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"BLAMING THE VICTIM": OPTIMAL INCENTIVES FOR PRIVATE PRECAUTIONS AGAINST CRIME

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OPTIMAL INCENTIVES FOR PRIVATE PRECAUTIONS AGAINST CRIME

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ABSTRACT

Deterrence from crime is ordinarily regarded as a function of the magnitude of the sanctions and the enforcement measures that the government employs. This paper argues that victims of crime may also be in a position to take enforcement measures that may deter crime and substitute or complement the government's effort. However, it may be difficult to synchronize the government's and the victims' efforts to reach the optimal combined enforcement, since victims' incentives to take precautions usually diverge from what is socially optimal. To correct the victims' incentives, criminal law can use an incentive mechanism which we label "contributory fault": a victim that fails to take the socially optimal level of precautions would lose some of the publicly provided protection. If the sanction on the offender would depend on his victim's conduct, and would be reduced whenever the victim deviates from the socially optimal effort, the victim may be led to engage in optimal precautions, to guarantee himself the greatest protection. This is accomplished without sacrificing deterrence. The paper illustrates that many criminal law doctrines can be interpreted as embodying the idea of contributory fault.

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I. INTRODUCTION

Criminal law is traditionally described as issuing its directives exclusively to potential criminals. Under this description, victims are passive parties whose role is limited to suffering the harm and their behavior is not a concern of criminal law. This article argues that the traditional view is too narrow. Normatively, criminal law can provide incentives for victims to engage in precautions in a manner that reduces overall enforcement and crime costs. Descriptively, various criminal law doctrines do, in fact, incorporate the idea that victims' behavior matters, and influence their behavior.

Efficiency considerations dictate that the legal system should minimize the total costs of crime, which include the net harm from criminal actions plus the costs of prevention and enforcement. Following Becker's (1968) classic article, It is usually assumed that prevention of crime and enforcement of sanctions are activities provided by the government. A large body of literature has examined the optimal government enforcement policy.[1] This literature has largely ignored any role that victims may play in the provision of law enforcement.[2] In this article, we argue that it is optimal for victims to participate in law enforcement, and they should do so as long as their private effort is less costly than the government's public measures. In effect, victims may substitute efficiently some of the public enforcement. Thus, any given level of deterrence that is achieved solely through the government's enforcement, may be achieved at a lower cost by the combined effort of the government and the victims.

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[1] See, for example, Polinsky and Shavell (1979); Kaplow (1990); Shavell (1991); Kaplow and Shavell (1991).

[2] The only paper we found that studies victims' precautionary incentives is Shavell (1991b). We will comment extensively on the relation between his analysis and ours. There is another branch of literature which examines the desirability of private enforcement firms. See Becker and Stigler (1974); Posner and Landes (1975); Polinsky (1980); Friedman (1984).

To illustrate the victims' role in enforcing criminal law, consider the following example. A potential victim of car theft can engage in a variety of activities that enforces his ownership. He can utilize preventive measures, such as steering locks and immobilizing components; he can also apply measures that raise the probability of detecting the thief, such as sensor sirens or tracking devices. Some of these private enforcement measures can efficiently substitute or complement the government's enforcement, to form the optimal combined operation.

While some positive level of victims' enforcement is in general socially desirable, we argue that the victims' incentives in choosing their actual level of private enforcement diverge from the social optimum. The divergence may arise for different reasons. One reason for the divergence, which is modelled formally in this paper, is that victims do not take into account the social benefit from crime (the legitimate benefit to the criminals), and hence tend to engage in socially excessive precautions. While society likes to tune deterrence to some optimal intermediate level, victims prefer maximal deterrence, and stop short of it only when its too costly to achieve. Another reason for this divergence is that the victims do not take into account some benefits of their enforcement activity, benefits that accrue to neighboring victims or to future potential victims. Here victims may elect to take too little precautions. Thus, absent any corrective incentive device, the aggregate enforcement efforts of the government and the victims will generally not be socially optimal.

We then turn to consider an incentive mechanism that may overcome the distortion and implement optimal enforcement efforts. We label it "contributory fault". It monitors victims' incentives by setting standards of precautions for victims of criminal actions, "standards of due enforcement". If a victim satisfies the standard, his offender -- once apprehended -- is inflicted with a "high" sanction. If the victim fails the standard, his offender is inflicted with a "low"

sanction. In this way, a victim is induced to satisfy the standard. If he complies, he receives more public protection: the "high" sanction deters more offenders and reduces this victim's expected harm. And the sanction schedule can be devised in a way that makes compliance privately beneficial. By setting the standard of due enforcement at the socially optimal level, victims can be led to engage in the optimal level of private enforcement. This is a rule of contributory fault because it reduces the criminal's sanction if the victim was at "fault", i.e., if the victim had engaged in non-optimal enforcement.[3]

To demonstrate the applicability of the contributory fault scheme, consider again the example of theft. If the sanction to the thief varies according to the precautions that its victim had taken, and specifically, if the sanction rises with the victim's care, victims are induced to raise their level of precautions. Such a mechanism can efficiently address problems of under-enforcement. In Section III of the paper, we will argue that this rationale can illuminate the distinction that the Common Law draws between theft and burglary or theft and robbery. Another application of contributory fault can be found in the U.S. Sentencing guidelines. We will demonstrate that courts are instructed explicitly to vary the criminal's sanction according to the precautionary conduct of its victim.

The fact that legal rules provide incentives for "passive" parties is well recognized in the law and economics literature. Liability rules in tort law induce victims to exercise care; remedies for breach of contract induce promisees to make reliance investments.[4] Indeed, there is a great

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[3] As in tort law, we may consider different versions of "contributory fault". In an all-or-nothing contributory fault regime, a victim loses the entire public protection if he deviates from the standard of enforcement. The government simply sets the sanction in such a case to equal zero. In a comparative fault regime, a victim loses only part of the public protection, a part that increases with the extent of the victim's deviation.

[4] Cooter (1985) studied the "unified model" and emphasized the similar properties of incentive structures across legal areas. One may view this article as extending Cooter's model to the domain of criminal law.

similarity between the contributory fault rule we analyze here and tort law's contributory negligence defense. Both defenses are aimed at providing incentives for victims to engage in precautions. However, their mechanics differ. In tort law, victims receive the damages directly. The threat of depriving them of some direct compensation generates their incentives. In criminal law, victims do not receive compensation and do not extract the fine that the offender pays. In order to correct their incentives, the law can threaten to reduce the public protection that victims get. Instead of tuning the ex post reward, as the contributory negligence doctrine does, the contributory fault doctrine tunes the "ex ante risk" that the victims face.

