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Abstract

Economic theory of criminal law consists of normative and positive parts. Normative economic theory, which began with writings by Beccaria and Bentham, aims to recommend an ideal criminal punishment scheme. Positive economic theory, which appeared later in writings by Holmes and Posner, aims to justify and to better understand the criminal law rules that exist. Since the purpose of criminal law is to deter socially undesirable conduct, economic theory, which emphasizes incentives, would appear to be an important perspective from which to examine criminal law.

Positive economic theory, applied to substantive criminal law, seeks to explain and to justify criminal law doctrine in economic terms – that is, in terms that emphasize the incentive effects created by the law. The positive economic theory of criminal law literature can be divided into three phases: classical deterrence theory, neoclassical deterrence, and modern synthesis. The modern synthesis provides a rationale for fundamental criminal law doctrines, and also more puzzling portions of the law such as the doctrines of intent and necessity. Positive economic theory also provides a rationale for the allocation of enforcement responsibilities.

Keywords: substantive criminal law, economics of criminal law, economic theory of criminal law, criminal intent, optimal deterrence, classical deterrence, complete deterrence, internalization of harm, error cost model, public choice theory of criminal law, necessity doctrine

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Introduction

Criminal law consists of substantive and procedural parts. Substantive law consists of the rules that govern and control behavior – specifically the rules enjoining types of conduct, such as robbery, that violate the criminal law. Procedural law consists of the rules that establish the methods by which the state enforces criminal law, such as constraints on prosecutorial behavior, and rules governing the burdens and standards of proof.[1] Substantive rules mostly constrain the conduct of private individuals. Procedural rules, by contrast, tend to regulate the conduct of agencies and institutions in the criminal law enforcement process. This essay focuses on substantive criminal law.

Economic theory of criminal law consists of normative and positive parts. Normative economic theory attempts to prescribe optimal rules for regulating socially undesirable conduct. Positive economic theory seeks to provide a rationale for existing criminal law doctrines and institutional features of the criminal law enforcement process. This essay emphasizes positive economic theory. However, much of the literature has advanced through analyses that are in part normative and in part positive.

The literature on the economics of criminal law is vast. This essay does not attempt to cover every detail, and instead focuses on the broad framework of progress in the literature. It provides an overview of the major arguments.

One of the great issues here, as in any other area of law and economics, is ensuring that economic analysis addresses questions that are of central concern to the law. The assessment of criminal intent, for example, is an important concern of criminal law, and yet economics still treats this as a subject too unwieldly to capture in models. In recognition of this tendency in economic analysis to avoid some matters at the heart of the law, this essay attempts to integrate economic analysis with major criminal law doctrines.[2]

This essay provides a review of the economics of substantive criminal law. It divides the literature into three phases: classical deterrence theory, neoclassical deterrence, and modern synthesis. The modern synthesis offers a positive account of fundamental doctrines (e.g., common law crimes), and also rationale for more puzzling doctrines such as intent and necessity in criminal law. The essay closes with some observations, again in the vein of positive economic analysis, on the allocation of enforcement responsibility.

Substantive Criminal Law

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[1] On the economics of criminal procedure, see, e.g., Posner (1973), Easterbrook (1983), Adelstein (1981), Miceli (1991).
[2] For a discussion of criminal law and economics that addresses these issues and behavioral economics as well, see Harel (2012).

The economics of substantive criminal law is largely contained in two models, one due (mostly) to Bentham (1781) and other due to Becker (1968). Bentham asserted that the purpose of criminal punishment is to *completely deter* offensive conduct. To completely deter, the state should set the criminal penalty at a level that eliminates the prospect of gain to the offender. Bentham was not the first to offer this commonsense proposition; Beccaria (1764) proposed it before him. However, Bentham explored the deterrence principle in greater depth than authors who came before him.

The notion that punishment should take the profit out of crime sounds like common sense, but it also leads to recommendations that fall outside of common practice. Bentham followed his theory to its logical conclusions on punishment, which led him to recommendations that would be condemned in modern society as cruel and extreme.[3]

Classical Deterrence Theory

Bentham's classical deterrence theory suggests that the expected penalty must be at least as large as the gain the offender gets from committing the offense.[4] The expected penalty is simply the probability of punishment multiplied by the penalty. Thus, if the expected penalty must be no less than the gain to the offender, in order to completely deter, then the expected penalty and the offender gain must have the relationship: *Gain ≤ Probability×Penalty.* This implies, in turn, that the penalty must be at least as great as the offender's gain divided by the probability of punishment.

