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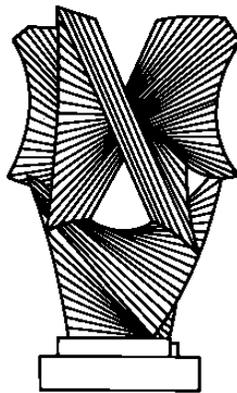
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## Beneficial Victims

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# Beneficial Victims

Oren Bar-Gill<sup>\*</sup> and Ariel Porat<sup>\*\*</sup>

## Abstract

In the standard tort case, the injurer-victim interaction results in harm to the victim. In this paper, we identify and analyze a distinct category of cases – beneficial victim cases – in which the injurer-victim interaction, results in both harm to the victim and benefit to the injurer. In other words, the injurer benefits from the presence of the victim. In these beneficial victim cases, which are quite common, standard results about the relative efficiency of different liability rules do not apply. When the benefit to the injurer exceeds the harm to the victim, liability should be imposed, whereas if the harm is larger than the benefit the case for liability becomes much weaker. These conclusions imply, counterintuitively, that it may be more important to impose liability on the non-negligent injurer rather than on the negligent injurer. We study the incentive effects of different liability rules, as well as the restitution rule, in the beneficial victim case. Our analysis also sheds new light on the law of takings.

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## 1. Introduction

Consider two scenarios:

*Scenario 1: Ship-owner 1 ties her ship (ship 1) to a dock, causing harm to another ship that was also tied to the same dock.*

*Scenario 2: Ship-owner 2 ties her ship (ship 2) to a dock, causing harm to the dock.*

In both scenarios, the ship-owners' decisions to tie the ship to the dock was made during a storm, without the possibility of bargaining with the dock owner or with the owner of the other ship. Assume that both ship-owner 1 and ship-owner 2 were not negligent, as the harm – to the other ship in Scenario 1 and to the dock in Scenario 2 – is smaller than the cost of avoiding the harm – the cost of certain ruin to either ship 1 or ship 2. Should ship-owner 1 be liable for the harm caused? How about ship-owner 2?

In this paper, we show that while the non-negligent ship-owner 1 need not pay for the harm, the similarly non-negligent ship-owner 2 must pay for the harm she caused, if we want to provide efficient incentives. Put differently, a negligence rule is efficient in Scenario 1, but not in Scenario 2. In Scenario 1, which represents the standard tort case, both negligence and strict liability are equally efficient. In Scenario 2, on the other hand, strict liability is the more efficient rule.

What is special about Scenario 2 – as opposed to Scenario 1 and other typical tort cases – is, that ship-owner 2 derived a benefit from the interaction with the victim, the dock owner. In other words, ship-owner 2 benefited from the presence of the victim and his property (the dock); it was better, for ship-owner 2, that the victim and his property were present at the place and time of the accident. This is very different from the standard tort case, where the injurer would rather not encounter the victim. We call the victim in Scenario 2, whose presence benefited the injurer, a “beneficial victim.” We show that the standard tort model and the policy implications of this standard model, specifically implications for the relative efficiency of different liability rules, do not extend to the beneficial victim case. The beneficial victim case requires separate analysis, which yields distinct policy implications.

To elaborate: In the typical tort case the injurer derives a benefit from her activity while the victim suffers harm. The injurer can reduce the harm by reducing her activity level and by taking precautions. The victim can reduce the harm by reducing his activity level and by taking precautions. The economic goal of tort law is to provide both the injurer and victim with efficient incentives to minimize social costs. The incentive effects of different liability rules, in the standard case, are well understood: the negligence rule, with or without a contributory or comparative negligence defense, and a strict liability rule, with a contributory or comparative negligence defense, provide the parties with efficient incentives to take precautions.<sup>1</sup> Inducing optimal activity levels is more difficult. Under the negligence rule, the injurer meets the Due Care Standard (DCS) and externalizes the harm from accidents that take place in the absence of negligence. As a result, the injurer will choose an excessively high activity level. Under the strict liability rule, it is the victim who externalizes the harm and, as a result, chooses an excessively high activity level. (See, e.g., Shavell, 1987)

In the beneficial victim case, the injurer receives a benefit from the injurious interaction with the victim. In this case, the prospect of an injurer-victim interaction increases the benefit, to the injurer, from engaging in her activity. In other words, the benefit to the injurer from her activity is higher than what it would have been had the victim not been present at all. More generally, any action by the victim that

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<sup>1</sup> Optimal precaution levels obtain in the standard tort model under assumptions of perfect information. We retain these assumptions here. For the effects of imperfect information – see, e.g., Bar-Gill and Ben-Shahar (2003).

reduces the probability of an interaction – reducing his activity level or investing in precaution – reduces the benefit that the injurer obtains from her activity.

We show that results obtained in the standard tort model do not apply in the beneficial victim case. In particular, while imposing liability on the injurer distorts the victim's incentives in the standard case, it can improve the victim's incentives in the beneficial victim case. The intuition for this result is the following: In the standard case, the injurer-victim interaction results only in harm (H) to the victim. Optimal incentives require that the victim internalize the harm, namely, the victim needs to "feel" H. No liability achieves such internalization. In the beneficial victim case, the injurer-victim interaction results both in harm (H) to the victim and in benefit (B) to the injurer, for a net benefit of  $B - H$ . Optimal incentives require that the victim internalize both the harm and the benefit, namely, the victim needs to "feel"  $B - H$ . Standard liability rules do not achieve such perfect internalization. The question that arises is whether liability does better, or worse, than no liability.

We show that when the benefit (B) to the injurer is higher than the harm (H) to the victim, liability is unambiguously more efficient than no liability. When benefit is lower than the harm, on the other hand, there is no clear priority for liability over no liability. This conclusion is counter-intuitive. To see why, consider, again, Scenario 2, and assume that the injurer can prevent the harm only by refraining from tying her ship to the victim's dock, which means that the cost of care equals the forgone benefit from the injurious interaction (B). In this scenario, liability is unambiguously more efficient than no liability when the injurer is *non-negligent* ( $B > H$ ); when the injurer is *negligent* ( $B < H$ ) imposing liability might be inefficient. This also implies that in such cases a rule of strict liability is unambiguously more efficient than a rule of negligence, since the difference between those two liability rules manifests itself only when  $B > H$  – the case in which liability is imposed under strict liability, but not under negligence (when  $B < H$  liability is imposed under both a strict liability rule and under a negligence rule).

Beneficial victim cases are common and they encompass both intentional and accidental infliction of harm. Whenever the presence of the victim, or the intensity of his presence, increases the injurer's benefit, imposing liability is efficient when the benefit exceeds the harm (and perhaps even when the harm exceeds the benefit). Accordingly, we need not impose liability on ship-owner 1, in Scenario 1 above, but we do need to impose liability on ship-owner 2, in Scenario 2 above. The reason is that the interaction with the dock, in Scenario 2, creates a benefit for the ship-owner, while the interaction with the other ship, in Scenario 1, does not.

Beneficial victims appear in many other cases. Consider non-negligent Driver 1 who hits a pedestrian, and non-negligent Driver 2 who damages a guardrail, owned by the municipality, which prevented him from rolling down the hill and being severely injured. It could be efficient not to impose liability on Driver 1 for the pedestrian's injury, but it would be inefficient not to impose liability on Driver 2 for the damage caused to the guardrail. Again, the reason is that the interaction with the guardrail creates a benefit for the driver, while the interaction with the pedestrian creates no such benefit. Or consider a facility or equipment owned by a charity. If a person non-negligently damages the facility or equipment, while using them for her own benefit, liability should be imposed for the harm caused. On the other hand, if another person, who gains no benefit from the facility or equipment, non-negligently causes the same harm, e.g., by crashing into them with her car, no liability could be efficient. As before, liability, in the absence of negligence, is necessary only when the injurer benefits from the interaction with the victim.

Our analysis of the beneficial victim case sheds light also on the law of takings. We emphasize the distinction between takings where the taker would rather not have the taking victim present, and takings where the taker benefits from the presence of the victim – the beneficial victim case. Consider first the taking of a house in order to destroy it and construct a highway. The taker gains no benefit from the victim's investment in the house; and would be just as well off, if not better off, had the victim, and his

house, not been there at all. Next consider the taking of a truck in a time of emergency to be used for transporting rescue workers and equipment. The taker benefits from the presence of the victim, and his truck, and from the victim's investment in maintaining the truck in good operating condition. Assume that both takings – of the house and of the truck – are efficient, as the benefit to the taker exceeds the harm to the victim. Liability is necessary in the truck case, which is a beneficial victim case, but not in the house case.

