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ACCURACY IN THE ASSESSMENT
OF DAMAGES

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ABSTRACT

Assessment of damages is a principle issue in litigation and, in light of this, we consider the social justification for, and the private benefits of, accurate measurement of harm. Greater accuracy induces parties to exercise levels of precaution that better reflect the magnitude of the harm they are likely to generate, and related, it stimulates uninformed parties to learn about risks before acting. However, accuracy in the assessment of harm cannot influence the behavior of parties -- and is therefore of no social value -- to the degree that parties lack knowledge of the harm they might cause when deciding on their precautions. In addition, regardless of the social value of accuracy, litigants generally gain by devoting resources toward proof of damages, leading often to socially excessive private incentives to establish damages.

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ACCURACY IN THE ASSESSMENT OF DAMAGES

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1. Introduction

Assessment of damages is often a principal issue in
litigation, as the primary objective of the plaintiff is usually
to collect as much as possible and that of the defendant to pay
as little as possible. Accordingly, parties frequently devote
substantial time and effort attempting to establish the level of
harm. In light of this, the question naturally arises concerning
the underlying social purpose of accurate determination of harm.
Our object here is to address this question and to compare
socially desirable effort to ascertain harm with what parties
wish to expend on the task. To this end, we consider a version
of the now standard model of liability for harm[1] in Section 2 of
the article, and develop the following four points.[2]

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[1]See, for example, Brown [1973], Landes and Posner [1987], and Shavell
[1987].

[2]As will be seen, the emphasis in this article is on the points that
assessment of damages is not socially worthwhile if parties do not know the
magnitude of harm when they act, and that, despite this, parties may have strong
incentives to spend to determine damages in court. These points have not been
developed elsewhere to our knowledge, although Kaplow [1991] deals with closely
related issues in analyzing which variables courts optimally ought to include in
legal rules. There are, in addition, a number of articles on legal error
concerning issues different from those addressed in this article, including
Craswell and Calfee [1986] (on mistake in assessing negligence); Kaplow and
Shavell [1992b], Png [1986], Polinsky and Shavell [1989], and Rubinfeld and
Sappington [1987] (all on mistake in determining who committed a punishable act);
and Posner [1973] (a general discussion of accuracy).

The first is that, other things being equal, *accuracy in the assessment of harm leads parties to act in a way that reflects the magnitude of the harm they might cause* -- to take greater precautions the greater the harm they are likely to bring about. This fundamental and familiar point is the social justification for accurate assessment of damages in the model.[3]

The second point is, in a sense, a corollary of the first: *accuracy in assessment of harm cannot influence the behavior of parties -- and is therefore of no social value -- to the degree that they lack knowledge of the level of harm they might cause when they make their decisions.* Suppose that when considering its level of precautions, a company does not know the specific level of harm that would come about in an accident. (The owner of a supertanker, for instance, is unlikely to be able to predict well the harm an oil spill would cause because that depends so much on circumstance.[4]) All that the company knows is the distribution of possible harms, say $100,000, $500,000, or $900,000, each with equal probability. In such a case, if harm is accurately determined, the company will view an accident as causing it an average liability of $500,000 (the average of $100,000, $500,000, and $900,000). But the company will view its potential liability as equivalent, and thus behave identically,

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[3]Another possible justification for accuracy is that it assures victims compensation. We note this issue in Section 3, but it does not enter in the model, as parties in the model are assumed to be risk-neutral.

[4]The harm due to an oil spill would be determined by such factors as the location of the spill, weather conditions (windy, when oil slicks spread rapidly, versus calm, when they do not), and the quantity of oil that escapes.

if no effort would be made to ascertain actual harm and liability would be set equal to the average harm of $500,000. The general conclusion this illustrates is that there is no effect on behavior, and thus no social value, in measuring harm with greater accuracy than that with which parties can appraise it at the time they decide on their actions.[5]

The third point concerns an indirect benefit of accuracy in assessing harm, namely, that it may *spur parties to learn more before they act about the harm they might do.* If the company knows that any harm it causes will be accurately determined, it will have a motive to learn in advance the magnitude of possible harm, for then it can benefit by altering its level of precautions. If, for instance, it learns that harm and its damages would be $900,000, it will want to take greater precautions than otherwise. (In contrast, the company will have no motive to learn about the level of harm in advance if damages will be based upon average harm, for then its particular level of harm will not affect its damage payments.) That parties have an incentive to learn about harm before they act may be socially beneficial because it is desirable for the level of precautions to reflect the magnitude of the potential harm.