If the punishment is not imposed until some period after the crime has been committed, then the offender's discounting over time must be incorporated into the punishment calculus to maintain deterrence. Let the offender's discount rate, δ, be defined as the rate that determines the subjective value today of a dollar to be received next year as $1/(1+\delta)$. If the punishment will not be imposed until n years after the crime is committed, the penalty must satisfy the condition: *Penalty* $\geq (1+\delta)^n$ *(Gain/Probability).* This suggests that classical deterrence requires multiplying the gain of the criminal by a multiplier based on the criminal's discount rate, the delay period, and the probability of punishment:

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[3] For a discussion, see Hylton (2005, at 98). On the social acceptance of harsh punishment, see Schkade et al. (2000).

[4] I have set aside the issue of marginal deterrence, that is, the concern that penalties should be bounded from above to ensure that the offender does not have an incentive to engage in more harmful conduct. The marginal deterrence problem was noted by Bentham (781). For modern discussions, see Stigler (1970), Mookherjee and Png (1994). I have also set aside other reasons why it may be optimal to have an upper limit on the penalty. One (see Andreoni, 1991) is that a high penalty may reduce the probability of conviction. Another (see Hylton, 1996) is that a high penalty may induce victims to take too little precaution. For an exploration of implications of victim precaution see Rappaport (2018).

$$Classical\ Deterrence\ Multiplier \geq \frac{(1+\delta)^{n}}{Probability}$$

Probabilities of punishment are not readily available. One study notes that less than half of violent crimes are reported to police and less than half of those reported are cleared by police, suggesting a maximum probability of punishment of 25 percent for violent crimes.[5] For property crimes, the rates are roughly one-third and one-fifth respectively, suggesting an upper bound of 7 percent.[6] A study of punishment for environmental crimes suggests that for such crimes the likelihood of punishment is extremely low, on the order of 8 in one million.[7]

As for delay, the average time between sentencing and the death penalty is running at 15 years.[8] Of course, this statistic is incomplete even as a sample measure of the delay between the commission and punishment of a crime. A murderer, unless released on bail, will have been incarcerated for the period of trial and throughout the period up to the imposition of the death penalty. If *any* time in confinement, however short, is treated as punishment, then the imposition of punishment occurs at the moment of apprehension. However, it is unlikely that a murderer would view a small period of time in jail or prison as consummation of the punishment. Moreover, there is quite a difference between imposition of confinement and imposition of the death penalty.

To simplify matters, suppose there is no death penalty, and the offender is sentenced to twenty years in prison. When, precisely, is the punishment imposed? The answer is that the punishment is imposed over the entire time-span of the sentence. The penalty is the discounted value of the disutility of the twenty-year sentence.[9] Thus, even in a case where there is no delay before the initiation of punishment, a punishment such as incarceration involves some feature of delay in imposition.

Obviously, it simplifies matters a bit too much to treat delay as simply a matter of the time between commission of the crime and imposition of the punishment. The punishment itself may not be instantaneous. Another problem is that the punishment may come in qualitatively different forms, as in the case of incarceration followed by the death penalty.

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[5] German Lopez, *The Great Majority of Violent Crime in America goes Unsolved,* VOX (Mar. 1, 2017, 3:10pm), https://www.vox.com/policy-and-politics/2017/3/1/14777612/trump-crime-certainty-severity.
[6] *Id*. *See also*, Shavell at 1232 (noting that violent crimes and theft in the U.S. often go unreported (26 percent of home thefts and 67 percent of vehicle thefts), and therefore statistical percentages in crime reports must be taken as "upper bounds for the probability of imposition of sanctions.")
[7] Lynch et al. (2016).
[8] *Time on Death Row,* DEATH PENALTY INFORMATION CENTER, https://deathpenaltyinfo.org/time-death-row
[9] Polinsky and Shavell (1999).

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As far as the time-period between apprehension and sentencing, one study reports that the median number of days between arrest and disposition (for all crimes) of the trial is 126 in the U.S., with another 52 days between disposition and sentencing.[10] In some jurisdictions, the median delay between arrest and sentencing is over one year.[11]

Most criminal defendants have low levels of education,[12] low impulse control,[13] and a tendency to discount the future heavily.[14] McAdams and Ulen (2009) survey the literature on the imperfect rationality of offenders. In effect, the typical criminal has a high discount rate on future utility. The combination of high discount rates coupled with delay suggests that criminal penalties should be enhanced to take these factors into account.[15]

Table 1 below computes complete deterrence penalties for different discount factors and punishment probabilities, on the assumption that the offender's gain is $100, and that the delay between commission and punishment is only one year. For the realistic cases of both a low probability of apprehension and high discount factor, this quite preliminary analysis suggests that multipliers that raise the penalty by an order of magnitude are plausible.