The beneficial victim case lies at the intersection of tort law and the law of restitution. In restitution law, under certain circumstances, rescuers are entitled to reimbursement for the costs they incurred in rescuing another person without that person's consent.<sup>2</sup> In the beneficial victim case, as in the rescue case, one party is a beneficiary of the interaction, while the other suffers harm from the interaction (in the rescue case, the harm is the cost of the rescue). But there is an important difference between the two cases: in the rescue case the benefit is provided at the initiative of the benefactor, while in the beneficial victim case the initiative belongs to the beneficiary. The law is very cautious in imposing liability on the beneficiary, in the rescue case, since the rescuer, benevolent as he may be, is an intervener who conferred an unrequested benefit. And even when restitution law imposes liability on the beneficiary, the remedy is not restitutionary damages, but rather compensatory damages – measured by the cost of the rescue.<sup>3</sup> Liability should be more freely imposed in the beneficial victim case, since it is the beneficiary who initiated the interaction without securing the benefactor's consent beforehand. Therefore, restitution law often allows restitutionary damages in the private taking case, namely, when the beneficiary takes the benefactor's property for her own use without the benefactor's consent.<sup>4</sup> Restitution law is unclear, however, about whether the victim, in the beneficial victim case, is ever entitled to restitutionary damages, outside the takings context.<sup>5</sup> We suggest that under certain circumstances restitutionary damages in beneficial victim cases are superior to compensatory damages. In particular, they provide efficient incentives for the victim, albeit distort the injurer's incentives.

To the best of our knowledge, the unique features, and legal policy implications, of the beneficial victim case have not been identified and analyzed previously. Still, several prior contributions touch upon certain elements of the beneficial victim case. Lander and Posner (1981) study intentional torts. They define intentional torts as cases in which the injurer enjoys an affirmative benefit from committing the tort. Focusing on *Vincent v. Lake Erie* (which corresponds to our Scenario 2), Landes and Posner show that without liability the victim will have insufficient incentives to invest in building docks, and thus favor strict liability in such cases. Landes and Posner, however, do not systematically study what we have called the "beneficial victim" case. Specifically, they do not distinguish between cases where  $B > H$  and cases where  $B < H$ . As we argue below, strict liability, while clearly better than no liability when  $B > H$ , might not be the best rule when  $B < H$ . Hilton (2010) studies the necessity defense. Like us, Hilton focuses on the victim's incentives to defend against harm. He notes that defending against harm is inefficient when the injurer's benefit exceeds the victim's harm and argues that the necessity doctrine plays a role in mitigating this inefficiency. Hilton, however, does not distinguish between the standard tort case and the beneficial victim case, and he does not identify the two, countervailing distortions that liability creates in the beneficial victim case, which, as we argue below, explain the different results in the beneficial victim case. In the takings case, Kaplow (1986) and others have argued against liability, focusing on the case where the taker who destroys the victim's asset. To the best of our knowledge, the takings literature does not distinguish between a taker who destroys the victim's asset and a taker who

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<sup>2</sup> When the benefit is to property or another economic interest, the law allows the benefactor to recover a reasonable charge for her beneficial actions. When the benefit is manifested in saving a person's life or avoiding bodily harm, the law allows such recovery only when the services granted were professional, as when a doctor provides first aid to an unconscious bystander. Restatement (Third) of Restitution & Unjust Enrichment §§ 20-21.

<sup>3</sup> *Id.*

<sup>4</sup> See *e.g.*, *Oiwell v. Nye & Nissen Co.* 173 P. 2d 652 (Wash. 1946), where the defendant made use of the plaintiff's property without the latter's consent and the court ordered restitutionary damages.

<sup>5</sup> CITE

benefits from the victim's investment in the asset. Liability, while providing inefficient incentives in the former case, may be efficient in the latter.

The paper is organized as follows: Section 2 presents the basic argument – first generally and then through a series of numeric examples. Section 3 develops a formal model for analyzing the beneficial victim case. Section 4 considers the special case of takings – both public takings and private takings. Section 5 concludes.

## 2. The Basic Argument

### 2.1 General

In the beneficial victim case, the interaction between the injurer and the victim results in harm ( $H$ ) to the victim and benefit ( $B$ ) to the injurer.<sup>6</sup> We assume that high transaction costs preclude the possibility of any pre-interaction bargaining. The benefit can be either higher than the harm (net benefit is positive) or lower than the harm (net benefit is negative). Consider first the case where the net benefit is positive, i.e., when  $B > H$ . Without liability, the victim bears the harm and does not enjoy the benefit. Instead of feeling  $B - H$ , the victim feels  $-H$ . The measure of the distortion without liability is:  $B - H - (-H) = B$ . With liability, the victim neither bears the harm nor enjoys the benefit. He feels zero. The measure of the distortion with liability is:  $B - H$ . The distortion is smaller with liability, which means that liability provides better incentives for the victim than no liability. Intuitively, with no liability there is a single distortion – the benefit is not internalized by the victim. With liability there are two, countervailing distortions – the victim internalizes neither the benefit nor the harm. When  $B > H$ , these countervailing distortions result in a smaller aggregate distortion. In this case, two distortions are better than one. The aggregate distortions – with and without liability – are depicted graphically in figure 1.

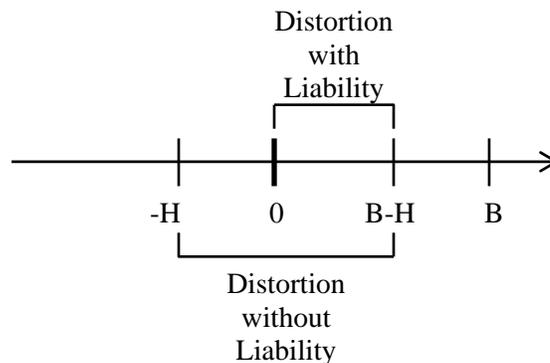


Figure 1: Distortions in Victim's Incentives when  $B > H$

Things are less clear when  $B < H$  and the net benefit from an injurer-victim interaction is negative. As before, the victim feels  $-H$  without liability and zero with liability. And, as before, the aggregate distortion is  $B$  without liability and  $B - H$  with liability. But now these distortions are more difficult to compare. First, the distortions are in opposite directions: Without liability, the victim's payoff from the injurer-victim interaction is too negative ( $-H$  instead of  $B - H$ ); with liability, the victim's payoff from the interaction is not negative enough ( $0$  instead of  $B - H$ ). Second, the magnitude of the aggregate distortion without liability can be either larger or smaller than the magnitude of the aggregate distortion with

<sup>6</sup> The interaction that produces the harm and the benefit can occur with different probabilities. See Section 3 below for further analysis.

liability. Specifically, when  $B > H/2$ , the distortion with liability is smaller, and when  $B < H/2$ , the distortion without liability is smaller. The aggregate distortions – with and without liability – are depicted graphically in figure 2, with figure 2(a) capturing the  $B > H/2$  case and figure 2(b) capturing the  $B < H/2$  case.<sup>7</sup>

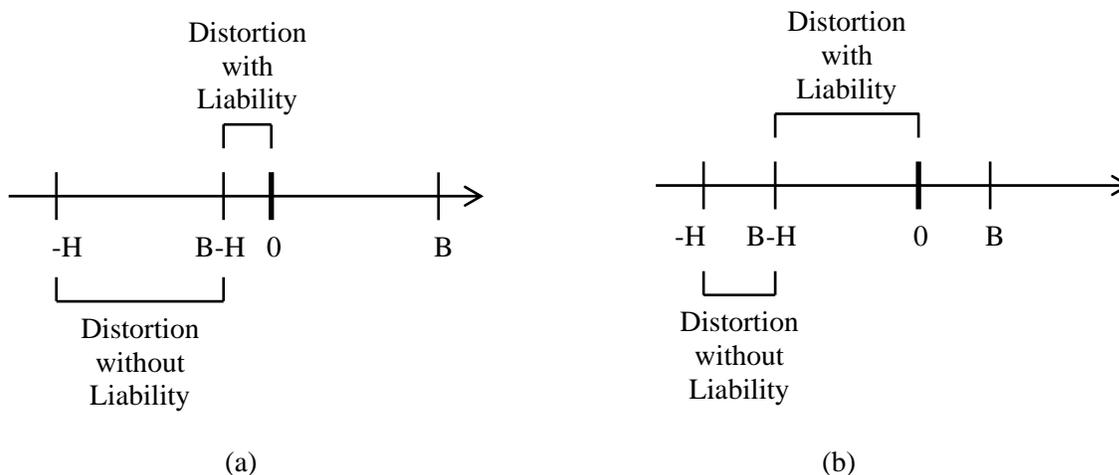


Figure 2: Distortions in Victim's Incentives when  $B < H$  and  $B > H/2$  (Fig. 2(a)) and when  $B < H$  and  $B < H/2$  (Fig. 2(b))

The beneficial victim case challenges standard results concerning the victim's incentives. From the injurer's perspective, on the other hand, the standard results hold: imposing liability improves the injurer's incentives. In the standard tort case, the injurer-victim interaction produces only harm and optimal incentives require that the injurer internalize this harm, through liability. In the beneficial victim case, the injurer-victim interaction produces both harm and benefit. The injurer enjoys the benefit and so optimal incentives require only that the injurer internalize this harm, through liability.

