A NY THEORY OF crime must answer two questions: “What acts should be punished?” and “To what extent?” The first question asks for a working definition of crime and the second question asks to calibrate punishments. In the next two chapters we will develop an economic theory of crime and contrast it with a particular moral theory. The economic theory, we argue, gives more convincing and precise answers to these two general questions, especially as applied to particular problems of criminal policy.

Instead of seeing crime as a challenge to theory, however, most people see crime as a threat to wealth and life. Crime, which once seemed rare to many people, is now endemic in many countries. In the United States, crime directly affects nearly one in three households each year. As a result, passionate arguments are made on behalf of radical reform to make punishment more certain, swift, and severe. Conversely, equally passionate arguments are made that such reforms unfairly victimize certain groups of people. When U.S. crime rates subsided recently, the proponents of harsh punishments claimed credit for the improvement, whereas their opponents say the decline in crime is one more reason to get rid of harsh punishments.

To advance these disputes, a theory of crime must provide predictions about the effect of alternative criminal policies on crime rates and other policy values. In the next two chapters we use economic theory to define crimes, distinguish them from civil wrongs, develop models of behavior by criminals and police, examine statistics on crime rates, and survey such important issues as capital punishment, handgun control, illegal drugs, and the deterrent effect of criminal sanctions. Here are some examples of particular issues in criminal law that we will address:

“The true measure of crimes is the harm done to society.”

Cesare Beccaria, ON CRIMES AND PUNISHMENT 64 (1764)
Example 1: Jim Bloggs is convicted of assault for striking and breaking the nose of Joe Potatoes. As punishment, the judge has discretion to choose a stiff fine or a short jail sentence. If the judge believes that each punishment would deter future crime equally, which punishment should the judge use?

Example 2: Bloggs is sentenced to jail, but the jail is full and the jailer cannot legally add any more inmates. The state could build another jail or release some current inmates to make room for Bloggs. Which response will lead to the right amount of deterrence of criminals and minimize the social costs of crime?

Example 3: A thief shatters a car window costing $100 and steals a radio worth $75. Is the social cost of the crime $175 (the victim's loss), $100 (the victim's loss minus the injurer's gain), or some other number?

Example 4: Yvonne wishes to increase the security of her home against burglars. She considers three alternatives: (1) install bars on her windows; (2) install a loud burglar alarm; or (3) buy a gun. How will each alternative affect burglaries of her house and of neighboring houses? For example, will bars on Yvonne's windows reduce crime in the neighborhood or merely redirect it to other houses? Will an alarm alert neighbors? Will burglars know that she has a gun? Which alternative should the state encourage Yvonne to adopt?

In this chapter we shall examine the answers that the traditional theory of criminal law gives to these questions. Then we shall propose an economic theory of crime and punishment that, we think, surmounts the limitations of the traditional legal theory.

I. THE TRADITIONAL THEORY OF CRIMINAL LAW

In England much of the criminal law was originally part of the common law, but over many decades criminal statutes replaced the common law of crimes. Modern criminal law is now codified in statutes in common law and civil law countries. This body of law embodies what we might call a traditional theory of crimes, according to which criminal law differs from civil law by the following characteristics:

1. The criminal intended to do wrong, whereas some civil wrongs are accidental.
2. The harm done by the criminal was public as well as private.
3. The plaintiff is the state, not a private individual.
4. The plaintiff has a higher standard of proof in a criminal trial than in a civil suit.
5. If the defendant is guilty, then he or she will be punished.

A complete theory of criminal law ought to explain why criminal law differs from private (or civil) law and why it has these five particular characteristics.
It ought, also, to answer the two general questions with which we opened this chapter. In answering those two general questions, the central strand of economic analysis focuses on social welfare. An act should be declared criminal if that act decreases social welfare. Similarly, the crime should be punished to the extent that maximizes social welfare. These answers place the economic theory of crime in the long tradition of utilitarian thought.

In contrast, the moral theory that we discuss is retributivism. From this perspective, criminal policy should do what is right. The right thing to do is punish people who are guilty. The wrong thing to do is punish people who are innocent. The punishment’s extent should be proportional to the seriousness of the crime. Disproportionate punishment is wrong.

The usual way to contrast utilitarian and retributivist theories is by posing hypothetical examples that pit one theory against the other and forcing people to choose. Our approach, however, is more pragmatic. We shall argue that the moral theory begs the important questions or gives the wrong answers when applied to details of crime policy, whereas the economic theory provides a useful framework.

WEB NOTE 11.1

Our focus will be on the economic theory of crime and punishment, and we will have occasion to contrast that theory with the retributivist theory. However, we will not be able to take as much care with this distinction as we might. The retributivist theory has a long and honorable tradition and deserves further elaboration than we can give it here. On our website, however, we give a much more complete account of retributivism and draw sharper contrasts between that theory and the economic account of crime and punishment.

A. Criminal Intent

A careful driver is not at fault and imposes moderate risk on others, whereas a careless driver is negligent and imposes excessive risk on others. Negligent drivers must compensate those they have harmed. Even careless drivers, however, do not disregard the safety of others and intentionally impose excessive risk on them. A driver who intentionally imposes excessive risk on others is reckless. As we saw in Chapter 9, recklessness can oblige the injurer in some countries to pay punitive damages in addition to compensatory damages.

Even a driver who disregards the safety of others does not intentionally run into someone. Beyond recklessness lies intentional harm. According to an old adage, “Even a dog knows the difference between being stumbled over and kicked.” So does the law. The law makes much over the distinction between accidental and intentional harm. Tort law concerns accidental harm, and criminal law concerns intentional harm.
Mens rea (Latin for “a guilty mind”) is the legal term for criminal intent.¹ To develop this idea of mens rea, we must draw the boundary between accidental and intentional harm. Consider the ranking of acts along a continuum in Figure 11.1.

Starting at the left side of the scale, the injurer is careful and blameless. Moving to the right, the injurer’s behavior becomes negligent, then reckless, and then criminal. Careful behavior is less culpable than negligent behavior; negligent behavior is less culpable than intentional harm. According to this continuum, the line separating fault from mens rea lies between recklessness and intentional harm. As actors cross this boundary line, they pass from fault to guilt.

Further gradations in criminal intent are sometimes relevant to determining punishment. To illustrate, harming someone intentionally to gain a personal advantage is not as bad as harming someone cruelly and taking pleasure in the victim’s pain. There is, thus, a continuous gradation in the moral evaluation of the actor from blameless on the good end to cruel on the bad end.² Developing these distinctions has long engaged philosophers and social scientists. Later in this chapter we will describe some contributions of economists when we explain models of diminished rationality and weakness of will.

**QUESTION 11.1:** We defined crime as “intentional harm to persons or property.” In the Communist countries, “crime” was often defined as “socially dangerous” behavior. Can you relate the difference in definitions to the continuum depicted above?

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²We could, of course, extend the line and fill in the gaps with fine distinctions found in criminal law. To illustrate, off the scale to the left lie meritorious acts, and off the scale to the right lie sadistic acts.
B. Public Harm and Public Prosecution

Proceeding down our list, the second distinguishing feature of a crime is the nature of the harm. In the areas of the law we have examined to this point—property, contract, and torts—most of the harm has been private. In criminal law much of the harm is public. Consider that a murder threatens the peace and security of society at large and thus puts others besides the victim in fear for their lives. The great 18th-century commentator on the laws of England, William Blackstone, said that “in these gross and atrocious injuries [which we call crimes] the private wrong is swallowed up in the public: we seldom hear any mention made of satisfaction to the individual; the satisfaction to the community being so great.”

The idea that crimes harm the public has several implications. First, it justifies the difference between the plaintiffs in civil and criminal suits. In a civil suit the plaintiff is a private individual (the victim). In a criminal prosecution the plaintiff is society as represented by the public prosecutor or attorney general.

Second, the idea that crimes harm the public implies the possibility of “victimless” crimes, such as gambling, prostitution, and the sale of illegal drugs. The parties to these crimes often engage in voluntary sales for mutual advantage. However, the traditional theory of criminal law holds that these transactions have victims—namely society, whose peace and security is threatened.