Offender Gain = $100	*Punishment Probability (P)*		
Discount Rate (δ)	*P = .5*	*P = .2*	*P = .1*
$\delta = .09$	$218	$545	$1090
$\delta = .18$	$236	$590	$1180
$\delta = .30$	$260	$650	$1300

Table 1: Classical Deterrence Penalties for Offender Gain of $100.

Since imprisonment is a common form of punishment, the existence of substantial discount factors implies the deterrent value of prison may be less than appears to the eye at first glance. If criminal offenders discount the future heavily, then a doubling of a ten-

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[10] Listokin (2007, at 139).

[11] *Id*.

[12] Caroline Wolf Harlow, *Education and Correctional Populations,* BUREAU OF JUSTICE STATISTICS, (Mar. 15, 2003), https://www.bjs.gov/content/pub/pdf/ecp.pdf (finding 68 percent of state prison inmates report having less than a high school education.)

[13] Nagin and Pogarsky (2004). On rationality and impulse control, see Cooter (1991).

[14] Nagin and Pogarsky (2004).

[15] Listokin, (2007).

year prison sentence may not have a significant deterrent effect.[16] To increase the deterrent effect of incarceration, the state would have to consider increasing the severity of incarceration in the earlier portion of the period rather than extending the period of incarceration. Heavy discounting implies a policy favoring the frontloading of punishment. Such implications probably led Bentham to support extreme forms of punishment, under a policy in which the punishment would be *characteristic* of the crime.[17] Bentham's ideal punishments would associate a severe loss with either the perceived gain or the physical mechanism immediately associated with commission of the crime. Thus, the thief would likely suffer amputation, and the rapist castration, under Bentham's punishment scheme.[18]

In the extreme case where the offender discounts the future so heavily that a backloaded punishment, such as a prison sentence, cannot deter his conduct, should the state simply give up on the notion of punishment? Even if the offender cannot be deterred by such a punishment, there is still an incapacitation basis for imprisonment. Once an offender has committed an offense punishable by some definable penalty, he has revealed that the gain he perceives from commission of the offense is greater than the expected penalty. Such an offender is therefore likely to commit the offense again, unless incapacitated. Hence, the observation that some criminals are unlikely to be deterred by the threat of prison is often inadequate as an argument against imprisonment or other forms of incapacitation.

Yet another problem for classical deterrence theory was suggested by an interesting thought experiment of Immanuel Kant (1797). Kant asked what society should do in its last moments, before being dissolved, with the remaining murderers in prison? His answer was that the state should execute them on that last day, lest society share in the guilt for their crimes. If deterrence were the sole basis for punishment, there would be no justification for punishment on the final day in Kant's thought experiment. Indeed, if the final day of society occurs on a certain date, the case for punishment for deterrence purposes unravels. The day before the final day, punishment would not be justifiable because every rational actor knows that the prospect of deterrence thereby gained is not credible, and on the day before the day before, the same expectation holds, ad infinitum. Hence, classical deterrence theory implodes.

But this reasoning is unpersuasive, on many grounds. First, it is inconsistent with the ample empirical evidence of discounting and impulsiveness on the part of criminals.[19] The infinite-regression disproof of classical deterrence assumes hyper-rationality on the part of actors, and the existence of a certain and foreseeable final date for society. None of this is true of the real world.

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[16] This is an implication of discounting, see Polinsky and Shavell (1999).
[17] *See*, e.g., Hylton, 2005a, at 98
[18] *Id*.
[19] Nagin and Pogarsky (2004).

Neoclassical Deterrence Theory

Becker's neoclassical deterrence theory holds that the goal of punishment should be to *internalize the social harm* from a criminal offense. Internalization maximizes social welfare by guaranteeing that a criminal offender takes an offensive action only when the gain he experiences is greater than the harm he imposes on society.

Under Becker's theory, the expected value of the penalty should be equal to the harm imposed on society by the offender (*Probability×Penalty = Harm*),[20] which implies that the optimal penalty is the social harm divided by the probability of punishment. If the penalty will not be imposed until one year after the crime is committed (or planned) then in order to achieve optimal deterrence the penalty must equal $(1+\delta)Harm/Probability$.