Results in the beneficial victim case are different from results in the standard tort case. They are also counterintuitive: Imposing liability is clearly superior when benefit is greater than harm and might not be superior when harm is greater than benefit. This sounds like the exact opposite of the standard negligence formula.<sup>8</sup>

This striking feature of the beneficial victim case is especially pronounced in the important special case where the only thing the injurer can do to reduce the expected harm, and benefit, from an interaction is to avoid the interaction altogether, and such avoidance does not entail affirmative cost.<sup>9</sup> We call this case: Avoidance-as-Precaution. In this special case, the injurer's cost of care is the forgone benefit,  $B$ . Accordingly, negligence is determined by comparing the benefit, to the injurer, from the interaction with the victim, to the harm that the interaction imposes on the victim. When  $B > H$ , the injurer is considered

<sup>7</sup> Our analysis of the victim's incentives, and of distortions in the victim's incentives, is relevant only when the injurer-victim interaction takes place (or can take place with a positive probability). It is possible that the injurer will decide to avoid the interaction, especially if she is subject to liability. If that happens, the victim "feels" zero. As explained below, when it is efficient for the injurer to avoid the interaction, it is also efficient for the victim to feel zero.

<sup>8</sup> We focus on the simple negligence rule. Adding contributory or comparative negligence defenses, when feasible, could produce optimal precaution incentives, but not optimal activity level decisions. See Section 3 below for further discussion.

<sup>9</sup> Avoiding the interaction does not mean refraining from the activity altogether (although the interaction can also be avoided by refraining from the activity). To use the famous case of *Vincent v. Lake Erie* [CITE] as an example, the injurer can avoid the interaction simply by not mooring her boat to the victim's dock. Such avoidance is different from a decision, by the boat owner, to use her boat less often or not at all – an activity level decision. (Of course, not mooring the boat to the dock during a storm reduces the benefit, to the boat owner, from her activity, which would indirectly lead to a lower activity level.)

non-negligent; and when  $B < H$ , the injurer is considered negligent. The negligence rule fails to impose liability when  $B > H$ , even though, as we have just explained, liability is clearly needed.

The negligence rule imposes liability, in the Avoidance-as-Precaution case, when  $B < H$ . In the general case, we have shown that imposing liability may or may not be efficient when  $B < H$ . With Avoidance-as-Precaution, the case for liability when  $B < H$  is stronger: If the injurer is liable for  $H$ , she will avoid the interaction at the cost of the foregone benefit,  $B$  (since  $B < H$ ). This is the efficient outcome. The interaction produces a net loss and should be avoided. And it is the injurer who should avoid it. Recall, the cost of avoidance by the injurer is only the foregone benefit,  $B$ . For the victim, avoidance entails an affirmative cost on top of the foregone benefit. In other words, the injurer is the least-cost avoider. Still the argument for liability needs to be qualified: We have thus far focused on incentives to avoid the interaction. When  $B < H$ , the interaction produces a net loss and should be avoided. But the relative magnitudes of  $B$  and  $H$  are endogenous. Specifically, the victim may be able to invest in reducing  $H$  to a level that would move us from the  $B < H$  case to the  $B > H$  case. With liability, the victim would have no incentive to make such an investment.

Our conclusion is, therefore, that strict liability is unambiguously superior to negligence in the Avoidance-as-Precaution case: When  $B > H$  and liability is efficient, a strict liability rule imposes liability, while a negligence rule does not; and when  $B < H$ , liability – which can be either efficient or not – is imposed under both rules. Moreover, as a practical matter, it is hard to imagine that courts would not impose liability when harm exceeds benefit ( $B < H$ ),<sup>10</sup> so the only real question is what to do when benefit exceeds harm ( $B > H$ ); and, as explained above, strict liability is superior in these cases.

We have thus far focused on tort liability. As noted in the Introduction, restitutionary damages can improve the victim's incentives, albeit at the expense of skewing the injurer's incentives. With restitutionary damages, the victim internalizes the benefits from the interaction and, since the victim already internalizes the harm (in the absence of liability), optimal incentives result. From the injurer's perspective, restitutionary damages lead to externalization of the benefit. Now the injurer feels neither the harm (in the absence of liability) nor the benefit. We get countervailing distortions. When  $B < H$ , these countervailing distortions are superior to the single distortion under No Liability. When  $B > H$ , either the countervailing distortions or the single distortion can be superior. (See Section 3 below, where we also compare restitutionary damages to liability with compensatory damages.)

## 2.2 Numeric Examples

The unique features of the beneficial victim case and how they affect the analysis of tort liability can be illustrated using three simple numeric examples. We begin with two examples where benefit exceeds harm – contrasting the standard tort case (Example 1) with the beneficial victim case (Example 2). In both examples, and throughout this section, we focus on the special case – the Avoidance-as-Precaution case – where the only thing the injurer can do to reduce the expected harm, and benefit, from an interaction is to avoid the interaction altogether. (And such avoidance does not entail affirmative cost.) We also assume that bargaining between the parties is impossible.

*Example 1. Standard Tort Case – Benefit Greater than Harm.* To avoid substantial ruin to her ship during a storm, a ship-owner ties her ship to a dock, causing harm to *another ship* that was also tied to the same dock. The benefit to the ship-owner, from saving her ship, is 15. The harm to the other ship is 10. The only way for the ship-owner to avoid harming the other ship is by not tying her ship to the dock. Should the ship-owner be liable for the harm done?

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<sup>10</sup> Not imposing liability would create inefficient incentives for the injurer, and would also infringe the principles of corrective justice. [Weinrib (1995)].

*Example 2. Beneficial Victim Case – Benefit Greater than Harm.* To avoid substantial ruin to her ship during a storm, a ship-owner ties her ship to a dock, causing harm to *the dock*. The benefit to the ship-owner, from saving her ship, is 15. The harm to the dock is 10. The only way for the ship-owner to avoid harming the dock is by not tying her ship to the dock. Should the ship-owner be liable for the harm done?

Under a rule of negligence, liability will not be imposed in both Example 1 and Example 2, since the cost of precaution (15) exceeds the harm (10). The question is whether it is desirable to impose liability. And the answer to this question is not the same in the two examples. In Example 1 – the standard tort case, liability has both advantages and disadvantages. On the one hand, liability will induce the ship-owner to optimally reduce her activity level. On the other hand, liability will distort the victim’s incentives, causing him – the owner of the other ship – to choose an excessively high activity level. Accordingly, a negligence rule that leaves the injurer free from liability may or may not be efficient in Example 1.

In contrast, in Example 2 – the beneficial victim case – liability is clearly desirable, and a negligence rule that fails to impose liability is clearly undesirable. While in Example 1, the ship-owner receives no benefit from the interaction with the victim – in fact, she would be better off if the victim had not been there at all – she does receive such a benefit in Example 2. In Example 2, which is an adaptation of the famous case of *Vincent v. Lake Erie Transportation Co.*,<sup>11</sup> the ship-owner would get no benefit if the victim, and his dock, had not been there! When the benefit to the injurer is contingent upon the injurer-victim interaction, the effects of liability change. Starting with the injurer’s incentives, the injurer enjoys the benefit (15) and liability forces her to also internalize the harm (10). Therefore, with liability, the injurer “feels” the net benefit of 5 and behaves efficiently. Now to the victim: Without liability, he internalizes the harm (10) but not the benefit (15). Feeling a net loss of 10, instead of a net benefit of 5, the victim’s activity level would be too low. With a liability, the victim internalizes neither the harm (since he receives compensation for the harm) nor the benefit. Feeling a net benefit (or net loss) of zero, instead of a net benefit of 5, the victim’s activity will be too low, but not as low as with no liability.

To summarize: In Example 2 – and, more generally, in beneficial victim cases where benefit exceeds harm – liability is more efficient than no liability. With no liability there would not be enough docks, since dock owners bear the harm but do not capture the benefits from their interactions with ship-owners. Even with liability the number of docks would be too small from a social perspective, but not as small as in the absence of liability.

Note that the victim’s incentives would be optimal if he received restitution for the benefit conferred (15) instead of compensation for harm incurred (10). Restitution, however, would distort the injurer’s incentives.

The next example, Example 3, shows, counter intuitively, that the case for liability is weaker when the harm, resulting from the injurer-victim interaction, exceeds the benefit. Examples 2 and 3, taken together, show that – when the only thing the injurer can do to reduce the expected harm is to avoid the interaction altogether and negligence is determined by a comparison between the harm and the benefit from the interaction – the case for imposing liability is stronger when the injurer is not negligent (when the benefit exceeds the harm) and weaker when the injurer is negligent (when the harm exceeds the benefit).

*Example 3. Beneficial Victim Case – Harm Greater than Benefit.* To avoid substantial ruin to her ship during a storm, a ship-owner ties her ship to a dock, causing harm to *the dock*. The benefit to the ship-owner, from saving her ship, is 10. The harm to the dock is 15. The only way for the

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<sup>11</sup> 124 N.W. 221 (Minn. 1910).

ship-owner to avoid harming the dock is by not tying her ship to the dock. Should the ship-owner be liable for the harm done?