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[5]Thus, suppose the company just mentioned had better knowledge than as described, say it knew the loss from an accident would be uniformly distributed between the bounds $450,000 and $550,000. Then it would not be socially worthwhile for the court to determine the precise level of damages within the range -- for this would be to acquire information beyond the knowledge of the company when it acted -- but it would be socially worthwhile for the court to ascertain that damages fell within the range rather than outside -- for that degree of knowledge was possessed by the company when it acted.

The last point is that parties' incentives to provide information about harm to courts tend to be socially excessive; that is, *parties may well want to demonstrate the level of harm to courts even though this has no, or only limited, social value.*[6] On one hand, parties will have very definite reasons to prove the level of harm to courts when an accident occurs: defendants will want to establish the true level of harm if it is less than estimated harm, and plaintiffs will want to demonstrate the true harm if it exceeds the estimated level.[7] On the other hand, these incentives to establish harm exist independently of the social value, if any, of accurate assessment of harm. For example, the incentives exist when defendants do not know the level of harm when they act, which is to say, when accuracy in determining harm has no effect on behavior and hence no social value.

After analyzing these points in the model, we discuss briefly in Section 3 the generality of our conclusions, the importance of risk aversion and insurance, and the significance of parties' socially excessive incentives to demonstrate the level of harm to courts.

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[6]More precisely, we show that when defendants do not know harm ex ante, both plaintiffs and defendants have excessive incentives to demonstrate harm to courts. When defendants know harm ex ante, defendants, but not necessarily plaintiffs, have excessive incentives to demonstrate harm.

[7]Suppose the company would be liable for $500,000 in the absence of evidence about the true level of harm. If the true level of harm is $100,000, the defendant would want to establish this rather than pay $500,000; and if the true level of harm is $900,000, the plaintiff would want to establish this rather than receive $500,000.

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2. Analysis

Assume that risk-neutral parties choose levels of precaution to reduce the risk of accidents. The harm that parties would cause in an accident varies among them, but each would cause one particular level of harm if involved in an accident. Specifically, define

x = cost of precautions to prevent accidents;

$p(x)$ = probability of an accident given x; $0 < p(x) < 1$; $p'(x) < 0$; $p''(x) > 0$;

h = harm if an accident occurs;

$f(h)$ = probability density of h; $f(h) > 0$ for $h > 0$.

Also, assume that if an accident occurs, the party who caused it will be held strictly liable[8] and will be required to pay damages;[9] let

d = damages paid if a party causes harm.

We will describe later how d is determined. Assume also that there is a cost to a party of presenting information about harm to courts,[10] where

k = cost of establishing h to courts.

In addition, in one version of the model, we will assume that

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[8] The assumption that liability is strict is not essential; see Section 3.

[9] We do not take into account the possibility of settlement, but were we to do so, the amount paid by the defendant would reflect d (and to induce a favorable settlement, he would spend some amount in negotiations that would reflect k, to be discussed), so that the conclusions we reach would be essentially unchanged.

[10] The assumption that k is borne by parties rather than by courts is, for the most part, inessential. If k is borne by courts and damages are raised by k from the level we say below is optimal, our conclusions remain valid except, as will be obvious, in section 2.3.

there is a cost to a party of obtaining information about harm
before he chooses precautions; let

      c = cost of obtaining information about h ex ante, before
         x is chosen.

Social costs exclusive of the expense of obtaining or presenting
information are

(1) $\int_{0}^{\infty} [x(h) + p(x(h))h]f(h)dh,$

where $x(h)$ denotes the precautions taken by parties who would
cause losses of h. The social goal is to minimize the sum of (1)
and any relevant expenses of obtaining and presenting
information. Let $x^*(h)$ denote the x that minimizes x +
$p(x)h$.

    2.1 Basic Case. We will assume here first that parties do
not know h ex ante and then that they do. In each case, we will
consider both the situation where courts do not observe h and
that where they do, involving the cost k. Our first result is

    PROPOSITION 1. *If parties do not know harm h ex ante, then it
is not socially desirable for h to be observed by courts.
Damages should be set equal to $\bar{h}$, expected harm.*

    Note. The reason for this conclusion is, of course, that if
parties do not know h ex ante, their behavior cannot be affected
by the fact that their damage payments will depend on h. And
since social resources must be expended for damage payments to
depend on h, this cannot be desirable.

