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What We Spend and What We Get: Public and Private Provision of Crime Prevention and Criminal Justice

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Abstract

In this paper, we consider a number of issues regarding crime prevention and criminal justice. We begin by considering how crime is measured and present both general and specific evidence on the level of crime in a variety of countries. Crime is pervasive and varies substantially across countries. We outline the arguments for some public role in crime prevention, enforcement, prosecution, defence, adjudication and punishment. We consider the relative roles of the public and private sectors in crime control and criminal justice. We discuss various measures for the effectiveness of the criminal justice system. We conclude by suggesting some potential areas for research.

JEL classification: H5, K14, K42.

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I. INTRODUCTION

Communities that cannot provide an acceptable level of security for persons and property will not long survive. Economists have long pointed out that, even if such communities were to survive, they would not prosper. Communities where the strong are allowed to victimise the weak freely will be small, and surviving members will have to spend most of their resources on defence.

When property can be freely taken by theft and deception, no one has the incentive to invest. Protection of property from taking is the most basic of all property rights. Without this protection, the problem of the commons is pervasive.

Adam Smith believed that the protection of person and property was the most important duty of government after national defence. Yet, somewhat surprisingly, economists interested in public economics have rarely analysed the nature of the government's role in providing domestic security for citizens. A search of both general and advanced textbooks on public economics revealed no text that considered government expenditures and the government role in crime prevention and criminal justice.

In this paper, we seek to use the perspective and tools of public economics to examine crime control and criminal justice. We begin by presenting both general and specific measures of the level and nature of crime for a variety of countries. Not surprisingly, crime is pervasive. However, the level of crime varies substantially across countries. In Section III, we outline the arguments for at least some public provision of crime prevention, enforcement, prosecution, defence and adjudication. We briefly consider sentencing. In Section IV, we describe the relative roles of the private and public sectors in the provision of crime control and criminal justice. In the penultimate section, we summarise some research on the effectiveness of public expenditures on crime control and criminal justice. We conclude by suggesting some potentially productive research directions.

II. WHAT IS THE PROBLEM?

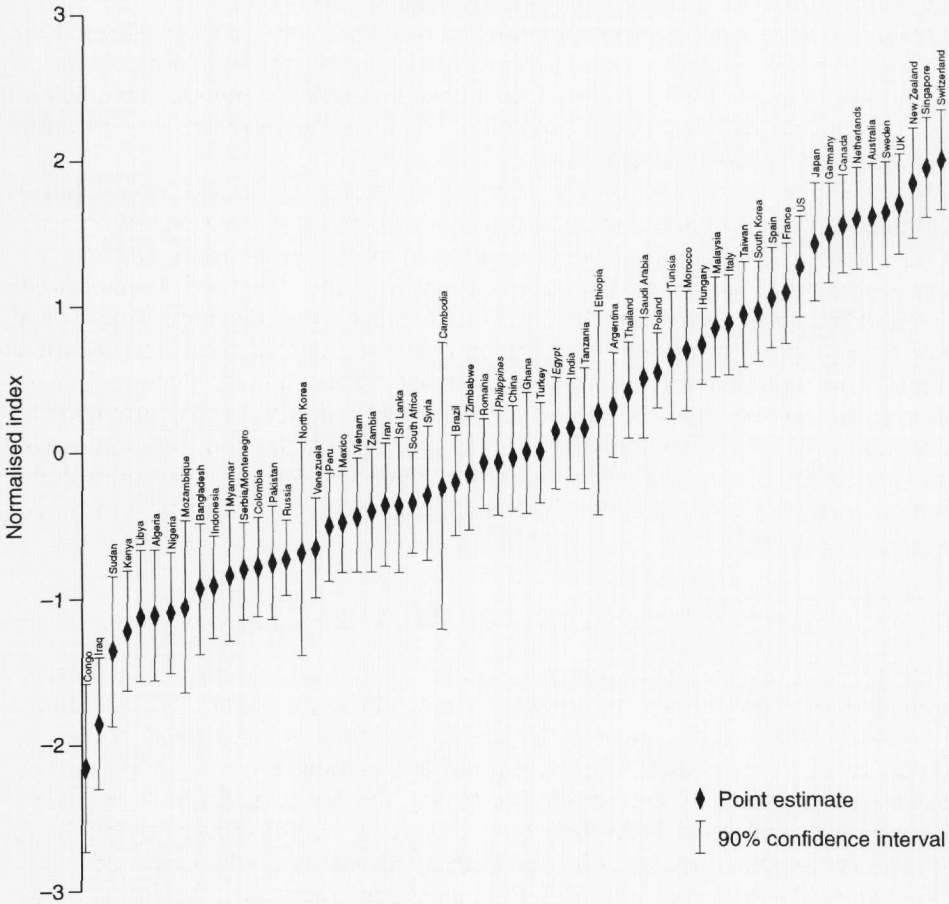
Crime is everywhere. Even though countries define crime differently in their criminal codes, no country is without crime. Some things are crimes almost everywhere. These have come to be called the core or traditional crimes — murder, robbery, rape, theft, burglary, fraud and assault. Even for these crimes, measuring the extent of the activity is, to say the least, difficult. Perpetrators have strong incentives to keep their activities secret, and discovery by public or private enforcement agencies is limited both by resources and by evidence.

Crime is, of course, not limited to the traditional crimes. Trafficking in illegal or stolen property is widespread and increasingly transnational. Financial and environmental crimes, sometimes carried out by large multinational enterprises,

can and often do cause mass human suffering and financial losses. One need only think of the Bhopal disaster or the BCCI scandal.

Obtaining an overall measure of the extent of crime that is comparable across countries is a daunting task. Fortunately, researchers at the World Bank have carefully compiled, analysed and aggregated indicators for the 'rule of law', graft and political instability and violence from 13 different sources for over 150 countries. See Kaufmann, Kraay and Zoido-Lobaton (1999a and 1999b) for a list of sources and methodology used. They provide an aggregate measure for each indicator that ranges from -2.5 to 2.5. Countries with higher numbers are

FIGURE 1
Rule of Law, 1997-98

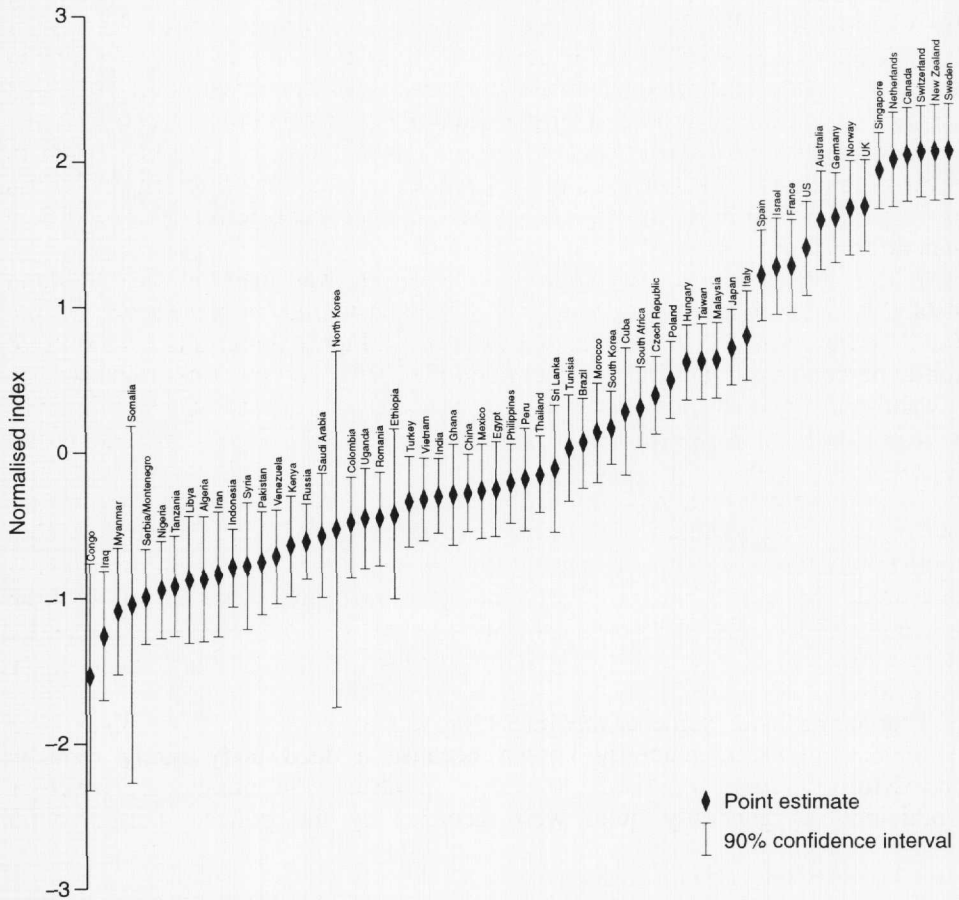


Source: Kaufmann, Kraay and Zoido-Lobaton, 2000.

deemed to be more law-abiding. Kaufmann et al. provide standard errors as well as point estimates for each country.

Kaufmann et al.'s rule of law provides, as far as we are aware, the broadest (in terms of both types of crime and geography) indicator of crime that is available. To obtain a measure for the rule of law, Kaufmann et al. aggregate a number of indicators that measure the extent to which agents have confidence in and abide by the rules of society. The indicators include perceptions of the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary and the enforceability of contracts. Kaufmann et al. indicate that, together, these indicators measure the success of a society in

FIGURE 2
Graft, 1997-98



Source: Kaufmann, Kraay and Zoido-Lobaton, 2000.

developing an environment in which fair and predictable rules form the basis for economic and social interaction.

Figure 1 displays Kaufmann et al.'s measures for the rule of law for selected countries. The diamond in the centre of the country name is the point estimate. The lines emanating from the point estimates provide the 90 per cent confidence interval for each estimate.

From these data, it is clear that some countries (for example, Switzerland and Singapore) have much stronger rules of law than other countries (for example, the Congo and Iraq). It is also clear that reasonable estimates for the middle-range countries (for example, Brazil, India and Turkey) do not differ significantly. Still, these estimates provide a useful broad assessment of the extent of the crime problem across countries.

