SHOULD LIABILITY BE BASED
ON THE HARM TO THE VICTIM
OR THE GAIN TO THE INJURER?

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Abstract: Should the level of liability imposed on an injurer be based on the harm he caused or instead on the gain he obtained from engaging in the harmful act? The main point of this article is that there is a strong reason to favor liability based on harm rather than gain when account is taken of the possibility of legal error. Notably, even a small underestimate of gain can lead an injurer to commit a harmful act when the harm greatly exceeds his gain, causing a large social loss. In contrast, a comparable error in the estimate of harm will not lead an injurer to engage in the harmful act when the harm significantly exceeds his gain. The general superiority of harm-based liability is shown to hold under the rules of negligence and strict liability and regardless of whether potential injurers know the error that will be made.

1. Introduction

    Should the level of liability imposed on an injurer be based on the harm
he caused or instead on the gain he obtained from his misconduct? For
example, if a person's failure to take a precaution that costs $1,000 results
in a harm of $10,000, should he be liable for the $10,000 harm or the $1,000
that he saved? If a firm violates a regulatory requirement and thereby
increases its profit, should the firm's liability equal the harm caused by the
violation or its additional profit?

    The answer provided by the law to such questions is not uniform in
character. In tort and contract disputes, liability generally is based on the
victim's harm,[1] although sometimes the injurer's gain is taken into account
(for example, in determining punitive damages in tort law and restitutionary
damages in contract law[2]). In criminal law and other governmental
enforcement contexts, liability often depends on harm, but also frequently on
gain (such as for noncompliance with certain environmental and financial
regulations).[3]

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[1] See, for example, American Jurisprudence (1988, p. 35) ("Generally, a
person who, tortiously or in breach of a contractual obligation, does an act
which has injurious consequences is liable for the damage caused by such
wrongful act." footnote omitted).

[2] Regarding punitive damages, see, for example, Pacific Mutual Life
Insurance Co. v. Haslip, 499 U.S. 1, 21-22 (1991) (in which the U.S. Supreme
Court endorsed a list of seven factors considered relevant to the size of a
punitive damage award, one of which was "the profitability to the defendant of
the wrongful conduct and the desirability of removing that profit and of
having the defendant also sustain a loss"). Regarding restitutionary damages,
see, for example, Farnsworth (1990, pp. 150-151) ("[T]he object of restitution
is ... the prevention of unjust enrichment. The focus is on the party in
breach rather than on the injured party, ... The party in breach is required
to disgorge what that party has received in money or services ....").

[3] Under guidelines promulgated by the United States Sentencing Commission
for individual defendants in criminal cases, courts are required to consider
in determining the amount of a fine "the need for the ... sentence to reflect

In this article we evaluate the efficacy of harm-based liability and gain-based liability as means of deterring socially undesirable acts -- acts for which an injurer's gain is less than the victim's harm.[4] Either measure of liability will deter such acts in a legal system in which harm and gain are correctly assessed. Harm-based liability accomplishes deterrence because the harm from a socially undesirable act, and therefore the level of liability, will exceed the injurer's gain. Gain-based liability achieves the same result by making the injurer disgorge his gain (or a little more).

We will emphasize, however, that the two approaches differ greatly when account is taken of errors that the legal system may make in calculating gain and harm. In particular, gain-based liability will be shown to be seriously flawed in the presence of legal error because it fails to deter many socially undesirable acts. Harm-based liability, however, is not as susceptible to this criticism and therefore generally is superior.

The problem with gain-based liability is that any underestimation of the gain will in principle lead an individual to commit an undesirable act, no matter how great the resulting harm may be. Suppose, for example, that an act

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the seriousness of the offense (including the harm or loss to the victim and the gain to the defendant), ..." See United States Sentencing Commission (1987, p. 5.15). Sentences for organizational defendants also take both harm and gain into account. Under the RICO (Racketeering Influenced and Corrupt Organizations) Act, "... a defendant who derives profits or other proceeds from an offense may be fined not more than twice the gross profits or other proceeds." See United States Code, Title 18, Section 1963(a)(3). See also United States Code, Title 42, Section 7420(d)(2) (providing for environmental noncompliance penalties at least equal to "the economic value which a delay in compliance ... may have for the owner" of the source of pollution) and Securities and Exchange Commission v. Paul A. Bilzerian, et al., 814 F.Supp. 116, 121 (1993) (an action by the SEC successfully seeking the disgorgement of profits obtained by defendant Bilzerian through certain securities transactions).