Third, the traditional theory of public harm justifies punishing attempts to cause harm, even when they fail. When potentially harmful behavior causes no actual harm, the victim’s injury is nil, so the victim usually has no cause for a civil suit. However, failed attempts at crime cause fear and other harm to the public. The traditional theory of criminal law holds that a person who tries to injure another and fails should be punished.

Later we will connect this traditional discussion of public harm to the economic theory of public goods, and we will connect public prosecution to theories of incentives.

**QUESTION 11.2:** Explain why counterfeiting money is a crime. Who is the victim?

**QUESTION 11.3:** Distinguish between (1) imposing risk on others by driving carelessly without an accident actually occurring, and (2) inspiring fear in others by attempting to commit a crime and failing.

C. Standard of Proof

The fourth characteristic of a crime is the high standard of proof imposed upon the prosecution. In a criminal case the prosecutor must satisfy a higher standard of proof than the plaintiff in a civil case. In a civil case in common law countries, as we saw in the last chapter, the plaintiff must prove the case by a preponderance of the evidence—that is, the plaintiff’s account must be more believable than the

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defendant’s. In a criminal action in common law countries, the prosecutor must prove the case beyond a reasonable doubt.

The traditional theory gives two reasons for imposing this high standard on the prosecution. First, convicting an innocent person seems worse than failing to convict a guilty person. Criminal law strikes the balance between these two errors (which statisticians call Type II and Type I errors, respectively) in favor of the defendant. Second, the prosecution can bring the full resources of the state to bear on winning. Imposing a heavy burden of proof on the prosecution diminishes this advantage. Third, citizens may need protection from overzealous prosecutors who seek bureaucratic and political advancement.

Compared to common law countries, some civil law countries encourage an intimate relationship between judges and the state prosecutor. In Germany, for example, officials often work as prosecutors before becoming judges, or alternate between these two jobs. One rationale for intimacy is reduction of errors by judge and prosecutor. Knowing the judge’s perspective helps prosecutors avoid wasting court time. Also, compared to common law countries, the judge in civil law countries plays a more active role in developing arguments during the trial. Judges are more effective in developing arguments when they have had experience as prosecutors. Reducing mistakes is especially important in criminal cases because the process of prosecution for a crime involves embarrassment and expense for the accused, even if the final verdict is “not guilty.” Note that people from common law countries sometimes exaggerate the intimacy of judge and prosecutor in civil law countries by saying that a person accused of a crime in an inquisitorial system is guilty until he proves his innocence. This is strictly false.4

**QUESTION 11.4:** Explain how the confidence of the public in the prosecutor influences the standard of proof in criminal trials.

**QUESTION 11.5:** Most jurisdictions have two possible verdicts in criminal trials: guilty or not guilty. Scottish criminal trials have three possible verdicts: guilty, not proven, or not guilty. Explain the difference between binary and trinary verdicts, with reference to the standard of proof.

### D. Punishment

People who commit crimes expose themselves to the risk of punishment. Punishment can take several forms: criminals’ freedom may be curtailed through imprisonment, their movements restricted by probation, (now called “supervised release” in U.S. federal law) or fines may be imposed. Fines, probation, and incarceration are by far the most common forms of punishment. Other forms of punishment, such as forced labor (“community service”), occur

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4 Article 6 (2) of the Convention for the Protection of Human Rights and Fundamental Freedoms, which the European Union requires its members to join, asserts the presumption of innocence—anyone charged with a crime is innocent until proven guilty.
in some jurisdictions. In some jurisdictions, the defendant still faces the possibility of being beaten, mutilated, or executed by the state. Capital punishment is prohibited in countries belonging to the European Union, but it persists in other countries such as China and it was restored in many U.S. states after it disappeared.

Punishment in criminal law is different from compensation in civil law. Compensation in civil law aims to restore the victim’s welfare at the expense of the injurer. Punishment in criminal law makes the injurer worse off without directly benefiting the victim. Because the motivation is different, the issues of compensation and punishment are often independent of each other in a given instance. Thus, punishment may be imposed on top of compensation, as when criminal prosecution follows recovery in tort. Alternatively, punishment may be imposed in lieu of compensation, as when the state imprisons a pauper for assault and the victim does not sue in tort because the injurer could not pay compensation.

In cases involving money, a strict definition illuminates the difference between compensation and punishment. Perfect compensation is a sum of money that leaves the victim indifferent between the injury with compensation or no injury. In Chapter 9, we defined the parallel concept of perfect disgorgement: perfect disgorgement is a sum of money that leaves the injurer indifferent between the injury with disgorgement or no injury. By definition, punishment goes beyond disgorgement. Monetary punishment is a sum of money that makes the injurer prefer no injury rather than the injury with payment of the money. To illustrate by Example 3, if a thief shatters a car window costing $100 and steals a radio worth $75, then perfect compensation equals $175, perfect disgorgement equals $75, and punishment is a sum of money exceeding $75. Thus, the criminal might be required to pay $175 as compensation to the victim and also to pay the state a fine of $100. Such a fine is “extra-disgorging.”

**QUESTION 11.6:** For burglary, the victim’s loss usually exceeds the injurer’s gain, but the opposite is true for breach of contract. Why? What are the implications for relative dollar values of compensation and punishment?

## II. AN ECONOMIC THEORY OF CRIME AND PUNISHMENT

The traditional theory of criminal law offers reasons for the characteristics of a crime and distinguishes criminal prosecutions from civil disputes, but it does not offer a predictive model of criminal behavior or propose a clear goal for criminal law. The economic theory of crime, which we develop in this chapter, does all of this and more. We shall begin by distinguishing criminal prosecutions from civil disputes and offering reasons for the characteristics of a crime. Next we develop a predictive model of criminal behavior based upon a theory of the rational choice to commit a crime. Finally, we propose a clear goal for criminal law and policy: it should minimize the social cost of crimes. Using this standard, we show how to compute optimal policies.
A. Inadequacy of Tort Law, Necessity of Criminal Law

In Chapters 8 and 9, we discussed how tort law achieves efficient incentives by making injurers—and, in some cases, victims—internalize the cost of accidents. Most crimes are also torts, which means that most criminals are vulnerable to civil suits. If civil suits made the injurer internalize the cost of crimes, then criminal law would be unnecessary from an economic viewpoint. For several reasons, however, civil suits cannot minimize the cost of crimes. We will explain these reasons in order to justify the existence of criminal law.

The first reason concerns some inherent limitations on compensation. In Chapter 8, we said that compensation is perfect when potential victims are indifferent about accidents in the sense that they would just as soon have the injury and the damages as have no injury and no damages. Perfect compensation internalizes the harm caused by injurers. In Chapter 9 we argued, however, that perfect compensation is impossible for most people who lose a leg or a child. In those cases, courts award damages to deter unreasonable risks, not to compensate for actual harm.

Similarly, criminal punishment aims to deter intentional harms, not to compensate for them. Consider a thought experiment regarding a crime. How much money would you require in order to agree to allow someone to assault you with a hammer? This question does not make much sense. The concept of indifference is difficult to apply to crimes like assault. Consequently, the relevant law cannot take as its goal the perfect compensation of victims and the internalization of costs by injurers. Rather than pricing crime, the goal of punishment is to deter it. The state prohibits people from intentionally harming others and backs this prohibition by punishment. Thus, criminal law is a necessary supplement to tort law when perfect compensation is impossible.

Even if perfect compensation is possible in principle, it may be impossible in fact. Let us suppose, for example, that a level of compensation exists that makes Jonny indifferent about whether Frankie lops off Jonny’s arm. It would be impossible to prove this level in court. The obstacle to proof is that arms are not bought and sold in a market; there is no objective way to know how much the loss is worth to Jonny. If the court asks Jonny what amount he feels would compensate for the loss, he may not know the answer, or he may answer by exaggerating. When there is no market to induce people to reveal their subjective valuations, economists say that there is a “problem of preference revelation.” When perfect compensation is possible in principle, it may be impossible in fact because of the problem of preference revelation.

We have justified criminal law where compensation is imperfect. But suppose that perfect compensation is possible. Can private law accomplish efficiency without the need for criminal law? The answer is no. To see why, we must consider another argument. In the first chapter on property, we distinguished between protecting an interest and protecting a right. Recall that if the law allows trespass on the condition that the trespasser compensates the owner for any harm caused, the law protects the interest of the owner in the property. But the law does not protect the owner’s right to use the property as he or she chooses without interference from others. Similarly, if the victims of car accidents were perfectly compensated, their interests in their persons and property would be protected, but their right to go
about their business without interference from others would be infringed. Protecting interests secures wealth, but allowing the infringement of rights diminishes liberty.