The paper is organized as follows. Section II extends the model of law enforcement to include victims' enforcement behavior. It is demonstrated that the equilibrium combined enforcement is not socially optimal. In Section III we define and examine a contributory fault incentive mechanism, and show that social optimum can be achieved. We discuss several examples from the area of criminal law, and argue that implicit applications of contributory fault are already embodied in the Common Law. Section IV offers concluding remarks.[5]

II. Model

A. Framework of Analysis

Risk-neutral individuals choose whether to commit a sanctionable act. The benefit, b, to the actor is assumed to be distributed uniformly in [0,1]. Acts impose a cost h, on risk-neutral victims. It is assumed that $0 < h < 1$, so that some acts are socially desirable.

Individuals who decide to commit the act are called offenders. Offenders that are detected

[5] This paper originates from a previous paper, Harel (1994), which emphasizes both fairness and efficiency properties of the contributory fault idea. Here we abstract from fairness issues altogether, but extend and generalize the welfare analysis and derive some additional results.

and apprehended are inflicted with a sanction, s, by the government. The maximum feasible sanction is $\bar{s}$. Sanctions are costless for society to impose. The probability of apprehension depends on two variables: the detection effort by the government, x, and (this is where our model departs from the ordinary enforcement model) the detection effort by potential victims, y (e.g., alarms, recording devices).[6] Denote the probability of apprehension by $p(x,y)$. It is assumed that $p(.)$ is continuous and twice differentiable in both arguments, and that $p_x > 0$, $p_y > 0$, $p_{xx} < 0$, $p_{yy} < 0$ and $p_{xy} < 0$ (where p_i denotes the first derivative of $p(.)$ w.r.t. i and $p_{ij}(.)$ is the second derivative w.r.t to j and to i), i.e., diminishing marginal returns to detection effort of both government and potential victims. The marginal cost of units of enforcement is 1 for both the government and the victims. We also assume the following conditions: $p(0,0) = 0$, $p_x(0,y) = \infty$, $p_y(x,0) = \infty$, $p_x(\infty,y) = 0$ and $p_y(x,\infty) = 0$.[7] Individuals know the model perfectly.

B. Social Optimum

The social problem is to choose s, x, y so as to maximize:

$$\int_{p(x,y)s}^{1} (b - h)db - x - y \qquad (1)$$

subject to the constraint $s \leq \bar{s}$.

Denote the solution by (s^*,x^*,y^*). The Becker argument, that $s^* = \bar{s}$, clearly holds in this framework. In optimum, enforcement effort should be allocated among x and y so that their marginal contributions be equal (since their marginal cost is constant and equal). To derive their

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[6] It is assumed at the outset that y is invested prior to the offense, so that potential victims have to choose their level of y before knowing whether they will become actual victims. Later, more general formulation of victims' precautions will be discussed.

[7] These conditions are assumed for technical simplicity, in order to guarantee interior solution.

precise magnitudes, differentiate (1) with respect to x and y and get:

$$p_x(x^*,y^*)\bar{s}(h - p(x^*,y^*)\bar{s}) = 1$$
$$p_y(x^*,y^*)\bar{s}(h - p(x^*,y^*)\bar{s}) = 1 \qquad (2)$$

Note, that in this setting, the optimal apprehension effort that the government should maintain is even lower than is implied by the original Becker argument. Since the government's efforts are complemented by private precautions, the government should invest even less in apprehension.

C. The Private Incentives to Detect Crimes

In criminal contexts, victims do not sue their offenders, nor do they get any benefit from the sanction that the government collects. Their role is confined to suffering the harm and to investing in self protection. How much do victims invest? The benefit to the victim from private enforcement is deterrence: the increase in the expected sanction that private enforcement brings about. This increase drives out some potential offenders and reduces the likelihood of becoming a victim.[8] The victim chooses y to solve:

$$Min_y\ [y + pr(b \geq p(x,y)s)h] \qquad (3)$$

Only individuals with benefit b that exceeds $p(x,y)s$ become offenders and impose harm on the victim. As y increases, $p(x,y)$ increases, and thus the expected harm diminishes.

Denote the solution to (3) by $\hat{y}(x,s)$. Notice, that if the government sets the socially optimal enforcement parameters, $(x^*,\bar{s})$, the victim does not choose y^*. Solving (3), victims set:

[8] It is assumed here that offenders observe the victims' precautions before they commit the offense, and thus anticipate the expected sanction accurately. The possibility that victims' precautions are unobservable to criminals will be discussed in Section III.C below.

$$p_y(x^*,\hat{y})\bar{s} = \frac{1}{h}. \tag{4}$$

But from expression (2) we know that y^* satisfies:

$$p_y(x^*,y^*)\bar{s} = \frac{1}{h - p(x^*,y^*)\bar{s}}. \tag{5}$$

Given the assumption that $p_{yy} < 0$, victims will choose $\hat{y}(x^*,\bar{s}) > y^*$.

The result that victims have the incentive to overinvest in precautions arises from the assumption that society counts the benefit to criminals, whereas the victims do not take it into account. There are, however, additional factors that may distort the victims' incentives. One element, which also leads to excessive precautions, is "replacement of crime", or the "diversion effect". If one victim's precautions only lead criminals to commit the act against other victims, there is a private benefit to precautions that is not translated to social gain. On the other hand, there are factors that may lead victims to engage in too little precautions. If precautions generate external benefits, that accrue to other potential victims, there is a problem of underinvestment. This may arise if apprehension of offenders prevents future harms (i.e., external benefit to future victims) or if private enforcement has "public good" properties (e.g., effort of stockholders against crimes by corporate officers, or actions by tenants of residential building to make their house safer).[9] In sum, regardless of the direction of the distortion, it is clear that we cannot expect victims to engage in the socially optimal level of precautions.

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[9] Shavell (1991b) labels this externality the "deterrence effect". He argues that victims overlook the deterrence effect that arises from their private measures, but since they are driven by a diversion effect, their incentives to take precautions may be either too great or too small. Once allowing for externalities across victims, our model yields results that are consistent with Shavell's.