The internalization policy is preferable to complete deterrence if the activity of offenders is potentially efficient, in the sense some instances the offender's conduct actually increases society's welfare. If no instances exist where the offender's gain is greater than the social harm, then Becker's framework would imply complete deterrence. In other words, Becker's framework incorporates the complete deterrence policy as a special case.

It should be clear that the foregoing statements concerning the relationship between delay and the penalty multiplier apply just as well to the neoclassical policy. However, there is a crucial difference. In the complete deterrence framework, the penalty multiplier represents a lower bound on punishment. In the internalization model, by contrast, the penalty multiplier must be precise; if it is too low, then the penalty under-internalizes, leading to too many offenses. Conversely, if the multiplier is too high, then it over-internalizes, leading to too few offenses.

The implication that there could be such a thing as "too little crime" is a soft spot in Becker's model. How, some scholars have asked, could there be too little fraud, robbery, or murder?[21] One answer, implied by the Becker model, is no, there could not be too little murder. The state should completely deter murder because the gain to the murderer is less than the loss to society. But this answer only pushes the question ahead slightly. What should society do about cases where the gain to the murderer is greater than the loss to society?

Modern Synthesis

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[20] This may seem to assume that the harm will be imposed with probability one. However, the harm component can be interpreted as expected harm without requiring any changes in the discussion.

[21] Ackerman v. Schwartz, 947 F.2d. 841, 847 (Easterbrook, J., "[t]he optimal amount of fraud is zero.").

The answer to this question was not suggested until Calabresi and Melamed (1972) offered an alternative to the Becker model's reconciliation of the complete deterrence and internalization policies. Calabresi and Melamed did not frame their article as an exploration of criminal law; it is mostly a discussion of civil law. However, in later passages and footnotes, the authors sketch some of the implications of their analysis for criminal law. Recognizing that Calabresi and Melamed had not fully explained the implications of their analysis for criminal law, Posner (1985) extended the Calabresi-Melamed framework to offer a positive theory of criminal law.[22]

Calabresi and Melamed created two categories for legal rules: *property rules* and *liability rules*. Property rules prohibit specified conduct. Liability rules do not prohibit conduct, and only require the offender to pay damages to the victim (or a fine to the state). Property rules implement the complete deterrence policy, while liability rules internalize social harm. Calabresi and Melamed argued that property rules are preferable where transaction costs are low or where (consistent with Becker) the underlying activity is unambiguously socially undesirable because the gain to offenders could not exceed the social harm. Property rules are therefore of two types: (Type 1) some aim to prevent offenders from bypassing the market where transaction costs are low, and others (Type 2) aim to eradicate socially undesirable activities where transaction costs are high.

Posner (1985), building on the Calabresi-Melamed framework, explains that much of criminal law consists of Type 1 property rules. A robbery, for example, is a forced transaction ("market bypass") that could otherwise occur through the market. Even if the robber's utility from the transaction exceeds the loss to his victim, society has an interest in encouraging such transactions to occur consensually through the market, rather than through force or fraud.[23]

Hylton (2005) presents a model that formalizes Posner's argument and reconciles the Becker and Posner approaches to criminal law.[24] The model generates the Becker and Posner approaches as special cases. As a general matter, wherever the cost of transacting through the market is less than the incremental cost of law enforcement, society should encourage transacting through the market, by adopting the complete deterrence policy. Second, even if transaction costs are high, complete deterrence is the optimal policy when the offender's activity is unambiguously harmful to society (as in the Becker model).

Curry and Doyle (2016) extend the framework of Hylton (2005) in a formal model of law enforcement that incorporates market transactions.[25] Importantly, Curry and Doyle show

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[22] Before Posner's positive theory of criminal law, the only work providing a positive economic theory (actually, utilitarian) of criminal law was the chapter on criminal law in Holmes (1881).

[23] The market-bypass theory is a simple economic explanation for prohibiting theft. Other theories are surprisingly complicated, see Hasen and McAdams (1997).

[24] Specifically, Hylton (2005) presents a simplified version of the Becker optimization problem that incorporates the option for the offender to purchase in the market rather than steal.