In Example 3, it is efficient to impose liability when the magnitude of the harm is exogenously given, but it might not be efficient to impose liability when the victim can invest in reducing the magnitude of the harm (or increasing the benefit). Consider first the exogenous harm case. Liability forces the injurer to internalize the harm from the interaction. Since the harm (15) exceeds the benefit (10), the injurer will avoid the interaction. And since the injurer avoids the interaction, the victim will not invest in avoidance. As explained above, avoidance by the injurer is efficient here, because the injurer is the least-cost avoider: the injurer can avoid the interaction at the cost of the forgone benefit (10), while avoidance by the victim entails affirmative costs on top of the foregone benefit. Without liability, the injurer would not avoid the interaction and the victim would invest excessively in avoidance.

Next consider the endogenous harm case. Specifically, assume that the victim can invest 3 in strengthening the dock and thus reduce the harm from 15 to 5. This would be an efficient investment: With the old dock, the interaction produces a net loss of 5 ( $10 - 15$ ) and should be avoided. With the improved dock, the interaction produces a net gain of 5 ( $10 - 5$ ). It is efficient to invest 3 in strengthening the dock to secure the net gain of 5. But would the victim invest? With liability, he will not. Since the victim is fully compensated for harm to the dock, he has no reason to invest in strengthening the dock. And since harm remains high (15), the injurer will avoid the interaction. Social welfare will be zero, rather than 2 ( $= 10 - 5 - 3$ ). Without liability, the victim internalizes the harm, and thus will invest 3 to reduce the harm by 10 (from 15 to 5). While the investment is efficient, the outcome is not first best. Now the injurer, who internalizes the benefit but externalizes the harm, will invest excessively in increasing the probability of an interaction and choose an excessively high activity level. And the victim, who internalizes the harm but not the benefit, will invest excessively in reducing the probability of an interaction and inefficiently reduce his activity level – the number of docks will be too low. Still, the bottom line remains: No Liability may be superior to Liability, when the harm (before it is reduced) exceeds the benefit.

To summarize: In Example 3 – and, more generally, in beneficial victim cases where harm exceeds benefit – liability can be either more or less efficient than no liability. While liability provides better incentives for the injurer, the effect of liability on the victim's incentives is ambiguous: With liability, we might have insufficiently maintained, vulnerable docks. Without liability, we might have an insufficiently small number of docks.

Note that, as in Example 2, the victim's incentives would be optimal if he received restitution for the benefit conferred (10) instead of compensation for harm incurred (15). But, again, a Restitution rule would distort the injurer's incentives.

Why is the case for liability stronger when the benefit exceeds the harm? We first note that liability is always desirable in terms of providing incentives for the injurer. As to the victim, when the benefit exceeds the harm (Example 2), compensating the victim for the harm *always* brings him closer to the optimal point, as compared to no liability. In Example 2, the optimal point is a net benefit of 5, and a net loss of 0 (liability) is better than a net loss of 10 (no liability). Importantly, with and without liability, the distortions are in the same direction: An inadequately low activity level without liability and a higher, but still inadequately low, activity level with liability. When the harm exceeds the benefit (Example 3) the case for liability is weaker. While liability provides optimal incentives in the exogenous harm case, it distorts the victim's incentives to reduce the harm in the endogenous harm case.

### 3. Model

We next examine the generalizability and robustness of the basic argument using a formal model. The model describes the general case of an injurer-victim interaction that is associated with both benefits and harms. The standard tort case can be viewed as a special case within this general model, where the benefit equals zero. Sub-section 3.1 lays out the framework of analysis. Sub-section 3.2 studies the standard tort case, as a benchmark. Sub-section 3.3 analyzes the beneficial victim case.

#### 3.1 Framework of Analysis

There are two Parties: an Injurer, X, and a Victim, Y. Party X engages in an activity that generates utility  $U$  (to party X). We denote Party X's activity level by  $x_1$ , and assume that utility is increasing in the activity level, but at a marginally decreasing rate. Formally, we have  $U(x_1)$  with  $U'(x_1) > 0$  and  $U''(x_1) < 0$ . Increasing one's activity level is costly. Without loss of generality, we measure this cost by  $x_1$ .<sup>12</sup> Party Y engages in an activity that generates utility  $V$  (to party Y). We denote Party Y's activity level by  $y_1$ , and assume that utility is increasing in the activity level, but at a marginally decreasing rate. Formally, we have  $V(y_1)$  with  $V'(y_1) > 0$  and  $V''(y_1) < 0$ . Increasing one's activity level is costly. Without loss of generality, we measure this cost by  $y_1$ . As is conventional, we assume that activity levels are not verifiable and, therefore, liability cannot be made conditional on a party's activity level.

The activities of X and Y may result in an interaction between the two parties. This interaction results in a harm,  $H$ , to party Y and a benefit,  $B$ , to party X.<sup>13</sup> The probability of an interaction,  $p$ , is a function of the parties' activity levels,  $x_1$  and  $y_1$ . Also, the two parties can affect the probability of an interaction through direct investments. Party X can invest  $x_2^+ \geq 0$  in increasing the probability of an interaction, or she can invest  $x_2^- \geq 0$  in reducing the probability of an interaction. Let  $x_2 = (x_2^+, x_2^-)$  denote Party X's vector of investments. Similarly, Party Y can invest  $y_2^+ \geq 0$  in increasing the probability of an interaction, or he can invest  $y_2^- \geq 0$  in reducing the probability of an interaction. Let  $y_2 = (y_2^+, y_2^-)$  denote Party Y's vector of investments. The probability of an injurer-victim interaction is:  $p(x_1, y_1; x_2, y_2)$ .<sup>14</sup> Investment levels are assumed to be verifiable and, therefore, liability can be made conditional on a party's investment level. The analysis below considers the basic negligence rule, which conditions liability on the injurer's investment in reducing the probability of an interaction,  $x_2^-$ . We do not consider more complex liability rules – specifically, rules with contributory or comparative negligence defenses – that condition liability also on the victim's investment in reducing the probability of an interaction,  $y_2^-$ . And we do not consider rules that condition liability on investments in increasing the probability of an interaction,  $x_2^+$  and  $y_2^+$ ; while one could devise such rules in theory, we don't see them in practice.

The special case, discussed in Sections 1 and 2, where the only thing the injurer can do to reduce the expected harm, and benefit, from an interaction is to avoid the interaction altogether, and where such avoidance does not entail affirmative cost, is captured, in this framework, by assuming that

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<sup>12</sup> Any non-linearity in the cost function can be captured by the utility function  $U(x_1)$ .

<sup>13</sup> To keep things simple, we assume that an interaction, when it occurs, always result in a deterministic benefit,  $B$ , and in a deterministic harm,  $H$ . The analysis, however, can be readily extended to cases where the harm is stochastic, i.e., when an interaction results in harm only with probability  $q$ . In this case,  $H$  would be the expected harm. And the application of certain legal rules would need to be adjusted. Specifically, if restitutionary damages were triggered only by actual harm, even though a benefit ( $B$ ) follows deterministically from every interaction, then the magnitude of the restitutionary damages would need to be  $B/q$ . (The analysis can also be extended to allow for stochastic benefits.)

<sup>14</sup> Without any investment by Party X or Party Y, there is a certain exogenous probability of an interaction. The parties can invest in increasing the probability of an interaction, above this exogenous benchmark. They can also invest in decreasing the probability of an interaction, below the benchmark level. These two types of investments can be qualitatively different. We, therefore, distinguish between  $x_2^+$  and  $x_2^-$ , for Party X, and between  $y_2^+$  and  $y_2^-$ , for Party Y. Compare: Landes and Posner (1981), who also distinguish between investments that reduce the probability of an interaction and investments that increase the probability of an interaction.

$p(x_1, y_1; x_2, y_2)|_{x_2^-=0} = 0$  and allowing the injurer to unilaterally choose, without incurring any affirmative costs, whether or not the interaction will take place. We call this the Avoidance-as-Precaution case and treat it separately in the analysis that follows.

We focus on investments that increase or decrease the probability of an interaction. A more general model would also consider investments, by the two parties, that affect the magnitude of the harm,  $H$ , and investments, by the two parties, that affect the benefit,  $B$ . We briefly discuss this extension in Section 3.4.