D. Equilibrium Enforcement

We demonstrated that $(x^*,y^*,\bar{s})$ is not an equilibrium. In this section we examine the equilibrium outcomes in the "enforcement game" between the government and the victims. We demonstrate that regardless of the timing or the information assumptions, the outcome is not efficient. There are a few optional settings in which this game can be analyzed. The simplest form is a simultaneous moves game, in which each side chooses an enforcement move not knowing the move by the other side. Alternatively, the victims can be assumed to observe the enforcement policy of the government prior to making their private enforcement choices. In this case, the game is played sequentially. The government chooses her enforcement effort first, and each victim reacts with his best response. We believe that the sequential setting is the more plausible one, since it is the government who chooses in advance some observable and general enforcement measures (e.g., number of police patrols, investigation guidelines). Therefore, the focus of this section is on the sub-game perfect equilibrium of the sequential game.[10]

Formally, the government has to choose levels of x and s that -- coupled with the best-response choice of y they generate -- will produce the greatest welfare. It solves:[11]

$$\begin{aligned} &Max_{x,y,s} \int_{p(x,y)s}^{1} (b - h)db - x - y \\ &s.t. \quad p_y(x,y)s = \frac{1}{h}. \end{aligned} \tag{6}$$

Our first observation is that in equilibrium, sanctions may not be maximal. The familiar argument

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[10] We do not analyze the opposite sequential case, in which the victims move first, because it is less plausible that the government can set different policies to different victims.

[11] In the following formulation, we invoke the first-order approach, i.e., substitute the constraint that the victims minimize their cost with the constraint of the first order condition of the victims' optimization problem. This technique is permissible because under our assumptions, the victim's optimal effort is unique. See Rogerson (1985).

why $\hat{s}$ must equal $\bar{s}$ does not necessarily hold in our bilateral enforcement setting. Suppose that $(\hat{x}, \hat{y}, \hat{s})$ is an equilibrium in which $\hat{s} < \bar{s}$. The usual "Beckerian" argument would suggest that the government would be better-off by raising s and reducing x in a way that the expected sanction is unchanged and some costs of enforcement are saved. However, in the present setting, such an argument does not work. If we try to raise s and reduce x, it is impossible to leave y unchanged. Since y is determined endogenously by the private incentives of the victims, it cannot be adjusted arbitrarily. In fact, if s is raised and x is reduced, then the victims will raise their private effort y. Victims will find it desirable to increase y for of two reasons: first, the incremental deterrence they generate through such an increase is greater if s is higher; second, as x decreases, the marginal effect of y on the probability of detection rises (from the assumption that $p_{xy} < 0$). Hence, an increase in s does not necessarily lead to a more efficient enforcement. An equilibrium with $\hat{s} < \bar{s}$ is possible.

To reinforce the intuition underlying this observation, consider a situation in which only victims invest in enforcement, and the government's sole role is administering sanctions. Here, the greater the sanction, the higher is the private enforcement level.[12] To avoid excessive deterrence, the government may opt to use less than maximal sanctions. This effect persists even if the government can control some of the enforcement level. As long as individuals provide some of the enforcement, equilibrium may involve less than maximal sanctions.

We state the following proposition:

Proposition 1. *The equilibrium enforcement levels when the government chooses its policy first are different from the optimal levels. The equilibrium sanction may be less than maximal.*

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[12] This is a familiar result, originally argued by Landes and Posner (1975) about the behavior of private enforcement firms.

Proof. See Appendix.

Remarks. (i) *The Reason for the Distortion.* Due to the victims' distorted incentives, we know that a choice of $(x^*,\bar{s})$ by the government does not implement y^*. Thus, the government may raise welfare by taking more or less than x^*, or even setting the sanction lower than $\bar{s}$. The government is, in a sense, a "Stackelberg" leader: it chooses a point on the victims' reaction function that generates maximal social welfare. As Figure I demonstrates, the victims' reaction curve, $\hat{y}(x)$, passes to the right of (x^*,y^*), thus this point cannot be chosen by the government.[13] The elliptical lines are the government's indifference curves (isowelfare sets). Highest welfare is at (x^*,y^*). The government maximizes welfare, subject to the constraint of being on the victims' reaction curve.[14]

*** FIGURE I ***

(ii) *Direction of Distortion.* The government's optimization may involve taking either more or less than x^*. If an increase in x generates a more powerful reduction in y, such that the probability of detection decreases, then raising x above x^* is desirable. It reduces the total enforcement effort, and saves both enforcement costs and the cost of excessive deterrence that arises from the pair $(x^*,\hat{y}(x^*,\bar{s}))$. In particular, if $\bar{s}$ rises sufficiently, the equilibrium $\hat{y}$ will fall under y^*. This type of equilibrium is depicted in Figure I(a).[15] Similarly, if an increase in x generates a modest reduction in y, such that the overall probability of detection rises, then the

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[13] The reaction curve is downward sloping: by the implicit function rule, differentiating the victim's optimization condition (expression (4)) yields $d\hat{y}(x)/dx = -p_x/p_{yy} < 0$. In economic jargon, this relationship between x and y is known as "strategic substitutes". See, e.g. Bulow et al. (1985).

[14] For simplicity of illustration, it is assumed that in equilibrium, the sanctions are maximal. Similar observations follow if $s < \bar{s}$.

[15] Notice that this type of equilibrium arises if $d\hat{y}(x)/dx$ is sufficiently small, i.e., has a steeper slope.

government will reduce its effort and lead to a reduction of total enforcement, as depicted in Figure I(b).

(iii) *Simultaneous Moves*. If the victims do not observe the government's enforcement policy when choosing their own, a different equilibrium arises. However, Proposition 1 holds for the simultaneous moves game as well: enforcement levels are not optimal, and the magnitude of the sanction may be less than maximal. Figure II illustrates this equilibrium diagrammatically. It depicts the reaction functions of the government and the victims, denoted by $\hat{x}(y)$ and $\hat{y}(x)$.[16] The Nash equilibrium is the point where the two reaction functions intersect, and may be one of two types. Figure II(a) involves $\hat{x} > x^*$ and $\hat{y} < y^*$. This situation arises if the victims' reaction function is very steep, i.e., if an increase in x generates a powerful reduction in y, such that the probability of detection decreases. Figure II(b) depicts the opposite case, in which $\hat{x} < x^*$ and $\hat{y} > y$, which corresponds to situations in which the victims' reaction function is relatively flat.