Proof. If courts do not observe h, then a single level of damages d applies to all parties, and each party chooses x to minimize

(2) $x + p(x)d$,

so all choose $x^*(d)$. Social costs are given by

(3) $\int_0^\infty [x^*(d) + p(x^*(d))h]f(h)dh = x^*(d) + p(x^*(d))\overline{h}$.

As (3) is minimized when $d = \overline{h}$, $\overline{h}$ is the optimal level of damages and social costs are

(4) $x^*(\overline{h}) + p(x^*(\overline{h}))\overline{h}$.

If courts observe h and $d = h$ (which will be shown to be an optimal choice of d), then since parties do not know what h will be, they will choose x to minimize

(5) $x + p(x)\int_0^\infty (h + k)f(h)dh = x + p(x)(\overline{h} + k)$,

so they will choose $x^*(\overline{h} + k)$ and social costs will be

(6) $x^*(\overline{h} + k) + p(x^*(\overline{h} + k))(\overline{h} + k)$.

It follows also that $d = h$ must be an optimum, for when parties do not know h ex ante and thus all choose the same x, (5) gives social costs, which are minimized when x is $x^*(\overline{h} + k)$.[11] Because (6) exceeds (4) for any positive k, we have established the proposition. ◄

Our next result is as follows.

PROPOSITION 2. *If parties know harm h ex ante, then it is socially desirable for h to be observed by courts -- and for*

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[11]Of course, $d = \overline{h}$ for all h is also an optimum.

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damages to equal h -- if and only if the cost k of observing h is sufficiently low.

Note. The explanation for this result is that when parties know h ex ante and their damage payments depend on h, they will, desirably, choose their level of precautions in accord with h. Hence, if it is not too costly for h to be observed by courts, that will be socially worthwhile.

Proof. In this case, if courts do not observe h, then parties will behave as they did in the previous case, so optimal damages will again be $\overline{h}$ and (4) will again give social costs.

If courts observe h and d = h (which will be shown to be optimal), then a party of type h minimizes

(7) $x + p(x)(h + k)$,

since he will pay damages of h and bear costs of k if there is an accident. Hence, he will select $x^*(h + k)$. Since this choice of x is optimal given the assumption that h is observed, it is optimal for damages to equal h. Social costs in this situation are

(8) $\int_{0}^{\infty} [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh.$

The difference in social costs between the situations where h is not observed and when it is observed is (4) minus (8):

(9) $x^*(\overline{h}) + p(x^*(\overline{h}))\overline{h}$

$- \int_{0}^{\infty} [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh.$

When k = 0, (9) equals

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(10) $\int_0^\infty \{[x^*(\bar{h}) + p(x^*(\bar{h}))h] - [x^*(h) + p(x^*(h))h]\}f(h)dh,$

which is positive because for every h other than $\bar{h}$, $x^*(h)$ differs
from $x^*(\bar{h})$ -- the optimal level of precaution exceeds (is less
than) $x^*(\bar{h})$ when h exceeds (is less than) $\bar{h}$. In addition, it is
clear that (9) is decreasing in k, since as k increases, (8)
rises; also, (9) is negative for all k sufficiently large.[12] It
follows that there is a critical $k^* > 0$ such that $k < k^*$ implies
that it is socially desirable to observe h, and such that $k > k^*$
implies that it is not socially worthwhile to observe h.[13]◂

2.2 Endogenous Acquisition of Information Ex Ante. Suppose
now that parties choose whether to acquire information ex ante by
making an expenditure: initially, they do not know h, but if they
spend c, they learn h ex ante. If damages are based on h, assume
too, as before, that parties must spend k to establish h to
courts. Social costs now include any expenditures made in
learning h ex ante. We ask when it is desirable for courts to
require parties to establish h and demonstrate the following.

PROPOSITION 3. *Suppose that parties can learn about harm ex
ante by making an expenditure c. Then*

*(i) it is socially optimal for courts to observe h if and
only if c and k are sufficiently low (as implicitly determined by
(13)).*

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[12]If $k \geq \bar{h}$, then the integrand in (9) exceeds $x^*(\bar{h}) + p(x^*(\bar{h}))\bar{h}$ for all
positive h, so (9) must be negative for such k.