Kaufmann et al.'s indicator for graft is designed to measure perceptions of corruption, an important aspect of crime (see Figure 2). Kaufmann et al. describe this measure as indicating the degree to which public power is used for private gain. This measure of crime is narrower than the rule of law considered previously, but it still provides a valuable measure of the extent of an important and often overlooked aspect of crime. Rankings are generally similar, but not identical, to those for the rule of law. For example, Italy is quite like Spain in terms of the rule of law but has a much lower rating than Spain for graft. Tunisia is quite like Brazil in terms of graft but has a higher measure for the rule of law than does Brazil.

While graft measures public property offences, Kaufmann et al.'s political instability and violence indicator might be considered as a measure of the likelihood of violent crime related to government. Figure 3 presents a measure of public perceptions regarding the likelihood that the government in power will be destabilised or overthrown by unconstitutional or violent means. On this indicator, Italy ranks above Spain, and Algeria joins the Congo and Iraq at the bottom of the scale.

Turning from general measures of lawfulness to measures for the core crimes, one finds less information both in terms of the number of countries for which comparable data are available and in terms of the crimes for which the extent is measured. Before proceeding, it is important to note that reports of crime to the police — the most broadly cited statistics in many countries — are generally more a measure of the functioning of the criminal justice system than of crime (Newman, 1999).

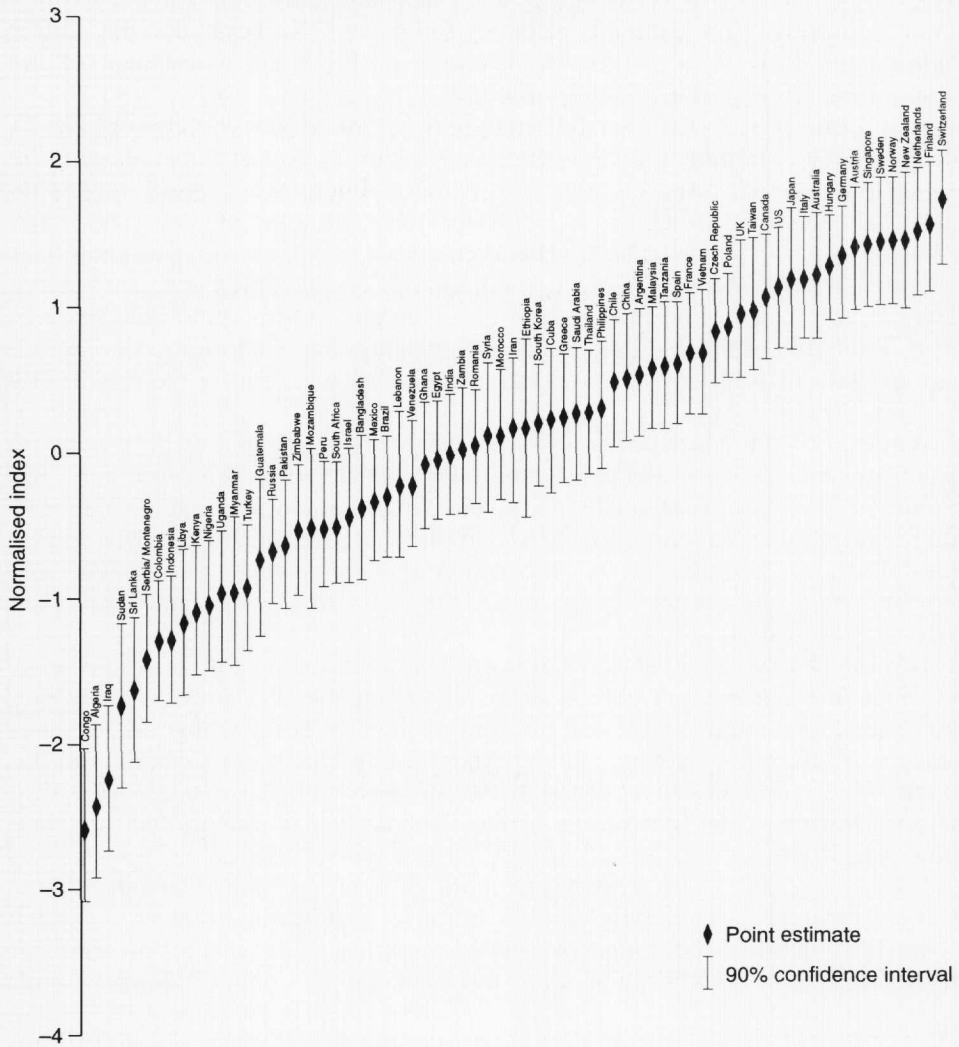
That being said, some crimes are more difficult to hide than others. For example, murder is generally known because a dead body rarely remains successfully hidden for long. In stable countries, the number of murders (homicides) is generally quite well recorded by the police.¹ Further vital

¹Newman, 1999, p. 11.

statistics provide a check on the number of homicides in countries with well-functioning public health departments.

The United Nations Crime and Justice Survey (UNCJS), the International Police Organisation (INTERPOL) and the World Health Organisation (WHO) provide independent estimates of the extent of homicide for a variety of

FIGURE 3
Political Instability and Violence, 1997-98



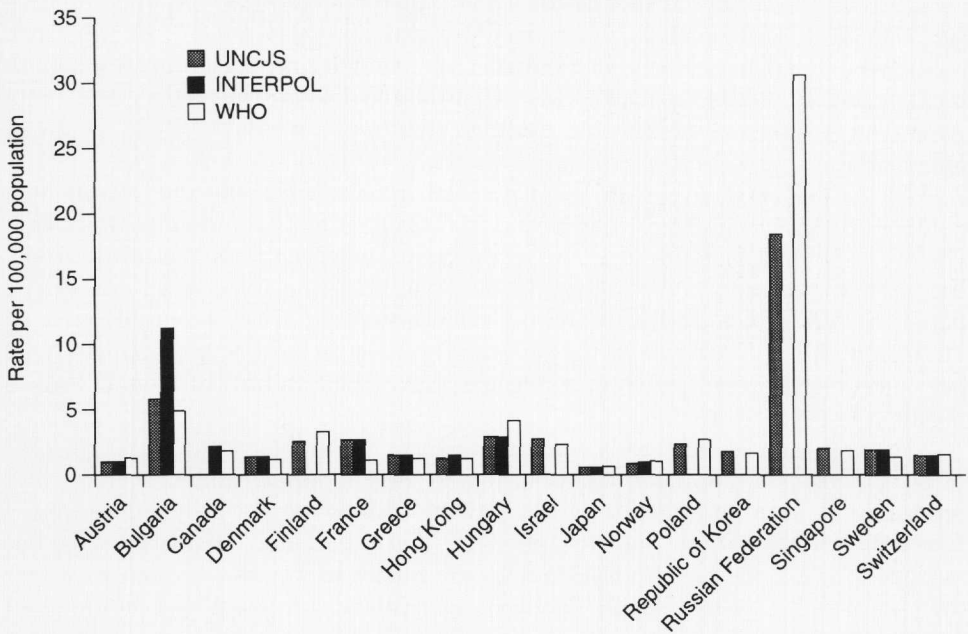
Source: Kaufmann, Kraay and Zoido-Lobaton, 2000.

countries. WHO reports only on successful, completed acts of homicide from vital statistics. The UNCJS and INTERPOL rely either directly or indirectly on the reports of national criminal justice systems.²

As can be seen in Figure 4, the three sources of data generally agree rather closely on the homicide rate for most countries. However, there are notable exceptions. For example, the different sources provide quite different estimates for Bulgaria and the Russian Federation. While the sources of data indicate quite different magnitudes for these countries, all sources indicate that they have higher murder rates than other countries for which data were available. For other countries, homicide rates range from under one per 100,000 (i.e. Japan and Norway) to over two per 100,000 (for example, Finland and Israel).

For crimes other than murder, measurement is more difficult. Surveys of victims provide reasonably accurate measures of offences for which there is an identifiable victim who knows that he has been victimised and is willing to report it in a survey setting. For international comparisons, the International

FIGURE 4
Homicide Rates per 100,000 Population, 1993



Source: Notes to Box 0.7 of Newman (1999).

²Raw data on homicide from the UNCJS and INTERPOL include attempts as well as completed murders. We use figures given in the notes to Box 0.7 of Newman (1999).

Crime Victim Surveys (ICVSs) that were carried out in 1989, 1992–94 and 1996 provide results for a number of industrialised, transition and developing countries.³ These surveys use consistent definitions of offences, while official statistics depend on the definition of offences in the criminal law, which can vary widely from country to country. The surveys asked about the following offences: (1) contact crimes (robbery, sexual offences, threats and assaults), (2) burglary (including attempts), (3) car crimes (car theft, theft from car and car damage) and (4) other thefts (motorcycle theft, bicycle theft and other personal theft).

These surveys reveal that more than half of urban residents report having been a victim of one or more of the covered offences during the last five years. Being the victim of a crime is a common occurrence in all urban areas. Rates of victimisation are highest in Africa and Latin America, where almost three-quarters of urban residents report having been victimised during the last five years. Rates are lowest in Asia, where 45 per cent of urban residents report victimisation in a five-year period. Victimisation rates in the US, England and Wales, and West Germany are quite similar, with between 60 and 65 per cent of urban residents reporting victimisation during a five-year period.

The ICVS asked respondents about their perception of the relative seriousness of various types of crimes. Western European and North American countries tended to rank violent crimes (for example, robbery with a weapon) most seriously, while African, Asian, Central and Eastern European, and Latin American countries ranked car theft as the most serious of the offences considered.

Urban residents have over a 50 per cent chance of being the victim of a contact crime during a five-year period in Colombia and less than a 10 per cent chance of being the victim of a contact crime in Switzerland. In Western Europe, the Netherlands reports the highest level of victimisation for contact crimes (22 per cent of urban residents report victimisation). This reported rate of victimisation is approximately the same as Russia's. In the US, approximately 20 per cent of urban residents report that they have been victims of contact crimes during a five-year period.

Car theft is most frequently reported in New Zealand (just under 50 per cent of urban residents report car thefts during a five-year period) and least frequently reported in China (less than 2 per cent of the Chinese report car thefts during a five-year period). These numbers point up the importance of opportunity. For most property crimes, victimisation rates are higher in wealthier countries where there is more of value to steal. Theft is significantly correlated with holdings of durable goods.