[25] Philip A. Curry and Matthew Doyle, Integrating Market Alternatives Into the Economic Theory of Optimal Deterrence, Economic Inquiry Vol. 54, No. 4, October 2016, 1873–1883.

that maximization of a social welfare function in which offenders have the option to transact through the market is equivalent to minimizing an objective function consisting of the costs of crime. In particular, the cost-minimization objective function they derive does not include the benefits that the offender receives from crime, which is quite different from the objective function analyzed by Becker (1968).[26]

Curry and Doyle do not recommend the complete deterrence approach as in Posner (1985) and in Hylton (2005). The reason is that their model allows for the cost of punishment to be positive. Given a positive cost of inflicting punishment, the incremental deterrence gain from increasing the punishment must be balanced against the incremental cost of imposing punishment. However, if the cost of punishment is negligible (as with monetary fines) or slight relative to deterrence gain, as implicitly assumed in Posner and in Hylton, then the complete deterrence penalties would also be recommended by Curry and Doyle's model.

The diagram below summarizes the modern synthesis suggested by Posner and developed in Hylton (2005). In the first cell, the offender's activity may be efficient. For example, the harm may be an externality such as pollution, which is the byproduct of producing some useful product. Transaction costs are high because it would be difficult for a large number of pollution victims to enforce a right to clean air. The incentive to free ride would make it unlikely that any single victim would sue to enjoin the polluter. In this category, criminal law should adopt the internalization policy, because the underlying activity is (at least potentially) efficient. Penalties should seek to internalize the social harm from pollution rather than to completely deter the offender's production activity.

In the second cell (upper right), the offender's activity is unambiguously inefficient. The activity could be some form of intentional imposition of harm, such as the production of infant milk formula knowingly contaminated with a harmful chemical, such as melamine.[27] Alternatively, the activity could be some form of reckless conduct, such as driving in the wrong direction on highways. The optimal policy here is complete deterrence, which requires a penalty that eliminates the prospect of gain on the part of the offender.

In the lower-left cell, transaction costs are low and the underlying activity is efficient, at least in some significant set of transactions. One set of examples includes temporary takings of property to protect more valuable types of property. Consider, for example, a mobile home seller who drives across the property of the victim, without the victim's permission, in order to avoid the burden of having to follow an alternative path that is more time-consuming to travel (*Jacque v. Steenberg Homes*, 563 N.W.2d 154 (Wis.

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[26] That the benefits from crime to offenders are included in Becker's social welfare function has been a source of controversy (Stigler, 1970). Dau-Schmidt (1990) addresses the controversy by arguing that criminal law serves in part to alter the preferences of offenders.

[27] *See,* e.g., Gossner, 2009, at 1803 (A major food safety incident in China was made public in September 2008. Kidney and urinary tract effects, including kidney stones, affected about 300,000 Chinese infants and young children, with six reported deaths. Melamine had been deliberately added at milk-collecting stations to diluted raw milk ostensibly to boost its protein content.)

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1997)). Alternatively, suppose a wealthy person, to protect his Rolls Royce from damage caused by bad weather, parks his car in the victim's garage without getting the victim's permission. The optimal policy is again complete deterrence because the offender can easily gain the consent of the victim for a transaction that imposes harm. The victim will consent if the compensation offered by the injurer is at least as great as the harm.

The final cell includes activities for which the transaction costs are low, and are never efficient. Most common law crimes such as murder fall within this cell. A consensual transaction in which the victim accepts the harm in exchange for compensation is unlikely, mostly because the injurer would be unable to offer a sufficient sum to fully compensate the victim for the harm.

Deterrence Theory Modern Synthesis	Maximum Offender Gain Greater than Minimum Victim Harm	Maximum Offender Gain Less than Minimum Victim Harm
High Transaction Costs	Internalization of Harm (Liability Rule)	Complete Deterrence (Type 2 Property Rule)
Low Transaction Costs	Complete Deterrence (Type 1 Property Rule)	Complete Deterrence (Type 1 Property Rule)

Table 2: Deterrence Policy Categories

As a positive theory of criminal law, this modern synthesis works well. Most crimes fall under the three cells labeled "complete deterrence" in the diagram above. The "internalization" cell captures transactions that fall under tort law generally. The tort-crime boundary is well explained by the boundary in the diagram between the first cell and the remaining three cells.

Kaplow and Shavell (1996) show that this modern synthesis breaks down in a zero transaction cost environment. If transaction costs are zero, then efficient transactions will occur whether the underlying legal rule is a property rule (complete deterrence) or a liability rule (internalization). This is an implication of the Coase Theorem. However,

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there are two reasons the modern synthesis remains valid in spite of the Kaplow-Shavell proposition. First, zero-transaction cost environments are almost never realized. Some sources of transaction costs, such as self-defense, are primitive,[28] in the sense that they are hard-wired by evolution into human behavior. The existence of such primitive transaction costs limits the Coase Theorem's applicability. Second, even in the zero-transaction costs scenario, the seemingly efficient takings of property that would occur under a liability rule would still fail the efficiency test in the longer term.[29] People make investments in reliance on property rights and entitlements protected by law generally. To the extent efficient takings deny individuals a profitable return on their investments, such conduct would diminish society's wealth in the long term.