[13]Of course, when $k = k^*$, it does not matter whether or not h is observed;
for simplicity, we will not comment here (or elsewhere) on cases of indifference.

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*(ii) If it is optimal for courts to observe h, damages equal
h, and parties are induced to learn about h ex ante. If it is
not optimal for courts to observe h, damages equal $\overline{h}$ and parties
are not led to learn about h ex ante.*

Note. The rationale behind part (ii) is that for it to be
optimal for courts to observe h, it must be that parties'
behavior is affected, and for this to be true, it must be that
parties are led to learn about h ex ante.[14]

Proof. If courts do not observe h, then d will not depend on
h, so that it is obvious that parties will not acquire informa-
tion about h ex ante. Hence, it is optimal for d to equal $\overline{h}$,
parties will choose $x^*(\overline{h})$, and social costs will be given by (4).

If courts observe h and d = h, then if parties acquire
information ex ante, their costs will be

$$(11) \quad c + \int_0^\infty [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh.$$

Note also that if parties acquire information, d = h must be
optimal, since (11) minimizes social costs given that parties
learn h. If parties do not learn h, they will minimize x +
$p(x)(\overline{h} + k)$ and thus bear costs given by (6). Hence, individuals
will acquire information about h when (11) is less than (6), or

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[14]The result here that accuracy leads parties to obtain information about
risk and is thus good may be contrasted with a quite different effect of accuracy
under assumptions different from ours. Suppose that in the absence of accuracy
in assessing harm, parties would expend effort attempting to predict the errors
courts would make (even though the parties know the true harm they would cause).
Then accuracy would be advantageous because it would discourage parties from
investing effort to predict courts' errors. On this general issue, see Kaplow
and Shavell [1992a].

(12) $c \leq [x^*(\overline{h} + k) + p(x^*(\overline{h} + k))(\overline{h} + k)]$

$$- \int_0^\infty [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh.$$

Note that the right side of (12) is positive since $x^*(h + k)$ minimizes $x + p(x)(h + k)$.

Let us now show that it is socially desirable for courts to observe h if and only if (4) exceeds (11), that is, if and only if

(13) $x^*(\overline{h}) + p(x^*(\overline{h}))\overline{h}$

$$- \{c + \int_0^\infty [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh\} > 0.$$

If (13) holds, then it is socially desirable for h to be observed provided that parties will be led to acquire information ex ante, for then (11) applies. But since $x^*(\overline{h}) + p(x^*(\overline{h}))\overline{h} < x^*(\overline{h} + k) + p(x^*(\overline{h} + k))(\overline{h} + k)$, (13) implies that (12) is satisfied, so that parties will indeed acquire information ex ante. If (13) does not hold, then it cannot be optimal for h to be observed; for if h is observed, social costs either equal (11), which exceeds (4), or equal (6), which exceeds (4). Also, we note that (13) will hold if c and k are sufficiently low.[15]◄

    2.3 Endogenous Reporting of Information Ex Post. Suppose that after an accident, plaintiffs and defendants know h and can

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[15]Specifically, we know from before that for any $k < k^*$, (9) is positive; hence, for any $k < k^*$, there is a $c^*(k)$ such that (13) is positive if and only if $c < c^*(k)$.

elect whether to establish this at cost k.[16] (To this point, we had assumed that parties do not elect whether or not to establish k; rather, courts decided whether or not parties spend k to establish h.) If a party establishes h, assume that damages will be h, whereas if neither party establishes h, assume that damages d will be ĥ, expected harm conditional on silence about h.[17] (This is a natural assumption to make about damages, but we shall discuss other possibilities.) Let us reconsider the two cases in the basic model, where defendants do not know harm ex ante and where they do.

In the case where defendants do not know harm ex ante, we know from Proposition 1 that it is not socially optimal for h to be established and used by courts. However, parties may well

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[16]These are the simplest assumptions capturing the ability of parties to decide whether to present information to courts; a more detailed model would consider discovery by plaintiffs and defendants of each others' information.