It is more difficult to gauge the extent of crimes other than murder and those covered by the ICVS. Official records of crime, such as the US Federal Bureau

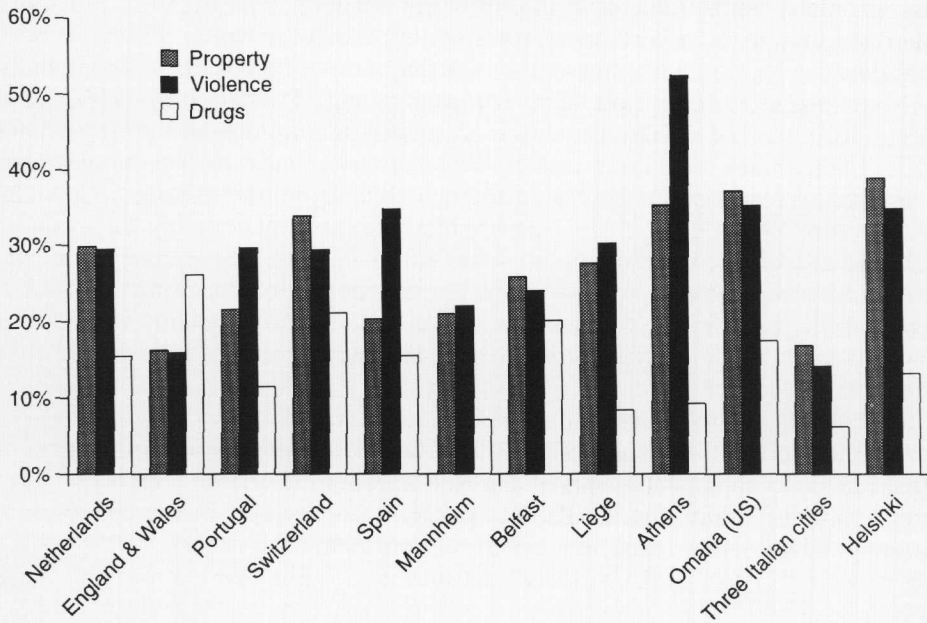
³For a description of methodologies and countries included, see Note 3 to Box 0.9 of Newman (1999).

of Investigation (FBI)'s Uniform Crime Reports (UCRs), reflect many things in addition to the underlying crime rate (for example, the willingness of residents to report crimes to the police and the reporting practices of police agencies). We discuss a few attempts (mainly cross-national) to study other types of offending here.

The ICVS, like most victimisation surveys, is concerned with offences where individuals or households are the victims. A few victimisation surveys have also sought to discern the extent to which businesses are victimised. For example, a 1993 survey of commercial establishments in England and Wales reports that eight out of 10 retailers and two out of three manufacturers experience one or more crimes covered by the survey in 1993. Commercial victimisation appears to be highly concentrated, with 3 per cent of retailers experiencing 59 per cent of the crime reported in the survey. The reported risk of victimisation and the amount of the loss were higher for retailers and manufacturers than for households (Mirrlees-Black and Ross, 1995a and 1995b).

As is well known, the core crimes with the exception of fraud are, like basketball, primarily a young man's game. In a very interesting study, Jurgen-Tas, Terlouw and Klein (1994) report the results of surveys of young people

FIGURE 5
Percentage Reporting Offences during the Last 12 Months



Source: Box 0.10 of Newman (1999).

(aged 14–21) in 12 countries that were carried out in 1992. As can be seen in Figure 5, rates of self-reported offending vary substantially across the areas studied. For example, young people in Athens report the highest rates of violent crime, with more than half of the respondents reporting that they had committed an offence during the last year. Young people in Helsinki report the highest rates of property crime (just under 40 per cent) and young people in England and Wales the highest rate of drug-offending (26 per cent).

Regardless of whether one considers general measures of law-abidingness, victimisation reports or self-reports of crime by the young, the message is the same — there is a lot of crime. That being the case, we turn to the next issue. What, if anything, should the public sector do about it?

III. WHAT PUBLIC ROLE?

As Hart (1994, p. 91) has noted, communities must have restrictions on the free use of violence, theft and deception if they are to survive and prosper. To put it somewhat differently, societies will place restrictions on the core or traditional crimes — murder, rape, robbery, theft, burglary, fraud and assault.

The question is how these restrictions will be imposed. In what Hart calls primitive societies, they may be imposed by custom and informal means of social control. However, as communities grow, develop and become more heterogeneous, restrictions against committing the core crimes tend to become a matter of religious or governmental rules or a mixture of both.

Today, the legal systems that outlaw the core crimes can be classified broadly into three types: (1) civil law, (2) common law and (3) Islamic law (Newman, 1999). Only in Islamic law do we find a mixture of religious and governmental restrictions against the core crimes. Islamic law tends to encourage non-governmental response to the core crimes, including murder (Groves, Newman and Corrado, 1987). Islamic law tempers retaliation by encouraging forgiveness. Under Islamic law, a victim or a victim's family may waive retaliation and receive instead a money payment from the perpetrator of the crime. In such a situation, the government will not become involved with either the offender or the offence. Only if the perpetrator and victim cannot agree does the government become involved.

In both the common law and civil law traditions, it is the government that forbids the core crimes. The civil law tradition originated as a combination of Roman law and papal statements of the Roman Catholic church. However, most countries that follow the civil law tradition today (for example, France, Germany, Brazil, Russia and Indonesia) rely on secular legislation as the source

of restrictions against the core crimes. Under a civil law system, there is a sharp separation of powers. Legislatures make the law and judges apply it.⁴

By way of contrast, the common law tradition relies on the customs of the people as its original source. Much of common law became codified over time. For example, restrictions against the core crimes are now generally legislated. However, judges may and do interpret the legislated law in particular cases. The judge has the ability to make laws in the common law tradition but not in the civil law tradition. Countries that use the common law tradition include England, India and the US.

Why do most developed countries empower one or more arms of government to determine what is criminal? The rise of the power of government to determine what is a crime coincides with the rise of the nation state, industrialisation and urbanisation. The rulers of the new nation states sought to monopolise control over the use of force in the hands of their servants for quite obvious reasons. Industrialisation and urbanisation weakened the force of traditional or customary law. The rise of secular society weakened religious restrictions against the core crimes, although religious restriction can still be very important in preventing crime.

Standardisation and codification of criminal laws lowered the transaction costs required for both interpersonal interaction and property transfers. Reliable and standardised rules allowed for greater economies of scale by lowering the costs of trade and travel over larger areas. As noted earlier, protection of property from taking by theft or fraud is the most basic of all property rights and is necessary to prevent the problem of the commons. The newly emergent nation state was in a unique position to undertake the codification and had the incentive to do so to solidify its power.

Many believe that crime is very distinct from other types of illegal acts because crimes are believed not only to harm the victim but also to harm other members of society. Crimes, particularly the core crimes, are believed to be offences against society, not merely offences against the individual (Kaplan, Skolnick and Feeley, 1991; Cooter and Ulen, 2000). In economic terms, crime produces negative externalities and will be too high if there is no public intervention.

An additional distinguishing feature of crimes as opposed to most civil offences, such as torts, is that conviction of a crime requires a finding of *mens rea* (a guilty mind). If enforcement costs were zero, we might want to eliminate the core crimes. By way of contrast, we only wish to encourage an efficient level of prevention expenditures in the case of torts. The intent to do physical harm or to transfer property by force or deception requires stronger deterrence than does

⁴In developed countries, the civil law and common law traditions have become more similar since the Second World War.

accidental occurrence and may even justify putting the offender in a position where he can no longer offend (i.e. incapacitating the offender).

Some have argued that many crimes should be handled like torts, with the victim bringing a case for compensation (for example, Friedman (2000)). Others argue that crimes are very different from torts. For some crimes (for example, rape and robbery), some argue that no amount of compensation can make the victim whole (Cooter and Ulen, 2000). Others argue that the intent required for a crime requires punishment or retaliation (*United States v. Bergman*, 1976).

Regardless of the position one takes in these arguments, even the most ardent proponents of treating many things that are currently crimes as torts find a need to criminalise in some circumstances. For example, Friedman (2000) suggests that criminalisation is necessary for acts in which the victims are anonymous (for example, highway robbery) or defendants are 'judgment-proof' (too poor to pay compensation to victims). The matter in dispute is what acts should be criminal.

1. Police

The police do many things, but we are concerned only with their crime-control functions. These functions include crime prevention and the apprehension of offenders.

(a) Preventing Crime

What is the proper role of government in preventing crime? As we will show later, crime prevention is now generally split between the private and public sectors, with the private sector generally spending more on prevention than the public sector.

Much crime prevention does not involve the use of force, and hence the argument for public provision is greatly weakened. When crime prevention does require the use of force, the case for public provision is stronger (Hart, Shleifer and Vishny, 1997). Public monopoly of and control over the legitimate use of force are central to the provision of standard levels of security for persons and property. Further, to be effective, the police require the sympathy and co-operation of the public. Public police may be better able to nurture these needed characteristics.

Public police forces are relatively new and emerged along with large, heterogeneous urban areas. They arose in response to a public outcry for more order. The first public police force was established in London in 1829 to provide a full-time day and night patrol to prevent crime. Sir Robert Peel, who was mainly responsible for establishing the force under the Metropolitan Police Act, insisted that political patronage be excluded from appointments and promotions (Miller (1977), as excerpted in Kaplan et al. (1991)). Boston established a public police force in 1837 to prevent violence between Protestants and Catholics. New York City's Municipal Police Act established a semi-military day and night

patrol force in 1845. The New York force was not insulated from political patronage (Kaplan et al., 1991, pp. 141–5).

(b) *Apprehending Offenders*

The police are asked not only to prevent crime but also to apprehend offenders when crime does occur. Apprehension often requires the use of force, and hence a reasonably good case can be made for public provision (Hart et al., 1997). Also, in contrast with many civil offences such as automobile accidents, the identity of the perpetrator may be unknown to the victim (Polinsky and Shavell, 1999). Even if the perpetrator's identity is known, the victim may well not be willing to press a case.