[4] We also briefly consider compensation issues in comment (e) in Section 5 below.

would produce a gain of $1,000 for an individual and that the gain is slightly underestimated, say it is thought to be $950. Then the individual will be led to commit the act -- he would profit by $50 -- regardless of the harm, whether it is $2,000, $20,000, or $200,000. In contrast, under harm-based liability, the individual is not likely to commit the act when the harm greatly exceeds his gain of $1,000, because his liability is likely to exceed $1,000 even if the measurement of harm is subject to substantial error.

We will show that harm-based liability is superior to gain-based liability under quite general assumptions about the probability distribution of legal error and regardless of whether individuals know the magnitude of the error before deciding whether to engage in the harmful act. Section 2 describes the basic framework of the analysis. Section 3 presents the results under the negligence rule and Section 4 briefly considers the strict liability rule. Section 5 contains concluding remarks.[5]

2. Basic Framework

Each individual in a population of risk-neutral individuals decides whether to engage in an act that will result in a harm and a gain with certainty. Both the harm and the gain vary among individuals. Let

g = gain to an individual if he engages in the act, $g > 0$;

h = harm caused if the individual engages in the act, $h > 0$;

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[5] Wittman (1984, 1985) considers liability based on harm and liability based on gain, but does not make the point that we emphasize here. His focus is on which party -- the injurer or the victim -- should decide how much care the injurer exercises. Parker (1989, pp. 554-563) and Gruner (1992, pp. 234-263) informally discuss harm-based and gain-based liability in the context of criminal sentencing policy for organizations. In addition, a number of authors have studied the effects of legal errors on individual behavior under liability rules, but take for granted that the level of liability is based on harm. See, for example, Craswell and Calfee (1986).

and assume that the joint probability density over g and h is positive for all positive g and h. Individuals know their own g and h.

If the social authority responsible for setting the level of liability makes errors in observing the gain and/or the harm, the values it observes are assumed to take the forms $g + \gamma$ and $h + \eta$, where

γ = error in observing the gain;

η = error in observing the harm.

These errors have mean zero and are independent of one another.

An individual will engage in the harmful act if and only if his gain exceeds his expected liability.[6] The latter depends (in ways described in Sections 3 and 4 below) on the applicable liability rule and on whether he knows before he commits the act the errors that the social authority will make in observing his gain and harm.

Social welfare is taken to be the sum of the gains less the harms associated with the subset of individuals who commit harmful acts. In the first-best outcome, every individual whose gain exceeds harm will engage in the act, and every individual for whom the reverse is true will refrain from the act.

3. <u>Analysis Under the Negligence Rule</u>

Under the negligence rule, an individual is liable if and only if he is negligent. An individual will be found negligent when his act is judged socially undesirable, that is, when his observed gain, $g + \gamma$, is less than the

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[6] We assume for simplicity that he will not engage in the act if his gain equals his expected liability.

observed harm, $h + \eta$.[7]

We will consider two alternative measures of liability under the negligence rule: gain-based liability -- equal to the observed value of the injurer's gain, $g + \gamma$ -- and harm-based liability -- equal to the observed value of the victim's harm, $h + \eta$. These measures will be compared first when there are no errors in estimation (when γ and η are identically zero), then when there are errors and their values are known by individuals before they decide whether to engage in the harmful act, and finally when there are errors but their values are not known by individuals in advance.

3.1. No Errors

In this case, an individual will be found negligent if and only if $g < h$; liability then will be g under gain-based liability and h under harm-based liability.

Under gain-based liability, an individual will be deterred from engaging in the act whenever $g < h$, for if he engages in it he will have to surrender his gain.[8] Similarly, under harm-based liability, an individual will be deterred from engaging in the act whenever $g < h$, for if he engages in it he will have to pay the harm, which exceeds his gain. Under both measures an individual will engage in the act whenever $g \geq h$ since he will not be found negligent. Thus, *if there are no errors in observing gain or harm, the two measures of liability are equivalent*. Moreover, the first-best outcome is

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[7] Although acts that are socially undesirable are described here as negligent, the reader also could interpret them as criminal or as violations of regulatory standards.

