THE SOCIAL DESIRABILITY OF PUNISHMENT AVOIDANCE

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ABSTRACT

This paper argues that the law should sometimes encourage people to incur costs to avoid punishment, or, at least, should not discourage such efforts. Avoidance efforts, such as concealment of evidence, perjury, or obstruction of justice, are generally deemed undesirable because they waste real resources and also reduce expected punishment, and thereby deterrence. However, since avoidance efforts are also costly to offenders, they may substitute for socially costlier punishment such as imprisonment. If the resulting savings in punishment costs outweigh the social harm associated with reduced deterrence, or the additional enforcement costs required for maintaining the same level of deterrence, then avoidance is socially desirable. This paper also explores the argument that sanctions should generally not be maximal if avoidance is present. It shows that this result holds if, and only if, fines are the sole form of punishment. Otherwise, if optimal punishment requires the use of both fines and imprisonment, then fines should be maximal. Similarly, if punishment takes the form of imprisonment, then it should be set at the maximum level. The latter result is another manifestation of the desirability of encouraging avoidance.

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1. INTRODUCTION

Avoidance efforts to escape punishment are a widespread phenomenon and a common feature of criminal behavior and law enforcement. They take various forms, such as concealing incriminating evidence, influencing witnesses, lying, “cooking” financial books, utilizing international transactions or entities, employing radar detectors, litigating and so forth. Intuitively, avoidance efforts are socially costly because they waste real resources, and reduce expected punishment, and thereby deterrence. Thus, it is not surprising that many lawmakers, legal scholars and economists recommend imposing sanctions or otherwise deterring such efforts.¹

The law has always attempted to deter certain avoidance efforts. Some avoidance efforts, such as perjury and obstruction of justice, are themselves deemed punishable crimes. Others, such as employing sophisticated means while committing a crime, are not deemed crimes themselves, but they may increase the punishment for the principal crime.² Recently, after evidentiary fouls, such as those at Enron, WorldCom and HealthSouth, lawmakers responded by broadening the definition of

¹ See, for example, Sanchirico (2006, p. 1337-8): "From a societal perspective detection avoidance is deadweight loss....What then can be done to lessen this wasteful by-product of sanctioning underlying violations? One possibility is to sanction detection avoidance as well. Such is apparently the first impulse of many lawmakers and legal scholars.” He continues (p. 1341): "Thus, the detection avoidance principle – and specifically its recursivity – seriously hampers attempts to limit detection avoidance by threat of sanction. What then should be done to control this source of social waste? This Article advocates shifting the locus of policy response toward the structural design of evidentiary procedure...the idea is to devise and amend these rules and practices to lower the productivity, from the avoider's perspective, of resources devoted to detection avoidance activities...". He concludes (p. 1399): "While the recent policy trend has been toward sanctioning detection avoidance activities, this Article suggests that a better course may be to intensify what has always been the law's chief mode of attack, namely designing evidentiary procedure to render such activities cost-ineffective.". See also Stanely (1995): "Society should give criminals incentives not to conceal their criminal activity. The concealment costs themselves are a social waste, as are other costs the concealment may impose on society, such as additional harm or increased law enforcement expenditure". For other legal scholars see generally Sanchirico (p. 1338 note 28).

² Sophisticated means are generally defined as "especially complex or especially intricate offense conduct pertaining to the execution or concealment of an offense. Conduct such as hiding assets or transactions, or both, through the use of fictitious entities, corporate shells, or offshore financial accounts ordinarily indicates sophisticated means". Their utilization in offenses such as tax evasion or basic economic offenses (theft, larceny and so on) under certain circumstances may increase the offense level by 2 levels.
obstruction of justice and stiffening the penalties for substantially obstructive acts with a view towards deterring or discouraging such conduct.³

This paper argues that the (un)desirability of avoidance efforts depends crucially on the nature of the imposed sanctions. The common intuition for the undesirability of avoidance applies forcefully if sanctions are socially costless (i.e., monetary sanctions) or if their social costs are less than the costs incurred by the offenders. However, if sanctions are socially costly over and above the costs imposed on the offenders, as is generally the case with imprisonment, then avoidance efforts may confer a social benefit by reducing punishment costs that might outweigh their social costs. Since avoidance efforts are also costly to offenders, they may substitute for socially costlier punishment. If, for example, the net savings in punishment costs outweigh the social harm associated with reduced deterrence, or the additional costs of enforcement required to maintain the same deterrence level, which all are the consequences of avoidance, then avoidance is socially beneficial.⁴

To illustrate, suppose that without avoidance efforts, the punishment for some crime is 10 years in prison with a probability of 10%, for an expected punishment of one year, which, let's assume, is equivalent to a disutility of 100 to offenders, and costs additional 50 to society. Suppose that an avoidance measure that can reduce the probability of punishment to 9% and that costs the equivalent of 9 is available. Risk neutral offenders are better off engaging in this kind of avoidance measure, spending

³ See Sanchirico (2006, p. 1333 and accompanying notes). Some scholars argue that avoidance efforts are better deterred ex-ante by increasing the marginal costs or decreasing marginal productivity than ex-post by imposing sanctions, since the latter approach might have adverse effects on avoidance and consequently on crime (see Nussim and Tabbach (2007)). It should be noted, however, that avoidance efforts remain widespread and also that some avoidance efforts, such as wearing gloves or engaging in zealous litigation, are not punished or otherwise regulated, usually because they are very costly to detect or because they are also widely utilized for legitimate purposes.

⁴ Stanely (1995), Sanchirico (2006) and others make no distinction between fines and imprisonment with regard to the undesirability of avoidance efforts. Sanchirico (2006), for example, discusses imprisonment explicitly, but completely ignores the benefits of avoidance in saving punishment costs. See, for example, Sanchirico (2006 at pp. 1363-4).
9 to save 10. Deterrence is negligibly reduced since the actual expected sanctions plus offenders' avoidance costs fall from 100 to 99. However, since expected punishment is reduced by 1% (from one to 0.9 years); the public costs of punishment are substantially reduced from 50 to 45.