As noted earlier, crime can produce very high negative externalities (for example, fear of going out when someone has recently been murdered in the neighbourhood) and so both prevention of crime and apprehension of criminals will be inadequately supplied by the private sector. Prevention and apprehension are also likely to be much higher in wealthier than in poorer neighbourhoods if these activities are financed by the private sector.

To summarise, both efficiency and equity arguments call for public financing of at least a minimal level of police services in larger communities. The wealthy will often choose to purchase additional prevention to protect both their person and their property.

The fact that the police's crime-fighting activities can involve the use of force in a wide array of situations suggests that public provision rather than contracting with the private sector will likely be best for these activities (Hart et al., 1997). Other police functions (for example, record-keeping) may well be better contracted out than provided by the public sector.

2. Prosecution

The role of the state in prosecuting crime clearly depends upon whether crime is seen mainly as an offence against the state or as an offence against the victim. Countries as diverse as China, France and the US see crime mainly as an offence against the state or the community as a whole, and public officials generally prosecute criminal cases. However, the powers and type of officials empowered to prosecute crimes vary substantially across countries. In continental Europe, the prosecutor is an appointed career civil servant of the central government with a close relationship to the court. Most prosecutors in the US are locally elected officials with substantial autonomy from both the judicial and the executive branches of government (Kaplan et al., 1991, pp. 289–91).

In China, private citizens (generally the victim or the victim's relatives) prosecute less serious crimes, while the state prosecutes more serious offences (Newman, 1999, p. 40). From an economic point of view, this split can be

justified because of the larger negative externalities arising from more serious crimes.

Traditional English common law sees crime as an offence against the victim, not as an offence against some broader community. It was not until 1879 that England created an Office of Public Prosecutions. The Director of this Office is a career civil servant. The actual trial of cases is assigned to barristers in private practice designated as Crown Counsel. For a discussion, see Newman (1999, p. 132) or Kaplan et al. (1991, pp. 287–306).

One can easily argue for public expenditures to secure prosecution of crimes that cause large negative externalities, since private parties would be expected to bring too few suits. Arguments for public provision of prosecution generally rest on the need to maintain a high level of standards in the prosecution of serious criminal cases. As Kaplan et al. (1991, p. 311) express it, 'The prosecutor is also a representative of the government upon whom the courts, and society, impose a standard of ethics which may transcend any particular rule'. Contracts for prosecutors would tend to be quite incomplete. Privately contracted prosecutors would have strong incentives to lower standards in order to lower costs (Hart et al., 1997).

3. Defence

Most developed countries, whether following a civil or a common law legal tradition, provide public funding to allow indigent defendants to hire legal counsel in serious criminal cases. The need for representation is probably stronger under the adversarial common law tradition, where the judge can only consider the evidence brought before him, than under the inquisitorial civil tradition, where the judge can actively search for information.

Economic arguments for the provision of defence counsel for the indigent rest mainly on equity grounds, although it would be possible to argue that it is inefficient to imprison the innocent poor. Horizontal equity dictates that the equally situated should be treated equally. In terms of the core crimes, equal situation might well be defined as being equally innocent or equally guilty. Defendants without legal counsel will clearly not be in a situation that is equivalent to the situation of those who are able to purchase competent legal counsel.

The US has a large, complicated and much criticised 'system' for providing defence counsel for the indigent. The sixth amendment to the US Constitution establishes the right to counsel in federal criminal prosecutions. However, most of the core crimes are prosecuted at the local level, not at the federal level. During the 1960s and 1970s, a series of US Supreme Court cases (for example, *Gideon v. Wainwright* (1963) and *Argersinger v. Hamilin* (1972)) established indigents' right to counsel for all criminal prosecutions that carry a sentence of imprisonment.

The Supreme Court did not indicate how state and local government were to provide indigent defence counsel or what source of funds would be used to pay for indigent defence. Currently, local governments (for example, the counties) are primarily responsible for providing defence counsel for the indigent. The majority of funding for indigent defence comes from local government, although the state share of funding has grown over the years (Smith and DeFrances, 1996).

The system for providing indigent defence in the US varies markedly from place to place. However, three basic methods are used:

- *Assigned counsel programmes* appoint indigent counsel on a case-by-case basis. The counsellor is chosen from members of the local, private bar.
- Under *contract attorney programmes*, the local or state government contracts with individual private attorneys, private law firms or local bar associations to provide indigent defence.
- Under *public defender programmes*, salaried staff of full-time or part-time attorneys provide indigent defence. The public defenders may be employed by state or local government or by non-profit corporations contracted to provide indigent defence (Kaplan et al., 1991, p. 351).

About three-quarters of inmates in state prisons and about half of those in federal prisons in the US received publicly provided legal counsel for the offence for which they were serving time (Smith and DeFrances, 1996). The quality of publicly provided legal counsel varies widely both across the US states and, in many states, across local jurisdictions. In 1986, the cost per case of providing defence counsel ranged from a low of \$63 in Arkansas to a high of \$540 in New Jersey (Kaplan et al., 1991, p. 353).

Horizontal equity is not achieved by the current US system for indigent defence. Further, as noted by Judge Richard Posner, criminal defendants have less access to the private market for lawyers than do defendants in civil cases where damage awards are possible (*Merritt v. Faulkner*, 1983).

4. Adjudication

The need for impartial adjudication of guilt in criminal cases is widely accepted. In traditional societies, this adjudication was often by a body of chiefs or elders. In the course of economic development and urbanisation, criminal law and criminal procedure became increasingly complex and a widely respected, informal body to adjudicate became more difficult to construct and use. The increasing complexity and impersonality of adjudication has led to the increasing use of trained personnel to referee the trial or inquisition (for example, to enforce criminal procedure) and establish matters of law. Still, adjudication is, in many countries, a task that is carried out jointly by lay citizens and trained personnel.

For example, in the US, a jury of peers (selected from voter registration lists or other compilations of residents) determines the facts and the guilt or innocence of the accused. The judge referees the proceedings (for example, enforces proper procedure and the admission of evidence), instructs the jury, determines matters of law and decides on the sentence a convicted defendant will receive after being found guilty.⁵ In the US, judges may be elected or appointed and the judiciary is separated from the executive or legislative branch of governments.

In Germany, lay judges often sit with professional judges in criminal trials (Aronowitz, 2000). By way of contrast, in Japan, the jury system has, by and large, been suspended and judges chosen on the basis of national-level examinations adjudicate in criminal trials (Moriyama, 2000).

As noted by Judge Richard Posner, impartial adjudication is central to a well-functioning judicial system. As Posner (1992, p. 534) puts it, 'the rules of the judicial process have been designed both to prevent the judge from receiving a monetary payoff from deciding a case in a particular way and to minimise the influence of politically effective interest groups on his decisions'. Posner's first requirement suggests that for-profit provision of adjudication is a non-starter. His second requirement suggests that some insulation from electoral politics may be desirable.

But why do so many adjudication systems involve the lay public? One possible justification for lay involvement in adjudication may be to obtain both public support for and tempering of legal outcomes in the criminal arena. For example, it is well known that juries will often not convict when the potential penalty is not in accord with community feelings regarding what is appropriate.

5. Punishment

Punishments for criminal offence range widely: death (capital punishment); deprivation of liberty (up to imprisonment for life); corporal punishment; control in freedom (for example, probation and parole); fines; warnings or admonitions; and community service orders. According to the fifth United Nations Criminal Justice Survey, which obtained information on crime and criminal justice for 1993–94 for a wide variety of countries, deprivation of liberty (i.e. imprisonment) was the most common form of criminal punishment, with 35 per cent of cases resulting in this type of sentence. Fines were the next most common sentence and were used in 33 per cent of the cases (Newman, 1999, pp. 89–90).

The relative use of fines and imprisonment varies widely across countries. For example, according to the UNCJS, adjudicated criminal cases in Colombia

⁵When criminal sentences were largely indeterminate (for example, five years to life), judges and parole boards had substantial discretion. The move to determinate sentencing (for example, sentencing guidelines) decreased the amount of sentencing discretion available to judges.

always result in imprisonment, 96 per cent of criminal cases resulted in imprisonment in Greece, 92 per cent in Mexico and 60 per cent in Italy. By way of contrast, 95 per cent of adjudicated cases in Japan resulted in a fine, 82 per cent in Myanmar, 79 per cent in England and Wales and 70 per cent in Egypt and in Germany.

After carrying out a quantitative examination of sentencing practices, Shinkai and Zvekic conclude that the level of development of the country, economic situation or region could not explain variations in sentencing practices. They conclude that cross-national variations in sentencing patterns are best explained by the 'availability and acceptability of the sentencing options' (Newman, 1999, p. 91).

Economists have been interested in optimal sentencing since the work of Becker (1968) and Stigler (1970). Economists generally conclude that fines should be preferred whenever they can be imposed. See, for example, Posner (1992, p. 227). The argument for fines rests on their production of revenue for the state, the victim or both and the high costs of imprisonment. The major economic arguments for the use of imprisonment for the core crimes rest on the fact that many who commit crimes are too poor to pay a fine that would provide optimal deterrence. For a discussion, see Kaplow and Shavell (1999). This is so both because of their penury and because many of the core crimes have low probabilities of the offender being penalised and, hence, would require very high fines if optimal deterrence were to be achieved. For example, in New South Wales (Sydney and surrounding communities), crime statistics for 1996 indicate that, as a whole, those who break and enter buildings, steal cars, rob or assault others have only a 4 per cent chance of being convicted and less than a 1 per cent chance of going to prison. The reason for the low probability of apprehension and punishment for these crimes is mainly victims' failures to report the offences to the police (54 per cent of offences are reported), the police's failures to record reported offences (40 per cent of crimes are recorded by the police) and the police's failures to find the perpetrator (7 per cent of crimes are cleared by the police) (Newman, 1999, p. 75).

Another economic argument for imprisonment rather than fines is that imprisonment quite successfully incapacitates offenders and fines do not. The social benefit of this incapacitation depends upon the extent to which offenders will continue to offend and on the elasticity of supply of offenders. This suggests that imprisonment of consistently violent offenders will have higher social benefits than will imprisonment of those who commit a 'crime of passion'. Certainly, it argues against the tendency in the US to use scarce prison resources for drug dealers. As my son, who lives on the lower east side of New York, says, 'Mom, they are like cockroaches — as soon as one leaves, there is another to replace him'. Society achieves little decrease in drug dealing by incarcerating drug dealers.