Implications for Law

Substantive criminal law consists of doctrinal rules, such as the requirement of criminal intent and defenses such as the necessity doctrine. These rules fit well within the synthesis explained so far.

Criminal Intent

Consider the law on criminal intent. Under the framework elaborated here, intent doctrine serves to distinguish cases where the complete deterrence policy is appropriate from those where the internalization policy is appropriate. The complete deterrence policy is appropriate where transaction costs are low and the offender has taken an action that imposes a substantial harm on the victim, with the intention to impose the harm. Recall, that I referred to this as a Type I Property Rule scenario. Complete deterrence is also appropriate where the offender's action are unambiguously socially undesirable, because the burden of avoiding the harm is low and the harm is both easily foreseeable and great. I referred to this as a Type 2 Property Rule scenario. Under these conditions, the offender's actions reveal an indifference to the victim's welfare (again, take the case of intentionally driving against the direction of highway traffic).

Criminal law doctrine requires something more of intent in the Type 1 scenario than does tort law. Tort law requires only an intent to execute the act, while knowing with substantial certainty that a harmful contact will occur (Hylton, 2016). Criminal law, on the other hand, requires, in addition to this level of intent, evidence that the actor intended to impose a substantial harm on the victim. A concrete illustration is *Vosburg v. Putney* (50 N.W. 403 (Wis. 1891)), where the defendant kicked the plaintiff to get his attention

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[28] Hylton (2018b).
[29] *Id*.

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while in school. The court found that the kick satisfied the level of intent required by tort law, but also held that the evidence need not show an intention to impose a substantial harm as would be required under criminal law. The slight kick given by Putney to Vosburg was enough to satisfy the tort standard of intentionality but probably not enough to satisfy the criminal law intent standard.

The tort law intent standard facilitates the optimal internalization of harm.[30] It guarantees that tortfeasors will bear the costs of their intentional conduct, and therefore choose to take an action that is potentially harmful (in the sense of being undesired) to another only when the perceived private benefit of doing so is greater. The criminal law intent standard, by contrast, ensures that courts apply the complete deterrence policy to the appropriate instances. The complete deterrence policy requires a sanction sufficient to remove the gain, and possibly greater. Such a policy would enable a court to impose a sanction more severe than the level required for internalization of harm.

Regina v. Smith (David) (1 Q.B. 354 (1974)) illustrates the function of the intent standard in criminal law. The defendant had installed electrical wiring, roofing, wall panels, and floorboards in the apartment he rented, with the landlord's permission. Under the law, these minor additions became the property of the landlord. When the defendant decided to leave the apartment he asked the landlord if his brother, who had been living with him, could remain as the tenant. The landlord refused, and the defendant damaged the roofing, wall panels, and floor boards in the course of taking out the electrical wiring he had installed. The defendant argued as a justification that he thought he was damaging his own property. A conviction by the trial court was overturned on appeal. The appellate court held that the defendant's actions did not indicate the type of intent to impose harm required by criminal law. The defendant's actions clearly revealed the type of intent required by tort law, but not the type required by criminal law.

Certainly if the defendant in *Regina v. Smith* had walked into the landlord's building and damaged the roofing in an act of vandalism, the intent standard required by criminal law would have been satisfied. In that case, the defendant would have imposed a substantial harm with the intention to do so. In addition, the defendant would have had the option, in this hypothetical scenario, to bargain with the landlord for the right to vandalize. Because a harm would have been imposed, for the sole purpose of doing so, in a setting where the actor could have arranged a consensual transaction, a Type 1 Property Rule violation would have occurred. The court's decision shows that courts distinguish the case of imposition of harm with the pure intention to do so from instances where harm is imposed in connection with some other, perhaps legitimate, motivation. These cases are not Type 1 Property Rule violations because they lack the intention to harm. Because of the absence of an intention to harm as the sole motivating factor the complete deterrence policy should not apply. Although the defendant's actions in *Regina v. Smith* violated tort

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[30] Hylton (2010).

law, and would justify a judgment for damages in favor of the landlord, the actions coupled with the intention would not justify criminal punishment.