There are good economic arguments for protecting rights more vigilantly than interests. In earlier chapters we saw that society is, in general, better off when goods are acquired through voluntary exchange, because such exchange guarantees that goods move to those who value them the most and, in doing so, makes both parties better off. Goods that change hands without the consent of both parties—as by theft—do not carry this same guarantee. The stolen good may be more valuable to its owner than to the thief, but the theft occurs because the thief need not pay the owner’s asking price. This is an argument for the proposition that remedies in criminal law should, in part, be set so as to protect and encourage voluntary exchange through markets.

We have argued that two obstacles prevent substituting compensation for punishment: first, perfect compensation may be impossible, and, second, even if perfect compensation were possible, the law may seek to protect the rights of potential victims rather than their interests.

There is a third reason to supplement liability with punishment in some circumstances: punishment is often necessary for deterrence. To illustrate, assume that a thief is considering whether to steal a $1000 television set. Assume that the probability of the thief’s being apprehended and convicted equals 0.5. Assume that the thief is liable in property law, but not punishable in criminal law. The expected cost of the theft to the criminal equals the expected liability: \(0.5 \times 1000 = 500\). The benefit to the thief equals $1000. Thus, the net expected benefit to the thief equals $1000 - $500 = $500. In this example, civil liability without punishment makes theft profitable.

In general, thieves cannot be deterred by the requirement that they return what they have stolen whenever they happen to get caught. In order to deter thieves, the law must impose enough punishment so that the expected net benefit of crime to the criminal is negative. In the preceding example, deterring the thief requires a fine of at least $1000, as well as the return of the television set.

According to the preceding discussion, tort law aims to internalize costs, such as the risk of accidents. Once costs are internalized, actors are free to do as they please, provided that they pay the price. Internalization, however, is not the proper goal when perfect compensation is impossible in principle or in practice, or when people want law to protect their rights instead of their interests, or when enforcement errors systematically undermine liability. In these circumstances, law’s proper goal is deterrence. When deterrence is the goal, actors are not free to pay the price and do as they please. Instead, punishments are calibrated to deter those actors who prefer to do the act in spite of its price.

The connection between the sanction and the actor’s psychology tips off the observer as to whether the law aims for internalization or deterrence. As the actor’s psychological commitment to the act increases, deterring the actor requires a larger sanction. When the goal is deterrence, a more severe punishment goes with greater psychological commitment to the act. For example, deterrence requires a
deliberate act to receive harsher punishment than the same act done spontaneously. Similarly, deterrence requires harsher punishment for a repeated crime than a first offense.

In contrast, the actor’s psychological commitment to the act does not affect the goal of internalization. Psychological commitment refers to subjective costs and benefits that the actor internalizes without the help of law. The legal problem of internalization concerns costs the actor imposes on others. As the actor’s psychological commitment to the act increases, internalization does not require the sanction to increase. For example, internalization does not require stronger sanctions for the same act done deliberately rather than spontaneously, or for a repeated act rather than a one-time act.

In a criminal trial, the court pays special attention to the defendant’s psychological commitment to the act. Deliberate or repeated crimes provoke harsher punishments. These facts suggest that criminal law especially concerns deterrence. In tort or contract law, however, the court shows less concern with the defendant’s psychological commitment to the act. In contract law where compensation is nearly perfect, the law takes little interest in whether breach was intentional or repeated. This fact suggests that contract law especially concerns internalization. For reasonable risks in tort law, the court does not care whether the injurer imposed the risk on others intentionally or repeatedly. For unreasonable risks in tort law, the court may increase the sanction if the injurer imposed the risk intentionally or repeatedly. These facts suggest that tort law seeks to internalize reasonable risks and deter unreasonable risks.

Now we return to the first of our fundamental questions, “What acts should be punished?” Acts should be punished when the aim is deterrence, whereas acts should be priced when the aim is internalization. The law should aim for deterrence when perfect compensation is impossible in principle or in practice, when people want law to protect their rights instead of their interests, or when enforcement errors systematically undermine liability. Criminal law especially concerns deterrence.

**QUESTION 11.7:** We gave three reasons for having criminal punishments instead of tort liability. Give a concrete example illustrating each reason.

**B. Rational Crime**

We have offered some economic reasons why criminal law is needed to supplement tort law. Now we develop a predictive theory of criminal behavior, first by explaining how a rational, amoral person might decide whether or not to commit a crime. (Later we consider the relationship between diminished rationality and crime.) By a “rational, amoral person,” we mean someone who carefully determines the means to achieve illegal ends, without restraint by guilt or internalized morality. Crimes can be ranked by seriousness, and punishments can be

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ranked by severity. The more severe punishments typically are attached to the more serious crimes. We represent these facts in Figure 11.2.

We measure the seriousness of the crime along the horizontal axis and the severity of the punishment along the vertical axis. The curved line labeled “actual punishment” shows the severity of the punishment prescribed in the criminal code as a function of the seriousness of the offense. The punishment curve slopes up to indicate that the punishment becomes more severe as the crime becomes more serious.

To give this graph more concrete meaning, consider the crime of embezzlement and the graph in Figure 11.2. The seriousness of embezzlement is sometimes measured by the amount stolen. Under this assumption, the metric for the horizontal axis in Figure 11.2 is dollars. Similarly, assume that the punishment at issue is a fine, so that a more severe punishment corresponds to a higher fine. Under this assumption, the metric for the vertical axis in Figure 11.2 is also dollars. Because both metrics are dollars, the lines on Figure 11.2 represent different punishment schedules. The 45° line represents an especially salient punishment schedule for purposes of deterrence. Along the 45° line, the punishment is a fine that exactly equals the amount embezzled. For example, a person convicted of embezzling $1,000 pays $1,000. When the severity of punishment equals the seriousness of the offense, punishment causes perfect disgorgement. Thus the 45° line in Figure 11.2 is labeled “perfect disgorgement.”

Making embezzlers return the stolen money whenever they get caught may not deter them. Consequently, the actual punishment for embezzlement must exceed perfect disgorgement. Above the perfect disgorgement line in Figure 11.2 is another line labeled “actual punishment.” Assume that this line represents the actual
punishment schedule for a particular legal system. Thus the actual punishment for embezzling $x_0$ is $x_1$. (The particular shape of an actual punishment schedule is determined by lawmakers. The curved shape in Figure 11.2 is one possibility that is particularly appropriate for analysis.)

**CRIMINAL CORPORATIONS?**

Corporations regularly commit torts. For example, much of the law of consumer-product liability concerns torts by corporations. When a corporation commits a tort, liability is imposed upon the organization, not upon its individual members. But what about crimes? Can a corporation commit a crime? There is a legal obstacle to convicting corporations of crimes: mens rea. An individual can have a guilty mind, but it is not clear that organizations can. Mens rea requires the intention to do wrong and cause harm. Presumably, organizations lack minds, so they also lack intentions (except metaphorically).

So long as it was thought that organizations could not have criminal intent, the crimes that corporations could commit were limited to so-called strict-liability crimes. Strict criminal liability does not require intending to do anything wrong. Examples of strict liability crimes are selling uncertified drugs or transporting explosives by forbidden routes. Other crimes, like manslaughter, fraud, or assault, could be committed by the members of the corporation, but not by the corporation itself.

The ability to prosecute corporations for strict liability crimes gives regulators and other officials an additional method for deterring corporate wrongdoing. In a civil suit, the prosecutor only needs to establish liability by the preponderance of the evidence, but damages are limited to compensation for the harm actually caused by the wrongdoing (possibly, punitive damages.) In a criminal suit, the prosecutor has to prove his case beyond a reasonable doubt, which is harder to do. However, a successful criminal prosecution results in punishment, not just liability.

**QUESTION 11.8:** Assume that a corporation commits a tort that is also a strict liability crime. How should the state decide whether to bring a civil action or a criminal prosecution?