In this framework, the social objective function is:

$$[U(x_1) - x_1 - x_2] + [V(y_1) - y_1 - y_2] + p(x_1, y_1; x_2, y_2) \cdot [-H + B].^{15}$$

### 3.2 Benchmark: The Standard Tort Case

In the standard tort model, victims do not benefit their injurers. This means that there is no  $B$ . The social objective function is:

$$[U(x_1) - x_1 - x_2] + [V(y_1) - y_1 - y_2] + p(x_1, y_1; x_2, y_2) \cdot [-H]$$

In the standard tort case, the injurer's optimal activity level satisfies the FOC:  $U'(x_1) + \frac{\partial p}{\partial x_1} \cdot [-H] = 1$ , and the victim's optimal activity level satisfies the FOC:  $V'(y_1) + \frac{\partial p}{\partial y_1} \cdot [-H] = 1$ . Since the injurer-victim interaction imposes a social harm,  $H$ , optimal activity levels are lower than the optimal activity levels in the absence of the injurer-victim interaction (these activity levels satisfies  $U'(x_1) = 1$  and  $V'(y_1) = 1$ ). Similarly, it is never socially optimal to invest in increasing the probability of an interaction between the injurer and the victim, i.e., in the social optimum  $x_2^+ = 0$  and  $y_2^+ = 0$ . Optimal investments in decreasing the probability of an interaction,  $x_2^- = 0$  and  $y_2^- = 0$ , solve the following FOCs:  $\frac{\partial p}{\partial x_2^-} \cdot [-H] = 1$  and  $\frac{\partial p}{\partial y_2^-} \cdot [-H] = 1$ .

The incentive effects of different legal rules, in the standard tort case, are well-understood: A No Liability rule provides optimal incentives for the victim – to reduce his activity level and to invest in reducing the probability of an interaction, but no incentive for the injurer – to reduce her activity level or to invest in reducing the probability of an interaction. Conversely, a Strict Liability rule provides optimal incentives for the injurer – to reduce her activity level and to invest in reducing the probability of an interaction, but no incentive for the victim – to reduce his activity level or to invest in reducing the probability of an interaction. A Negligence rule that sets the Due Care Standard (DCS) for the injurer at the socially optimal level induces the injurer to invest optimally – to avoid being found negligent, but provides no incentive for the injurer to reduce her activity level. The victim bears the harm, under a Negligence rule (because the injurer meets the DCS and thus avoids being found negligent), and thus optimally reduces his activity level and optimally invests in reducing the probability of an interaction.

The outcomes are summarized in Table 1:

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<sup>15</sup> An alternative approach to modeling activity levels and precaution investments would assume (1) that raising the activity level does not entail a direct cost, and (2) that precaution costs are incurred per-unit of activity. The social objective functions would thus be:

$$U(x_1) + V(y_1) + x_1 \cdot x_2 + y_1 \cdot y_2 + p(x_1, y_1; x_2, y_2) \cdot [-H + B]$$

We chose to treat activity levels and precaution investments as we did, mainly because this approach is more convenient technically. The two approaches are substantively similar, and our main results can be derived under the alternative approach as well. [VERIFY]

		No Liability	Strict Liability	Negligence
X	Activity Level	Too High	Optimal	Too High
	Investment	Zero instead of decrease	Optimal	Optimal
Y	Activity Level	Optimal	Too High	Optimal
	Investment	Optimal	Zero instead of decrease	Optimal

Table 1: Standard Tort Model - Outcomes

The relative efficiency of the three rules is described in the following proposition.

**Proposition 1:** In the Standard Tort Model (when  $B = 0$ ) -

- (a) With respect to party X's incentives – in terms of both activity levels and investment levels – Strict Liability is superior to Negligence, which is superior to No Liability.
- (b) With respect to party Y's incentives – in terms of both activity levels and investment levels – No Liability and Negligence are superior to Strict Liability.
- (c) Negligence is superior to No Liability in terms of overall efficiency.

### 3.3 When Victims Benefit Their Injurers

Recall the social objective function:

$$[U(x_1) - x_1 - x_2] + [V(y_1) - y_1 - y_2] + p(x_1, y_1; x_2, y_2) \cdot [-H + B]$$

We focus on decisions – by X and Y – that directly affect the likelihood of Harm and Benefit, i.e., on the choice of activity levels  $x_1$  and  $y_1$ , and on investment decisions  $x_2$  and  $y_2$ .

These decisions depend on what part of the net benefit  $[-H + B]$  each party enjoys/bears, as determined by the legal rule.

We distinguish between two cases: (1)  $B > H$ , and (2)  $B < H$ .

We will show that, counterintuitively, liability can be desirable when the benefit exceeds the harm (in Case 1) and less desirable when the harm exceeds the benefit (in Case 2).

#### 3.3.1 Case 1: $B > H$

In this case, the interaction produces a net gain. Since higher activity levels – higher  $x_1$  and  $y_1$  – increase the probability of an interaction, the parties should increase their activity levels. Specifically, the injurer's optimal activity level satisfies the FOC:  $U'(x_1) + \frac{\partial p}{\partial x_1} \cdot [-H + B] = 1$ . Since  $-H + B > 0$ , the optimal activity level is higher than the optimal activity level in the absence of the harm-benefit interaction (which satisfies  $U'(x_1) = 1$ ). Similarly, the victim's optimal activity level satisfies the FOC:  $V'(y_1) + \frac{\partial p}{\partial y_1} \cdot [-H + B] = 1$ . Again, since  $-H + B > 0$ , the optimal activity level is higher than the optimal activity level in the absence of the harm-benefit interaction (which satisfies  $V'(y_1) = 1$ ).

In addition to adjusting their activity levels, the parties can directly invest in either increasing the probability of an interaction – investments  $x_2^+$  and  $y_2^+$  – or in decreasing the probability of an interaction

– investments  $x_2^-$  and  $y_2^-$ . Since the interaction produces a net gain, the parties should invest in increasing the probability of an interaction, and not in decreasing the probability of an interaction. Formally, optimal investment levels for the injurer are:  $x_2^- = 0$  and  $x_2^+ > 0$ , where the first best level of  $x_2^+$  satisfies the FOC:  $\frac{\partial p}{\partial x_2^+} \cdot [-H + B] = 1$ . And optimal investment levels for the victim are:  $y_2^- = 0$  and  $y_2^+ > 0$ , where the first best level of  $y_2^+$  satisfies the FOC:  $\frac{\partial p}{\partial y_2^+} \cdot [-H + B] = 1$ .

Socially optimal incentives would result if both the injurer and the victim internalize both the benefit ( $B$ ) and the harm ( $H$ ), but such perfect internalization is not achieved under existing law. Different liability rules allocate harms and benefits between the two parties. Under a No Liability rule, the injurer enjoys the benefit but does not bear the harm, while the victim bears the harm but does not enjoy the benefit. Under Strict Liability, the injurer internalizes both the harm and the benefit, and the victim internalizes neither the harm nor the benefit. Under a Restitution rule, the victim internalizes both the harm and the benefit, and the injurer internalizes neither the harm nor the benefit.

Table 2 summarizes the allocation of harms and benefits under different liability rules, as well as the social optimum benchmark of perfect internalization.

	Social Optimum	No Liability	Strict Liability	Restitution	Negligence
X	$-H + B > 0$	$B$	$-H + B$	$0$	$B$
Y	$-H + B > 0$	$-H$	$0$	$-H + B$	$-H$

Table 2: Allocation of Harms and Benefits

Under the No Liability rule, the injurer enjoys the benefit,  $B$ . As compared to the (net) social welfare effect of the interaction,  $-H + B$ , the injurer’s payoff is *too* high. The victim obtains a negative payoff,  $-H$ , whereas the (net) social welfare effect of the injurer-victim interaction is positive, specifically  $-H + B$ . This means that the injurer will increase his activity level by too much (the activity level will be too high) and invest too much in increasing the probability of an interaction. The victim, on the other hand, will decrease, rather than increase his activity level (the activity level will be too low); and invest in decreasing the probability of an interaction, instead of investing in increasing this probability.

Under the Strict Liability rule, the injurer’s payoff exactly equals the (net) social welfare effect of the interaction,  $-H + B$ . The victim, however, obtains a zero payoff, instead of  $-H + B$ . This means that the injurer will choose the optimal activity level and invest optimally in increasing the probability of an interaction (given the victim’s suboptimal behavior). The victim will invest neither in increasing or decreasing the probability of an interaction, and choose an activity level as if there is no harm-benefit interaction (the activity level will be too low).

Under the Restitution rule, the victim’s payoff exactly equals the (net) social welfare effect of the interaction,  $-H + B$ . The injurer, however, obtains a zero payoff, instead of  $-H + B$ . This means that the victim will choose the optimal activity level and invest optimally in increasing the probability of an interaction (given the injurer’s suboptimal behavior). The injurer will invest neither in increasing or decreasing the probability of an interaction, and choose an activity level as if there is no harm-benefit interaction (the activity level will be too low).

A Negligence rule, in Case 1, is equivalent to No Liability. Since  $B > H$ , the injurer should not invest in reducing the probability of an interaction. The DCS would thus be zero, and the injurer would never be held liable. The assumption is that the DCS applies only to the  $x_2^-$  dimension. In Case 1, it is optimal for

the injurer to invest in *increasing* the probability of an interaction. It seems unlikely, however, that a court will set a DCS on the  $x_2^+$  dimension and deem an injurer negligent for not investing sufficiently in *increasing* the probability of an accident/interaction.