[17]As will be discussed, both the plaintiff and the defendant will decide to be silent about h when $|h - d| \leq k$. Thus, since d is the conditional mean of h among the silent, we have

$$(*) \quad d = \int_{d-k}^{d+k} hf(h)dh/[F(d + k) - F(d - k)].$$

It can be shown, under the plausible assumption that f(h) is decreasing for all h sufficiently high, that (*) has a solution. By L'Hospital's Rule,

$$\lim_{d \to \infty} \int_{d-k}^{d+k} hf(h)dh/[F(d + k) - F(d - k)]$$

$$= \lim_{d \to \infty} [(d + k)f(d + k) - (d - k)f(d - k)]/[f(d + k) - f(d - k)]$$

$$= d + k\{\lim_{d \to \infty}[f(d + k) + f(d - k)]/[f(d + k) - f(d - k)]\} < d.$$

(The latter inequality follows because of the assumption that f is decreasing for h sufficiently high.) Thus, as d→∞, d must exceed the right side of (*). But at d = 0, the right side of (*) is positive. Since the right side is continuous in d, there must exist a d satisfying (*).

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decide to spend k to establish h to courts, as is evident from the next result.

PROPOSITION 4. *Suppose that defendants do not know harm h ex ante; that parties can choose whether or not to establish h to courts; and that if h is not established, damages d equal expected harm among those who do not establish h. Then although it is not optimal for anyone to devote effort to demonstrate h to courts, this will be done by defendants when h < d - k and by plaintiffs when h > d + k.*

Proof. If a defendant who has caused harm h establishes this, his costs will be h + k, whereas if he does not demonstrate h, his costs will be d. Hence, a defendant will establish h if and only if h < d - k. By similar logic, a plaintiff will establish h if and only if h > d + k. Hence, h will be established if and only if

(14) $|h - d| > k$.

Since some parties spend k to establish h, the outcome is not socially optimal; the expenditures on demonstrating h are a social waste.[18]◄

It follows from the proposition that a tax eliminating the incentive to reveal information would be socially desirable.

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[18]The expenditures are $k[1 - F(d + k) + F(d - k)]p(x) > 0$, where x is chosen by defendants to minimize

$$x + p(x)[\int_0^{d-k} (h + k)f(h)dh + d(F(d + k) - F(d - k)) + \int_{d+k}^{\infty} hf(h)dh]$$

$$= x + p(x)[\overline{h} + kF(d - k)].$$

Note too that since the term in brackets exceeds $\overline{h}$, the chosen x exceeds $x*(\overline{h})$.

Alternatively, social welfare could be raised if damages are not determined as we assumed. In particular, the state can trivially achieve the optimal outcome by setting d equal to $\bar{h}$ for both silent parties and those who reveal h, for then no one will reveal their h and defendants will choose $x*(\bar{h})$, which is optimal, as they do not know h ex ante.

Now let us consider the case where defendants know harm ex ante. In this case, they anticipate that h will be demonstrated if they cause harm and $|h - d| > k$. In particular, if $h < d - k$, defendants will demonstrate h if an accident occurs, and thus will decide to choose x to minimize $x + p(x)(h + k)$ and will select $x*(h + k)$; and if $h > d + k$, plaintiffs will demonstrate h if an accident occurs, so defendants will choose $x*(h)$. Defendants also recognize that if h is in $[d - k, d + k]$, they will take the same level of precautions, $x*(d)$.

Defendants have a socially excessive incentive to spend to demonstrate h in the following sense: if the marginal defendants who reveal k -- the defendants who cause harm of just below $d - k$ -- were instead to be silent and the behavior of other parties were to be held constant, social costs would fall. This is true because the marginal defendants' precautions would not change were they to be silent (their precautions are approximately $x*(h + k) = x*(d - k + k) = x*(d)$ if they are not silent), but society would save k per silent defendant.

If, however, the marginal plaintiffs who reveal k -- the plaintiffs who suffer harm of just above $d + k$ -- were to remain

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silent, social costs would not necessarily fall. The reason is that, although society would save k per plaintiff, the defendants for whom h is just above d + k would reduce their precautions from approximately $x^*(d + k)$ to $x^*(d)$, increasing the probability of accidents (specifically, social costs would change from $x^*(d + k) + p(x^*(d + k))(d + 2k)$ to $x^*(d) + p(x^*(d))(d + k)$).

These observations about the marginal parties suggest that social costs might be lowered under rules altering incentives to demonstrate harm. In the next proposition, we will show this is the case. In particular, we examine rules that may reduce incentives to demonstrate h by limiting the circumstances under which h will be awarded even if established.