[8] Recall that we have assumed for simplicity that an individual will not engage in the act when he is indifferent. This assumption can be interpreted as capturing the fact that liability slightly in excess of gain would make the injurer strictly prefer not to engage in the act.

achieved.

3.2. Errors Anticipated

We now assume that the social authority makes errors and that individuals know what the errors are before deciding whether to engage in the harmful act.

Suppose first that only the gain is observed with error.[9] Then if $g + \gamma \geq h$, negligence will not be found and the measure of liability will be irrelevant. Assume, therefore, that $g + \gamma < h$, so negligence will be found.

Then under harm-based liability, since liability is h, an individual will engage in the act if and only if $g > h$. Under gain-based liability, an individual will engage in the act whenever the gain is underestimated -- that is, whenever $\gamma < 0$. Relative to the outcome under harm-based liability, this results in a social loss of h - g if $g < h$, and is equivalent to the outcome under harm-based liability if $g \geq h$. If the gain is overestimated, an individual will be deterred under gain-based liability, as well as under harm-based liability; the latter result follows because $\gamma > 0$ and $g + \gamma < h$ (the maintained assumption that negligence will be found) imply that $g < h$.

The preceding discussion shows that *when gain alone is observed with error and the error is anticipated, harm-based liability is superior to gain-based liability*. In particular, if gain is underestimated, the gain-based measure will lead an individual to engage in the harmful act even when his gain is less than the harm (possibly much less than the harm); but under harm-based liability, an individual never engages in the act when his gain is less than the harm.

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[9] Because our principal interest is in errors in estimating the gain, we will not consider in the text the situation when harm alone is subject to error. However, this case is discussed in notes 11, 14, 15, and 16 below.

Now suppose that both gain and harm are observed with error. When $g + \gamma \geq h + \eta$, negligence will not be found and the measure of liability will be irrelevant, so again assume that negligence is found -- that $g + \gamma < h + \eta$.

If $g \leq g + \gamma$, an individual will be deterred under both measures of liability (since $g \leq g + \gamma < h + \eta$). Conversely, if $g > h + \eta$, an individual will engage in the act under both measures. Only when $g + \gamma < g \leq h + \eta$ will the two measures of liability differ in their effect -- an individual will engage in the act under gain-based liability but not under harm-based liability.

The extra inducement to engage in the act under the gain-based measure may in principle be undesirable or desirable. It will be undesirable if $g < h$. This clearly is possible since $g + \gamma < g < h < h + \eta$ can occur if $\gamma < 0$ and $\eta > 0$; and $g + \gamma < g < h + \eta < h$ can occur if $\gamma < 0$ and $g - h < \eta < 0$. The added incentive to engage in the act will be desirable if $g > h$. This also is possible because $g + \gamma < h < g < h + \eta$ can occur if $\gamma < h - g < 0$ and $\eta > g - h > 0$; and $h < g + \gamma < g < h + \eta$ can occur if $h - g < \gamma < 0$ and $\eta > g - h > 0$. Thus, without further assumptions, it is not possible to say which measure of liability is preferable.

Notwithstanding that the two measures cannot be ranked unambiguously when both gain and harm are observed with error and the errors are anticipated, there is an important sense in which harm-based liability is superior to gain-based liability: Let γ_M be the maximum error that can occur in observing gain and η_M be the maximum error that can occur in observing harm. It can be shown that, for any γ_M, harm-based liability is superior to

gain-based liability when η_M is sufficiently low.[10] However, the converse is not true; gain-based liability may be inferior to harm-based liability no matter how small γ_M is (as long as it is positive).[11] These results are demonstrated in the appendix.

The explanation is in essence that even a small error in estimating gain can cause a large social loss because such an error can lead an individual to commit a harmful act when his gain is much less than the harm. In contrast, a small error in estimating harm can cause only a small social loss because an individual will commit the act only if his gain exceeds the estimate of the harm, which (by hypothesis) is relatively close to the harm.

