable if it is more desirable to control injurers' activity than victims'.[32]

However, there are many features of tort law which the analysis by itself does not seem to satisfactorily explain. And this is not unexpected, for it is in the nature of the formal approach to isolate selected factors of interest by ignoring others; the formal approach aims for a particular kind of insight, not for true balance or comprehensiveness.[33] Two examples will illustrate various limitations in our ability to employ in a direct way the results of this article. The first concerns the trend in decisions in product-liability cases toward expansion of manufacturer's liability. If this trend can be likened to one toward holding manufacturers strictly liable, we may be tempted to explain it as broadly rational given some of our results (Propositions 2, 3, 6,

[32] Posner, *supra* note 9, at 140-41, makes essentially this point. Also George P. Fletcher, Fairness and Utility in Tort Theory, 85 Harv. L. Rev. 537 (1972), explains the pockets of strict liability (at 547-49) by appeal to the notion that strict liability is imposed when parties create "nonreciprocal" risks. Our discussion might be viewed as helping to explain why it is that when parties create nonreciprocal risks, they should be strictly liable (but Fletcher would probably not welcome this interpretation).

[33] Of course, the informal instrumentalist approach is more flexible, aims for, and achieves greater balance and generality. But, whether formal or informal, the instrumentalist approach has been subject to the limitation that it does not refer to "moralist" argument or explanation—that which sounds in terms of what is "right" or "fair" or "just" to do in the particular situation at hand. (Fletcher, *supra* note 32, is a recent and valuable discussion of the contrast between the instrumentalist and moralist approaches. See also Richard Epstein, A Theory of Strict Liability, 2 J. Legal Stud. 151 (1973).) Perhaps a few tentative remarks about this will not be out of order. Given that (i) we believe that to an important extent legal institutions are/should be shaped by moralist notions and that legal decisions are/should be made in consideration of them; and that (ii) the instrumentalist approach has some merit (I am not saying how much) in descriptive and normative analysis of law, it seems plausible (by implicit reasoning) that (iii) moralist notions must encapsulate instrumentalist goals (and, of course, there are explicit arguments for this, such as those of the utilitarian ethical theorists). Yet it also seems that (iv) to an important extent the moralist notions (or many of them) must be viewed as having a life of their own—cannot be fruitfully, or at least naturally, viewed as embodying what would normally be conceived of as instrumentalist goals. One would hope that discussion of such issues in the future might help to clarify the extent to which the division between instrumentalists and moralists merely reflects use of a different mode of discourse, and is therefore not "real," and the extent to which the division is in fact substantive.

7a). However, realism requires us to look at other, complementary explanations of the trend, such as that strict liability may provide a better means of risk sharing than the negligence rule, or that strict liability may be easier to apply than the negligence rule. Moreover, realism requires us to ask whether there even is an explanation of the trend based on its social rationality— whether in fact the trend might be socially undesirable, say on the ground that the expansion in the scope of liability has led to an excessively costly volume of disputes. Similar questions may be asked in respect to the second example, which concerns the fact that the negligence rule is the dominant form of tort liability in Anglo-American and in Western European legal systems today. Our analysis certainly does not suggest why this should be so, since, at least as often as otherwise, strict liability (with a defense of contributory negligence) is superior to the negligence rule. We are therefore led to ask again about such matters as risk sharing, administrative simplicity, and (especially) the social costs of expansion of the scope of liability.

5. Many of the points made in this article have been discussed before, and doubtless numerous times.[34] For example, the literature on enterprise liability virtually always considers the effect of such liability on product price, and the influence of this on purchases. The contribution made here would therefore seem to lie principally in the attention given to context—to the specifics of the relationship obtaining between injurers and victims—and in the unified way in which the variety of problems is viewed.

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[34] But it is hard to find the points stated in explicit and general form. However, the reader should certainly refer to "Strict Liability vs. Negligence" in Posner *supra* note 9, at 137-42, which is the clearest discussion of our subject of which I am aware, and on which this article may properly be regarded as building. The reader should also refer to Guido Calabresi, Optimal Deterrence and Accidents, 84 Yale L. J. 656 (1975). And the reader might also want to look at the following papers by economists: John Prather Brown, Toward an Economic Theory of Liability, 2 J. Legal Stud. 323 (1973); Peter A. Diamond, Single Activity Accidents, 3 J. Legal Stud. 107 (1974); Jerry Green, On the Optimal Structure of Liability Laws, 7 Bell J. Econ. 553 (1976); and Steven Shavell, Accidents, Liability, and Insurance (forthcoming in Am. Econ. Rev.). In these papers liability rules are studied when parties can affect accident losses only by altering their levels of care; levels of activity are implicitly regarded as fixed (but see Section 11 of Diamond's paper). The reader may also find relevant Michael Spence, Consumer Misperceptions, Product Failure, and Producer Liability, 44 Rev. Econ. Stud. 561 (1977). He studies the use of strict liability and fines in the case of unilateral accidents; and he allows for sellers to offer guarantees and for consumers to be risk averse and to misperceive risks.