The outcomes – activity levels and investments – are summarized in Table 4:

		No Liability	Strict Liability	Restitution	Negligence
X	Activity Level	Too High	Optimal	Too Low	Too High
	Investment	Increase too much	Optimal	Zero instead of increase	Increase too much
Y	Activity Level	Too Low	Too Low	Optimal	Too Low
	Investment	Decrease instead of increase	Zero instead of increase	Optimal	Decrease instead of increase

Table 3: Outcomes – Case 1

As we can see, different rules lead to distortions that vary in both type and magnitude. The ability to rank the different rules, in terms of overall efficiency is, therefore, limited. Still, we can say the following –

**Proposition 2:** In Case 1, when  $B > H$  –

- (a) With respect to party X’s incentives – in terms of both activity levels and investment levels: Strict Liability is superior to both Restitution and No Liability/Negligence. Restitution is superior to No Liability/Negligence iff no incentive to change activity levels or to invest in increasing the probability of an interaction is better than the excessively high activity level and the excessively high investment in increasing the probability of an interaction induced by No Liability/Negligence.
- (b) With respect to party Y’s incentives – in terms of both activity levels and investment levels: Restitution is superior to Strict Liability, which is superior to No Liability/Negligence.
- (c) Strict Liability is superior to No Liability/Negligence in terms of overall efficiency.

Remark – Countervailing Distortions:

1. Strict Liability: Under Strict liability there are countervailing distortions – Y internalize neither the harm nor the benefit. In Case 1, the benefit exceeds the harm, hence Y should increase his activity level and invest a positive amount in increasing the probability of an interaction. Rather, Y does not alter his activity level and invests zero in increasing the probability of an interaction. The measure of the aggregate distortion equals the difference between the countervailing distortions:  $B - H$ . Under No Liability there is a single distortion – Y internalizes the harm, but not the benefit. As a result, Y feels a loss of  $H$  instead of the (net) social gain,  $B - H$ , and accordingly decreases, rather than increases, his activity level, and invests in reducing the probability of an interaction instead of investing in increasing this probability. The measure of the distortion is  $B$  ( $= B - H + H$ ). Since  $B > B - H$ , Strict Liability provides Y with better incentives than No Liability. Two countervailing distortions are better than a single distortion.
2. Restitution: Under Restitution there are countervailing distortions – X internalize neither the harm nor the benefit. In Case 1, the benefit exceeds the harm, hence X should increase her activity level and invest a positive amount in increasing the probability of an interaction. Rather, X does not alter her activity level and invests zero in increasing the probability of an interaction. The measure of the aggregate distortion equals the difference between the countervailing distortions:  $B - H$ . Under No Liability there is a single distortion – X internalizes the benefit, but not the harm. As a result, X feels a benefit of  $B$  instead of the (net) social benefit,  $B - H$ , and

accordingly increases her activity level by too much and invests too much in increasing the probability of an interaction. The measure of the distortion is  $H (= B - (B - H))$ . Restitution provides X with better incentives than No Liability, when two countervailing distortions are better than a single distortion. (While our measures of the different distortions do not translate directly into social costs, it is informative to compare the distortion under Restitution,  $B - H$ , to the distortion under No Liability,  $H$ . The distortion under Restitution is smaller iff  $B < 2 \cdot H$ .)

Remark – Avoidance-as-Precaution: What happens when the only thing the injurer can do to reduce the expected harm from an interaction is to avoid the interaction altogether, at a cost of forgoing the benefit,  $B$ , and such avoidance does not entail affirmative costs, beyond the forgone benefit?

1. X's investment decision: The Avoidance-as-Precaution scenario is unique in that the injurer's investment decision is binary, rather than continuous; the injurer chooses either to seek the interaction or to avoid it. In Case 1, the interaction produces a net gain, and, therefore, it is efficient for the injurer to seek the interaction, not to avoid it. Both No Liability and Strict Liability provide optimal incentives in this regard. Restitution leaves the injurer indifferent between avoiding the interaction or not.
2. Y's investment decisions: Under Strict Liability, No Liability and, perhaps, Restitution, X will seek an interaction, and Y's investment decisions will be as described in Table 3. If, under Restitution, X decides to avoid the efficient interaction, then Y will invest neither in increasing or decreasing the probability of an interaction.
3. Activity levels: Under Strict Liability, No Liability and, perhaps, Restitution, X will seek an interaction, and the activity level decisions of both X and Y will be as described in Table 3. If, under Restitution, X decides to avoid the efficient interaction, then both X and Y's activity levels will be too low.
4. Redefining Negligence: With Avoidance-as-Precaution, Negligence needs to be redefined, such that the injurer will be considered negligent iff  $B < H$ . This means that in Case 1, when  $B > H$ , an injurer will never be considered negligent. The new definition of Negligence does not change our previous observation: the Negligence rule is equivalent, in Case 1, to No Liability.

### 3.3.2 Case 2: $B < H$

In this case, the interaction produces a net loss. Since higher activity levels – higher  $x_1$  and  $y_1$  – increase the probability of an interaction, the parties should reduce their activity levels. Specifically, the injurer's optimal activity level satisfies the FOC:  $U'(x_1) + \frac{\partial p}{\partial x_1} \cdot [-H + B] = 1$ . Since  $-H + B < 0$ , the optimal activity level is lower than the optimal activity level in the absence of the harm-benefit interaction (which satisfies  $U'(x_1) = 1$ ). Similarly, the victim's optimal activity level satisfies the FOC:  $V'(y_1) + \frac{\partial p}{\partial y_1} \cdot [-H + B] = 1$ . Again, since  $-H + B < 0$ , the optimal activity level is lower than the optimal activity level in the absence of the harm-benefit interaction (which satisfies  $V'(y_1) = 1$ ).

In addition to adjusting their activity levels, the parties can directly invest in either increasing the probability of an interaction – investments  $x_2^+$  and  $y_2^+$  – or in decreasing the probability of an interaction – investments  $x_2^-$  and  $y_2^-$ . Since the interaction produces a net loss, the parties should invest in reducing the probability of an interaction, and not in increasing the probability of an interaction. Formally, optimal investment levels for the injurer are:  $x_2^+ = 0$  and  $x_2^- > 0$ , where the first best level of  $x_2^-$  satisfies the FOC:  $\frac{\partial p}{\partial x_2^-} \cdot [-H + B] = 1$ . And optimal investment levels for the victim are:  $y_2^+ = 0$  and  $y_2^- > 0$ , where the first best level of  $y_2^-$  satisfies the FOC:  $\frac{\partial p}{\partial y_2^-} \cdot [-H + B] = 1$ .

Socially optimal incentives would result if both the injurer and the victim internalize both the benefit ( $B$ ) and the harm ( $H$ ). Such perfect internalization is not achieved under existing law. The allocation of harms and benefits between the two parties, under different liability rules, was summarized in Table 2 above. For convenience, we copy the table below (labeling it Table 2a). Note that the  $-H + B$  payoffs are now negative.

	Social Optimum	No Liability	Liability	Restitution	Negligence
X	$-H + B < 0$	$B$	$-H + B$	0	$B$
Y	$-H + B < 0$	$-H$	0	$-H + B$	$-H$

Table 2a: Allocation of Harms and Benefits

We see that under the No Liability rule, the injurer obtains a positive payoff,  $B$ , whereas the (net) social welfare effect of the injurer-victim interaction is negative, specifically  $-H + B$ . The victim bears the loss and thus obtains a negative payoff,  $-H$ . As compared to the (net) social welfare effect of the interaction,  $-H + B$ , the victim's payoff is *too* negative. This means that the injurer will increase, rather than decrease her activity level (the activity level will be too high); and invest in increasing the probability of an interaction, instead of investing in decreasing this probability. The victim, on the other hand, will reduce his activity level by too much (the activity level will be too low); and invest too much in decreasing the probability of the interaction.

Under the Strict Liability rule, the injurer's payoff exactly equals the (net) social welfare effect of the interaction,  $-H + B$ . The victim, however, obtains a zero payoff, instead of  $-H + B$ . This means that the injurer will choose the optimal activity level and invest optimally in decreasing the probability of an interaction (given the victim's suboptimal behavior). The victim will invest neither in increasing or decreasing the probability of an interaction, and choose an activity level as if there is no harm-benefit interaction (the activity level will be too high).

Under the Restitution rule, the victim's payoff exactly equals the (net) social welfare effect of the interaction,  $-H + B$ . The injurer, however, obtains a zero payoff, instead of  $-H + B$ . This means that the victim will choose the optimal activity level and invest optimally in decreasing the probability of an interaction (given the injurer's suboptimal behavior). The injurer will invest neither in increasing or decreasing the probability of an interaction, and choose an activity level as if there is no harm-benefit interaction (the activity level will be too high).

Let's add the Negligence rule to the mix. We assume that under the Negligence rule, the court sets a Due Care Standard (DCS) on the  $x_2$  dimension. If the court sets the DCS optimally, considering the benefit from the injurer-victim interaction, as well as the harm, then the injurer will invest optimally in reducing the probability of an interaction. The non-negligent injurer will not be subject to liability and will, therefore, choose an excessively high activity level. Since the injurer is non-negligent, the victim bears the loss and obtains a negative payoff,  $-H$ . As compared to the (net) social welfare effect of the interaction,  $-H + B$ , the victim's payoff is *too* negative. This means that the victim will reduce his activity level by too much (the activity level will be too low); and invest too much in decreasing the probability of the interaction.