The arguments presented up to this point suggest that wealthy offenders with little likelihood of offending again should be fined, not imprisoned. While this is largely the case, it is not always so. Why? Before turning to possible economic arguments for imprisoning such offenders, we will consider the reasons judges provide.

In *United States v. Bergman* (1976), a 64-year-old rabbi with an excellent reputation for community service was convicted of fraudulently charging the government for services rendered by nursing homes that he owned. In sentencing Bergman to a short term of imprisonment, Judge Marvin Frankel carefully enunciated his reasoning. He concluded that both general deterrence and equal justice required a prison sentence in this case.

It is also interesting to consider Judge Kimba Wood's reasoning when sentencing the US junk bond inventor, Michael Milken, to prison. She found that a prison term was necessary in the Milken case to achieve general deterrence (i.e. the need to prevent others from violating the law). Her reasoning is interesting. She found that prison sentences are viewed as one of the most powerful deterrents to the financial community. She also reasoned that crimes such as securities fraud, which are hard to detect, require greater punishment in order to deter others from committing them (Kaplan et al., 1991, pp. 571–5).

In some ways, the arguments of Judge Frankel and Judge Wood are like those of economists, but in other ways they are quite different. Both Bergman and Milken were capable of paying large fines (indeed, Milken paid very large fines). Being barred for life from working in the securities industry effectively incapacitated Milken, and Judge Frankel found it unlikely that Bergman would ever offend again. This leaves only the economic argument of optimal deterrence. Would it have been possible to achieve optimal general deterrence by only fining Bergman and Milken? The judges ruled not, but I suspect that many economists would argue that, given the wealth of these two criminals, a large enough fine would have effectively deterred others.

This leaves Judge Frankel's second argument, equal justice. Economists are not accustomed to thinking about equal justice but are accustomed to thinking about horizontal equity. As we argued earlier, in the criminal justice setting, horizontal equity might be seen as treating equally guilty parties equally. Sending the judgment-proof poor to prison and allowing the equally guilty rich to pay a fine might strike some economists as horizontally inequitable.

IV. PUBLIC AND PRIVATE PROVISION OF PREVENTION AND CRIMINAL JUSTICE

The previous section gave reasons why we might have public expenditures on crime prevention and criminal justice. In this section, we will focus on (1) how much overall spending there should be on crime prevention and criminal justice, (2) public expenditures on crime prevention and criminal justice, (3) individual

crime prevention activities and (4) the partial privatisation of criminal justice activities.

1. Optimal Level of Expenditures on Crime Prevention and Criminal Justice

In many industrialised countries, an increasing amount of public and private resources is devoted to crime prevention. What counts as prevention? Examples include specific crime prevention programmes (for example, juvenile delinquency, school, ex-offender job training, rehabilitation and counselling programmes), employment of security guards, installation of locks, burglar alarms, CCTV systems and many other innovations in crime preventive technology, and policing. The socially or individually optimal level of crime prevention is where the marginal benefit of reduction in crime equals the marginal cost of extra prevention. However, as Freeman (1999) has noted, to estimate the marginal dollar value of the reduction in crime due to any crime prevention policy is hard because of the difficulties associated with measuring reductions in monetary and non-monetary costs (for example, reduced non-monetary loss from being victimised).

To calculate the trade-off of the marginal value of the reduction in crime due to the criminal justice system is even trickier than for prevention. The criminal justice system is diverse and multifaceted. There are a host of agencies involved and, at the margins, these agencies engage in much work having little to do with criminal justice. Thus, when the youth services of an English town asked the simple question 'did our interventions against offending come to a profit or loss last year?', the answer required a considerable research effort. A criminal justice 'audit' was set in train to estimate the costs of operating the criminal justice system. For a discussion of such an audit, see Shapland (2000), who notes that such work helps us to understand the respects in which criminal justice is indeed a 'system'. Efforts to gauge precisely the unit cost of each stage of criminal justice (for example, average costs to provide support to victims during the reporting and investigation stage) have a wider significance. Only by comparing the use of resources with such data can one see the effective priorities of the system — that is, upon what it spends its money. Informed comparison of, say, spending on victim-offender mediation compared with spending on refuges for rape victims can then be made.

Interest in rigorous evaluations of crime prevention programmes has increased in recent years. Sherman et al. (1997), for example, introduce a scientific methods scale to assess the methodological quality of evaluation studies in the US, and Goldblatt and Lewis (1998) report similar research from the UK. Partially in response to this trend, the UK government established a three-year Crime Reduction Programme (1999–2002), which included an assessment of the effectiveness and cost-effectiveness as a foundation for setting priorities and allocating resources. Cost-effectiveness and cost-benefit analyses

of criminal justice agencies and programmes require estimates of both the costs of crime and the cost of the agency or programme. As noted earlier, estimating the cost of crime is difficult. However, estimates are becoming more common. For example, Brand and Price (2000) provide estimates of the cost of crime for the UK, which include monetary and non-monetary costs to victims. Cost-benefit analyses of crime prevention programmes have also been carried out in other industrialised countries (see references cited in Brand and Price).

There appears to be a broad consensus in the international community on the process required to ensure cost-effectiveness in reducing crime: increased collaboration between institutions (see Walker and Sansfacon (2000)). These institutions include communities, families, schools, businesses and government agencies, such as law enforcement, education, health, labour, social services, housing and urban planning departments. For France, Walker and Sansfacon provide confirmation of the importance of co-ordination of crime prevention programmes between government agencies in reducing crime. The authors describe 'Local Prevention Contracts' in which mayors, chief prosecutors, police chiefs and the national official for education sign contracts to support local crime prevention projects covering most urban areas in France. Also, a community might end up with a group of young workers who share the experience of work with the police as safety and security assistants or as social mediation agents.

In addition to increases in partnerships with other organisations, there has been some interesting work on police tactics. On the one hand, the Kansas City preventive patrol experiment (Kansas City, Mo., Missouri Police Department, 1977) concluded that reduced police response time does not reduce crime. On the other hand, community policing with a clear focus (for example, directed police patrol in crime hot spots) has shown substantial evidence of crime reduction in the US (Sherman et al., 1997). Despite the fact that there is evidence that many different crime prevention programmes can effectively prevent crime (see Section V), the police and prisons remain the two most fiscally important areas of criminal justice expenditure in almost all developed countries.

2. Public Expenditures

In analysing expenditures on criminal justice, it should be borne in mind that, in most countries, the police, courts and prisons are administered by many different agencies or departments of government. Consequently, within countries, it is difficult to identify expenditures since financing is often conducted in separate government departments which may be unrelated to criminal justice itself (see Newman (1999, pp. 137–8)). It should also be noted that, while information problems concerning annual expenditures on criminal justice exist within countries over time, comparisons at cross-national level are sometimes even more problematic. Difficulties arise, in the main, from the way different

countries define crime, justice and other relevant concepts (see Howard, Newman and Pridemore (2000) for a survey of comparative criminology issues).⁶

According to the Bureau of Justice Statistics, the total amount spent on criminal justice by all levels of government in the US in 1996 was \$120 billion. Lindgren and Gifford (2000) report that \$53 billion was for police protection,

TABLE 1
Expenditures per Mille of GDP (1998 prices)

	<i>Judiciary</i>	<i>Prosecution</i>	<i>Police</i>	<i>Prison</i>	<i>Total</i>
Australia	1.12	0.28	7.37	1.76	10.53
Austria	2.49	0.17	8.79	1.15	12.60
Canada	1.20	0.34	7.23	2.48	11.25
Denmark	1.22	0.21	4.86	1.35	7.64
England and Wales	1.24	0.46	10.82	2.55	15.07
France	1.05	0.26	6.10	0.85	8.26
Germany	2.72	0.79	5.86	1.06	10.43
Netherlands	1.12	0.56	7.30	2.59	11.57
Sweden	1.67	0.42	6.07	2.18	10.34
US	2.91	0.47	6.75	5.51	15.64

Note: Estimates are italicised.

Source: van Dijk and de Waard, 2000, p. 49.

TABLE 2
Expenditures per Capita

	<i>Judiciary</i>	<i>Prosecution</i>	<i>Police</i>	<i>Prison</i>	<i>Total</i>
Australia	25	6	160	38	229
Austria	57	4	203	26	290
Canada	28	8	169	58	263
Denmark	30	5	117	32	184
England and Wales	23	9	205	49	286
France	23	6	132	19	180
Germany	64	19	137	25	245
Netherlands	23	11	151	54	239
Sweden	33	8	119	43	203
US	81	13	188	154	436

Euros, 1998 prices

Notes: Estimates are italicised. Fixed exchange rates for Euro-zone countries; purchasing power parity 1998 for other countries.

Source: van Dijk and de Waard, 2000, p. 50.

⁶Clearly, differences in accounting practices may seriously affect capital and labour expenditure estimates reported by countries to agencies such as the UNCJS.

\$41 billion for corrections (for example, prisons and jails) and \$26 billion for judicial and legal costs. In the US, government spending on crime as a percentage of GDP was roughly 1½ per cent in 1996. Tables 1 and 2 summarise the estimates of criminal justice expenditures for a number of major industrialised countries. These cross-country aggregates are from van Dijk and de Waard (2000) and relate mainly to 1997 and 1998.

The US and England and Wales have the highest levels of spending on crime as a proportion of GDP, with Denmark and France recording the lowest expenditure rates. A striking feature of Table 1 is the relatively low level of police expenditure for the US compared with the high level in England and Wales. This difference may reflect the high ratio of private to public police in the US relative to England and Wales but may also reflect differential salary levels within and across these countries.

It is no surprise that the expenditure on prisons is much higher in the US than in other countries, given the substantial increases in the US incarceration rate over the last three decades. For purposes of comparison, expenditure rates on prisons in France are the lowest in the sample.

From Table 2, we note that the US is the biggest per capita spender, with expenditures of 436 euros per head, followed by Austria and England and Wales. The lowest per capita spenders are France and Denmark, with 180 euros and 184 euros respectively.