*** FIGURE II ***

(iv) *Greater Welfare When Government Moves First*. The equilibrium that arises when the government moves first will generally increase social welfare, relative to the equilibrium of the simultaneous moves. Notice, that if the government moves first, it can always choose the equilibrium point of the simultaneous moves game, as this point rests on the victims' reaction curve. Therefore, society is never worse-off, and generally better-off, if victims can observe the

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[16] To verify that the government reaction curve is downward sloping, differentiate the government's optimization condition (expression (2)):

$$\frac{dx}{dy} = \frac{p_y p_x - p_{xy}(h - p(x,y)\bar{s})}{p_{xx}(h - p(x,y)\bar{s}) - p_x p_x}$$

The numerator is positive, the denominator is negative, thus the entire expression is negative.

government's enforcement policy before making the private enforcement choices. It may pay-off for society to invest in making public enforcement observable, perhaps even at the expense of using less efficient methods.

III. The Mechanism of Contributory Fault

A. General

The inquiry into the private incentives to engage in precautions revealed that the first best enforcement effort is not attained. This distortion can be addressed in different ways. One way is a centralized approach: regulation of private enforcement rules or taxation of precaution devices. Another approach, which we examine here is a decentralized one. It is based on providing incentives for victims to take the first-best levels of private enforcement by indirectly "punishing" those who fail to take the optimal levels. The government can exploit the feature that sanctions are set after a victim's enforcement level is already known. The government need not sanction defying victims, but instead deprive them of the protection against crime that they enjoy through the deterrent effect of criminal sanctions. If a victim fails to take the required "due level of enforcement", the government would reduce the sanction that the **offender**, who harms this victim, faces. Full sanctions would be imposed on offenders only if their victims took adequate enforcement measures. Otherwise, the sanction will be reduced. Such policy can induce victims to satisfy the due level of private enforcement. They prefer to satisfy the required enforcement standard, and signal to offenders that they belong to the highly protected group,[17] rather than be deprived of the sanction-generated protection.

[17] This argument rests on the assumption that criminals can observe the victims' precautions, because otherwise the victims would gain no benefit from complying with the enforcement standard. The possibility that precautions are not observed by criminals will be discussed in sub-Section C below.

B. Analysis

Consider the following sanctioning rule. The sanction imposed on an apprehended offender is either 0 or $\bar{s}$, according to:

$$s = \begin{cases} \bar{s} & \text{if} \quad y = y^* \\ 0 & \text{if} \quad y \neq y^* \end{cases} \tag{7}$$

y^* is the due level of private enforcement. Full sanctions are imposed only if the victim abided by the standard. In this setting, a victim's decision about y affects not only the probability of detection, but also the magnitude of the sanction. If the victim takes any level of y other than y^*, there will be an expected sanction of 0 on potential offenders, which implies that the probability of being harmed becomes 1. We state and prove the following proposition:

Proposition 2. *If the government sets $x = x^*$ and applies the contributory fault sanction rule of expression (7), then the socially optimal enforcement is implemented.*

Proof. See Appendix.

Remarks. (i) *Why Contributory Fault works?* The reason that a rule of contributory fault, as the one embodied in expression (7), works, is that it eliminates victims' incentives to deviate from the first-best level of private enforcement. As Figure III demonstrates, the rule creates a discontinuity in victims' returns to their enforcement effort. Instead of the continuous payoff function that victims face, and which leads them to choose $y(x^*)$, victims now face a sharp decrease in their cost if they take y^*. In other words, a victim that deviates from y^* to $y(x^*)$ may gain from his own superior effort, but would lose from the reluctance of the government to protect him by a high sanction.

*** FIGURE III ***

(ii) *Forms of Contributory fault.* Proposition 2 shows that the specific mechanism which is embodied in the rule of expression (7) implements the first-best level of enforcement. Generally, there are other mechanisms that can achieve this result. First, it may not be necessary to reduce the sanction to 0 whenever $y \neq y^*$. It may suffice to use "comparative fault" standards and reduce the sanction to some positive level $s < \bar{s}$ to generate the same effect. Second, if the government chooses some public enforcement effort after knowing how much victims invested (e.g., assign officers to investigation), it can threaten to reduce its public enforcement if the victim deviated from the standard.

(iii) *"Rewarding" Cautious Victims versus "Punishing" Careless Victims.* One may view the contributory fault mechanism from two perspectives. It may be regarded as a rule that punishes careless victims, by reducing the protection that they receive. But it may also be regarded as a rule that rewards cautious victims by raising the public protection that they receive. The two views are incentive-equivalent, but may have different intuitive appeals.[18]

(iv) *Actual Sanctions in Equilibrium.* Notice that in this model, the government's threat to deprive victims of the public enforcement protection is never carried out in equilibrium. The threat works, and the victims are driven to satisfy the standard of behavior, thus there is never a need to actually administer the reduced protection. To explain how actual findings of contributory fault can be supported in equilibria, we can invoke the same arguments that explain why contributory

[18] While the focus of this paper is on total welfare issues, the contributory fault doctrine also produces distributive justice. If one views "protection" as a scarce good, the contributory fault approach leads to a distribution of this good based on individual merits. See, Harel (1994).

negligence is actually found in tort law.[19] There may be court errors in observing behavior or in setting the standards; Victims may err in anticipating the standards or may have imperfect control over their instantaneous activity; or, victims may vary with respect to some private, relevant feature, which is not observable. For example, a victim with a high harm may choose greater precautions than one with a low harm, yet courts, unaware of the actual harm, may deem the latter to be at contributory fault.