The outcomes – activity levels and investments – are summarized in Table 4:

		No Liability	Strict Liability	Restitution	Negligence
X	Activity Level	Too High	Optimal	Too High	Too High
	Investment	Increase instead of decrease	Optimal	Zero instead of decrease	Optimal
Y	Activity Level	Too Low	Too High	Optimal	Too Low
	Investment	Decrease too much	Zero instead of decrease	Optimal	Decrease too much

Table 4: Outcomes – Case 2

As we can see, different rules lead to distortions that vary in both type and magnitude. The ability to rank the different rules, in terms of overall efficiency is, therefore, limited. Still, we can say the following –

**Proposition 3:** In Case 2, when  $B < H$  -

- (a) With respect to party X's incentives –
  - i. In terms of activity levels: Strict Liability is superior to Restitution, which is superior to No Liability and Negligence.
  - ii. In terms of investment levels: Strict Liability and Negligence are superior to Restitution, which is superior to No Liability.
- (b) With respect to party Y's incentives – in terms of both activity levels and investment levels: Restitution is superior to the other three rules. Strict Liability is superior to No Liability and Negligence (both of which provide identical incentives to Y) iff no incentive to change activity levels or to invest in reducing the probability of an interaction is better than the excessively low activity level and the excessively high investment in reducing the probability of an interaction induced by No Liability and Negligence.
- (c) Restitution is superior to No Liability in terms of overall efficiency.

Remark – Countervailing Distortions:

1. Strict Liability: Under Strict liability there are countervailing distortions – Y internalize neither the harm nor the benefit. In Case 1, the harm exceeds the benefit, hence Y should reduce his activity level and invest a positive amount in reducing the probability of an interaction. Rather, Y does not alter his activity level and invests zero in reducing the probability of an interaction. The measure of the aggregate distortion equals the difference between the countervailing distortions:  $H - B$ . Under No Liability and Negligence, there is a single distortion – Y internalizes the harm, but not the benefit. As a result, Y feels a loss of  $H$  instead of the (net) social loss,  $H - B$ , and accordingly reduces his activity level by too much and invests too much in reducing the probability of an interaction. The measure of the distortion is  $B (= H - (H - B))$ . Strict Liability provides Y with better incentives than No Liability and Negligence, when two countervailing distortions are better than a single distortion. (While our measures of the different distortions do not translate directly into social costs, it is informative to compare the distortion under Strict Liability,  $H - B$ , to the distortion under No Liability and Negligence,  $B$ . The distortion under Strict Liability is smaller iff  $B > H/2$ .)
2. Restitution: Under Restitution there are countervailing distortions – X internalize neither the harm nor the benefit. In Case 2, the harm exceeds the benefit, hence X should reduce her activity level and invest a positive amount in reducing the probability of an interaction. Rather, X does not alter her activity level and invests zero in reducing the probability of an interaction. The measure of the aggregate distortion equals the difference between the countervailing distortions:  $H - B$ . Under No Liability there is a single distortion – X internalizes the benefit, but not the harm. As a result, X feels a gain of  $B$  instead of the (net) social loss,  $B - H$ , and accordingly increases, rather

than decreases, her activity level, and invests in increasing the probability of an interaction instead of investing in decreasing this probability. The measure of the distortion is  $H (= B - (B - H))$ . Since  $H > H - B$ , Restitution provides X with better incentives than No Liability. Two countervailing distortions are better than a single distortion.

Remark – Avoidance-as-Precaution: What happens when the only thing the injurer can do to reduce the expected harm from an interaction is to avoid the interaction altogether, at a cost of forgoing the benefit,  $B$ , and such avoidance does not entail affirmative costs, beyond the forgone benefit?

1. X's investment decision: The Avoidance-as-Precaution scenario is unique in that the injurer's investment decision is binary, rather than continuous; the injurer chooses either to seek the interaction or to avoid it. In Case 2, the interaction produces a net loss, and, therefore, it is efficient for the injurer to avoid it. (Note that the injurer can avoid the interaction without incurring affirmative cost, beyond the forgone benefit. If the injurer does not avoid the interaction, the victim can reduce the probability of an interaction, but only after incurring an affirmative cost; the forgone benefit would also add to the social cost.) Under Strict Liability, the injurer will efficiently avoid the interaction. Under No Liability, the injurer will inefficiently seek the interaction. And Restitution leaves the injurer indifferent between seeking the interaction and avoiding it.
2. Y's investment decisions: Under Strict Liability, X will avoid the interaction, and so Y will invest neither in increasing or decreasing the probability of an interaction, as is efficient. Under No Liability, the injurer will seek the interaction, and Y will invest excessively in reducing the probability of an interaction. Y's investment under Restitution will depend on what X does: If X avoids an interaction, then Y will invest neither in increasing or decreasing the probability of an interaction. If X seeks an interaction, then Y will invest optimally in reducing the probability of an interaction (given X's inefficient choice).
3. Activity levels: Under Strict Liability, anticipating her efficient decision to avoid the interaction, X chooses an optimal activity level. Y also anticipates X's decision to avoid the interaction, and chooses an optimal activity level. Under No Liability, X will inefficiently seek the interaction and, since she does not feel the implications of this decision, X will choose an excessively high activity level, as in Table 4. Y's activity level will also be as specified in Table 4. Results for the Restitution rule depend on whether X decides to avoid the interaction or seek it. If the former, then X and Y's activity level decisions will be optimal. If the latter, then X's activity level will be too high, as in Table 4, and Y's activity level will too low, again as in Table 4.
4. Redefining Negligence: With Avoidance-as-Precaution, Negligence needs to be redefined, such that the injurer will be considered negligent iff  $B < H$ . This means that in Case 2, when  $B < H$ , an injurer who seeks the interaction will always be considered negligent. Accordingly, the injurer will avoid the interaction, as is efficient. As a result, the injurer will also choose an optimal activity level, and similarly the victim will choose an optimal activity level and invests zero in reducing the probability of an interaction, which is optimal (given that the interaction will be avoided anyway).

### 3.4 Extension: Endogenous Harms and Benefits

We have thus far assumed that the magnitudes of the harm ( $H$ ) and the benefit ( $B$ ) are exogenously determined and focused on the effects of the parties' activity level and investment decisions on the probability of an interaction. But, of course, in many cases the parties can also invest in reducing the harm and increasing the benefit from an interaction. The framework developed above can be extended to study endogenous harms and benefits.

Under Strict Liability, X will optimally invest in reducing  $H$  and in increasing  $B$ , while Y will inefficiently choose not to invest at all.

Under No Liability, X will optimally invest in increasing  $B$ , but will not invest in reducing  $H$ . Y, on the other hand, will optimally invest in reducing  $H$ , but will not invest in increasing  $B$ .

Under Restitution, Y will optimally invest in reducing  $H$  and in increasing  $B$ , while X will inefficiently choose not to invest at all.

Under Negligence, when the DCS incorporates both investments in reducing the probability of an interaction and investments in reducing the harm, X would optimally invest in both reducing  $H$  (to avoid being found negligent) and in increasing  $B$ . Since X will choose not to be negligent, there will be no liability and Y will internalize the harm. As a result, Y will optimally invest in reducing  $H$ . Y will not invest in increasing  $B$ .

Importantly, the parties' investments – in reducing  $H$  and in increasing  $B$  – can reverse the  $B, H$  ordering. Specifically, if absent such investments, we were in Case 2, with  $B < H$ , the investments can move us to Case 1, where  $B > H$ .

## 4. Takings

### 4.1 The Basic Argument

The government sometimes condemns people's assets for public use. The question then is whether it should compensate the owner of the asset ("the victim") for the value of the asset, which typically corresponds to his harm. Takings law mandates such compensation.<sup>16</sup> Compensation for takings provides incentives for the government to use its taking powers efficiently, namely, only when benefits exceed costs. At the same time compensation distorts the incentives of the victim to invest efficiently in the asset, since once he is fully compensated for his harm he would ignore the possibility that his asset would be destroyed by a taking. Consequently the victim would invest excessively in increasing the asset's value.<sup>17</sup>

The analysis of the beneficial victim case sheds new light on the law of takings. It reveals that liability for takings – the duty to compensate the takings victim – should depend on whether the taker derives a benefit from the victim's investments in the condemned asset. The two examples below illustrate the two polar cases – the case where the taker derives no benefit from the victim's investment (Example 4) and the case where the victim fully benefits from the victim's investment (Example 5). The former corresponds to the standard tort case, while the latter corresponds to the beneficial victim case. There are, of course, "in between" cases, where the taker derives partial benefit from the victim's investment. These cases lie between the standard tort case and the beneficial victim case.