The case for an insanity defense in criminal law, though not in tort law, follows directly from this reasoning. Given that the intention to impose harm is an important element of the Type 1 Property Rule violation, evidence that the defendant was insane would undermine the inference that he had an intention to impose a substantial harm.[31] On the other hand, the mere intention to execute the act leading to the harm would be sufficient to justify the internalization policy effected through tort law.[32] Consequently, insanity is not recognized as a defense in tort law, except in rare cases where the insanity prevents the actor from meeting the basic intention-to-execute standard.[33]

The self-defense justification also follows from the foregoing discussion. A person who harms an assailant in self-defense clearly does not have the intent to harm required under the criminal law, and necessary for triggering the complete deterrence policy. Surely, if the defendant in *Regina v. Smith* did not have the intent required by criminal law, then an individual who acts in self-defense does not meet the intent standard too. Of course, if the person who acts in self-defense does so with excessive force, or in situations where there is no reasonable basis for perceiving a need to act in self-defense, then the self-defense justification is invalid. In all of these cases, the inference of intent to commit a Type 1 Property Rule violation follows from the acts committed by the defendant.

Regina v. Cunningham (2 Q.B. 396 (1957)) illustrates the function of the intent standard in the Type 2 Property Rule context. The defendant went to the basement of 7A Bakes Street, which was being rented by his prospective mother-in-law, though it was at the time unoccupied, and tore the gas meter off the wall, causing coal gas to escape from the connecting pipe. 7A Bakes Street was separated from the house next door in which the victim lived only by a porous wall of loosely cemented rubble. The two houses had originally been one. The gas seeped through the wall, nearly killing Mrs. Wade, the tenant next door. The defendant claimed that he tore the meter off the wall to get money from the meter. The court overturned the defendant's conviction for reckless endangerment because the jury had not been instructed to consider whether the defendant had foreseen that removal of the meter might injure someone.

Conduct that is reckless under tort law is often reckless under criminal law as well. However, courts should, under the economic framework, be more observant of the intent requirement in the criminal law setting. *Regina v. Cunningham* indicates that the criminal law requires strong evidence that the defendant acted with indifference toward the welfare of the victim, which requires evidence of knowledge of the danger and of knowledge of a foreseeable victim. The tort standard for recklessness is formally the

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[31] Posner (1985) justifies the insanity on the ground that insane actors are not deterrable. This approach is over inclusive. Deterrability is not the sole basis for determining the scope of criminal law doctrines, otherwise tort law would mirror criminal law.

[32] Hylton (2016).

[33] *Id*.

same, though *Cunningham* suggests that criminal law courts are more demanding on evidence supporting the inference of intent (indifference to harm).

The foregoing doctrines of criminal law are not entirely consistent with the theory that intent is just an index of the probability of harm.[34] In *Regina v. Smith*, the harm to the landlord may have been the same whether the defendant thought he was recapturing his own property or not.

Necessity

The necessity defense in criminal (and in tort law) is an implication of this model. Under the defense, a defendant may be excused if his actions imposed a harm in order to avoid a much greater harm. These are cases where the costs of arranging a consensual transaction are high, typically because of an emergency setting and because the victim would be unlikely to give his consent anyway. In addition, the social gain from the defendant's conduct is positive. These two features put the necessity cases within the first cell of Table 1, under the internalization policy.

United States v. Holmes (26 F. Cas. 360 (C.C. Penn. 1842)) illustrates the function (or non-function) of criminal law in the necessity settings. After a shipwreck, Holmes, the captain, and his crew found themselves in a lifeboat with surviving passengers. Finding that the lifeboat was too small to carry the passengers and crew to safety, Holmes and his crew decided to throw some passengers (unmarried males) off the boat to ensure the safety of the remaining passengers. When the party made it to shore, Holmes was charged with murder.

At first glance, the necessity defense would appear to be appropriate in *Holmes*. The defendants were able to save a greater number of lives by jettisoning some passengers. However, the court rejected the necessity defense because of the procedure that Holmes had adopted in determining the unlucky passengers to jettison. The court held that Holmes should have, to take advantage of the necessity defense, first determined the minimum number of crew members necessary to maintain the lifeboat before turning toward passengers to jettison, a procedure which Holmes had not followed. The procedural rule required by the court is itself economically reasonable, because it would dampen the moral hazard that would arise if ship captains could assume that passengers would be sacrificed before crew.

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[34] An approach that starts with the optimal sanction and then works backward to determine whether criminal law doctrines are consistent with the optimal sanction would suggest that intent is for the most part an index of the probability of harm; see Holmes (1881), Becker (1968), Shavell (1985). This is an appropriate starting point, but intent doctrine serves other functions as well.