The advantage of harm-based liability can be illustrated by the following numerical example. Suppose that there are one million individuals in the population; that the gain from engaging in the harmful act varies uniformly among them from $1 to $100 (by increments of a dollar); and that the resulting harm also varies uniformly and independently from $1 to $100 (by increments of a dollar). Then the level of social welfare in the first-best outcome -- equivalently, the outcome when there are no errors in observing gain or harm -- can be calculated to be $16.665 million. Suppose the errors, both positive and negative, in observing gain and harm are uniformly distributed (by increments of a dollar) from zero to some upper bound -- γ_M

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[10] Note that this result implies that harm-based liability is superior to gain-based liability when the gain alone is subject to error, for then $\eta_M = 0$.

[11] In the special case in which only the estimation of harm is subject to error, gain-based liability and harm-based liability are equivalent: both result in deterrence whenever negligence is found (for $g < h + \eta$ implies that an individual will not engage in the act regardless of whether he pays g or $h + \eta$). This does not contradict the result stated in the text, since when harm alone is subject to error, $\gamma_M = 0$.

for gain and η_M for harm.[12] If $\gamma_M = \eta_M = \$1$, so that both gain and harm are observed with only a small error, social welfare falls 32% under gain-based liability, to $11.270 million, but less than 1% under harm-based liability, to $16.658 million. Holding γ_M (the maximum error in observing gain) at $1 but raising η_M (the maximum error in observing harm) to $25 does not significantly affect this result: social welfare then is $10.795 million under gain-based liability (a 35% reduction from the first-best level) and $15.948 million under harm-based liability (a 4% reduction). In other words, even when the errors with respect to harm are large and the errors with respect to gain are small, harm-based liability is strongly preferred to gain-based liability.

3.3. Errors Not Anticipated

In this case, we assume that individuals do not know what the social authority's errors will be when deciding whether to engage in the harmful act; they only know the distributions of the error terms.

With this information, an individual can compute the probability that he will be found negligent if he engages in the act -- that is, the probability that $g + \gamma < h + \eta$ given his g and h. Let p(g, h) represent this probability. If p(g, h) is zero, the measure of liability is irrelevant, so we will consider only g and h such that p(g, h) is positive.

An individual also can calculate the probability distribution of the level of liability if there is a finding of negligence. Let Eg(g, h) denote the expected value of the individual's liability under the gain-based measure, conditional on negligence being found; and let Eh(g, h) be the corresponding

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[12] We assume that the maximum possible error is reduced whenever, given the true value of the injurer's gain and the victim's harm, the observed values of gain or harm otherwise would be less than $1 or greater than $100.

expected value under the harm-based measure.[13]

Since $g + \gamma < h + \eta$ whenever negligence is found, it follows that $Eg(g, h) < Eh(g, h)$, so that $p(g, h)Eg(g, h) < p(g, h)Eh(g, h)$. In other words, the individual's expected liability is lower under the gain-based measure. Consequently, if $g < p(g, h)Eg(g, h)$, the individual will be deterred from engaging in the harmful act under both measures of liability; and if $g > p(g, h)Eh(g, h)$, he will engage in the act under both. The measures differ only if $p(g, h)Eg(g, h) < g < p(g, h)Eh(g, h)$ -- in which case an individual will engage in the act under gain-based liability but not under harm-based liability. But then, engaging in the harmful act lowers social welfare since $g < p(g, h)Eh(g, h) \leq h$; the latter inequality follows from the fact that if an individual were always found liable, his expected liability under the harm-based measure would be the unconditional expected value of $h + \eta$, which is h.

We conclude, therefore, that *when both gain and harm are observed with error and the errors are not anticipated, harm-based liability is superior to gain-based liability.*[14] Note that the present argument favoring harm-based liability is stronger, since it is unambiguous, than the argument when errors are anticipated. In both cases, the problem with gain-based liability is that it provides an added inducement to engage in the harmful act when an individual's gain is less than the harm.

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[13] In other words, $Eg(g, h)$ equals the expected value of $g + \gamma$ conditional on $g + \gamma < h + \eta$; and $Eh(g, h)$ equals the expected value of $h + \eta$ conditional on $g + \gamma < h + \eta$.

[14] This result implies that in the special cases in which gain alone or harm alone is estimated with error, harm-based liability is superior to gain-based liability.