In view of its possible social benefits, attitudes toward avoidance may be turned completely upside down. Not only should avoidance efforts not necessarily be discouraged by sanctions or otherwise, as lawmakers generally suggest, but society may also consider providing offenders with positive incentives to avoid punishment. These incentives if properly designed would induce offenders to engage in costly avoidance that would substitute for costlier punishment, thereby enhancing social welfare.\(^5\)

The social desirability of avoidance efforts does not imply that measures to increase the private costs of avoidance or reduce its productivity should not be taken. On the contrary, such measures may enhance welfare. However, contrary to the common view, such measures are best if they are ineffective in deterring or discouraging avoidance.\(^6\) The intuition is the following. Reducing the productivity of avoidance, for example, without discouraging it, decreases the downside of avoidance in terms of diluting deterrence, while increasing the upside in terms of substituting for costly punishment. Indeed, as shown below, under certain circumstances, completely discouraging avoidance is generally non-optimal.

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\(^5\) To illustrate this, modify the example above and assume that the private costs of avoidance are 11 rather than 9. Since the private benefits of avoidance are only 10, offenders are better off refraining from it. However, society can improve social welfare by subsidizing the costs of avoidance by 2, thereby inducing avoidance. In the example above, since the social welfare is increased by more than 2, the subsidy is socially beneficial.

\(^6\) The reader may be struck by the possibility of increasing the costs of avoidance or decreasing its productivity without discouraging it. However, this is possible if the total costs or productivity are changed without affecting the marginal costs or productivity. Borrowing from public finance jargon, the idea is to tax away any "avoidance surplus" (i.e., any pure profits associated with avoidance).
Furthermore, the desirability of avoidance efforts does not negate Malik's (1990) idea that screening offenders and letting those committing efficient crimes (in which the benefits to the offenders are greater than the harm to victims) go unpunished may be socially beneficial. Rather, it reinforces it, as screening would save not only avoidance efforts but also punishment costs.

Avoidance efforts are not only considered undesirable, but they may also change Becker's (1968) famous maximal sanctions result, according to which sanctions – imprisonment or fines – should be employed to the maximum possible level, while the probability of sanctions should be set appropriately low, so as to save enforcement efforts. As Malik (1990) explains, avoidance makes fines socially costly since more severe punishment induces more avoidance. If so, fines may not be utilized to the maximum possible level but should be set so that the marginal benefit in reducing the enforcement costs equals the marginal costs of the increased wasteful avoidance efforts.

This paper shows that Malik's (1990) argument against maximal sanctions applies if, and only if, sanctions are monetary or more generally have no social costs above and beyond the costs incurred by offenders. Otherwise, Becker's result holds – sanctions should be set at the maximum level and enforcement efforts should be

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7 This result is qualified in the literature on various grounds (see, generally Polinsky and Shavell (2000)). For our purposes it suffices that it strictly applies if offenders are risk neutral in fines/imprisonment. Throughout this paper risk neutrality is assumed.

8 Malik (1990) implicitly confined himself to fines. He did not mention how his analysis and results would change if sanctions took the form of imprisonment, or imprisonment and fines. However, the logic of his argument seems to apply to all forms of sanctions. The restrictive nature of his results is not generally recognized. For example, Innes (2001, p. 240) presents Mailk's argument referring generally to "sanctions" and not restrictively to "fines" or "monetary sanctions". Similarly, Sanchirico (2006, p. 1350, note 64) points out that the great Italian philosopher, Cesare Beccaria, who is among the founders of the classical approach to law enforcement, anticipated Malik's argument supporting mild punishment: "The worse the ill that confronts them, the more men are driven to evade it. The very the savagery of a punishment has this effect, and to avoid the penalty for the one crime they have already committed, men commit other crimes". (This statement (Beccaria, pp. 43-44) is clearly meant to apply to both fines and imprisonment.)
appropriately low, even in the presence of avoidance. The reason is simple. Without avoidance, increasing imprisonment and reducing the probability of sanctions so as to leave the expected sanctions unaltered saves on the enforcement costs without affecting the costs of punishment. With avoidance, increasing sanctions provides a further benefit because it induces more avoidance, which substitutes for costlier punishment, thereby saving also on the punishment costs. Essentially, the increase in punishment, supplemented by an appropriate decrease in enforcement efforts, may be viewed as a socially beneficial scheme for encouraging avoidance.

Furthermore, if optimality requires utilizing both fines and imprisonment, then Malik's argument is again inapplicable and basic results are unchanged. Fines should be set to the maximum level, while imprisonment generally should not. The intuition underlying the first claim is that avoidance efforts depend on the total rather than on the mix of punishment. Therefore, increasing fines to the maximum and appropriately reducing imprisonment, while keeping total punishment constant, does not alter avoidance, yet saves on the punishment costs.

The results in this paper are based on the insight that avoidance efforts can substitute for socially costly sanctions, such as imprisonment. This immediately raises the question why costly punishment is employed in the first place. Why not first employ the maximum possible fines, as recommended, for example, by Becker (1968) and others, or utilize other less costly corporal sanctions? How is the use of costly punishment consistent with offenders engaging in or spending on avoidance? Several explanations may be offered. First, one can postulate a constraint on the choice of the punishment instrument. For example, some believe that fines and imprisonment are

9 See, however, the qualification in Section 5.
10 See Shavell (1991) and Polinsky and Shavell (1984) who demonstrate these results in the absence of avoidance.
11 The proof and intuition for the second claim are given in Section 4.
non-commensurable so that imprisonment should be employed as the principal, official sanction.\textsuperscript{13} Thus, avoidance can take monetary or non-monetary forms, while punishment for the principal crime is constraint to be socially costly. Such a scenario is consistent with the legal reality in which imprisonment is utilized although fines are not fully exploited.\textsuperscript{14} Alternatively, avoidance may take a non-monetary form, and imprisonment is employed because offenders are wealth-constrained. In any event, the second-best nature of the problem is evident and should be borne in mind.

This paper is organized as follows. Section 2 sets the general model. Section 3.1 reviews the properties of optimal law enforcement without avoidance, which are equivalent to assuming that avoidance is costlessly and completely deterred. Section 3.2 then examines the properties of optimal law enforcement if avoidance is not discouraged at all, and Section 3.3 compares the social welfares and other issues under both scenarios. In Section 3.4 the proposition that discouraging avoidance completely is non-optimal is proven. Section 4 extends the analysis to situations in which optimal enforcement requires the use of both fines and imprisonment, generalizing the results. Section 5 provides some discussion and comments.