During the past two decades, the number of police per head of population for both industrialised and developing countries has increased, although the greatest increases have been seen in industrialised countries. As Newman (1999) points out, there exists a strong positive correlation between expenditure on criminal justice and economic wealth (as measured by GDP per capita). Table 3 focuses on police expenditure per capita and GDP per capita. In general, we see that richer countries spend more per head on policing. However, Japan is one clear exception, with a very high GDP but low police expenditure. Rough calculations suggest that developing countries (for example, Colombia, Cyprus, Jordan, Saint Vincent and Grenadines, and Slovenia) spend more on police as a percentage of GDP relative to industrialised countries.⁷

Rapidly growing prison populations in many countries have led to an upsurge of interest in discerning the impact of this costly increase on crime rates. For example, recent work in the US, using either state-level panel data on crime rates from the FBI's Uniform Crime Reports (for example, Levitt (1996)) or time-series data (for example, Witt and Witte (2000)), finds increased imprisonment to be associated with significant declines in the reported crime rate. It is important to note that this work considers the effect of increased imprisonment

⁷In some countries, the military assumes some police functions. For example, in the US, the military was used to help fight the 'war on drugs'.

TABLE 3
Police Expenditure and GDP per Capita, 1994

	<i>GDP per capita (US\$)</i>	<i>Expenditure on police per capita (US\$)</i>	<i>Expenditure on police as a percentage of GDP (%)</i>
Colombia	1,847	18.72	1.01
Costa Rica	2,463	7.42	0.30
Croatia	3,867	20.57	0.53
Cyprus	9,754	136.59	1.40
Denmark	28,245	145.28	0.51
Finland	19,048	112.23	0.59
France	24,608	148.90	0.61
Greece	7,465	60.01	0.80
Hong Kong	22,590	185.65	0.82
Hungary	4,072	6.09	0.15
India	309	0.20	0.06
Japan	36,782	18.40	0.05
Jordan	1,095	15.42	1.41
Madagascar	208	0.05	0.02
Malta	7,394	77.09	1.04
Netherlands	21,536	204.09	0.95
Romania	1,274	4.13	0.32
St Vincent and Grenadines	2,248	41.45	1.84
Singapore	23,556	100.94	0.43
Slovenia	7,206	98.13	1.36
Spain	12,201	27.73	0.23
Sweden	22,499	157.29	0.70
Switzerland	36,096	299.53	0.83
Turkey	2,227	9.66	0.43

Source: Adapted from Newman (1999, p. 302).

on crimes reported to the police. As noted earlier, reported crime can change even when actual crime does not. For example, victims can decide to report more or less crime to the police and the police can decide to record more or less of the crime that they uncover.

As of mid-1999, the US had incarcerated 1,860,520 individuals in its prisons and jails. This represents an incarceration rate of one in every 147 US residents. Estimates of the annual cost of locking up an inmate in the US can be found in Donohue and Siegelman (1998). For example, they estimate (p. 5) that the annual cost of incarcerating an additional inmate is approximately \$36,000 (in 1993 dollars). Although this estimate includes the costs of building, occupying a

prison cell and lost legitimate wages, it ignores a number of social benefits (for example, the benefit from seeing an individual punished) and social costs (for example, the effects of imprisonment on future legitimate work experience).

TABLE 4
Annual Expenditure per Convicted Prisoner, 1994

	<i>Expenditure per convicted prisoner (US\$ p.a.)</i>
Northern Ireland	158,197
Switzerland	112,145
Sweden ^a	90,806
US ^a	73,205
Denmark	64,932
England and Wales	61,721
Bermuda	56,510
Japan	47,873
Scotland	46,235
Luxemburg	43,885
Cyprus	39,284
Slovenia	31,786
Hong Kong	28,341
Portugal	22,442
Finland	18,908
Austria	17,980
Belgium	15,767
Uruguay	10,949
Republic of Korea	10,122
Hungary	9,788
Singapore	9,593
Czech Republic	8,903
Brunei Darussalam ^a	4,253
Colombia	4,028
Turkey	3,384
Slovakia	2,962
Panama	2,871
Costa Rica	1,923
Croatia	1,231
Guyana	542
Madagascar	70

^a1990 data.

Source: Newman, 1999, p. 142.

As well as differences in expenditure on police and courts between developed and developing countries, richer countries also tend to spend more on prisons, although Japan again, with its high GDP, spends relatively little on prisons (Newman, 1999). Table 4 shows UNCJS figures for annual public expenditures per convicted prisoner. These data are derived by multiplying the expenditure (salaries and fixed assets) on corrections (penal and correctional institutions) reported by each country in local currency by an exchange rate and then dividing by the number of convicted adult prisoners reported in 1994. With the exception of Northern Ireland, which has its own unique characteristics, Switzerland is currently one of the highest spenders, alongside Sweden, the US, Denmark, and England and Wales. Interestingly, these are countries identified in Figure 1 as having stronger rules of law.

An examination of expenditures per convicted prisoner indicates some interesting facts. Japan has relatively low levels of spending on prisons per head of the population, while at the same time it spends a high amount per prisoner. Another fact that stands out is that developing countries have lower levels of prison expenditure per prisoner than industrialised countries. These particular comparisons are obviously sensitive to the precise choice of day of year, given that the number of admissions to prison is not taken into account (see Newman (1999, p. 337)).

3. Individual Efforts to Prevent Crime

In general, an individual will purchase crime prevention goods and services when the cost of prevention is less than the expected benefits from prevention. One aspect of the debate over the modes of crime prevention is the separation between private and public expenditures. There are a number of explanations as to why certain individuals may only be concerned about private expenditures. The failure of government programmes to stem the growth in crime may provide one example, but an alternative explanation may lie in terms of how individual objectives are determined. The median-voter model, originally developed in the political sciences, may be applied to shed light on the level of private prevention expenditures. In democracies, things such as police services will be set at the level desired by the median voter (generally considered to be the voter with median income). Individuals and firms with above-median income may quite rationally choose to increase their level of protection by buying in the private market. Under such circumstances, it could be argued that richer individuals and firms purchase relatively more protection, because they personally stand to gain more from this than from the alternative low-protection strategy.

Expenditures by individuals and private organisations on crime prevention are more difficult to estimate than public expenditures. In 1992, the latest year in the US for which we have a bench-mark input-output table, private household purchases of detective and protective services amounted to \$944 million and

purchases of security systems services amounted to \$1,301 million. Clearly, these are not the only private purchases related to crime prevention and criminal justice. Purchases of legal services by private households cost about \$44 billion in 1992, but we have no information on what part of this cost was related to criminal cases. There are also expenditures on modifications to existing structures (for example, bars on windows), car alarms and other anti-theft devices that do not show up explicitly in the estimates. The above private expenditures do not include expenditures by businesses and other organisations, which have substantial crime prevention and apprehension expenditures, as is clear from a trip to any major company or university in the US. Unfortunately, such estimates are not readily available in the UK due to the absence of systematic accounting of private crime prevention expenditures.

Cooter and Ulen (2000, p. 458) quote figures for US private expenditures on crime prevention in 1993 of \$65 billion. Sources cited in Anderson (1999) estimate that expenditures on private protection in 1993 were \$69 billion. Philipson and Posner (1996) cite a yet higher estimate of \$300 billion (including expenditures by businesses and other enterprises on security guards and other measures of self-protection). Laband and Sophocleus (1992) provide a similar estimate.

Anderson (1999) concludes that the aggregate burden of crime, taking into account the value of lost property, transfers and losses to victims of crime (for example, worth of assets from victims, lost productivity, medical expenses and diminished quality of life), is \$1,705 billion. This estimate seems excessive, given that it is approximately one-fifth of the US GDP reported in 1999.⁸

It would appear that private and public anti-crime initiatives can be either substitutes or complements. Philipson and Posner (1996), for example, show that the proportion of homes with burglar alarms in a state falls with improved public sector crime protection schemes. Ayres and Levitt (1998) find that the introduction of a Lojack system for recovering stolen cars (hidden radio transmitter that enables the police to locate the stolen vehicle) reduces overall car crime.

Measures of the cost of crime and of private expenditures on crime prevention and criminal justice are sparse, and yet such numbers are central to being able to talk intelligently about either the public/private trade-off or the optimal level of overall expenditures on crime prevention and criminal justice. This is an area ripe for detailed and careful empirical work.

4. Partial Privatisation of Criminal Justice Activities

What role does the private sector play in the criminal justice system? The American example is, perhaps, the most dramatic in the variety of private sector

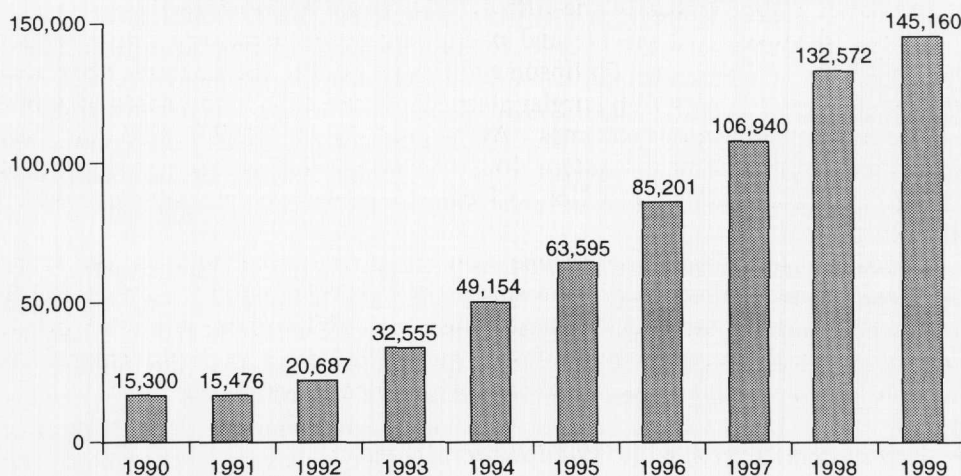
⁸We have been unable to find estimates of private expenditure on crime prevention goods and services for other countries.

activities that characterise its criminal justice system. Benson (1998) provides a comprehensive account of the public sector contracting out to the private sector. Examples of this partial privatisation include police services, drug treatment facilities, airport security, prisons and correctional facilities.