PROPOSITION 5. *Suppose that defendants know harm h ex ante, and consider the class of damage rules with three properties: if a party establishes h, damages are set equal to h when and only when h lies outside a specified interval [a, b]; otherwise, damages equal an amount d; and $a \leq d - k$ and $b \geq d + k$.*

(i) Then for any such rule, neither defendants nor plain-tiffs will demonstrate h if h is in [a, b]; defendants will demonstrate h if h < a; and plaintiffs will demonstrate h if h > b.

(ii) The optimal rule damage rule in the class is such that a < d − k; thus, some defendants who are silent would demonstrate h if that would allow them to pay only h in damages. Further-more, the optimal d equals ĥ, the expected value of h in [a, b], provided that $a + k < ĥ \leq b - k$.

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Notes. With regard to part (i), if a party were to demonstrate h and it was in [a, b], he would still obtain d, not h. Hence, parties will never want to demonstrate h in [a, b], which gives the state a way to reduce incentives to demonstrate h. The assumptions that $a \leq d - k$ and $b \geq d + k$ guarantee that h will be demonstrated either by defendants or by plaintiffs if h lies outside [a, b]. It should be observed that the rule we studied above, in which parties obtain h whenever they demonstrate it, is essentially a member of the class of rules described here (set [a, b] = [d - k, d + k]).[19]

Part (ii) of the proposition reflects the observation made above about the marginal defendant: because social costs fall if a defendant for whom h = d - k does not demonstrate h, an optimal rule in the class will discourage such a defendant from demonstrating h. This is accomplished when $a < d - k$. In addition, the reason that the optimal d for silent parties equals the conditional mean over [a, b] is that this induces the best uniform level of care for the silent. (The inequality involving ĥ guarantees that parties have an incentive to reveal h when it is outside of [a, b].)

Proof. Part (i) follows immediately from the assumptions. With regard to part (ii), observe that social costs under a rule in the class are

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[19]To be precise, the rule we studied above does not have the property that if a person demonstrates h, he will still obtain d if h is in [d - k, d + k]. However, such a rule would be equivalent in the behavior it induces to the one we studied, as no one would ever choose to demonstrate h when h is in [d - k, d + k].

(15) $\int_0^a [x^*(h + k) + p(x^*(h + k))(h + k)]f(h)dh$

$+ \int_a^b [x^*(d) + p(x^*(d))h]f(h)dh$

$+ \int_b^\infty [x^*(h) + p(x^*(h))(h + k)]f(h)dh.$

The derivative of (15) with respect to a is

(16) $[x^*(a + k) + p(x^*(a + k))(a + k)]f(a)$

$- [x^*(d) + p(x^*(d))a]f(a).$

At a = d - k, (16) equals $p(x^*(d))kf(d - k)$, which is positive.
Hence, social costs are lowered by reducing a below d - k,
establishing that a < d - k is optimal. With regard to the
optimal d, observe that if (15) is maximized with respect to d,
the optimal d is ĥ.[20] However, it must be that the rule with
this d satisfies the requirement that a ≤ d - k and b ≥ d + k.
Clearly, that will be so if a + k < ĥ ≤ b - k.◄

3. Extensions and Discussion

        (a) *Generality of conclusions*. On reflection, it can be
seen that our main conclusions apply more generally than to
assessments of harm in accidents. Consider the conclusion that
it is not socially desirable for resources to be spent informing
courts of the magnitude of harm to the degree that harm was
unknown to parties when they made their decisions. This conclu-

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[20]The second term in (15) is the only one involving d, and it equals $[F(b) - F(a)][x^*(d) + p(x^*(d))ĥ]$. The second term in brackets is maximized when $x^*(d) = x^*(ĥ)$.

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sion is true also of any elements other than harm (such as facts about causation) unknown to parties when they made their decisions, under any legal rule in any area of law (for instance the negligence rule, or a rule of contract damages). The reason of course is that making liability depend on elements not known to parties when they choose their actions cannot affect their behavior.[21] Similarly, the other conclusions, about the effect of considering a factor in liability on parties' incentives to learn about the factor ex ante, and about parties' excessive incentives to present information to courts about such a factor ex post, also hold more generally.