4. Analysis Under the Strict Liability Rule

Under the rule of strict liability, an individual is liable whenever he causes harm (regardless of whether he is negligent). We will now compare the gain-based measure of liability to the harm-based measure under this rule in the three cases discussed in Section 3.

4.1. No Errors

In this case, if liability is set equal to h, an individual will engage in the harmful act if and only if $g > h$, and the first-best outcome will be achieved. If liability is set equal to g, an individual will be deterred from engaging in the act regardless of g and h. This outcome is undesirable whenever $g > h$. Thus, *if there are no errors in observing gain or harm, harm-based liability is superior to gain-based liability.*

4.2. Errors Anticipated

Suppose first that only the gain is observed with error. Then under harm-based liability, individuals will engage in the harmful act if and only if $g > h$, again resulting in the first-best outcome. Under gain-based liability, if gain is underestimated, an individual will engage in the harmful act regardless of h. This results in a social loss of h - g if $g < h$. Alternatively, if gain is overestimated, the individual will be deterred regardless of h, resulting in a social loss of g - h if $g > h$. Thus, *when only gain is observed with error and the error is anticipated, harm-based liability is superior to gain-based liability.*

Although this is the same conclusion that was reached under the negligence rule when gain alone is observed incorrectly, the explanation differs somewhat. There the inefficiency of gain-based liability was that it led many individuals to engage in the harmful act when their gain was less

- 11 -

than harm. That problem remains under strict liability. In addition, gain-based liability now deters many individuals whose gain exceeds harm.

Next suppose that both gain and harm are observed with error. Under the harm-based measure, some individuals whose gain is less than harm will engage in the act -- those for whom $h + \eta < g < h$ -- and some individuals whose gain exceeds harm will not engage in the act -- those for whom $h < g < h + \eta$. Likewise, under the gain-based measure, some individuals whose gain is less than harm will engage in the act -- those for whom $g + \gamma < g < h$ -- and some individuals whose gain exceeds harm will not engage in the act -- those for whom $h < g < g + \gamma$. Hence, as was the case under the negligence rule, either harm-based or gain-based liability could in principle be superior.

But again, *although the two measures cannot be ranked unambiguously when both gain and harm are observed with error and the errors are anticipated, harm-based liability is superior to gain-based liability in the previously described sense.* Specifically, harm-based liability is preferable when the maximum error with respect to harm, η_M, is below a threshold, but gain-based liability is not necessarily superior to harm-based liability even if the maximum error with respect to gain, γ_M, is small.[15]

4.3. <u>Errors Not Anticipated</u>

In this case, an individual's expected liability under the harm-based measure is h, since the error, η, has mean zero. Therefore, an individual will engage in the harmful act if and only if $g > h$, and the first-best outcome will be achieved. Under the gain-based measure, the individual's expected liability is g since the error, γ, has mean zero, and so he will be

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[15] In the special case in which only the estimation of harm is subject to error, it is readily shown that harm-based liability is superior to gain-based liability if η_M is sufficiently low.

deterred from engaging in the act regardless of g and h. This outcome is undesirable whenever g > h. Thus, *when errors are not anticipated, harm-based liability is superior to gain-based liability.*[16]

5. <u>Concluding Remarks</u>

(a) As we noted in the introduction, in practice liability sometimes depends on gains. This might be because an injurer's gain is easier to calculate than the victim's harm. For example, the amount of money saved by not installing pollution control equipment may be more readily ascertainable than the harm suffered by victims of pollution. But it could be a mistake nonetheless to base liability on the injurer's gain. For as we have seen, if the gain is underestimated -- the cost of controlling pollution might be greater than the enforcement authority calculates -- substantial harm can occur. As a general policy, it may be better to base liability on a victim's harm even though the harm can only be approximated, because if the harm is great in relation to the gain, the harmful act is likely to be deterred.

(b) Although our focus has been on comparing measures of liability under the negligence rule, it is worth repeating here why the gain-based measure is inferior to the harm-based measure under the strict liability rule: the gain-based measure not only would lead many individuals to engage in the harmful act when their gains are far less than harm, it also would deter many individuals whose gains far exceed harm. In other words, under the strict liability rule, the gain-based measure also would result in a chilling effect on socially desirable behavior. It therefore is not surprising that the gain-

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[16] This result also holds in the special cases in which gain alone or harm alone is estimated with error.

based measure does not appear to be used under that rule.