It is now commonplace for private firms to provide a whole range of services previously supplied by governments. Corrections Corporation of America and Wackenhut Corrections Corporation, for example, provide correctional, security and other related services to government agencies around the world. Wackenhut contracts include security at the US Embassy in El Salvador, supplying the entire police force for a nuclear power plant in Illinois and providing correctional facilities in New Zealand.

Benson (1998) provides evidence to show that private security and community policing initiatives have been extremely successful in reducing crime. Examples include private residential streets, private patrols and neighbourhood watch, the deterrent effect of gun ownership⁹ and technology (Lojack example mentioned above). In addition to these private sector efforts, he argues that the criminal justice system should employ more resources in giving reparation for loss or injury inflicted to the victims of crime. Benson notes that private sanctions imposed by firms (for example, firing an employee who steals from the firm) are now being substituted for public sector criminal prosecution.

FIGURE 6
Rated Growth Capacity of Private Secure Adult Correctional Facilities



Source: Thomas, 2000, <http://web.crim.ufl.edu/pcp/census/1999/Figure1.html>.

⁹The deterrent effect of private gun ownership is very controversial. See Cook and Ludwig (2000). As a whole, Benson's book has been the subject of considerable controversy. It would be very useful to have scholars with different perspectives consider the benefits and costs of privatisation of crime prevention and criminal justice.

The contracting-out by governments around the world of prison management services to private companies has grown rapidly over the last decade. As Figure 6 documents, the total number of prisoners held in private facilities rose sharply from 15,300 in 1990 to 145,160 in 1999. For example, the number of private prisoners in the US has grown from about 1,200 in 1985 to 122,871 at the end of 1999, which represents 6.6 per cent of the total prison population. Estimates of the number of private prisoners in other countries, at the end of 1999, are Australia (7,459), England and Wales (7,161), the Netherlands (737), New Zealand (384), Scotland (500) and South Africa (6,048). With the exception of Australia, these totals are very small relative to the total number of prisoners.

The US, Australia and the UK have been the main countries to experiment with private prisons. At the end of 1999, the numbers of privately managed secure adult facilities in the US, Australia and the UK were 158, 15 and 10 respectively. Corrections Corporation of America and Wackenhut Corrections Corporation have the largest global market share of contracts to run private prisons.

Perhaps because of increased privatisation of governmental functions and the claim that private prisons are cheaper per prisoner than public prisons, the issue of privatisation of prisons has become highly contentious (see, for example, Shaw (1994), Biles (1997), Hart, Shleifer and Vishny (1997) and Benson (1998)). Arguments for governments to manage prisons generally rest on the need to maintain a high level of standards in the quality of prison services and in the behaviour of prison employees. Contracts for private prison operators would tend to be quite incomplete: privately contracted firms would have strong incentives to lower standards in order to minimise costs (Hart et al., 1997). There are a number of recent examples where this has actually happened. A prison in Louisiana was recently taken away from the private sector because of unacceptable conditions. Others argue that it is not necessarily the contractual incompleteness that has an adverse effect on quality, but rather the inability or unwillingness of the client to enforce contract terms (Domberger and Jensen, 1998).

There has been a substantial growth in private policing in many countries. As Newman (1999, p. 126) observes, 'While private policing has a long history in industrial countries, it is also becoming a major growth industry in emerging market economies'. Sources cited in Newman estimate that the number of security guards in Singapore (with a population of 2.6 million) is approximately 15,000 to 20,000, which is at least twice the police strength. A high ratio of private to public police is also found in other developed economies. For example, the US has a security guard (or officer)/police ratio of three to one (see Newman (1999, p. 127)).

V. WHAT WE KNOW ABOUT THE RELATIVE EFFECTIVENESS OF CRIME PREVENTION AND CRIMINAL JUSTICE

Just how effective are specific crime prevention programmes? What are the major benefits of incarceration? In this section, we do two things. First, we survey briefly a range of crime prevention strategies that seem to work in the US. Second, we look at the arguments that have been put forward relating to the economic issues surrounding the benefits of incarceration. Standard texts on law and economics (for example, Cooter and Ulen (2000)) discuss four types of social benefits derived from imprisonment — namely, retribution, rehabilitation, deterrence and incapacitation. Given the difficulty of measuring the first two, we shall concentrate on deterrence and incapacitation. It should be noted, however, that much of the empirical literature does not distinguish between deterrence and incapacitation effects. In the case of imprisonment, separating incapacitation from general deterrent effects is difficult since the two are jointly produced.

1. Specific Crime Prevention Programmes

Potential effective crime prevention programmes could take a number of forms. Sherman et al. (1997), writing from a US perspective, point to a number of successful programmes. These include community-based mentoring and after-school recreation programmes, intensive work with at-risk families with young children, intensive residential training programmes for at-risk youth, extra police patrols in high-crime hot spots and a number of situational crime prevention schemes, such as neighbourhood watch and building and community redesign programmes.

The recently completed evaluation of the Children at Risk (CAR) programme found that youths in the treatment group had participated in more social and educational activities, exhibited less anti-social behaviour, committed fewer violent crimes and used and sold fewer drugs than did youths in the control group (see Harrell, Cavanagh and Sridharar (1999)). CAR was a drug and delinquency prevention programme for high-risk adolescents between the ages of 11 and 13 who lived in five cities (Austin, Bridgeport, Memphis, Savannah and Seattle). The programme consisted of eight components considered key to comprehensive delinquency prevention: case management, family services, educational services, after-school and summer activities, mentoring, incentives, community policing and enhanced enforcement, and criminal-juvenile justice intervention. One interesting result was that positive effects of the programme on drug use, crime and risk factors were not generally observed at the end of the programme. This may indicate that CAR was simply a secondary prevention programme when youths got into trouble.

The Job Corps programme in the US has long been a central part of federal government efforts to provide training for disadvantaged youths. Recent evidence suggests that participation in the programme significantly reduced

arrest and conviction rates, as well as time spent in jail (see Schochet, Burghardt and Glazerman (2000)). The arrest rate was reduced by about 6 percentage points and the impacts on arrest rates were very similar across male and female sub-groups.

Evaluation of the effectiveness of private crime prevention activities is much more difficult to find. However, given the recent epidemic of households and firms buying locks, alarms or other forms of protection in response to the threat of crime, researchers have started considering how these activities can have negative or positive spillover effects for the neighbourhood community. For example, Ayres and Levitt (1998) conclude that the Lojack system for recovering stolen cars, mentioned in Section IV, provides an example of a positive externality due to a general deterrent effect.

Related to the above initiatives are those of how communities organise themselves when allocating resources to crime prevention programmes. Hawkins (1999), for example, explores the implications of a 'Communities That Care' system, where prevention science is used to guide the type of prevention policies suitable according to profiles of risk and protection.

2. Deterrence

There is a reasonably large theoretical and empirical literature in economics that considers both the deterrent (specific and general) and incapacitative effects of imprisonment. For example, economists and others have sought to discern whether increased imprisonment lowers the crime rate. How does the deterrent effect of formal sanctions arise?

Following the theoretical work of Becker (1968), much empirical work by economists has focused on the role of the criminal justice system in determining criminal activity. In short, economists have argued, using both theory and empirical work, that if the cost of crime is raised, by increasing the probability of apprehension or imposing more or longer sentences, less of it will occur.¹⁰ Deterrence refers to the effect of possible punishment on individuals contemplating criminal acts.¹¹ Deterrence may flow both from criminal justice system actions and from social actions (i.e. the negative response of friends and associates to criminal behaviour). To date, attempts by economists to measure deterrent effects have concentrated on the effects of the criminal justice system, while work by sociologists has concentrated on 'social sanctions'. See Nagin (1998) for a survey of this literature.

The potential criminal's perceptions regarding social sanctions are difficult to measure, although work on peer-group (for example, Evans, Oates and Schwab

¹⁰Actually, the deterrence hypothesis was widely explored both empirically and theoretically prior to economists' re-entry to the study of crime in the late 1960s.

¹¹Marginal deterrence refers to a situation where individuals commit less harmful rather than more harmful acts if expected sanctions rise with harm (see Polinsky and Shavell (1999)).

(1992)) and community effects (for example, Sampson and Groves (1989)) may be able to capture some aspects of perceived social sanctions. In terms of the effects of education, a consistent finding is that students who attend schools with strong ethical values (for example, parochial schools) offend less than students attending modern urban high schools (see, for example, Tauchen, Witte and Griesinger (1994)). This effect may stem from higher levels of social sanctions against crime in schools with strong ethical standards or from the better family and community settings of at least some students.

In an interesting paper, Williams and Sickles (1999) provide an extension of Ehrlich (1973) by including an individual's social capital stock into his utility and earnings functions. Social capital, including things such as reputation and social networks, is used as a proxy to account for the effect of social norms on an individual's decision to participate in crime. This assumes that the stigma associated with arrest depreciates an individual's social capital stock. Williams and Sickles clarify this point further by arguing that employment and marriage create a form of state dependence, which reduces the likelihood of criminal involvement. In other words, an individual with a family, job or good reputation has more to lose if caught committing crimes than those without such attachments. Dynamics arise from current decisions affecting future outcomes through the social capital stock accumulation process. The paper's main result is that criminals behave rationally in the sense that they account for future consequences of current-period decisions.¹²

Glaeser, Sacerdote and Scheinkman (1996, p. 543) make a similar point in the context of family structures, claiming that 'the average social interactions among criminals are higher when there are not intact family units. The presence of strong families interferes with the transmission of criminal choices across individuals'. The importance of family structure (along with other variables such as deterrence and returns to crime) in explaining urban crime is also the key point of Glaeser and Sacerdote (1999).

In the literature, deterrence is broken into two components. The first component, called specific deterrence, encompasses the effect of punishment on the individual punished. The second component, called general deterrence, encompasses the effect of punishment on the general public. Specific deterrence is generally reflected by including measures that reflect the individual's past experience with the criminal justice system (for example, Witte (1980) or Trumbull (1989)). The implicit assumption is that offenders form their perceptions regarding possible punishment based on their own experience with the criminal justice system.¹³ For example, the offender's perceived probability

¹²Many of these insights into the dynamics of crime were originally discussed in Williams (1996).