(b) *Risk aversion and insurance.* Defendants' risk aversion is a factor disfavoring accuracy in the determination of harm, for a risk-averse defendant would prefer damages to be based on average harm than to bear the risk of actual harm. Conversely, plaintiffs' risk aversion favors accuracy in determination of

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[21]To be precise, assume that $u(x)$ is the utility of a party as a function of his action x, that $p(x, z)$ is the probability of harm as a function of x and a variable z unknown to him when he chooses x, where $f(z)$ is the probability distribution of z, and that $h(x, z)$ is harm given an accident. Suppose that damages d under a legal rule depend on h, x, and z, requiring in particular that z be observed. Then a party will choose x to maximize

$u(x) - \int p(x, z)d(h(x, z), x, z)f(z)dz.$

But if instead damages do not depend on z or h, but rather are defined by

$d(x) = \int p(x, z)d(h(x, z), x, z)f(z)dz/\int p(x, z)f(z)dz,$

then the party will behave the same way: he will maximize

$u(x) - \int p(x, z)d(x)f(z)dz = u(x) - d(x)\int p(x, z)f(z)dz$
$= u(x) - \int p(x, z)d(h(x, z), x, z)f(z)dz.$

Hence, we can construct a damage measure not depending on z under which the party behaves identically, so this must be better, as it does not require courts to observe z.

harm, since this assures compensation equal to losses.[22] The
availability of liability and first-party insurance, however,
qualifies these points, for insurance coverage protects parties
against risk.

It should also be noted that ownership of liability insur-
ance reinforces our point that accurate assessment of harm may
not much affect incentives. This is because the level of damages
that are imposed in the particular instance will often matter
little to a covered party, since his liability insurer will pay
most or all of a court award.

(c) *Importance of the possibility of excessive private*
incentives to establish harm in adjudication. The conclusion
that private incentives to establish harm accurately in adjudica-
tion tend to be excessive seems to us to be of substantial
practical importance because parties often lack significant
knowledge of risk in deciding on their actions. An individual
driving a car is unlikely to be able to predict who he would
injure in a collision (a bricklayer or a doctor) or the extent of
the harm (whiplash, broken bones, or death). Frequently, a
potential injurer will possess only rough actuarial knowledge of
risk when choosing his level of precautions. Moreover, it is
self-evident that parties are motivated to devote great effort to
develop estimates of harm in the course of litigation, for a

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[22]These statements apply if harm is monetary. If a component of harm (such
as pain and suffering) is not monetary and does not affect marginal utility of
wealth, then risk-averse plaintiffs as well as defendants will prefer damages for
that component to be based on average harm.

party will be willing to spend as much as $.99 for every $1 of
damages that he can alter in his favor.

Nonetheless, we do not want to be misinterpreted. Parties
do, of course, generally possess information relevant to poten-
tial accident losses when making decisions. The owner of a fleet
of oil tankers will be aware of the amount of oil carried by his
vessels, the resources at risk from spills near a vessel's ports
of call, and the like; this knowledge will influence his prior
estimates of losses from spills. Damage estimates produced by
the legal system should be accurate enough to reflect such
factors; if only general averages were used to compute damages,
incentives would not be as sharp as they could be. Further, at
modest cost parties may be able to improve information about the
harm they would cause. Hence, there clearly are valid reasons
for computing harm to some reasonable degree of accuracy.[23] Yet
we have shown that even where parties have knowledge of risk when
deciding on their actions, they may have an excessive incentive
to establish harm to courts.[24]

(d) *Implications of the analysis for the law.* To the degree
that parties have socially excessive incentives to spend deter-
mining harm, it would be efficient for the legal system (and for

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[23]An additional reason for computing harm accurately that one sometimes
encounters is that it may increase the knowledge of third parties who will decide
on actions in the future. The significance of this consideration is limited,
though, for most cases settle and, in any event, jury verdicts are not readily
interpreted. Moreover, if the government wishes to disseminate information about
losses, it would be more efficient for that to be done directly rather than
through litigation.

[24]Recall from Proposition 5 and the discussion preceding it that there is a
sense in which defendants have a socially excessive incentive to demonstrate
harm, although plaintiffs may not.

private regimes of alternative dispute resolution) to limit their efforts. Thus, rules that would curtail the number of witnesses offered on damages, that would restrict expert testimony, and so forth, might be beneficial. In addition, in some areas of litigation, it might be advantageous for courts to abandon individualized calculation of harm and instead to employ a tabular approach to determine damages.

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