\textbf{2. The Model}\textsuperscript{15}

Risk-neutral individuals with respect to fines and imprisonment\textsuperscript{16} choose whether or not to engage in a proscribed activity that causes positive harm, $h$. Different individuals obtain various benefits from the activity, $b$, assumed to be distributed with continuous density $f(b)$ and cumulative distribution $F(b)$ on the

\textsuperscript{13} The same people may also strongly support encouragement of criminal litigation, which is a form of avoidance.
\textsuperscript{14} Compare also to Lott (1987), who assumes that punishment takes the form of imprisonment although offenders have sufficient wealth to purchase legal services.
\textsuperscript{15} The model loosely follows those proposed by Polinsky and Shavell (1984) and Innes (2001).
\textsuperscript{16} Risk neutrality with respect to imprisonment implies that the total disutility from years in prison is linear (or the marginal disutility is constant). See Polinsky and Shavell (1999).
support \([0, \infty)\). The benefits are private information to the offenders. Individuals engaging in the proscribed activity can devote resources \(z\) to concealing their identity, the commission of a crime, or otherwise reducing the probability of being detected and punished. These resources may be monetary or non-monetary, but they all have a monetary equivalent \(z\). The probability of punishment, \(p\), depends not only on offenders' avoidance efforts but also on the public enforcement efforts \(e\) to apprehend and punish offenders. Enforcement efforts increase the probability of punishment with decreasing rates and avoidance efforts reduce it with increasing rates. Formally, \(p(e, z), p_z(e, z) > 0, p_{ee}(e, z) < 0\) and \(p_z(e, z) < 0, p_{zz}(e, z) > 0\).

Assume that \(p(0, z) = 0\) and \(p(e, 0) = p\), and that the effectiveness of enforcement and avoidance efforts are independent, so that \(p_{ee}(e, z) = 0\). Assume also that there is zero probability that individuals not engaged in crime would be punished, so that innocents do not spend any resources on avoidance.

Detected offenders incur sanctions that may take the form of fines, imprisonment or both. The maximal amount of fine, \(f\), is assumed to be bounded, so that \(f \leq f_{\max}\), which might represent offenders' maximum wealth. Similarly, the maximum term of imprisonment, \(s\), is also bounded, so that \(s \leq s_{\max}\). This may represent the limited lifetime of individuals or reflect a consideration for fairness. As usual, fines are assumed to be socially costless: the loss of utility by individuals paying fines is exactly offset by the gains in utility the government derives from

\[\text{Section 5 discusses how the results in this paper are affected if enforcement and avoidance efforts are dependent. Generally, the qualitative desirability of avoidance efforts is unaffected.}\]

\[\text{An interesting elaboration of this model would be to incorporate type II errors and efforts of innocent parties to avoid punishment.}\]
receiving the fine revenues, which in Becker's notation, means that $\beta = 0$. By contrast, imprisonment is socially costly, imposing a monetary equivalent of $\alpha$ on offenders and additional costs of $\gamma$ on society, both per unit imprisonment term. The latter represents the public costs of operating the prisons. In general, the social costs of imprisonment, $\beta$, are greater than unity.\textsuperscript{20}

Individuals engaging in the proscribed activity choose their level of avoidance efforts so as to minimize expected losses, which consist of the expected sanctions plus avoidance costs: $L = \min z + p(e, z)(f + \alpha s)$. The optimal avoidance efforts, assuming an interior solution, satisfy the first-order condition, $- p_z(e, z)(f + \alpha s) = 1$, and evidently increase with higher sanctions but unaffected by the enforcement efforts, since by assumption, $p_z(e, z) = 0$. Moreover, minimum expected losses, $L$, increase with the levels of enforcement and punishment, although with the latter the actual probability of punishment, given adjustment of avoidance efforts, actually falls. Formally, by the envelope theorem, $\frac{dL^*}{de} = \frac{\partial L^*}{\partial e} = p_z(f + \alpha s) > 0$, $\frac{dL^*}{df} = \frac{\partial L^*}{\partial f} = p(e, z) > 0$, and $\frac{dL^*}{ds} = \frac{\partial L^*}{\partial s} = ap(e, z) > 0$.

Individuals would engage in the proscribed activity if the benefits from doing so are greater than the minimum expected losses faced, i.e., if $b > z^* + p(e, z^*)(f + \alpha s)$.\textsuperscript{21} Thus, $\tilde{b}$ that just satisfies this inequality represents the critical value of the benefits, which determines who would engage in the proscribed activity and who would be deterred.

\textsuperscript{20} Implicitly, this paper ignores any possible incapacitation value of imprisonment. Such value may clearly affect the results. If the real social costs of imprisonment are less than unity, avoidance is definitely undesirable, as demonstrated below.

\textsuperscript{21} If $b = z^* + p(e, z^*)(f + \alpha s)$, individuals are indifferent as to whether to engage in the proscribed activity or not. By convention, it is assumed that they do not.
Social welfare is assumed to be equal to the sum of expected utilities of the individuals. Since offenders are assumed to be risk neutral both with respect to fines and imprisonment, may be expressed as:

\[
W = \int_{b}^{\infty} b f(b) db - [1 - F(\tilde{b})](h + z + p(e, z)s(\alpha + \gamma)) - e
\]

The first term in (1) is the aggregate gain to those engaging in the proscribed activity. The second term is the aggregate harm caused by such offenders, plus the costs of avoidance, and the private and public costs of imprisonment for the detected subset. The last term is the public cost of enforcement.

This paper considers the desirability of avoidance efforts. This is accomplished by comparing optimal enforcement schemes and the resulting social welfares under two scenarios regarding avoidance efforts: (1) Complete and costless deterrence; (2) No-deterrence. The possible benefits of utilizing measures to increase the avoidance costs or reduce its productivity with as little as possible discouragement are then explored.22

3. ANALYSIS

3.1. Imprisonment with No Avoidance

Assume first that avoidance is costlessly and completely deterred, which is termed a world without avoidance. Sanctions take the sole form of imprisonment, and the social problem is to choose the imprisonment term, \(s\), and the probability of

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22 A more general analysis would explicitly include measures to discourage/encourage avoidance and their associated costs and would generally be solved for the optimal solutions. However, the approach chosen here is simpler and clearer.
punishment, $p$ (through the choice of $e$), so as to maximize social welfare, which is given by:\textsuperscript{23}

\begin{equation}
W = \int_{\tilde{b}}^{\infty} bf(b)db - [1 - F(\tilde{b})](h + ps(\alpha + \gamma)) - c(p),
\end{equation}

where $\tilde{b} = p\alpha$s determines deterrence.