There is now an effort to overcome this obstacle and prosecute corporations for acts requiring criminal intent. For example, the Ford Motor Company has been prosecuted, so far unsuccessfully, for manslaughter in connection with manufacturing the Pinto with a gas tank that allegedly explodes when struck from the rear.

**QUESTION 11.8A:** What does it mean to say that a corporation intends to do something? Can corporations be punished beyond the value of their assets?

The punishment of criminals is probabilistic. The offender may escape detection or apprehension, or be apprehended but not convicted. A rational decision-maker takes the probability of punishment into account when contemplating the commission of any crime, including embezzlement. We may say that the rational embezzler calculates an expected value for the crime, which equals the gain minus the punishment multiplied by the probability of being caught and convicted.
To illustrate, if the fine for embezzling $1000 equals $2000, and the probability that an offender will be caught and convicted equals .75, then the expected punishment equals .75($2000) = $1500. To reflect this element of uncertainty, we have drawn a second punishment curve in Figure 11.3 (labeled the “expected-punishment curve”) below the first one. The lower punishment curve in the figure equals the higher punishment curve minus a discount for the uncertainty of punishment.

How would a rational criminal respond to the expected-punishment schedule? Under certain assumptions, a rational, amoral decision-maker will embezzle money so long as the benefit exceeds the expected punishment. Even though punishment is uncertain by assumption, the expected punishment still exceeds perfect disgorgement in Figure 11.3. When the expected punishment exceeds perfect disgorgement, the criminal expects to be worse off for the crime. So, embezzlement will not occur. Presumably, crime does not usually pay, even for rationally self-interested people without moral qualms. Consequently, Figure 11.3 represents the situation in which most people actually find themselves.

The situation is different in Figure 11.4. In this case, the expected punishment dips below perfect disgorgement for embezzlement at least as serious as \( x_1 \) and no more serious than \( x_2 \). In this range, the criminal gains more than he expects to lose, so crime pays. Under these circumstances, an amoral decision-maker would embezzle some money. We can read off the graph exactly how serious the most

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6We implicitly assume risk neutrality. A risk-averse person is more deterred by a severe punishment applied with low probability than by a mild punishment applied with high probability, holding expected punishment constant.
profitable offense is. The expected profit from the offense equals the difference between perfect disgorgement and the expected punishment, which is represented on the graph by the vertical distance between the perfect disgorgement line and the expected-punishment curve. The vertical distance is maximized when the seriousness of the offense equals $x^*$. We may conclude that the rational decision-maker will embezzle the amount $x^*$.

This conclusion can be expressed in marginal values. The marginal benefit to the criminal from increasing the seriousness of the offense by a small amount is given by the perfect disgorgement curve’s slope, which is $45^\circ$. The marginal expected cost to the criminal is equal to the expected increase in punishment from increasing the seriousness of the offense by a small amount, which is given by the slope of a tangent line to the expected punishment curve. For values of $x$ below $x^*$, the marginal benefit exceeds the marginal expected cost to the criminal, so the criminal will increase the seriousness of the offense. For values of $x$ above $x^*$, the marginal expected cost exceeds the marginal benefit, so the criminal will decrease the seriousness of the offense. For $x$ equal to $x^*$, the marginal benefit equals the marginal expected, so the criminal maximizes his net payoff by not changing the seriousness of the offense.

**QUESTION 11.9:** What is the significance of the fact that the severity-of-punishment curve in Figure 11.2 intersects the vertical axis asymptotically at a positive value?

**QUESTION 11.10:** How do Figures 11.3 and 11.4 change if the police become more efficient and catch a larger proportion of criminals? What does the change in the figures indicate about a change in criminal behavior?
C. Mathematics of Rational Crime

The rational criminal’s behavior can be explained by using mathematical notation corresponding to the graphical analysis of Figure 11.3. Let the variable \( x \) indicate the seriousness of the crime (in dollar amounts). Let the variable \( y \) indicate the criminal’s payoff from the crime (in dollar amounts). We assume that the payoff is an increasing function of the seriousness of the crime: \( y = y(x) \).

Let the punishment \( f \), assumed to be a fine, for committing a crime of seriousness \( x \) be given by the function \( f = f(x) \). Furthermore, let the probability of being punished for committing a crime of seriousness \( x \) be given by the function \( p = p(x) \). Thus, the expected punishment equals the product of the amount of punishment and its probability: \( p(x)f(x) \).

The rational, amoral criminal chooses the seriousness of crime \( x \) to maximize his or her net payoff, which equals the payoff \( y(x) \) minus the expected punishment:

\[
\max y(x) - p(x)f(x), \quad \text{where} \quad y = y(x).
\]

The marginal values of the functions \( p(x) \) and \( f(x) \), which we denote \( p' \) and \( f' \), give the changes in the probability of punishment and its severity when the seriousness of the crime, \( x \), changes slightly. Similarly, the marginal value of \( y \), which we denote \( y' \) gives the change in the payoff as the seriousness of the crime changes slightly. The criminal maximizes the net benefits of the crime by embezzling an amount of money up to the point at which the marginal benefit of an additional amount embezzled equals the marginal expected punishment:

\[
y' = p'f + pf'
\]

We can use this analysis to predict the response of criminals to changes in marginal costs and benefits. An investment of more effort in enforcing criminal law can increase the marginal probability \( p' \) of punishing the criminal. Similarly, an investment of more effort in punishing criminals, such as improving the system of collecting fines, can increase the marginal severity \( f' \). According to the preceding equation and graphs, an increase in \( p' \) or \( f' \) will decrease the seriousness of the offense committed by the rational criminal. The rational criminal decreases
the seriousness of his offense in order to offset the increased risk he faces from the increase in the punishment schedule.

We explained that more certain and severe punishment reduces the seriousness of crime. Now consider a change in the opportunity to commit crimes like embezzlement. The marginal benefit of crime falls when the opportunities to commit lucrative crimes diminish. According to the preceding equation, a decrease in the marginal benefit of crime $y'$ will decrease the seriousness of the offense committed by the rational criminal. When the opportunity to embezzle increases, the rational criminal increases the seriousness of his offense until the risk of punishment rises to a level commensurate with his improved opportunities for crime.

We have explained how the rational, amoral criminal responds to changes in the probability of punishment, the severity of punishment, and opportunities to commit crimes. Next we will discuss how to use these predictions in public policy towards crime.

The proposition that the seriousness and frequency of crime decreases when the expected punishment increases corresponds to the proposition that the consumer’s demand curve for goods slopes downward. Economists have a lot of confidence in this prediction, just as they have a lot of confidence in the prediction that the demand curve slopes downward. The downward slope in the demand curve may mean that a lower price causes each consumer to buy a little more of the good, as with gasoline, or the downward slope may mean that some consumers buy the good who would not otherwise have bought it, as with houses. With a slight adjustment, our model can be made to yield the conclusion that an increase in $p'$ or $f'$, or a decrease in $y'$, will decrease the number, rather than the seriousness of, offenses committed by rational criminals. The same reasoning applies to the seriousness and the number of crimes.

The proposition that people demand less of a good when the price increases bears the august title, “The First Law of Demand.” Similarly, we call the proposition that people commit less crime when the expected punishment increases the “first law of deterrence.” The preceding math is a simple derivation of this law. Perhaps you think that the first law of deterrence is false because people commit crimes passionately, irrationally, or ignorantly. In laboratory experiments, however, even rats obey the first law of deterrence. At their worst, people are far more rational than are rats. The interesting question is not whether people commit less crime when the expected punishment increases, but the question “How much do crime rates respond to increases in expected punishment?” In other words, the interesting question concerns not the supply curve for crime, but rather its elasticity.

Our model of rational crime simplifies reality in various ways. The simplifying assumptions do not usually affect predictions qualitatively, by which we mean that introducing more complexity into the model does not affect the direction of most predictions. To illustrate, even in a more complicated model, the amount of crime usually falls when the expected punishment increases. However, the simplifying assumptions usually affect the predictions quantitatively, by which we mean that more complexity in the model affects the predicted magnitude of most changes. Empirical research on crime, consequently, requires more complexity than our simple model.
We cannot develop more complex models here, but we will briefly discuss our simplifying assumptions. We assume an informed criminal, who knows the costs, benefits, and probabilities associated with the crime; we assume a risk-neutral criminal; and we assume that all the criminal’s costs and benefits are monetary. Most criminals are imperfectly informed about the benefits of crime and the probabilities and magnitudes of punishment. Criminals are unlikely to be neutral towards risk. Most people are risk-averse, although criminals may be unusually risk-loving. (Later we discuss more about risk.) Many crimes have nonmonetary punishments and rewards, such as disapproval in the larger society and prestige within the society of criminals. These remarks indicate some corrections in the simple model required for empirical research.