(c) In our model we assumed that harm occurs with certainty if an individual engages in an act. In many contexts, however, harm occurs only with a probability. Then harm-based liability is superior to gain-based liability even in the absence of errors in observing harm and gain: Under gain-based liability, an individual will not be deterred from engaging in a socially undesirable act because he will have to disgorge his gain only with a probability (when harm occurs). Under harm-based liability, however, he will be deterred. For example, suppose that an act results in a gain of $100 and creates a fifty percent chance of a harm of $500. Since the expected harm is $250, the act is socially undesirable. Under gain-based liability, the individual's expected liability is fifty percent of $100, or $50 -- which will not deter him -- whereas under harm-based liability, his expected liability is $250 -- which will deter him.

(d) We did not consider victims' incentives to avoid harm in our analysis. Under the negligence rule, this factor favors gain-based liability because, whenever negligence is found, the resulting level of liability will be lower than under harm-based liability, which will induce victims to take more care because they will have more to lose. Under the strict liability rule, the implication of this factor is ambiguous because the gain-based measure may be greater than or less than the harm-based measure. In any case, the importance of this issue is limited by the fact that the law generally circumscribes victims' ability to collect damages when they have not made reasonable efforts to avoid harm.

(e) Another factor omitted from the analysis is risk aversion and compensation. This consideration favors harm-based liability if victims are

more risk-averse than injurers (because harm-based liability, by definition, attempts to make victims whole) and gain-based liability in the reverse case (because, by removing an injurer's gain, gain-based liability keeps the injurer's utility stable). However, the relevance of risk aversion is attenuated by the general ability of parties to purchase insurance.

(f) Finally, we did not take into account the costs of imposing monetary sanctions. Such costs often are substantial. For example, in non-auto tort litigation, nearly a dollar of legal fees and related expenses is incurred for every dollar of liability borne by the defendant.[17] The existence of such costs makes lower levels of liability more appealing, other things being equal. This suggests that a modified form of gain-based liability might be superior to harm-based liability under the negligence rule. Specifically, suppose that the level of liability is set equal to the injurer's gain plus an additional amount to ensure that, even if the gain is underestimated, deterrence will occur with a high probability. By design, this variation of gain-based liability will not suffer significantly from the problem of underdeterrence that characterizes the gain-based measure we analyzed. Moreover, presuming that the resulting level of liability is less than harm, this alternative will generate lower administrative costs than harm-based liability.

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[17] See Hensler, Vaiana, Kakalik, and Peterson (1987, pp. 25-29).

<u>Appendix</u>

The appendix proves the results stated in subsection 3.2 regarding the sense in which harm-based liability is superior to gain-based liability when both gain and harm are observed with error and the errors are anticipated.

Recall that γ_M is the maximum error that can occur in observing gain and η_M is the maximum error that can occur in observing harm.

It was shown in subsection 3.2 that when only gain is observed with error -- in which case $\eta_M = 0$ -- harm-based liability is superior to gain-based liability. It is obvious that as $\eta_M \to 0$, the outcome under harm-based liability approaches the outcome when $\eta_M = 0$. It follows that if η_M is positive but sufficiently small, harm-based liability also dominates gain-based liability.

To explain why gain-based liability does not necessarily become superior to harm-based liability even as $\gamma_M \to 0$, assume that, for all positive γ_M, the probability that the error regarding gain is negative is at least k for some positive k. (This is a weak assumption and would be satisfied, for instance, by any symmetric distribution of error, in which case k = .5.) Then, no matter how small γ_M is (provided γ_M is positive), under gain-based liability the likelihood of the party engaging in the act is at least k for all g, and in particular, for g < h. It follows that under gain-based liability, the social loss -- the deviation in social welfare from the first-best outcome -- is bounded away from zero when aggregated over the situations in which negligence is found.[18] Thus, even if γ_M is very small, the social loss

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[18] There also is a social loss in situations in which negligence is not found. But because the measure of liability is immaterial when negligence is not found, this social loss is the same under both measures. Hence, only the social loss in situations in which negligence is found is relevant to the comparison of the two measures.

under gain-based liability may exceed the social loss under harm-based liability.

The analysis under the strict liability rule is essentially the same as under the negligence rule.

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