It is well known that, if individuals are risk neutral, the optimal imprisonment term is at the maximum.\textsuperscript{24} If this were not so, it would be possible to increase the imprisonment term to the maximum, and decrease the probability of punishment so as to achieve the same expected punishment at a lower enforcement cost. To illustrate, suppose that $s^* < s_{\text{max}}$ and let $k = p^* s^*$. By raising $s$ to $s_{\text{max}}$ and lowering $p$ to $\frac{k}{s_{\text{max}}}$, the expected punishment is unaffected. Thus, offenders' total utility, level of deterrence, and public costs of punishment are all unaltered. However, since the probability of punishment is lower, enforcement costs are saved. Thus, social welfare rises, and $s^* < s_{\text{max}}$ could not have been optimal.\textsuperscript{25}

Given that $s^* = s_{\text{max}}$, the optimal probability is determined by maximizing social welfare (2) with respect to $p$. The resulting first-order condition, assuming an interior solution, may be written as:

\begin{equation}
(h - p\alpha s_{\text{max}} + (\alpha + \gamma) p s_{\text{max}}) \frac{dF(\tilde{b})}{dp} = c'(p) + [1 - F(\tilde{b})](\alpha + \gamma)s_{\text{max}}.
\end{equation}

The RHS of (3) represents the marginal costs of raising the probability of punishment, which include the direct costs involved, $c'(p)$, and the indirect costs

\textsuperscript{23} Note the slight difference between (1) and (2). In the present case, since avoidance efforts are costlessly and completely deterred, $z = 0$ and $p(e,0) = p$. Thus, the function $p$ is single valued and the choice of $e$ exclusively determines $p$. One can therefore speak about the choice of $p$ instead of $e$, and the associated costs $e \equiv c(p(e,0))$, with $c'(p) > 0$ and $c''(p) > 0$.

\textsuperscript{24} The result is due to Becker (1968); see also Polinsky and Shavell (1984, 1999, 2000).

\textsuperscript{25} A similar argument implies that fines should be maximal as well.
stemming from the increase in the private and public costs of imprisonment due to the apprehension of a greater proportion of those engaging in the proscribed activity, 

\[ [1 - F(\hat{b})](\alpha + \gamma)s_{\text{max}}. \]

The LHS of (3) represents the marginal benefits of raising the probability, which are equal to the reduction in the number of offenders, \( \frac{dF(\hat{b})}{dp} \), times the net harm caused by each, \( h - p\alpha_{\text{max}} \), plus the savings in the private and public costs of imprisonment, \( (\alpha + \gamma)p_{\text{max}} \). At the optimum, the marginal costs and benefits should be equal.

Condition (3) reveals, as is well-known, that the first-best behavior is generally non-optimal. Rather, some degree of under-deterrence (in the sense that the benefits to undeterred offenders are less than the harm they cause) or over-deterrence (in the sense that some deterred individuals could have obtained greater benefits than the harm they would have imposed) is desirable. The reason for this is as follows.

Suppose that \( s = s_{\text{max}} \) and \( p = \frac{h}{\alpha_{\text{max}}} \) so that expected sanctions are equal to the harm, so that there is no under- or over-deterrence. Consider now a slight reduction in the probability of punishment \( p \). This saves enforcement costs and also reduces the private and public costs of punishment for those engaging in the activity. It also leads the marginal individuals to engage in the proscribed activity. On the one hand, this has no first-order effect on social welfare because these individuals receive benefits equal to the harm caused (since \( p\alpha_{\text{max}} = h \)). On the other hand, the private and public costs of punishment are increased because there is some probability of punishment of
additional offenders. If the former effect is dominant, then under-deterrence would be optimal; otherwise, over-deterrence might be socially desirable.\textsuperscript{26}

### 3.2. Imprisonment with Avoidance

Alternatively, assume that avoidance is available and not controlled at all. Sanctions still take the sole form of imprisonment. The social problem is to choose the imprisonment term, \( s \), and the probability of punishment, \( p \) (through the choice of \( e \)), leading to the actual probability \( p(z) \), so as to maximize social welfare, which is now given by:\textsuperscript{27}

\[
W = \int_{b}^{\infty} \left( b f(b) db - [1 - F(\tilde{b})](h + z + p(z)s(\alpha + \gamma)) - c(p) \right),
\]

where \( \tilde{b} = L^*(\cdot) = \min z + p(z)\alpha \) now determines deterrence.

Despite the presence of avoidance efforts, the optimal imprisonment term is still at the maximum level. If it were not, it would be possible to increase the term of imprisonment to the maximum and lower the probability of punishment so as to achieve the same level of deterrence with lower enforcement and public punishment costs. To illustrate this, suppose that \( s^* < s_{\text{max}} \) and \( p^* > 0 \). Raise \( s \) to \( s_{\text{max}} \) and lower \( p \), so that expected punishment plus avoidance efforts are unaffected, i.e.,

\[
L(p^*, s^*) = z^* + p^*(z^*)\alpha s^* = L(\tilde{p}, s_{\text{max}}) = \tilde{z} + \tilde{p}(\tilde{z})\alpha s_{\text{max}},
\]

where \( \tilde{z} \) is the optimal avoidance efforts after the change in the enforcement scheme. By construction, deterrence and offenders' total utility are unaffected. Combined with the properties of the expected loss function, \( \tilde{z} > z^* \), \( \tilde{p} < p^* \) and \( \tilde{p}(\tilde{z})s_{\text{max}} < p^*(z^*)\gamma s^* \). Thus, the

\textsuperscript{26} Note that if sanctions took the form of socially costless fines the probability of punishment would be characterized by some under-deterrence. See Polinsky and Shavell (1984).

\textsuperscript{27} The probability of punishment is given by \( p(e, z) \). However, since \( p_{ee} = 0 \), the probability is determined exclusively through \( e \). See note 22.
enforcement costs are lowered as well as the public costs of imprisonment. Since social welfare rises, \( s^* < s_{\text{max}} \) could not be optimal.\(^2\)

The intuition behind this result is that increasing punishment to the maximum level is beneficial because it induces avoidance efforts, and allows the same level of deterrence to be achieved with less socially costly sanctions and less enforcement efforts. Avoidance efforts effectively substitute for costlier punishment.

Given that \( s^* = s_{\text{max}} \), the optimal probability is determined by maximizing social welfare (4) with respect to \( p \), and, for an interior solution, should satisfy the first-order condition given by:

\[
(h - z - p \alpha s_{\text{max}} + z + (\alpha + \gamma) ps_{\text{max}}) \frac{dF(b)}{dp} = c'(p) + [1 - F(b)](\alpha + \gamma)s_{\text{max}}.
\]

The RHS and LHS of (5) represent marginal benefits and costs, respectively, and have essentially the same form as without avoidance since the \( z' \)s on the LHS cancel out. The interpretation is also similar, except that the marginal benefits of increasing the probability of punishment due to reduction in the number of offenders saves, in addition to the private and public costs of punishment, avoidance efforts as well, and the net harm, i.e., harm minus benefits, is defined at the optimum with regard to avoidance efforts.