**Question 11.11:** Assume that the punishment function \( f(x) \) increases by a constant \( k \), so that \( f(x) \) becomes \( f(x) + k \). What is the effect on the criminal’s behavior?

**Question 11.12:** Assume that the payoff function \( y(x) \) increases by a constant \( k \), so that \( y(x) \) becomes \( y(x) + k \). What is the effect on the criminal’s behavior?

### D. Applying the Model of Rational Crime to Public Policy

Our discussion of rational crime has focused on the quality of crime, specifically its seriousness. Discussions of crime, however, often focus on the quantity of crime. With a slight adjustment, our model of the seriousness of crime can become a model of the quantity of crimes. Instead of the horizontal axis in the preceding graph representing the seriousness of a crime, reinterpret the horizontal axis as representing the number of crimes that a rational person commits. As before, the vertical axis represents the severity of punishment, whose expected value increases as the actor commits more crimes. Under this interpretation, \( x^* \) in Figure 11.4 represents the number of crimes that a rational criminal commits. The important point is that an increase in \( p \) or \( f \), or a decrease in \( y \), will decrease the number of crimes committed by a rational criminal.

Summing the number of crimes committed by each criminal gives the aggregate number of crimes in society. Since an increase in \( p \) or \( f \) will decrease the number of crimes committed by each rational individual, the aggregate number of crimes committed by rational individuals must also decrease. Figure 11.5 depicts this fact, with aggregate crime decreasing as expected punishment increases. The proposition that the number of crimes decreases as the expected punishment increases corresponds to the proposition that the consumer’s demand curve for goods slopes downward. In effect, Figure 11.5 depicts the “demand” for crime by criminals. An increase in expected punishment causes a decrease in the quantity of crime because some criminals reduce the number of crimes that they commit and some people who would otherwise become criminals do not commit crimes.

The proposition that people demand less of a good when the price increases bears the august title, “The First Law of Demand.” Similarly, we call the proposition...
that people commit less crime when the expected punishment increases the “first law of deterrence.” Perhaps you think that the first law of deterrence is false because people commit crimes passionately, irrationally, or ignorantly. However, economists have a lot of confidence in the downward sloping demand curve based on many statistical studies. In laboratory experiments, even rats obey the first law of deterrence, and people at their worst are far more rational than are rats.

The interesting question is not whether people commit less crime when the expected punishment increases. Rather, the interesting question is, “How much do crime rates respond to increases in expected punishment?” In other words, the interesting question concerns the elasticity of the supply of crime. When the supply of crime is elastic, policy-makers can reduce crime significantly by moderate increases in expected punishment. When the supply of crime is inelastic, however, the variables encompassed by the economic model of rational crime are relatively less important for policy-makers than other variables, such as employment rates, family configuration, drug addiction, quality of schooling, etc.

Our model of rational crime simplifies reality in various ways that we should mention. In reality, crime has multiple causes, so empirical research on crime should especially rely on multiple variable regression analysis. We cannot develop more complex models here, but we will briefly discuss some of our simplifying assumptions. We assume an informed criminal, who knows the costs, benefits, and probabilities associated with the crime; we assume a risk-neutral criminal; and we assume that all the criminal’s costs and benefits are monetary. Most criminals are imperfectly informed about the benefits of crime and the probabilities and magnitudes of punishment. Criminals are unlikely to be neutral towards risk. Most people are risk-averse, although criminals may be unusually risk-loving. (Later we discuss more about risk.) Many crimes have nonmonetary punishments and rewards, such as disapproval in the larger society and prestige within the society of criminals. These remarks indicate some corrections in the simple model required for empirical research.

![Figure 11.5: Aggregate crime.](image-url)
E. Criminal Behavior and Criminal Intent

Economists usually describe the economic model of decision-making as an account of behavior, not as an account of subjective reasoning processes. Thus, consumers are said to act as if they were computing marginal utilities. Similarly, criminals are said to act as if they were comparing marginal benefits of crime and expected punishments. The commission of most crimes, however, requires criminal intent. To commit crimes, it is not enough for people to act as if they had criminal intent. They must actually have it. So criminal law concerns reasons, not just behavior.

Notwithstanding its focus on behavior rather than reasons, the economic model of rational choice remains useful as an account of the criminal mind. Criminal intent is often distinguished according to the level of deliberation. To illustrate, a crime may be committed spontaneously in the sense that the criminal did not make any plans in advance. Spontaneous criminals do not search out opportunities to commit crimes, but, when opportunities come their way, they avail themselves of them. At the opposite extreme, crimes may be carefully planned out in advance and all the possibilities weighed. Thus, a premeditated crime shows a greater degree of deliberation than a spontaneous crime.

The economic model may be understood as an account of the deliberations of a rational, amoral person when deciding in advance whether to commit a crime. In the case of premeditated crimes, the economic model may correspond to the actual reasoning process of the criminal. In the case of spontaneous crimes, where there is no deliberation, the economic model may nevertheless be understood as an account of the criminal’s behavior but not of his reasoning. For spontaneous crimes, criminals may not actually reason as in the economic model, but they may act as if they had. By saying that criminals act “as if” they had deliberated, we mean that, when presented with the opportunity to commit crimes, they respond immediately to benefits and risks as if they had weighed them. If they respond in this way, their behavior can be explained by the economic model, even though their reasoning processes are only a fragment of it.

A behavioral model is not very useful in establishing criminal intent in the trial of an individual. The focus on individuals, however, is not the only perspective on criminal law. Legislators and other officials must establish general policies toward crime. General policies are formulated with an eye to their aggregate effects, such as reducing the social costs of crime. At this level of inquiry, the fact that economics models behavior rather than reasons is not a weakness. Whether the economic model of deterrence accurately predicts criminal behavior is an empirical question to be answered by facts, not logic. Fortunately, there is a great deal of evidence on this matter, and we shall present a summary of the literature on deterrence in the next chapter. Now, however, we will improve the analysis by extending economic reasoning to diminished rationality.

Even when interpreted as a behavioral model, the model of rational choice is valuable in the study of criminal law. To see why, consider another difference between the application of the rational choice model to markets and to criminal prosecution. When economists study markets, they are concerned with aggregate
behavior. Eccentric and erratic behavior washes out by aggregation with the mass of ordinary people. In contrast, criminal prosecutions focus upon individuals, and individual criminals are often statistical outliers. Seen in this perspective, the economic model of rational choice does not seem applicable to the criminal law.

But this focus on individuals is not the only perspective on criminal law. Criminal law involves more than the prosecution of individuals. General policies toward crime must be set by legislators and officials in the criminal-justice system. General policies must be formulated with an eye to their aggregate effects, such as their ability to minimize the social costs of crime. At this level of inquiry, the economic model is very valuable.

We have asserted that the economic model of choice describes the deliberation of rational criminals when their crimes are premeditated, and we have asserted that rational criminals behave as if guided by the economic model when they commit spontaneous crimes. If this assertion is true, empirical investigations should demonstrate that crime rates are responsive to the considerations identified in our model, specifically, that crimes rates respond in the predicted manner to punishments and payoffs. This is an empirical question to be answered by facts, not logic. Fortunately, there is a great deal of evidence on this matter, and we shall present a summary of the literature on deterrence in the next chapter. Now we turn to computing the optimal punishment in light of the economic theory of how criminals decide to commit crimes. The first step is to explain the goal of minimizing the social costs of crime.

**QUESTION 11.13:** Why should the law punish a person more severely for committing the same crime deliberately rather than spontaneously?

**QUESTION 11.14:** Laboratory experiments demonstrate that rats respond in an economically rational way to punishment, yet rats cannot legally commit crimes. Why not?