C. Extension: Unobservable Precautions

In our model, a contributory fault mechanism works because victims prefer to appear compliant, knowing that some potential offenders who observe the victims' behavior will be deterred. A crucial assumption in working this mechanism is that criminals can indeed observe the precaution level of the victims. If criminals cannot observe the victims' conduct, they cannot distinguish between targets that involve high expected sanction (victims that comply), versus targets that involve low expected sanction (victims that deviate from the standard). If this is the case, victims may not be led to comply. Compliance no longer generates a private benefit, because even if a criminal who targeted a complying victim is more severely punished, the criminal does not know this ex ante, and his incentives are not affected. More precisely, if victims' enforcement effort affects only the detection rate, then when these efforts are unobservable to criminals, victims will invest zero effort in equilibrium, whether or not there is a contributory fault doctrine. The reason is that victims do not care about detection per se, since they do not receive any compensation or reward when the criminal is sanctioned. Victims care only about deterring potential criminals and since there is no deterrence effect to unobservable

[19] For many of the arguments that lead to actual findings of contributory negligence in tort law, see Shavell (1987), ch.4.

measures, there is no return to private enforcement effort. Even if a victim complies with the enforcement standard perfectly, he gains nothing and he would prefer to be contributorily faulty and save the cost of precautions.[20]

When victims' precautions are not readily observable, several complications arise. First, victims may manipulate the information that passes over to criminals, and simulate protection measures without actually applying them. For example, victims may display misleading alarm signs, hoping to exploit the criminals' ignorance. In addition, criminals may invest effort in verifying the actual precautions that victims use, to overcome their ignorance.

In light of these possibilities, a contributory fault mechanism has several desirable effects. First, it increases the incentives of victims to expose their precaution measures. Criminals know that if victims' precautions are unobservable, there is no benefit to victims from investing in precautions, thus victims are likely to take a low level of precautions. Given this anticipation by criminals, and given that criminals will remain skeptical about warning notices, it is in the interest of victims to display their precautions publicly, to generate a deterrence effect. A contributory fault mechanism raises the victims' incentives to use observable precautions, because such precautions deter criminals both directly and by raising the magnitude of the sanction. Second, if victims engage in a positive level of precautions, criminals have an incentive to observe it before they commit a crime. Under contributory fault, the criminals' incentives to acquire information are increased. Knowing the actual level of precautions affects the anticipated probability of detection **and** the anticipated sanction. The value of information, i.e., the

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[20] Victims' precautions may also affect the rate of success of a crime. In these situations, there is a private benefit to unobservable precaution -- the reduction in the expected harm from crime. However, as Shavell (1991b) demonstrated, the level of precautions that individuals take when precautions are unobservable is lower than when precautions are observable to criminals. Observable precautions provide the added effect of deterring criminals from attempting the crime. Without the deterrence effect, victims cannot be led to comply with the private enforcement standard and a mechanism of contributory fault does not work.

difference between targeting a compliant or a non-compliant victim, becomes greater. Given that the private incentives to produce and acquire information are greater under a contributory fault regime, it is socially desirable to administer such regime if the costs of information dissemination do not exceed the costs of distorted precautionary incentives.

Another reason why society may want victims to keep their pracautions unobservable is to prevent the "diversion effect".[21] If criminals cannot identify the protected victims and target solely the unprotected victims, the deterrent effect of victims' precautions will be enhanced. To generate this deterrent effect, victims must be induced to make their precautions unobservable. A contributory fault mechanism can "punish" victims who make their precautions observable by reducing the sanction to their offenders. To illustrate, consider the LoJack car anti-theft device. An electronic transmitter is hidden inside a car, and its signal can be located, any time the car is stolen, by a network of antennas. Almost every stolen car equipped with this device has been recovered.[22] If some fraction of the cars were to be equipped with this system, a significant deterrent effect could be gained. However, if thieves can identify cars that are protected by LoJack, and target only those that are not, the deterrent effect is greatly diminished, to the extent that the social cost of administering such a system may not be justified. To guarantee that the deterrent effect of the system persists, car owners must be given the incentive to make the equipment unobservable. When the sanction to a thief that is caught stealing a car with an unobservable LoJack is higher than if it were observable, car owners can be induced to hide the presence of the protection device. Thus, comparative fault can regulate not only the amount of

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[21] Shavell (1991b) has shown that the diversion effect arises only when precautions are observable.

[22] See G. Dillow, *When a Car Alarm Just Isn't Enough*, Los Angeles Times, February 7, 1993. It is reported that 95% of cars equipped with LoJack were recovered, whereas only about 25% of these recoveries would have occurred without the LoJack.

precautions that victims use, but also their nature.

D. Applications: Implicit Legal Doctrines of Contributory Fault.

(i) *Sentencing Guidelines: Victim-Related Adjustment to Sentences.* The U.S. sentencing guidelines incorporate explicitly the idea of victim's fault.[23] For example, §3A1.1 instructs courts to raise the sanction to a criminal who acted against an unusually vulnerable victim. By recognizing victims' vulnerability, the court induces victims to self-select: victims who are vulnerable due to some physical shortcoming (i.e., whose precautions are less productive) will need to take less precautions, given the extended public protection they receive; and victims who are more capable to protect themselves will be driven to do so. Another sentencing guideline, §5K2.10, instructs courts to reduce the sanction to a criminal if his victim's conduct contributed to the danger. Again, this rule can be viewed as an incentive device aimed at victims, inducing them, through the threat of lower sanctions to their offenders, to refrain from contributory fault.

(ii) *The Classification of Property Offenses.* The legal system distinguishes between various property crimes, including theft, burglary and robbery.[24] This distinction, in particular the differentiated sanctions, incorporates a subtle scheme of contributory fault, which shapes the incentives of victims to protect their property.Of the three property offenses, theft is the lightest. Burglary, a more severe offense, is a conjunction of criminal trespass and theft. It is puzzling why the legal system creates this combined offense, rather than simply treating each component separately. It is even more puzzling why the sanction imposed upon the burglar is more severe than the sum of the sanctions imposed on a thief who also committed, separately, a criminal

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[23] *United States Sentencing Commission Guidelines Manual* 1992.

[24] See Sections 223.2, 221.1 and 222 of the Model Penal Code.

trespass.[25] Likewise, robbery is a conjunction of assault and theft. Again, it is puzzling why the legal system created this combination, and why the combined offense is treated more harshly than the aggregation of its components.[26] Why isn't the robber punished the same way a person who commits a theft and assault without combining them?

Some of the enigma can be resolved through the lens of contributory fault. The case of theft is a case in which the victim took a relatively low level of private precautions to protect his property. Burglary is a case in which the victim took the additional precaution of locking his property, and robbery is a case where the victim took the additional precaution of holding the property close to his body. By imposing harsher sanctions on the burglar or the robber, the legal system rewards the victim for his precautionary activity and induces victims to exercise such measures. If it is the case that victims take insufficient precautions measures, the "super-additivity" feature of the penalty induces greater caution by victims. If, however, victims take excessive care measures, the "super-additivity" aggravates the distortion.