Condition (5), like condition (3), reveals that the first-best behavior is generally non-optimal. Instead, some under- or over-deterrence would be desirable. To see this, suppose that \( s = s_{\text{max}} \) and \( p(z) = \frac{h - z}{\alpha s_{\text{max}}} \) so that the expected sanctions plus avoidance efforts are equal to the harm, and there is no under- or over-deterrence.

\(^2\) A similar argument easily explains Malik's (1990) result that fines are not necessarily maximal if avoidance is available. With fines, instead of savings in the public costs of imprisonment, there is a revenue loss in terms of lower expected fines. If this is greater than the savings in enforcement efforts, maximal fines are not optimal.
Consider now a slight decrease in the probability of punishment, $p$. This saves enforcement costs and also some private and public costs of punishment associated with those already engaged in the proscribed activity. It also reduces deterrence in the margins. This has no first-order effect on social welfare because these additional, marginal offenders are receiving benefits equal to the harm caused plus their avoidance efforts (since $z + p(z)\alpha_s = h$). However, the private and public costs of punishment are increased because these additional offenders are also punished with some probability. Again, if the former effect is dominant, then under-deterrence would be optimal; otherwise, over-deterrence might be socially desirable.

3.3. Avoidance versus Non-Avoidance

As shown above, with or without avoidance, optimal enforcement includes utilizing imprisonment to the maximum level and setting the probability of punishment so that under- or over-deterrence ensues. Is a world in which avoidance is costlessly and completely deterred (i.e., without avoidance) superior to one in which avoidance is not controlled at all (i.e., with avoidance)? If not, then avoidance and incentives to induce it may be socially desirable.

To facilitate the comparison, let us construct enforcement schemes giving rise to the same level of deterrence under both worlds, and compare the resulting social welfares. Suppose then that the probabilities of punishment are chosen so that $p_N \alpha_s = z^* + p_A(z^*)\alpha_s$, where $p_A$ and $p_N$ represent the probabilities in the worlds with or without avoidance, respectively, and $s = s_{\text{max}}$ is employed in both worlds. If $p_N$ satisfies (3), then the enforcement scheme in the world without avoidance is optimal.
By construction, deterrence and the offenders' total utility is the same under both worlds. Since the actual probability of punishment depends on avoidance efforts, then \( p_A > p_N \) and \( c(p_A) > c(p_N) \). To achieve the same deterrence level, greater enforcement efforts should be employed in the world with avoidance than without it. This accord with intuition. However, since avoidance efforts are positive, then \( p_A(z^*) < p_N \), and so \( p_A(z^*)p_s \gamma < p_Np_s \gamma \). That is, the public costs of punishment are lower with avoidance than without it. This is because avoidance efforts substitute for costlier punishment. Thus, whether avoidance is socially desirable depends on the comparison between the increased enforcement costs and the decreased public costs of imprisonment.\(^{29}\)

To understand this further, examine the explicit, sufficient condition for the desirability of avoidance:\(^{30}\)

\[
(6) \quad [1 - F(\tilde{b})][p_Np_s \gamma - p_A(z^*)p_s \gamma] > [c(p_A) - c(p_N)].
\]

It is evident that the higher (lower) the public costs of imprisonment, \( \gamma \), the more (less) valuable avoidance is because it substitutes for more (less) costly sanctions. In fact, if the public costs of punishment were zero or negative, as would be the case with fines, then avoidance would definitely be undesirable. Put differently, for

\(^{29}\) Alternatively, avoidance is socially desirable if the net savings in punishment costs outweigh the associated harm of reduced deterrence. To illustrate this, assume that enforcement efforts with or without avoidance are the same, \( p \). Without avoidance, deterrence is determined by \( b_N = p \alpha_{\text{max}} \). With avoidance, it is determined by \( b_A = z^* + p(z^*)\alpha_{\text{max}} \). Clearly, \( b_A < b_N \). The associated net harm of the reduced deterrence is \( \int_{b_A}^{b_N} (b - h)f(b)db \). The net savings in punishment costs is equal to \( p_s \gamma ([1 - F(b_N)]p - [1 - F(b_A)]p(z^*)) \). It should be noted that punishment costs are not necessarily lower with avoidance, since deterrence is reduced. In any event, if the savings in punishment costs are greater than the associated harm of reduced deterrence, avoidance is socially desirable.

\(^{30}\) Derived by subtracting (2) from (4), requiring the result to be positive, and rearranging. Note that while (2) gives the optimal social welfare without avoidance if \( p_N \) satisfies (3), (4) is not the optimal social welfare with avoidance, since \( p_A \) does not satisfy (5).
avoidance efforts to be socially desirable, the social costs of punishment, $\beta$, must be greater than unity. Similarly, the lower the costs of enforcement, the more valuable avoidance is, since it is less costly to maintain the same level of deterrence. In the limit, if enforcement efforts were costless, avoidance would always be desirable. In addition, the greater the optimal efforts of avoidance, $z^*$, and the less the resulting loss in deterrence, $z^* + p_s(z^*)\alpha s_{\text{max}} - p_s\alpha s_{\text{max}}$, the more desirable avoidance is. This is so for the simple reason that avoidance substitutes for costlier punishment, so the greater it is, the more the possible savings in these costs. However, avoidance also reduces deterrence, so the less effective it is, the less the “sacrifice” in deterrence. Indeed, avoidance is more valuable the lower is the social costs benefits ratio, $\frac{z^* + [p(z^*) - p]s_{\text{max}}}{z^*}$.

The possible social desirability of avoidance efforts not only implies that avoidance should not necessarily be deterred or otherwise discouraged, but also that incentives to induce it may be socially desirable. This by now should be self evident. Interpret the world without avoidance as one in which avoidance is available but not beneficial to offenders on balance. Then, if the subsidy required for inducing private avoidance efforts at level $z^*$, with the corresponding reduction in $p$, is less than the increased social welfare associated with avoidance, as exemplified in (6), positive

31 Note that if enforcement efforts were costless the logic applied in Sections 3.1 and 3.2 would still hold. Imprisonment should be set to the maximum level, both with and without avoidance, so that the optimal probability would have to satisfy the first-order conditions (5) or (3), respectively only then would $c'(p)$ vanish. This is because although enforcement efforts are costless, the probability of punishment still affects punishment costs. However, if enforcement efforts were costless, optimality in a world without avoidance would not be uniquely defined. To see this note that $p$ could be chosen arbitrarily, $s$ would then have to satisfy the first-order condition:

$$(h - p\alpha s)\frac{dF(\tilde{b})}{ds} = [1 - F(\tilde{b})](\alpha + \gamma)p - (\alpha + \gamma)ps\frac{dF(\tilde{b})}{ds}.$$ 

With no avoidance, the reason $p$ and $s$ are not determined uniquely is that they are perfect substitutes in terms of both deterrence and punishment costs.