*Example 4. Taker Derives No Benefit from Victim's Investment.* In order to construct a highway, the government condemns a house and destroys it. The value of the house to the takings victim is 10, and the benefit to the government is 15, so the taking is efficient. Should the government compensate the victim for the taking?

*Example 5. Taker Fully Benefits from Victim's Investment.* In time of emergency the government condemns a truck and uses it to transportation rescue workers and equipment. The value of the truck to the takings victim is 10, and the benefit to the government is 15, so the taking is efficient. Should the government compensate the victim for the taking?

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<sup>16</sup> But disallows recovery, or at least full recovery for taking part of a real property asset, see.

<sup>17</sup> CITE

In both examples, the taking is efficient, and thus will occur with and without liability. We thus focus on the victim's incentives to invest in the asset. No Liability results in efficient incentives in Example 4, while Liability is efficient in Example 5.

In Example 4, the taker destroys the victim's house and derives no benefit from the victim's investment in the house. Indeed, the taker would have been better off, if the house had not been built at all (demolition costs would have been saved). Efficiency requires that the victim, when investing in his house, consider the possibility that the house would be taken and destroyed and the investment wasted. With Liability, the victim would ignore this possibility and invest excessively. With No Liability, the victim would consider the possibility that the investment would go to waste and efficiently reduce the level of investment to account for this possibility. No Liability forces the victim to internalize the reduced benefits of his investment.

In Example 5, the taker benefits from the victim's investment, and the victim should consider this benefit when deciding how much to invest in the asset. With No Liability, the victim will not consider the benefit to the taker and choose an inadequately low investment level. With Liability, the victim gets 10 when the asset is taken, and thus will invest more. The victim's investment will still be too low, since the benefit to the taker is 15 and the victim internalizes only 10; but this is clearly better than the outcome under No Liability. (A Restitution rule, imposing damages of 15, would provide optimal incentives for the victim, but might inefficiently weaken the taker's incentives to take the asset. An intermediate award – between 10 and 15 – could be second-best optimal.)

In both examples, the victim should internalize the consequences of a potential taking. In Example 4, a taking implies zero utility from the victim's investment and thus No Liability provides optimal incentives. In Example 5, a taking increases the utility from the victim's investment and thus Liability provides better incentives.

#### 4.2 Model

In the takings context, the interaction between party X, the taker, and party Y, the victim, results in a transfer of the asset from Y to X. Party Y loses the utility from the asset that is being taken. In other words, the harm to Y is a function of the value of the asset to Y:  $H = H(V(y_1))$ . And, for simplicity, we assume:  $H = V(y_1)$ . While Y loses the asset, X gains the asset. What proves critical is whether the taker, X, will use the asset for the same purpose that Y used it, or for an entirely different purpose (or for a related, though still different purpose). We define the benefit to X as  $B = B(\tilde{U} + \alpha \cdot V(y_1))$ . And, for simplicity, we assume:  $B = \tilde{U} + \alpha \cdot V(y_1)$ . When  $\alpha = 0$ ,  $B = \tilde{U}$ . In this case, the benefit to X is not a function of the value of the asset to Y, which means that X will use the asset for an entirely different purpose. The utility, to X, from this different purpose is denoted  $\tilde{U}$ . When  $\alpha = 1$ ,  $B = \tilde{U} + V(y_1)$ . In this case, the value of the asset to Y fully enters into X's benefit function, which means that X will use the asset for the same purpose that Y used it. Of course, there are also intermediate cases, where  $0 < \alpha < 1$ . Finally, it is possible that X will use the asset for the same purpose as Y, but extract greater benefit. In this case,  $\alpha > 1$ . We emphasize that the relevant factor is whether, and to what extent, X benefits from Y's investment in the asset. We use "purpose" as a proxy – for expositional convenience.

We analyze the effects of different legal rules on Y's investment in increasing the value of the asset that can potentially be taken. To focus on this investment decision, we consider the following (simplified) social objective function:

$$[V(y_1) - y_1] + p \cdot [-V(y_1) + (\tilde{U} + \alpha \cdot V(y_1))]$$

In the absence of a taking, the asset is used by Y and social welfare is  $V(y_1) - y_1$ . With probability,  $p$ , the asset is taken by X. This means that Y's utility from using the asset is deducted from the social welfare function,  $-V(y_1)$ ; and X's utility from using the asset,  $\tilde{U} + \alpha \cdot V(y_1)$ , is added to the social welfare function.

The optimal investment level solves:  $[1 + p \cdot (-1 + \alpha)] \cdot V'(y_1) = 1$

With No Liability, Y's objective function is:  $V(y_1) - p \cdot V(y_1) - y_1$ . The FOC is:  $[1 + p \cdot (-1)] \cdot V'(y_1) = 1$ , which means that:

- If  $\alpha > 0$ , Y's investment will be too low. The measure of the distortion is:  $p \cdot \alpha$ .
- If  $\alpha = 0$ , Y's investment will be optimal.

With Liability, Y's objective function is:  $V(y_1) - y_1$ . The FOC is:  $V'(y_1) = 1$ , which means that:

- If  $\alpha < 1$ , then Y's investment will be too high. The measure of the distortion is:  $p \cdot (1 - \alpha)$ .
- If  $\alpha > 1$ , then Y's investment will be too low. The measure of the distortion is:  $p \cdot (\alpha - 1)$ .
- If  $\alpha = 1$ , then Y's investment will be optimal.

This analysis is summarized in Table 5:

	No Liability	Liability
$\alpha = 0$	Optimal [0]	Too High [ $p \cdot (1 - \alpha)$ ]
$0 < \alpha < 1$	Too Low [ $p \cdot \alpha$ ]	Too High [ $p \cdot (1 - \alpha)$ ]
$\alpha = 1$	Too Low [ $p \cdot \alpha$ ]	Optimal [0]
$\alpha > 1$	Too Low [ $p \cdot \alpha$ ]	Too Low [ $p \cdot (\alpha - 1)$ ]

Table 5: Investment Levels

We can now state the following proposition –

**Proposition 4:** In the Takings case, when we consider Y's investment in increasing the value of the asset, then -

- (a) No Liability is better, when  $\alpha$  is small, i.e., when the taker will use the asset for a different purpose, and
- (b) Liability is better, when  $\alpha$  is large, i.e., when the taker will use the asset for a similar purpose.

Remark – Restitution: Under a Restitution rule, the Y's objective function is identical to the social objective function, which means that Y's investment in increasing the value of the asset will be socially optimal.

Remark – Taker Incentives: We have thus far focused on the incentives of the takings-victim, Y, to invest in increasing the value of the asset. What about the incentives of the taker, X, to take the asset? To answer this question, we can apply results from the general analysis in Section 3 above. Note that a taking

corresponds to the injurer-victim interaction, and the taker's incentives to take correspond to the injurer's incentives to increase the probability of an interaction. As explained in Section 3, with respect to X's incentives, Liability is superior to No Liability and to Restitution.

## 5. Conclusion

This paper identified and analyzed a type of injurer-victim interaction, which has thus far escaped systematic analysis. In this type of interaction, which is quite common, the injurer benefits from the presence of the victim and, moreover, this benefit often increases with the intensity of the victim's activity. In these beneficial victim cases, standard results about the relative efficiency of different liability rules do not apply. When the benefit to the injurer from the victim presence is larger than the harm, liability should be imposed, while if the harm is larger than the benefit the case for liability becomes much weaker. These conclusions imply, counterintuitively, that it may be more important to impose liability on the non-negligent injurer rather than on the negligent injurer.

Our analysis has direct implications for tort law. Courts should treat beneficial victim cases differently from "regular" tort cases. In particular, while a negligence rule may be more efficient than a strict liability rule in the standard tort case, strict liability is unambiguously more efficient than negligence in beneficial victim cases. To appreciate the risk of a failure to distinguish beneficial victim cases from regular cases, let's return to *Vincent v. Lake Erie Transportation Co.*, with which we started this paper. In this famous case, a ship-owner tied her ship to a dock, and later failed to untie the ship when a storm broke out, thereby causing harm to the dock. Although it was clear that the ship-owner was not negligent in her failure to untie the ship, the court applied a strict liability rule and accordingly imposed liability on the ship-owner. The court, and the many commentators who puzzled over the *Vincent* ruling, failed to link the decision to apply a strict liability rule, rather than a negligence rule, to the classification of *Vincent* as a beneficial victim case. Instead, commentators have tried to justify the choice of strict liability in *Vincent* by classifying the case as an intentional tort case – a private taking. Under this interpretation, strict liability should also be applied when it is not the dock that is harmed, but rather another ship, tied to the same dock. But when another ship is harmed, it is a regular tort case, not a beneficial victim case, and a negligence rule may be the efficient rule.

In addition to tort liability – negligence and strict liability – we also studied the incentive effects of a restitution rule in beneficial victim cases, identifying both its advantages and disadvantages. Finally, we applied our analysis to the law of takings, arguing that the decision whether to compensate the taking victim should be based the classification of the case as a regular takings case or beneficial victim case.

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