(iii) *Provocation.* Criminal law distinguishes between murder and manslaughter. A homicide is reduced from murder to voluntary manslaughter if the intentional killing resulted from the victim's provocation. If one views provocation through the lens of contributory fault, a new rationale for the doctrine emerges.[27] The doctrine gives an incentive for a potential victim not to

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[25] The commentary to the Model Penal Code concedes that the very existence of burglary as a separate offense can be justified only in historical terms. The commentary adds that the Model Penal Code drafters would have been content to eliminate the offense altogether had it not been so entrenched in common law systems. See Model Penal Code draft no. 11, p. 57. See also Note (1951).

[26] See Note (1954) for discussion.

[27] There have been previous attempts to justify the doctrine of provocation on efficiency grounds. According to Posner, a person who commits a homicide as a result of provocation is more likely to be apprehended than a person who commits an unprovoked homicide. That person is also less likely to succeed in his act, and thus the ex-ante risk he imposes on the victim is lower. Hence, in order to achieve optimal deterrence, lower sanctions are required against provoked homicide. See Posner (1992), p. 237

provoke, while maintaining sufficient protection for provokers, to deter provoked individuals from committing murder. Reducing the sanction too much would raise the tendency of provoked individual to murder, while reducing the sanction too little would leave a high tendency to provoke. An intermediate reduction of the sanction, which the Common Law incorporates, seems to be the optimal path to reach the social goal of minimizing the number of homicides.[28]

IV. Concluding Remarks

(1) *General Precautions By Victims.* Victims' conduct may have various effects on the rate of crime. One effect, that was modelled above, is to raise the likelihood of detection. Other effects may be to reduce the likelihood of a successful crime (e.g., install a safe that the burglar may fail to crack), to reduce the harm that a successful crime inflicts on the victim (e.g., carry small amounts of cash in one's wallet), or to reduce the benefit to the offender from a successful crime (e.g., plant secret operating codes in one's electronic accessories). All of these techniques have similar deterrence results. Also, the private incentives to utilize these precautions would ordinarily diverge from the socially optimal level. In some cases, there may be excessive incentives; in other cases, the private incentives may be insufficient. The effects of a contributory fault scheme that were discussed above carry over to whichever precautionary activity the victims take. As long as the government can tailor its sanctions specifically, according to victims' actual behavior, it can induce compliance on the part of the victims.

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[28] There are other areas in which provocation by the victim is deterred by reducing the penalty to his offender. One example is the "No Retreat Rule". A person who faces a deadly attack is allowed to use deadly force to combat the attack, even he could have avoided it by retreating. I.e., the self-defense claim is broadened whenever the victim initiated the deadly conflict. This doctrine affects the incentives of provoking victims, who become exposed to harsher retaliations, and consequently are deterred from aggression. See Sections 3.04(2)(b)(ii)(1) and 3.04(2)(b)(1) to the Model Penal Code. The common law stipulates that if defendants "incite the fatal attack, encourage the fatal quarrel or otherwise promote the necessitous occasion for taking life", the claim of self-defense is denied. See U.S v. Peterson, 483 F.2d 1222.

(2) *Risk Aversion and Insurance.* The results above do not change significantly if victims are risk averse. Such victims will be more inclined to spend in precautions, to reduce the risk of crime. Thus, risk aversion alleviates problems of under-investment in precautions, and intensifies problems of over-investment. A contributory fault incentive mechanism would have the same effect: abiding by the standard of enforcement brings the risk that the victims faces to minimum. If, in addition, risk averse victims are insured against crime losses, a moral hazard problem arises, that cannot be corrected by a contributory fault mechanism. But when insurance companies can monitor victims' precautions, the insurance contracts can provide incentives to satisfy efficient private enforcement standards. Otherwise, it may be that the insurance contracts would cover only part of the losses.

(3) *Heterogeneity of Victims.* The magnitude of victims' harm is relevant to the determination of the optimal enforcement and sanction. When harm varies across victims and is their private information, a contributory fault regime may have an additional effect of inducing victims to "signal" their types through their precautionary behavior. Victims with high harm will tend to engage in greater precautions, both for raising the direct deterrence and for receiving greater public protection. This is a desirable effect, since it leads to greater deterrence whenever the harm is higher.[29] In this situation, some victims -- the low-harm types -- will be found at contributory fault and be awarded the efficiently reduced protection.

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[29] One issue that has to be addressed if contributory fault is to achieve self-selection of victims, is whether low-harm victims have an incentive to "pool" with high harm victims. Hypothetically, low-harm victims may wish to take greater precaution and appear as high-harm victims, in order to gain greater public protection. Under some conditions, a contributory fault regime can be "strategy-proof", i.e., can implement a separating equilibrium. This problem is discussed in Ben-Shahar and von Randow (1993).

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APPENDIX

Proof of Proposition 1.

The first order conditions of the government's problem are:

$$p_x(x,y)s(h - p(x,y)s) - 1 - \lambda p_{xy}(x,y)s = 0 \tag{1A}$$

$$p_y(x,y)s(h - p(x,y)s) - 1 - \lambda p_{yy}(x,y)s = 0 \tag{2A}$$

$$p(x,y)(h - p(x,y)s) - \lambda p_y(x,y) = 0 \tag{3A}$$

$$p_y(x,y)s = \frac{1}{h} \tag{4A}$$

Where λ is the Lagrangian multiplier. Substituting for λ from expression (3A), we can rewrite expressions (1A) and (2A) as:

$$p_x(x,y)s(h - p(x,y)s) = 1 + \frac{p(x,y)(h - p(x,y)s)}{p_y(x,y)} p_{xy}(x,y)s \tag{5A}$$

$$p_y(x,y)s(h - p(x,y)s) = 1 + \frac{p(x,y)(h - p(x,y)s)}{p_y(x,y)} p_{yy}(x,y)s \tag{6A}$$

Comparing expressions (5A) and (6A) to the first order conditions of the first-best problem (condition (2) in the text), indicates that the equilibrium outcome will generically differ from the optimal outcome. As explained in the text, we may have $s \neq \bar{s}$. Even if $s = \bar{s}$, the right hand side of the above conditions diverges from the right hand side of the expressions in condition (2), thus $\hat{x} \neq x^*$ and $\hat{y} \neq y^*$. Q.E.D.