32 For some discussion of the empirical importance and cost of punishment avoidance, see Sanchirico (2006, pp. 1352-1360).
steps to induce avoidance are desirable. It is important to realize that incentives to induce avoidance should lead offenders to spend privately more on avoidance. This would require, for example, that the subsidy would kick in only for avoidance efforts over and above those taken without the subsidy, or that the elasticity of avoidance efforts with respect to the subsidy would be greater than unity. Otherwise, there would not be savings in the public costs of punishment, so that subsidizing avoidance would not be socially desirable.  

3.4 The Undesirability of Completely Discouraging Avoidance

The above analysis underestimates the desirability of avoidance efforts in three important respects. First, it assumes that avoidance could be costlessly and completely deterred. More realistically, avoidance could be deterred or discouraged at some positive costs. Taking these costs into account would clearly enhance the scope of the desirability of avoidance. Second, it compares the two worlds under the construction of deterrence neutrality, so that it does not optimize social welfare in a world with avoidance. Third, and most importantly, the above analysis proves that a

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33 If avoidance is socially desirable, then first-best deterrence can be achieved more easily, since the savings could be used to increase enforcement efforts if under-deterrence is optimal or to reduce them if over-deterrence is optimal. However, with avoidance, optimality may be associated with moving further a way from perfect deterrence. As Section 3.1 showed, over-deterrence in a world without avoidance occurs because, at the optimum, the costs of punishing the additional marginal offenders, starting from perfect deterrence, P2, are greater than the net loss associated with over-deterrence, H, plus the additional required enforcement efforts, C, and the additional public costs of punishing those engaging in efficient crimes, P1. Formally, over-deterrence is characterized by P2 > P1 + C + H. With desirable avoidance, the public costs of punishment are generally reduced, and the savings in the costs of punishing offenders are greater than the additional enforcement efforts necessary to maintain the same level of deterrence. Thus, less over-deterrence is desirable. If under-deterrence is optimal without avoidance, then, at the optimum, the savings in enforcement efforts, C, plus the savings in the costs of punishing those efficiently engaged in the activity, P1, are greater than the net social harm associated with under-deterrence, H, plus the costs of punishing the additional, marginal offenders, P2. Formally, under-deterrence is characterized by C + P1 > H + P2. With desirable avoidance, the public costs of punishment are generally lower, and the savings in the costs of punishing offenders are greater than the additional enforcement efforts necessary to maintain the same level of deterrence. However, without avoidance, P1 may be greater than or less than P2. If P1 > P2, then the reduction in the public costs of punishment would lead to less under-deterrence. Otherwise, it would lead to more under-deterrence.

34 This is true even if avoidance is completely deterred by threatening offenders with execution and setting the probability of punishment for avoidance very low.
world in which avoidance is let alone may be socially preferable to one in which avoidance is costlessly and completely deterred. This does not imply that letting avoidance alone is socially optimal. On the contrary, the logic behind the desirability of avoidance and the parameters affecting it suggest that taking measures to increase the private costs of avoidance or decrease its productivity with the least possible discouragement of avoidance is socially beneficial. This is because reducing the productivity of avoidance without discouraging it reduces the downside of avoidance in terms of diluting deterrence, while increasing its upside potential in substituting for socially costlier punishment. Similarly, increasing the avoidance costs without discouraging it increases its upside potential and reduces its downside effect. To further understand this, note that avoidance provides offenders with what is termed in this paper "Avoidance Surplus", which is the difference between minimum expected losses with and without avoidance. Formally, $\Delta S = \Delta L = p\alpha_{\text{max}} - z^* - p(z^*)\alpha_{\text{max}}$. If it were possible to tax away this avoidance surplus, without deterring avoidance, there would be no social costs associated with avoidance, leaving only its social benefits in reducing punishment costs.

Indeed, with completely flexible measures to increase the avoidance costs or reduce their productivity, a world in which avoidance is completely discouraged would be generally inferior to a world in which it is not, so that avoidance is generally socially desirable. To demonstrate this, suppose that the private costs of avoidance can be willfully increased at a certain cost. A world without avoidance can be interpreted as one in which the private costs of avoidance would be sufficiently increased so that it would become undesirable for offenders to engage in avoidance. Formally, for any $z$, $p\alpha_{\text{max}} < z + \delta + p(z)\alpha_{\text{max}}$, where $\delta$ denotes the increased private costs of avoidance. Suppose now that $\delta$ is reduced to $\delta^*$ so that avoidance is
not completely discouraged while deterrence is almost unaffected, that is, 
\[ z + \delta^\ast p(z)\alpha_{\text{max}} \leq p\alpha_{\text{max}}, \]
and compare the resulting social welfares. Under both scenarios, the deterrence and the offenders' total utility remain the same. However, since \( z \) is positive, \( p(z)\gamma_{\text{max}} < p\gamma_{\text{max}}, \) so that the public costs of punishment with avoidance are lower. Moreover, since avoidance is not completely deterred, the costs of increasing its private costs are presumably lower. Thus, social welfare rises, and a world in which avoidance is completely discouraged is not optimal.

It should be stressed: taxing away the avoidance surplus without discouraging avoidance is not an easy task. If, for example, the private costs of avoidance cannot be increased at will or if such an increase is costlier than discouraging avoidance completely, then the argument may breakdown, and a world in which avoidance is deterred altogether may be socially desirable.

**4. IMPRISONMENT AND FINES**

So far it has been assumed that imprisonment is the sole form of punishment. How would the basic results change if optimal enforcement required the use of both fines and imprisonment?

A familiar result states that, without avoidance, fines should be used at the maximum level, with imprisonment supplementing them accordingly. This is simply because fines, as a socially costless means of punishment, should be used to the limit before employing socially costly sanctions.\(^{35}\) This logic remains the same even in the presence of avoidance, and thus Malik's argument against maximal fines is inapplicable. Since avoidance efforts depend on the total rather than the mix of punishment, changing the mix while keeping total punishment constant does not alter

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\(^{35}\) But see Chu and Jiang (1993).
avoidance at all. Thus, substituting costly with costless sanctions is socially desirable. 