### F. Diminished Rationality—Saturday Night Fever

The economic theory of behavior begins with super-rationality, but it need not end there. Many crimes and torts occur under conditions of diminished rationality, which economists have begun to model. For example, many crimes result from lapses, which are temporary aberrations in behavior. Thus, young men often commit crimes when they temporarily lose control of their emotions and act impulsively. We call this behavior “Saturday Night Fever.” The proof that Saturday Night Fever caused a young man to commit a crime is that he wakes up on Sunday morning and says to himself, “I can’t believe what I did last night!”

In this section, we develop an economic model for this type of lapse. Prudence involves giving reasonable weight to future events, whereas imprudence involves giving unreasonably little weight to future events. Occasional imprudence is a kind of lapse in which the actor temporarily discounts the future consequences

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7Robert Cooter has developed this model in several papers, most recently “Models of Morality in Law and Economics: Self-Control and Self-Improvement for the ‘Bad Man of Holmes,’” 78 BOSTON UNIVERSITY LAW REVIEW 903 (1998).
of his or her behavior at a much higher level than ordinarily would be the case. When the act in question is illegal, a high discount rate prevents the actor from giving as much weight to future punishment as he or she would ordinarily give.

To formalize this idea, imagine that a person draws his discount rate for future costs and benefits from a probability distribution. Most of the time, the person draws a moderate discount rate from the center of the distribution, so he acts prudently and does not commit crimes. From time to time, however, he draws a very high discount rate from the tail of the distribution. In this situation, the person may lapse and commit a crime.

WEB NOTE 7.2
As we shall see in the following chapter, there are some clear and testable predictions of the economic theory that we have just outlined, and there is a considerable body of empirical work that we shall summarize there. You are no doubt aware that there are alternative theories of the decision to commit a crime. One of the most famous and widely held is what might be called the “socio-economic” theory. On our website we summarize that theory and give some references to literature regarding it.

G. The Economic Goal of Criminal Law

Crime imposes various costs on society, which we reduce to two basic kinds. First, the criminals gain something and the victims suffer harm to their persons or property. The resulting social harm, according to the standard view among economists, equals the net loss in value. To illustrate by Example 3, if a thief shatters a car window costing $100 and steals a radio worth $75, then the criminal gains $75 and the victim loses $175, for a net social loss of $100. The net loss equals value destroyed, not value redistributed. Second, the state and the potential victims of crime expend resources to protect against it. For example, homeowners install bars on their windows, and the city employs police officers to patrol the streets.

To express this argument in notation, assume that wrongdoing yields an immediate benefit at time 1, denoted \( b_1 \), risks future punishment at time 2, denoted \( c_2 \) for cost. Let \( r \) denote the rate at which the actor discounts costs for futurity and uncertainty.\(^8\) Thus an actor whose discount rate exceeds \( r^* \) commits the wrong, and an actor whose discount rate falls short of \( r^* \) does not commit the wrong.

\(^8\)The discount rate \( r \) exceeds 1. To illustrate, the discount rate might be, say, \( r = (1 + 0.07) \). Thus the rational actor follows this rule:

\[
b_1 - \frac{c_2}{r} < 0 \implies \text{do not commit the wrong;}
\]

The tipping point occurs where the actor is equally poised between committing the wrong and not committing it. The tipping point value of \( r \), denoted \( r^* \), is found by solving the preceding equation, which implies

\[
r^* = \frac{c_2}{b_1}.
\]
As moods shift, a person may discount the future at different rates. The horizontal axis in Figure 11.6 depicts possible values of the discount rate $r$ depending on the actor’s mood. The vertical axis depicts the probability distribution $g(r)$ that the actor will have different values of $r$ at any point in time. If the actual value $r$ drawn from the distribution $g(r)$ equals or exceeds $r^*$, the actor commits the wrong. The small shaded area in the right-tail of the distribution represents the probability that the actor commits the wrong. Conversely, if the actual value drawn from the distribution $g(r)$ is less than $r^*$, the actor does not commit the wrong. The unshaded area in the distribution represents the probability that the actor does not commit the wrong.

Mood, which determine the actor’s discount rate for uncertainty and futurity, obeys a mysterious chemistry. In effect, Figure 11.6 assumes that mood is unpredictable at any point in time but distributes predictably over time. With low probability, the actor draws a value of $r$ greater than $r^*$ and commits the wrong. With high probability, the actor draws a value of $r$ smaller than $r^*$ and does not commit the wrong. These characteristics of the distribution correspond to the proposition that crime is unusual.

An increase in the variability of moods increases the probability of wrongdoing by the actor. In terms of Figure 2, spreading the distribution by shifting density into the tails increases the area to the right of $r^*$. Greater probability density to the right of $r^*$ implies an increase in the probability of wrongdoing. Conversely, a decrease in the variability of moods decreases the probability of wrongdoing. To illustrate, volatile emotions, which corresponds to high variance in the distribution $g(r)$, causes young men to commit disproportionately many crimes.

Will increasing punishment $c$ cause crime to decrease? Whenever the actor draws a discount rate close to the tipping value $r^*$, a small change in punishment

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9To be precise, the probability of wrongdoing may increase, and cannot decrease, with a mean-preserving spread in $g(r)$. 

CH A P T E R 11 An Economic Theory of Crime and Punishment

FIGURE 11.6

Tipping Point for Lapses.
can tip the decision one way or another. For example, a small increase in punishment causes the actor to decide against committing the wrong, whereas a small decrease in punishment causes the actor to decide in favor of committing the wrong. Thus punishment deters.

Earlier we explained that the issue for economists, however, is how much punishment deters. The probability that the actor draws a discount rate close to \( r^* \) is low, whereas the probability that the actor draws a discount rate much smaller or larger than \( r^* \) is high. When \( r \) is not close to \( r^* \), a small change in punishment cannot tip the decision one way or another.

In so far as imprudent lapses cause crime, more severe punishment is not a very effective deterrent. Severity is ineffective because the cause of crime is unreasonable discounting of future punishment. In these circumstances, increasing the punishment’s severity gets discounted too much to have a large effect on behavior. Alternatively, increasing the certainty and immediacy of punishment may be more effective for deterring crime. For example, if teenagers in the school yard sometimes commit violence against each other, having a disciplinarian present to administer certain and swift punishment may prevent violence more effectively than increasing the severity of future punishment.

Moods are more variable for youth than adults. In terms of Figure 11.6, aging reduces the variance in \( g(r) \). Deterrence of youth crime may require certain and swift punishment, whereas severe punishment that is uncertain and remote may deter many kinds of adult crime, such as embezzling. In general, the state should punish differently youthful crime due to lapses and deliberative crime by adults.

Besides punishment, this model predicts that social policies can reduce crime by reducing variability in moods. To illustrate, chemical stimulants or depressants, such as alcohol and drugs, increase variability in moods. Social polices that reduce episodic use of alcohol and drugs will decrease crime. Psychological testing and use of new families of medicinal drugs can help adolescents to stabilize their moods. A regular rhythm to life, such as holding a steady job, presumably reduces variability in moods for most people.

H. Civility

The economic models of crime that we have been discussing assume that actors decide whether or not to obey the law based on a calculus of self-interest. In fact, many people obey the law from intrinsic motivation and respect. Suppressing crime requires the moral majority to help authorities. Without the respect of citizens for law, the state decays through thousands of small acts, as in W. H. Auden’s poem, “The Fall of Rome”:

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Fantastic grow the evening gowns;
Agents of the Fisc pursue
Absconding tax-defaulters through
The sewers of provincial towns.
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Performing civic acts such as helping the police solve a crime often costs money, time, effort, opportunity, inconvenience, or risk. Thus the vertical axis in
Figure 11.7 represents the amount a person would be willing to pay to do a particular civic act, and the horizontal axis represents the proportion of citizens willing to pay the price. According to the graph, a small number of people will pay a lot and a large number of people will pay a little. Roughly 80% of the citizens will pay something to do their civic duty, although not the same amount, whereas roughly 20% will pay nothing. To illustrate concretely, imagine a state in which 80% of the citizens will expend some time and effort to help police solve a crime, but not everyone is willing to expend the same amount, and 20% of the citizens are unwilling to expend anything. Thus 80% of the citizens have “internalized” norms of civic responsibility, and 20% externalize these norms.