Holmes does not reject the principle of necessity. The decision merely limits the scope of the defense in order to mitigate moral hazard that might generate more mass accidents in which the sacrifice of some victims may be necessary to save a larger number of victims.

Public versus Private Enforcement

The choice between public and private enforcement of law is closely related to this essay,[35] but it is largely a question of procedure rather than substance. The criminal law consists of rules applying criminal sanctions to specific conduct. The determination of whether law enforcement is carried out by the state exclusively or through the efforts of private individuals is a different matter, and could be answered in any manner under the same set of substantive law rules. Modern criminal law is a matter of public enforcement. In the past, criminal law was privately enforced for the most part.[36]

Comparative advantage explains most of the observed allocation of enforcement effort between public and private actors.[37] Victims have an advantage in the ordinary cases of knowing who the offender is.[38] For this reason, tort law is often sufficient as a law enforcement mechanism. However, there are many scenarios where victims either do not know who the offender is, or, knowing the offender, are unlikely to pursue an enforcement action. Public enforcement is necessary in these cases.

The contribution of this model to the enforcement allocation question comes from its derivation of a boundary between areas of complete deterrence and of internalization. The state has an advantage over victims in carrying out the complete deterrence policy.[39] The state can credibly threaten to enjoin or to punish in instances where private individuals could not. Enjoining or preventing the completion of a criminal act will often require investigation and the collection of information. Few private individuals would have an incentive to do so, especially given that the benefit of such effort would go mainly to other potential victims. Moreover, the most harmful offenders would threaten to retaliate against any private individual who attempted to enforce the law against them. Few private individuals would risk their own safety to pursue an enforcement action against an offender who threatens harm to the general public.

Conversely, private litigation has an advantage under the internalization policy.[40] Victims will often know the identity of the offender, and will especially have an advantage in determining the harms they have suffered. Victims will be in the best

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[35] Polinsky and Shavell (2000).
[36] *See*, e.g., Landes and Posner (1975, at 2), Grannuci (1969).
[37] Steven Shavell (1993).
[38] *Id*.
[39] Hylton (2018a)
[40] *Id*.

position, relative to state actors, to inform courts of the harm, and to aid courts in designing remedies that internalize the harm suffered by victims.

Public Choice

The public choice literature becomes relevant as soon as one examines the incentives of actors under public enforcement. However, the public choice literature has important implications for criminal procedure, more so than substantive criminal law (Hylton and Khanna, 2007; Hylton 2018). The procedural implications matter for the deterrence question.

The complete deterrence policy requires the elimination of any prospective gain from the commission of an offense. There are many forms of punishment that could be used to accomplish this purpose. The most common form today, imprisonment, would not necessarily be the most obvious choice of punishment if society were to begin with a clean slate. Incarceration provides an incapacitation benefit to society, by ensuring that the criminal offender cannot offend again (at least against non-incarcerated people) while in prison. The deterrence value of prison, however, is somewhat uncertain, given the presumably heavy discounting of the future among the population of criminals. Moreover, imprisonment is costly to society – both in the direct costs of maintaining the incarcerated and in the indirect (opportunity) costs of their forgone labor.

The most plausible reason society bears such heavy costs in imprisoning convicted criminals is that more efficient forms of punishment would generate greater rent seeking in the enforcement process (Friedman, 1999). For example, a general property forfeiture penalty would incentivize enforcers to pursue violations, both real and imagined, to maximize the revenue to enforcers from forfeitures. The inefficient punishment system that exists today appears to be suboptimal at first glance, but it would be difficult to design a different punishment system that would not have substantial inefficiencies as well.

Conclusion

Much of substantive criminal law can be justified using economic analysis. It appears to be true that criminals are not easy to deter by the threat of punishment, probably because many of them tend to discount the future heavily. At the same, however, there is a vast population of non-criminals that includes many who are in fact deterred from harming others by the criminal law. In any event, the focus on punishment is mostly of tangential relevance in examining the economics of criminal law.

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Substantive criminal law consists of rules assigning criminal punishment to an assortment of acts. The rules assign certain areas of offensive conduct to tort law and others to criminal law, and within criminal law exempt some types of offensive conduct from punishment. These assignments across tort and criminal law boundaries, and within criminal law itself appear to be consistent with the aim of providing incentives to minimize the costs of harm and harm avoidance. The moral injunction against harming others fails to explain many of these patterns. Take, for example, the necessity defense, which fits easily within an economic framework, but is unjustifiable on moral grounds.

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