Proof of Proposition 2.

If the victim takes y^*, his total cost is $y^* + pr(b \geq p(x^*,y^*)\bar{s})h$. This includes his cost of

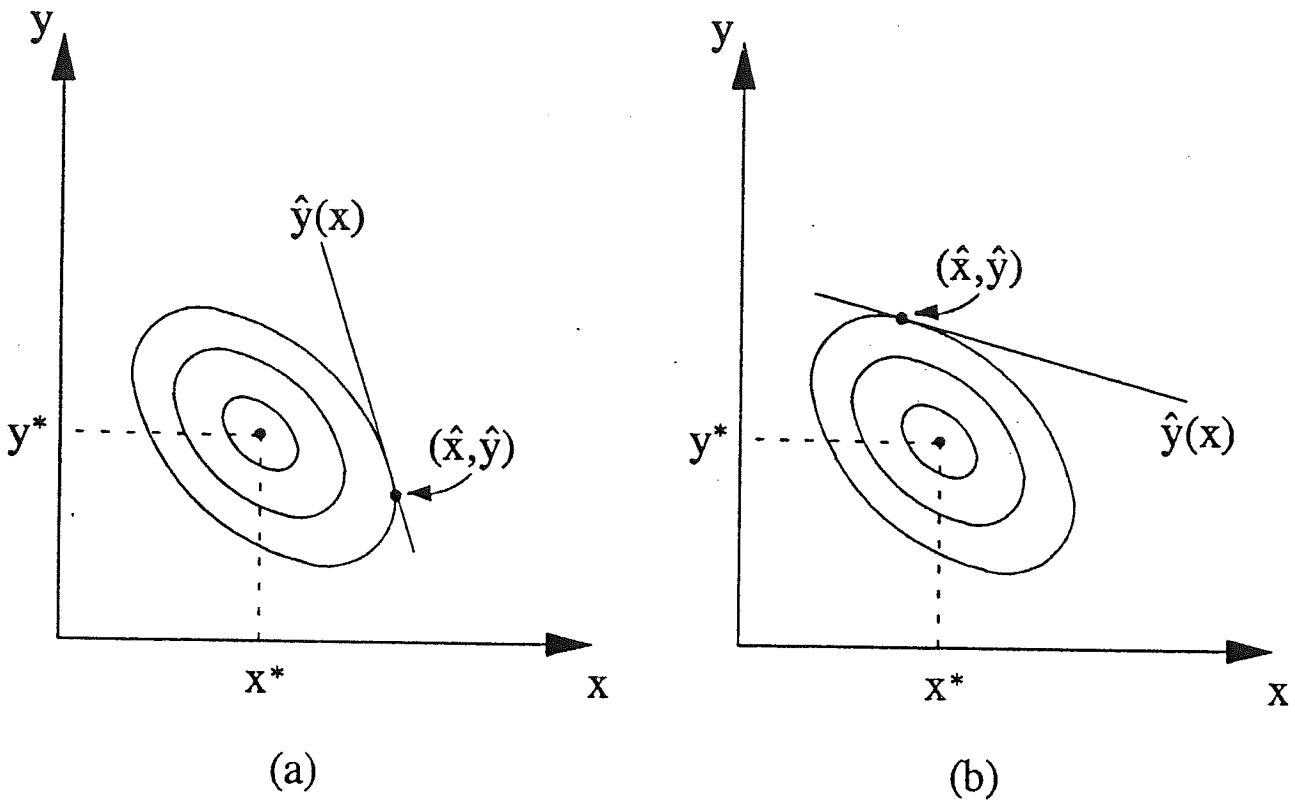
enforcement, plus his expected cost of harm, given that only offenders with a benefit exceeding $p(x^*,y^*)\bar{s}$ commit the act. If, however, the victim takes anything other than y^*, then the magnitude of the sanction becomes 0. In this case, the victim is best-off taking $y = 0$, because no positive detection effort on his part can generate any deterrence benefit. But if the expected sanction is 0, then every type of offender would commit the act, and the victim would suffer h for certain. Thus, for a victim that takes $y \neq y^*$, the lowest cost (when he takes $y = 0$) is h. To prove that taking y^* is better than taking $y = 0$, we need to show that $y^* + pr(b \geq p(x^*,y^*)\bar{s})h \leq h$. But from the definition of (x^*,y^*) we know that

$$\int_{p(x^*,y^*)\bar{s}}^{1} (b - h)db - x^* - y^* \geq \int_{0}^{1}(b - h)db \tag{7A}$$