In economic jargon, the willingness-to-pay curve describes the distribution of “tastes” for civic acts. Tastes are internal to people. Thus the curve in Figure 11.7 depicts the distribution of internalized civic values among citizens.

While the values depicted in Figure 11.7 are intrinsic, civic acts can also have instrumental value. The instrumental value of civic acts often depends on the advantage gained from having the reputation of being a good citizen. For example, people may prefer to do business with someone who has a reputation of being a good citizen.

Having graphed willingness-to-pay for civic acts, now we turn to their cost. Doing one’s civic duty such as helping the police often imposes direct costs in money, inconvenience, effort, risk, or lost opportunity. Figure 11.8 depicts the cost of doing a civic act, net of any instrumental gain.

In general, net costs can increase or decrease with the number of people who obey the norm. Figure 11.8 depicts the case where costs decrease with the number of people who obey the norm, which has a simple explanation. People are notoriously susceptible to group pressures, variously described as conformity, herd effects, or social solidarity. With group pressures, an increase in an act’s popularity lowers its cost. To illustrate concretely, as fewer people smoke...
in airports, non-smokers may feel that they take less risk of confrontation when asking smokers to obey the rule against smoking. Or when most people help the police, a person who does so may feel that helping the police runs less risk of retaliation from a criminal.

The next figure combines the two preceding figures. Specifically, Figure 11.9 depicts both the willingness-to-pay and cost curves. Their intersection, which occurs roughly at 40%, indicates the equilibrium level of civic acts. To increase the equilibrium number of civic acts, public policy could try to induce more people to internalize civic morality, which shifts the willingness-to-pay curve to the northwest. Improved civic morality might come from more stress in school on the
responsibilities of citizenship. Similarly, to increase the equilibrium number of civic acts, public policy could try to reduce their costs, which shifts the cost curve to the southeast. The cost might decrease because the state honors people who do civic acts, reward others with a good reputation for citizenship. In any case, we presume that an increase in civic acts reduces crime.

An important feature of the equilibrium for civic acts requires explanation. In the preceding Figure, the willingness-to-pay curve is equivalent to the demand curve in consumer theory. Notice that the willingness-to-pay curve has the usual downward slope of a demand curve. However, the cost curve in Figure 11.9, which is equivalent to the supply curve, also slopes down, which is not the usual shape of a supply curve.

An interesting effect occurs when the cost curve slopes down more steeply than the willingness-to-pay curve, as depicted in Figure 11.10. Instead of having a stable equilibrium at the intersection of the two curves, two stable equilibria exist as the corners of the graph. At one corner, the number of actors who do civic acts is zero, and at the other corner, the number is 100%. (We explain why in footnote\(^{10}\).)

The point of this example is that actors could end up in a situation where very few or very many citizens do civic acts. These two possibilities correspond to a world where many people help to suppress crime or few people do so. In circumstances

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\(^{10}\)Consider what happens when the number of actors doing civic acts is, say, 15% in Figure 11.10. At that point, the actual cost of civic acts exceeds what actors are willing to pay, so the number of actors performing civic acts will fall. The process continues until zero actors are performing civic acts. Alternatively, consider what happens when the number of actors doing civic acts is, say, 60% in Figure 11.10. At that point, the actual cost of civic acts is less than what actors are willing to pay, so the number of actors performing civic acts will rise. The process continues until 100% of actors are performing civic acts.
such as these, law plays an essential function that is different from deterrence. Instead of deterring criminals, law can help good citizens move to an equilibrium where many people perform civic acts and little crime occurs. In economic jargon, the criminal law “coordinates” good citizens so that society achieves a low-crime equilibrium.

We described two basic kinds of social costs: the net harm caused by crime and the resources spent on preventing it. The optimal amount of crime, or efficient deterrence, balances these costs. We propose the following simple goal for analyzing criminal law: *Criminal law should minimize the social cost of crime, which equals the sum of the harm it causes and the costs of preventing it.*

These two basic kinds of social costs often suffice for purposes of analysis. When analysis requires more complexity, we can refine and expand the types of social costs. To illustrate, criminal activities divert the efforts of criminals from legal to illegal activities, which imposes an opportunity cost. For example, an accountant who devotes herself to embezzling funds has less time for legitimate bookkeeping. Furthermore, while in prison, an accountant cannot audit books for clients. The opportunity cost of crime among accountants may be large enough to affect the optimal deterrence of embezzlement. From time to time, we will expand the definition of social costs to include such losses as the criminal’s opportunity cost, as required by our analysis.

Another complexity concerns the criminal’s perceived benefit from crime. According to the standard view among economists, as mentioned, the criminal’s benefit partly offsets the victim’s cost. Moralists, however, might say that the criminal’s illicit gain should not count as a social benefit. Ordinarily people reach different conclusions on different examples. To illustrate, most people agree that the benefit enjoyed by a person who steals food from an unoccupied cabin to save his life when lost in the wilderness should count as a social gain, and most people agree that the pleasure felt by a rapist (if there is such a pleasure) should not count as a social gain commensurate with the victim’s pain.

Unfortunately, many important examples that confront policy-makers do not provoke a consensus, even among economists, about the social value of the criminal’s gain. To illustrate, some government regulations on industry promote efficiency by correcting market failures, such as prohibitions against dumping toxic chemicals in rivers, whereas other regulations profit politically favored groups by making competition a crime, such as restrictions on agricultural production. A dramatic example of disagreement over regulations concerns the United States’ most creative and profitable financier in the 1970s, Michael Milken, who used high-risk bonds (“junk bonds”) to finance leveraged buyouts and hostile takeovers of corporations. He was sentenced to prison for violating technical regulations in security laws. Some economists believe that he did more than any other person to help modernize American industry, and other economists believe that he undermined the stock market by engaging in fraud.

When policy-makers disagree about the social benefits of crime, a good strategy for economists is to clarify the issues without necessarily resolving the dispute. Similarly, we will avoid arguments whose conclusions require taking sides in such debates.
QUESTION 11.15: What are some ways to measure the social cost of the harm caused by murder? (Recall our discussion in Chapter 9 of how to assign value to a life lost in an accident.)

QUESTION 11.16: Compare the simple economic goals of criminal law and tort law.

I. Optimal Amount of Crime Deterrence and of Efficient Punishment

Figure 11.11 depicts how to strike the balance between the net cost of the harm caused by crime and the cost of preventing it. In the figure, the horizontal axis measures reductions in the amount of criminal activity, ranging from no reduction at the origin up to a complete absence of crime at the amount 100%. Dollar amounts are measured along the vertical axis. The curve $MSC_D$ represents the marginal social costs of achieving a given level of crime reduction. $MSC_D$ slopes upward because officials undertake easy deterrence before resorting to harder deterrence. Consequently, achieving additional reductions in crime becomes increasingly costly. For example, reducing crime by an additional 1% is easier when crime has already been reduced 5% than when crime has already been reduced 95%.

The curve labeled $MSB$ measures the marginal social benefit of achieving various levels of crime reduction or deterrence. $MSB$ slopes downward because the benefit to society of a small reduction in the amount of crime declines as the total amount of crime declines. Thus, the reduction from, say, 5% to 7% benefits society more than the reduction from 95% to 97%.

Socially optimal deterrence occurs at the point where the marginal social cost of reducing crime further equals the marginal social benefit. In Figure 11.5 the social optimum occurs at the level of deterrence marked $D^*$. Notice that for any level

Figure 11.11

The efficient level of deterrence.
of reduction in crime less than $D^*$, the marginal social benefit of a further reduction exceeds the marginal social cost, so society should reduce crime further. Similarly, for any level of reduction in crime more than $D^*$, the marginal social costs of a further reduction exceed the marginal social benefit, so society should allow more crime to go undeterred.

Notice that changes in $MSC_D$ and $MSB$ can change the optimal level of deterrence. For example, suppose that the opportunity cost of resources devoted to deterring crime falls, and the marginal social benefit of deterrence remains the same; $MSC_D$ would fall to $MSC_{D1}$ and the optimal level of deterrence would increase to $D^{**}$.

As long as deterrence is costly, the optimal amount of crime is positive. Costly deterrence precludes a rational society from entirely eliminating crime. If deterrence costs rise, the optimal amount of crime rises. If, however, the net harm from crime rises, the optimal amount of crime falls.