To illustrate, suppose that \( f^* < f_{\text{max}} \), \( s^* > 0 \) and \( p^* > 0 \), so deterrence is determined by \( z^* + p^*(z^*)(f^* + \alpha s^*) \). Raise \( f \) to \( f_{\text{max}} \) and lower \( s \) to \( \tilde{s} \), so as to hold the total punishment constant, that is, \( f^* + \alpha s^* = f_{\text{max}} + \alpha \tilde{s} \). Since avoidance depends on total punishment, there is no change in avoidance efforts. Consequently, deterrence and the offenders' total utility are unaffected. The only effect on social welfare is the reduced public costs of punishment since \( \tilde{s} < s^* \), and increased governmental revenues from fines since \( f_{\text{max}} > f^* \), which effectively represent the decrease in the private costs of punishment \( \alpha \tilde{s} < \alpha s^* \). Since social welfare is increased, \( f^* < f_{\text{max}} \) and \( s^* > 0 \) cannot be optimal.

Moreover, without avoidance, the imprisonment term should not generally be set at the maximum level. This is because increasing the term of imprisonment either reduces governmental revenues and increases punishment costs if enforcement efforts are appropriately adjusted, or gives rise to greater deterrence if they are not. Similar logic applies if avoidance is present. To illustrate, suppose that \( f_{\text{max}}, s_{\text{max}}, \), and \( p^* > 0 \), so that deterrence is determined by \( z^* + p^*(z^*)(f_{\text{max}} + \alpha s_{\text{max}}) \). Consider now decreasing the imprisonment term to \( \tilde{s} \) and increasing the probability of punishment to \( \tilde{p} \) so as to hold deterrence constant, that is, \( z^* + p^*(z^*)(f_{\text{max}} + \alpha s_{\text{max}}) = \tilde{z} + \tilde{p}(\tilde{z})(f_{\text{max}} + \alpha \tilde{s}) \), where \( \tilde{z} \) is the optimal avoidance efforts after the change. Clearly, \( z^* > \tilde{z} \) so that \( p^*(z^*)(f_{\text{max}} + \alpha s_{\text{max}}) < \tilde{p}(\tilde{z})(f_{\text{max}} + \alpha \tilde{s}) \), and since \( p^* < \tilde{p} \), it necessarily follows that \( p^*(z^*) < \tilde{p}(\tilde{z}) \). Thus, while enforcement efforts are increased, so are governmental revenues, \( (p^*(z^*)f_{\text{max}} < \tilde{p}(\tilde{z})f_{\text{max}}) \). However, the public costs of punishment may
increase or decrease, since \( p^*(z^*)s_{max} \geq \tilde{p}(\tilde{z})s \). In any event, the increase in governmental revenues may outweigh the increased enforcement efforts and the possible increase in punishment cost, so that social welfare may rise and \( s_{max} \) may not be optimal.

More importantly, if the use of both fines and imprisonment is optimal, avoidance may still be socially desirable. The intuition is simple. Avoidance increases the enforcement costs, while substituting for costly imprisonment but also for costless fines. The latter decreases further the potential benefits of avoidance efforts. However, the benefits may still outweigh the costs, if the public costs of imprisonment are relatively high and the loss of governmental revenues is relatively low. Indeed, avoidance efforts may be socially desirable if the social costs of total punishment are greater than the costs incurred by offenders, that is, if \((a + \gamma)s^* > f_{max} + \alpha s^*\), where \( s^* \) is the optimal imprisonment term without avoidance. Otherwise, avoidance efforts are definitely undesirable. To illustrate this, suppose that without avoidance, optimal enforcement is characterized by \( f_{max} \), \( s^* < s_{max} \), and \( p_N > 0 \),\(^{36}\) so that deterrence is given by \( p_N (f_{max} + \alpha s^*) \). Suppose that with avoidance, \( p_A \) is set so as to maintain deterrence, that is \( p_N (f_{max} + \alpha s^*) = z^* + p_A (z^*)(f_{max} + \alpha s^*) \). By construction, deterrence and the offenders' total utility are the same under both worlds. However, allowing avoidance increases enforcement costs, since \( p_A > p_N \). In addition, it reduces governmental

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\(^{36}\)More precisely, the optimal probability and magnitude of punishment (imprisonment), assuming an interior solution, should satisfy the following two first-order conditions:

\[ (1) \quad (h - p(s + (a + \gamma)ps)) \frac{dF(\tilde{b})}{dp} = c'(p) + [1 - F(\tilde{b})](a + \gamma)s. \]

\[ (2) \quad (h - p(s)) \frac{dF(\tilde{b})}{ds} = [1 - F(\tilde{b})](a + \gamma)p - (a + \gamma)ps \frac{dF(\tilde{b})}{ds}. \]
revenues since \(p_A(z^*) < p_N\) so that \(p_A(z^*) f_{\text{max}} < p_N f_{\text{max}}\), but this still saves imprisonment costs since \(p_A(z^*) s^* < p_N s^*\). Thus, avoidance may still be socially desirable, if the savings in the imprisonment costs are higher than the loss in governmental revenues and the additional cost of increased enforcement efforts. However, for avoidance to be potentially desirable \( s^*\) must be greater than \(f_{\text{max}}\). This means that the social costs of total sanctions should be greater than the costs incurred by offenders, that is, \(\beta > 1\).\(^{37}\)

5. DISCUSSION AND COMMENTS

This paper suggests that avoiding punishment may be socially desirable if the social cost of punishment is above and beyond the costs imposed on the offenders. Avoidance efforts are socially costly because they waste real resources and reduce the expected punishment, and thereby deterrence. However, since avoidance efforts are also costly to offenders, they may substitute for costlier sanctions, thereby saving punishment costs. This benefit of avoidance may outweigh its social costs, suggesting that avoidance should not necessarily be discouraged, or should even be positively induced.