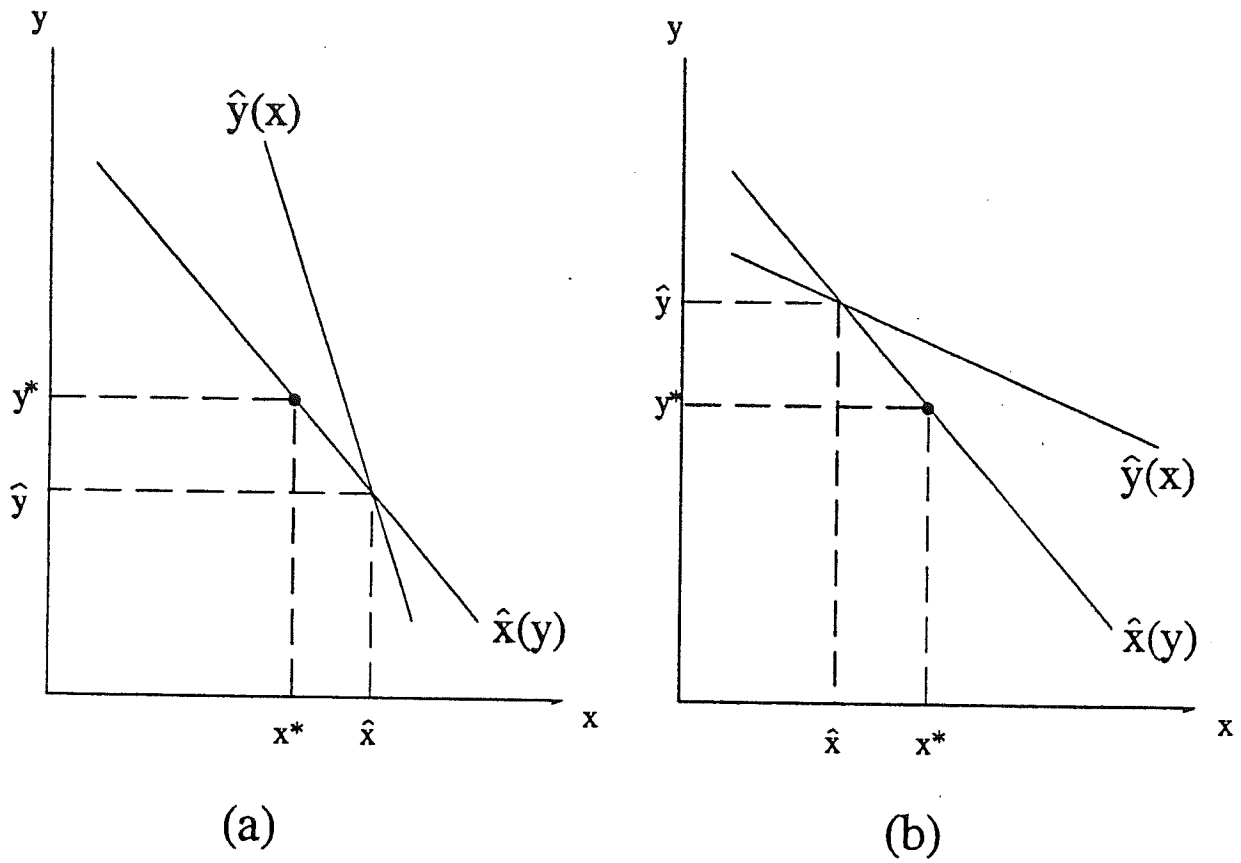
(The right hand side denotes the social cost when $x = y = 0$). After rearranging, we get

$$h \geq x^* + y^* + pr(b \geq p(x^*,y^*)\bar{s})h + \int_{0}^{p(x^*,y^*)\bar{s}} bdb > y^* + pr(b \geq p(x^*,y^*)\bar{s})h. \tag{8A}$$

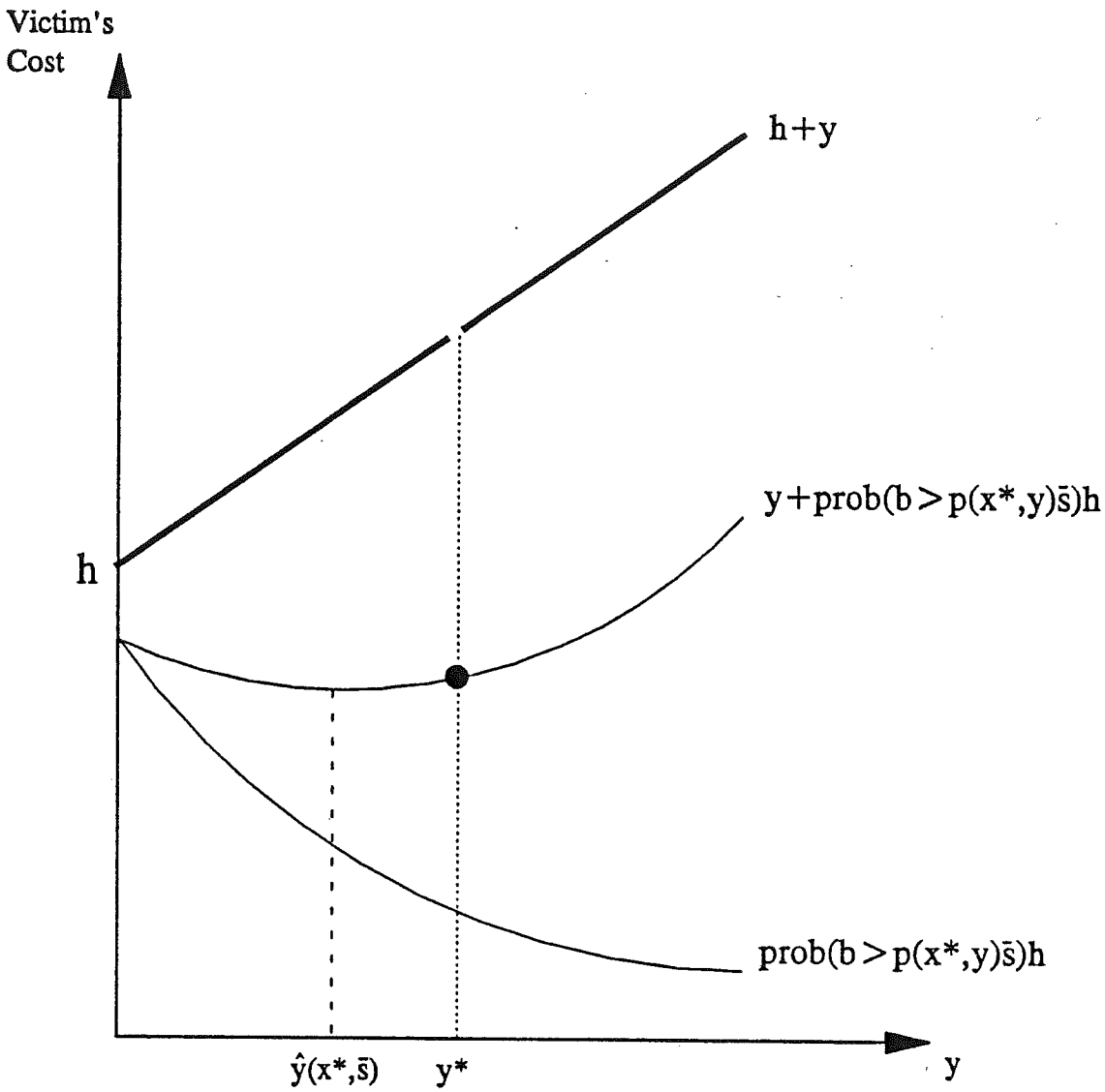
Q.E.D.



- Figure I -



- Figure II -


Victim's
Cost
h+y
y+prob(b>p(x*,y)s̄)h
h
prob(b>p(x*,y)s̄)h
ŷ(x*,s̄)
y*
y
Victim's Cost Under Comparative Fault

- Figure III -