In the next chapter, we describe efforts to determine whether marginal deterrence costs more or less than the resulting savings in the cost of crime in the United States; in other words, these studies try to determine whether the value of $D$ for the United States is above, below, or equal to the optimal value of $D^*$.

Note that this mathematical representation simplifies the computation of optimal deterrence in several ways. One important simplification is that we have not modeled an optimal schedule of punishments for related crimes. Rather than standing alone, criminal penalties form part of an integrated schedule, which influences their optimal values. Using powerful deterrents on less serious crimes often precludes using them on more serious crimes.

To illustrate, assume that life imprisonment is the maximum punishment available in a society, and the law prescribes life imprisonment for embezzling. Now assume that a policeman runs after an embezzler who has a gun. If the policeman apprehends the embezzler, the criminal will be imprisoned for life as required by the harsh law. So, the embezzler might as well try to shoot the policeman. If he succeeds in killing the policeman, he will escape. If he fails, there will be no additional punishment because the punishment for embezzling is already the maximum. In this example, harsh penalties for minor crimes undermine the deterrence of serious crimes. Unfortunately, taking such facts into account when calibrating punishments requires mathematics beyond the scope of this book.

Where efficient, harsh penalties may violate the moral and constitutional rights of criminals. For example, consider a law imposing the death sentence for embezzling petty cash. This law would create a large disparity between the severity of the punishment and the seriousness of the offense. Most people would regard the law as immoral, and U.S. judges would probably declare it unconstitutional. Such noneconomic considerations can operate as constraints upon the computation of optimal deterents.

**QUESTION 11.17:** Assume the acquisition of computers by the police increases the force’s efficiency. How would Figure 11.11 change?
**QUESTION 11.18:** Assume the acquisition of computers by criminals increases their elusiveness. How would Figure 11.11 change?

### J. Mathematics of Optimal Means of Deterrence

Having shown how to determine the optimum amount of deterrence, we next turn to an analysis of the optimal means of deterring crime. There are many allocation decisions to be made, such as the choice between foot patrols and car patrols by police, the choice between more police and more prosecutors, and the choice between more use of fines and more use of jails. We shall examine several of these choices to bring out some underlying principles.

First, consider a choice between allocating resources to make punishment more certain or more severe. For example, allocating more resources to police makes punishment more certain, and allocating more resources to prisons permits longer sentences. Recall that the expected punishment equals the probability of punishment multiplied by its extent. For example, the four rows in the following table 11.1, represent combinations of a punishment $f$, which might be a fine denominated in dollars, and a probability $p$, that result in expected punishment $p \times f$ equal to 10.

When the probability of punishment is multiplied by its severity, the result is the expected punishment. We might represent the combinations of certainly and severity graphically, in which case we would get the combinations in Table 11.1 lying along a single convex curve. The expected punishment is the same along any one line because, when moving along the line, changes in the probability of punishment exactly offset changes in its severity. These lines would look very much like a consumer’s indifference curves. (See if you can draw the curve that corresponds to the figures in Table 11.1.)

To keep the analysis simple, assume that the amount of crime is constant when the expected punishment is constant. By assumption, all four combinations of fines and probabilities in the preceding table result in the same amount of crime. Consequently, the socially efficient combination is the one that costs less. The one that costs less is almost certainly the fine of $100 applied with probability .10. The reason is that a higher probability requires more expenditures on police and prosecutors, whereas a large fine costs not much more to collect than a small fine. Indeed, fines are so cheap to administer that they yield a profit to the state, at least so long as the fine is not too large relative to the offender’s income. Since certainty of punishment is costly for the state to achieve relative to severity

<table>
<thead>
<tr>
<th>$f$ (PUNISHMENT)</th>
<th>$p$ (PROBABILITY)</th>
<th>$p \times f$ (EXPECTED PUNISHMENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1.00</td>
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<td>20</td>
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<td>100</td>
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of punishment by a fine, large fines with low probability are typically more efficient than low fines with high probability.

Instead of assuming that the punishment is a fine, assume that it is incarceration. Re-interpret the punishment \( f \) in the preceding table as days in jail. Unlike fines, incarceration is very expensive. Assume that longer jail sentences, which increase the severity of punishment, cost the state more than additional police and prosecutors, which increase the certainty of punishment. Under these assumptions, efficient deterrence may require modest punishment with high probability. Thus the low punishment 10 with high probability 1.00 may be most efficient.

There is an important consequence of this argument concerning combinations of fines and jail sentences. If fines are cheap to administer and incarceration is expensive, then it never makes sense to put someone in jail until the state first exhausts its ability to collect a fine from the criminal. In general, efficiency requires exhausting the ability to punish criminals cheaply with fines before resorting to the costly punishment of imprisonment. The optimal punishment includes the maximum fine that the criminal can reasonably pay. The fact that the state must spend much more to deter people who cannot pay fines than to deter people who can pay fines. This fact prompts policy-makers to look for ways to increase the capacity of criminals to pay fines. In the next chapter, we describe a system developed in northern Europe, called the “day-fine,” which attempts to overcome the criminal’s bankruptcy constraint that limits his ability to pay a fine.

**Question 11.19:** Explain in words when efficiency requires severe punishments with low probability, and when efficiency requires mild punishments with high probability.

**Question 11.20:** How does full employment reduce the cost of deterring crime?
K. Private Deterrence

Example 3 concerns whether Yvonne should protect herself by (1) installing bars on her windows; (2) installing a loud burglar alarm; or (3) buying a gun. Much deterrence of crime is by private individuals, not public officials. The example raises the question of whether or not private citizens have incentives to invest optimally in deterring crime. In general, the answer is “no.” Private citizens are mostly concerned with private costs and benefits, which do not necessarily align with public costs and benefits.

To illustrate, suppose that Yvonne installs a brand X double-bolt lock on her front door. Installing the lock has private value for her if it prevents the burglary of her house. Call this effect private deterrence because it benefits the private investor in precaution. Installing the lock has public value for Yvonne’s neighbors if burglars tend to avoid neighborhoods in which some houses have brand X double-bolt locks. Call this effect public deterrence because it benefits the public. Installing the lock has little social value if it prevents the burglary of Yvonne’s house by causing a burglar to rob the house next door. Call this effect redistributing crime. Redistributing crime has no net social benefit.

Private investment in preventing crime usually has these three effects (and other effects that need not concern us here). The state should encourage private investments that contribute to public deterrence, but the state need not encourage private investments that contribute to private deterrence or redistribute crime.

A simple condition determines whether the redistributive effect is small or large. Before committing a crime, the criminal can observe some private precautions. For burglary, examples of ex ante observable precautions include lights on walkways, bars on exterior windows, and exterior alarms. Ex ante observable precautions tend to redistribute crime. Criminals cannot observe other private precautions until they begin committing the crime. For burglary, examples of ex post observable precautions include locks on interior doors, interior alarms, identification marks on valuable objects, and guns owned by residents. Ex post observable precautions promote public deterrence by reducing the average profitability of crime. These facts lead to a definite prescription about private investment in preventing crime: The state should encourage ex post observable precautions; the state need not encourage ex ante observable precautions. (We will discuss the special case of guns—including whether they should be encouraged as an ex post observable precaution—in the next chapter.)

**Question 11.21:** Classify the following precautions against crime into ex ante observable and ex ante unobservable, and explain your answer: private guards in stores, auto alarms, “quick-dial” emergency phone systems (911 numbers in the United States), hidden cameras, and plain-clothes detectives.

**Question 11.22:** Assume that burglars correctly believe that many people in your neighborhood keep guns. How might this fact increase your security? How might this fact endanger you?
CONCLUSION

We began this chapter with a discussion of the traditional characteristics of a crime. We then recast the theory of crime in terms of an economic theory of criminal behavior. That theory holds that rational criminals compare the benefits of crime with the expected punishment imposed by the criminal justice system. We used this behavioral theory to develop an economic theory of optimal punishment, based upon the goal of minimizing the sum of the social harm caused by crime and the cost of deterring it. We showed how to determine the optimal level of deterrence and how to allocate society’s resources optimally among alternative ways to deter crime. Our task in the next chapter is to show how to use these models in formulating policy in the area of criminal law.

SUGGESTED READINGS