Several issues may bear on the conclusions of this paper which are worth emphasizing. First, the offenders' benefits from the proscribed activity as well as their avoidance efforts and private suffering caused by punishment were assumed to be taken into account in the social welfare calculus. Some may claim that for malicious

\(^{37}\) The optimal probability and magnitude of punishment (imprisonment) in a world with avoidance should satisfy the following two first-order conditions:

\[
\begin{align*}
(1) \quad & (h - z - p\alpha s + z + (\alpha + \gamma) ps) \frac{dF(\tilde{b})}{dp} = c'(p) + [1 - F(\tilde{b})](\alpha + \gamma)s \\
(2) \quad & (h - z - p(f_{\text{max}} + \alpha s)) \frac{dF(\tilde{b})}{ds} = [1 - F(\tilde{b})]((\alpha + \gamma) p + \frac{\partial z}{\partial s}) - (z + (a + \gamma) ps) \frac{dF(\tilde{b})}{ds}
\end{align*}
\]
crimes, such as theft, burglary or murder, these costs should have little or no weight in calculating social welfare. Nevertheless, the social desirability of avoidance is not diminished, and may even be enhanced by relaxing these assumptions. If offenders' benefits from the proscribed activity were not given any weight in the social welfare function, complete deterrence would still generally not be optimal because enforcement and punishment are socially costly. Avoidance can still improve social welfare since it substitutes for socially costly punishment. As explained above, what is really important for the social desirability of avoidance is a low social cost-to-benefit ratio, implying that avoidance is very costly to offenders, on the one hand, but not very effective in reducing deterrence, on the other hand. Moreover, if avoidance efforts were not given any weight in the social welfare function, while the private suffering of punishment were, as many argue is appropriate, the social desirability of avoidance would merely strengthen, because the social costs of avoidance would decrease. Thus, the implications in this paper are relevant for a large set of criminal activities, including malicious crimes.38

Second, it was assumed that avoidance is socially costly in terms of utilizing real resources and reducing deterrence. Obviously, the desirability of avoidance efforts would also hinge on other associated externalities, which were implicitly assumed away. For example, if avoidance takes the form of threatening or killing witnesses, the social costs should definitely include such grave harm and would clearly render it undesirable. Similarly, if avoidance involves efforts to incriminate innocents, then clearly the social costs should include all the associated costs, which

38 Innes (2001) recommends controlling avoidance efforts through a self-reporting mechanism. He notes that if sanctions takes the form of costly imprisonment, then self-reporting is not optimal. However, he confines himself to situations where offenders' avoidance efforts and private costs of punishment are given zero weight in the social welfare function. This restriction, however, is unnecessary.
would probably also make it undesirable. On the other hand, if avoidance efforts come at the expense of the offenders engaging in other proscribed activities then they may confer additional social benefits.

Third, the offenders' benefits from engaging in the proscribed activity were assumed to be private information. This implied that the enforcement scheme and, in particular, sanctions, could not be tailored to the specific offender. If offenders could be costlessly and perfectly screened, then the result would be markedly different. As Malik (1990) shows, with prefect screening, there should be no fines for offenders engaging in socially efficient crimes, in the sense that the benefits exceed the harm. This would save wasteful avoidance efforts altogether. This argument is only reinforced if the sanctions are themselves socially costly, since with costless and perfect screening, the costs of imposing sanctions are also saved. All in all, this implies that screening, even if costly or imperfect, may be socially beneficial under the present model.

Fourth, enforcement and avoidance efforts were assumed to be independent, in the sense that the level of one factor had no effect on the marginal effectiveness of the other. This implied that punishment, but not enforcement efforts, affect avoidance. This may not represent reality. Avoidance and enforcement efforts may be complements or substitutes in the production of detection. This substitutability or complementarity may affect the results regarding the optimality of maximal sanctions.

39 In addition, if avoidance involves destroying other real resources other than those of the offenders, such social waste should also be taken into account.

40 Another example of a positive externality associated with avoidance is suggested by Stanley (1995). Consider those who illegally move toxic waste in seal-proof containers, which reduce the probability of detection. Deliberately raising the cost of such containers to induce the use of leakier containers would seem unlikely.

41 See Shavell (1987). Indeed, the argument for screening offenders also holds for undesirable activities for which the given enforcement efforts cannot possibly deter. Screening offenders would save punishment costs (as in Shavell (1987)) and also avoidance efforts. Consider, for example, the act of killing in the heat of passion. If screening took place and no punishment imposed, the offender who by assumption could not have been deterred would not engage in costly and wasteful avoidance efforts.

42 See, for example, Sanchirico (2006), Langlais (2006), and Nussim and Tabbach (2006).
For example, as Langlais (2006) shows, if the elasticity of avoidance efforts with respect to fines is equal to or less than that with respect to the enforcement efforts, then the maximum fines are optimal in the presence of avoidance, in contrast to Malik's (1990) argument. The intuition is that although more severe punishment increases wasteful avoidance, a proportionate decrease in enforcement efforts reduces avoidance even more. By analogous analysis, under the opposite conditions, imprisonment need not be maximal.43

However, the fundamental result of this paper that avoidance may be socially desirable is unaltered. This is so, since the arguments for the desirability of avoidance were not conditional in any way on the independence between avoidance and enforcement efforts. Punishment probabilities with or without avoidance were chosen so that deterrence was held constant under both worlds, which necessarily implied that enforcement efforts were greater with avoidance, but that the probability of punishment given avoidance efforts was less, regardless of the technological relationship between avoidance and enforcement efforts. Thus, avoidance efforts increased the enforcement costs, while reducing the public costs of punishment, thereby potentially increasing social welfare.

43 The proof can be sketched as follows. Suppose that $s_{\text{max}}$ and $p^*$ are optimal so that deterrence is determined by $z^* + p^*(z^*)\alpha s_{\text{max}}$. Suppose now that imprisonment is slightly reduced to $\tilde{z}$ and the probability of punishment is slightly increased to $\tilde{p}$ so that deterrence is maintained, that is, $z^* + p^*(z^*)\alpha s_{\text{max}} = \tilde{z} + \tilde{p}(\tilde{z})\alpha \tilde{s}$, where $\tilde{z}$ is the optimal avoidance effort given the change in enforcement scheme. If enforcement and avoidance efforts are complements, avoidance may be increased or decreased depending on its elasticity with respect to enforcement efforts relative to imprisonment, that is, $\frac{\partial z}{\partial p} p z > < -\frac{\partial z}{\partial f} f z$. If avoidance efforts are increased, that is, $\tilde{z} > z^*$, then the public costs of imprisonment are reduced, $\tilde{p}(\tilde{z})\tilde{s} < p^*(z^*)s_{\text{max}}$, possibly by more than the increase in the enforcement efforts. Consequently, social welfare would be increased, and $s_{\text{max}}$ and $p^*$ cannot be optimal.
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