¹³We know little about how individuals form their perceptions of likely sanctions if they offend, although Paternoster and his colleagues (see, for example, Nagin and Paternoster (1991)) have done interesting empirical work and Sah (1991) has developed a model for the perceived probability of punishment. In a study of institutionalised young adults (college students and prison inmates), Lattimore, Baker and Witte (1992) find

of arrest might be proxied by the ratio of his past self-reported offences to arrests and his perceived punishment by some sort of average of the punishments he has received in the past. There is an important potential difficulty in using this type of specific deterrence measure. If there is autocorrelation in criminal behaviour, these measures of specific deterrence will be correlated with the error term in the crime equation. One might instrument these variables by using community-level or peer-group measures.

It has proven much more difficult to obtain reasonable measures of general deterrent effects. As an example, consider the probability of arrest. In a standard model of criminal choice, an individual's probability of arrest depends upon his level of criminal activity, his ability to avoid arrest and exogenous factors related to the criminal justice system. When contemplating a crime, the individual is faced with a schedule of probabilities that relates the nature and extent of his criminal activity to the probability of arrest. See Cook (1979) or Tauchen, Witte and Griesinger (1994) for a discussion. An analogy would be to a taxpayer who, when making labour supply and tax-reporting decisions, is faced with a schedule that relates taxable income to the schedule of tax rates.

Just as there is no single tax rate, there is no single probability of arrest. There is a different probability of arrest for each and every possible set of criminal choices. For example, we would expect that, for a given individual, the probability of arrest would be much higher for robbery than for petty theft.

Changes in criminal justice policy or in the level of criminal justice resources alter the probability schedule facing a potential criminal. For example, an increase in criminal justice resources such as that contained in the 1994 US Crime Bill might raise the probability of being arrested for each criminal act — that is, it might cause the schedule relating the probability of arrest to criminal activity to shift up. The 'war on drugs' caused certain sections of the probability schedule (the sections associated with drug offences) to shift up and other sections to shift down (the sections associated with violence offences). It is these types of exogenous changes in the criminal justice system that should be used to reflect deterrent effects, not a community-level probability of arrest. This approach to representing deterrence has been used by Block, Nold and Sidak (1981) and Tauchen et al. (1994).

There are a number of practical problems that arise in testing for deterrent effects. In particular, we consider three estimation issues: measurement error, endogeneity and non-stationarity.

Models of criminal behaviour are usually estimated using official reported crime statistics. Such recorded offences are influenced both by victims' willingness to report crime and by police recording practices and procedures. At

that individuals transform probabilities when making risky choices. Risk-seeking is common over long-shot odds, and subjects are less sensitive to changes in mid-range probabilities than is assumed by expected utility models.

the level of the individual police department, both administrative and political changes can lead to abnormalities in reported data or to failures to report any data. For example, the measurement error in crime rates may arise because hiring more police leads to more crimes reported. Consequently, estimates derived from regressing crime rates on the number of police (or on arrest rates) may be severely distorted by the impact of measurement error. Until quite recently, measurement error was not widely considered in the economics literature. However, the importance of the issue and potential solutions were considered very early by Carr-Hill and Carr-Hill (1972) and Carr-Hill and Stern (1973).

More recently, Corman and Mocan (2000) report that complaints to the police about murder, robbery, burglary and motor vehicle theft 'decline in response to increases in arrests'. They use detailed information from the New York Police Department and modern time-series estimation techniques. By using data for a single police department, they avoid some of the measurement error inherent in studies that use cross-department statistics. However, changes in victim reporting behaviour are not considered.

Murder is the one crime for which police reports are quite good. Corman and Mocan (2000) report that the elasticity of murders reported to the police with respect to the arrest rate is approximately -0.3 , indicating that a 10 per cent increase in the growth rate of arrests reduces the growth rate of murders by 3 per cent. A number of authors have noted recently that much of the decline in murder rates in developed countries has stemmed from a decrease in domestic assaults. Corman and Mocan do not include measures to reflect the change in public and police attitudes regarding domestic violence in their equations. In general, economists' work on crime is only beginning to incorporate family and community effects.

Not very surprisingly, economists have concentrated their attention on the possibility that crime and sanctions are jointly determined. The main point is that increases in sanctions may cause decreases in crime, but increases in sanctions may also be a response to higher crime rates. Since the 1970s, there has been a considerable effort to find instruments (i.e. exogenous factors) to identify the effects of sanctions on the supply of crime. For example, Levitt (1996) uses instrumental variables to estimate the effect of prison population on crime rates. Prison-overcrowding litigation in a state is used as an instrument for changes in the prison population.

In order to identify the effect of police on crime, Marvell and Moody (1996) and Levitt (1997) propose different procedures. Marvell and Moody are concerned with the timing sequence between hiring police and crime. Using lags between police levels and crime rates to avoid simultaneity, they test for causality in the spirit of Granger (1969). Although they find Granger causation in both directions, the impact of police on crime is much stronger than the impact of crime on police. In a recent paper, Levitt (1997) uses the timing of elections (when cities hire more police) as an instrumental variable to identify a

causal effect of police on crime. He finds that increases in police, instrumented by elections, reduce violent crime but have a smaller impact on property crime. Levitt does not consider the impact of elections on either victim or police reporting behaviour.

A substantial problem that has been ignored in the vast majority of empirical studies is non-stationarity of crime rates. A time series is said to be non-stationary if (1) the mean and/or variance does not remain constant over time or (2) the covariance between observations depends on the time at which they occur. In the US, the UCR crime index appears strongly non-stationary (see, for example, Witt and Witte (2000)). Here, the authors have attempted to estimate and test a model using time-series cointegration techniques. The empirical results suggest a long-run equilibrium relationship between crime, prison population, female labour supply and durable consumption.

3. Incapacitation

Incapacitation refers to an offender behind bars being unable to commit new crimes against members of society outside prison.¹⁴ Therefore, unless there is an infinitely elastic supply of criminals, incapacitation will reduce crime to below what it would otherwise have been. However, as argued in Section III with respect to drug dealers, if the supply of offenders is reasonably elastic, the incapacitation effect may be very small (see Freeman (1996)). In addition, for some individuals, incarceration may only affect the timing rather than the total number of crimes they commit.

These uncertainties of the effects of prison on crime are illustrated in a recent report by the Justice Policy Institute (2000) on incarceration and crime trends in Texas. As of the end of 1999, there were 706,600 Texans in prison, on jail parole or on probation, the largest population of people under the jurisdiction of a state's prison system in the US. However, there is little evidence that Texas's severe correctional system is responsible for the fall in crime: Texas crime rates have not experienced the declines witnessed in other parts of the US, where prison population growth has been much slower.

The basic intuition of the optimal sanction is that individuals should be put in prison and kept there as long as the expected net harm exceeds the costs of imprisonment. Polinsky and Shavell (1999) argue that prison should only be used to incapacitate individuals whose net harm is relatively high. In addition, these authors highlight two points about incapacitation. First, since expected harm caused by individuals usually declines with their age, it may be worth having fewer older people in prison. Second, past behaviour is the best predictor of future behaviour. Thus the criminal justice system should impose a prison sentence on someone who has committed a harmful act rather than incapacitating

¹⁴As discussed in Polinsky and Shavell (1999), incapacitation can take forms other than imprisonment — for example, loss of a driver's licence prevents an individual from doing harm while driving.

someone who has the potential to commit a crime. In practice, you have to commit a crime to go to prison.

While the theory of optimal incapacitation policy is well established (see Shavell (1987)), the empirical work faces some difficulties. The central difficulty is how to separate the deterrent and incapacitation effects associated with imprisonment. One approach, discussed at length in Ehrlich (1981), is to compare regression estimates of the actual effect of imprisonment on crime with theoretical estimates of maximum incapacitation effects. Some authors, such as Levitt (1998), seek to identify some observable substitution effects of the probability of arrest for one crime on the incidence of a substitute crime. Other authors, such as Kessler and Levitt (1999), have used California's adoption of 'three strikes and you're out' sentencing rules to separate the deterrence and incapacitation effects of punishment.

Recently, some researchers have focused their attention on whether sanctions depend on offence history. Glaeser and Sacerdote (2000) provide evidence to show that repeat offenders are more likely to receive longer sentences. Offenders with a high expected probability of recidivism are more likely to commit crimes in the future and thus more likely to be worth incapacitating by imprisonment. Glaeser and Sacerdote use a variety of data sources to examine the sentences given to murderers in the US. They find that sentences are longer when there is a greater value to incapacitation or greater deterrence elasticity. However, contrary to the predictions of the economic model of optimal punishment, they find victim characteristics are important in explaining sentencing among vehicular homicides (for example, drivers who kill women get 56 per cent longer sentences, whereas drivers who kill blacks get 53 per cent shorter sentences).

VI. CONCLUSIONS AND SOME SUGGESTIONS FOR RESEARCH

Crime is pervasive. However, the extent of crime is hard to measure. Cross-nationally, we have the best measures for murder. However, even for murder, estimates from different sources can vary widely. Given differences in criminal laws, defendant protections and statistical systems, broad measures of law-abidingness (for example, those developed by the World Bank) and cross-national victimisation and self-report surveys offer the best hope of comparing the level of other types of offences across countries. Crime statistics coming from the criminal justice system (for example, offences reported to the police) provide valuable information but do not generally provide reliable estimates of crime either across countries or across time.

To date, much work by economists on crime has used criminal justice statistics and interpreted these statistics as measures of the underlying level of crime. This first-generation work has been valuable, but it is now time to move forward. Two directions appear particularly promising. First, in order to interpret criminal justice data, we need to know more about the behaviour of both crime

victims and the criminal justice system. For example, in order to interpret properly results that use police reports as a measure of crime, we need to understand both victim reporting behaviour and police recording practices. Second, work seeking to estimate the deterrent effects of the criminal justice system could benefit from using sources of data on crime other than data from the criminal justice system (for example, victimisation surveys). Studies that use a number of indicators of crime (for example, multi-indicator models) are likely to provide more meaningful results than studies that use any single indicator.

So far, studies by economists of crime have focused on relatively few issues (for example, the deterrent effect of police resources and imprisonment). There have been relatively few studies of the way in which such important criminal justice system entities as prosecutors' offices and public defenders operate.¹⁵

Most, if not all, criminal justice systems operate with budgets that are not adequate to process all cases fully. To deal with this 'overcrowding', one or more agencies are given discretion in how they handle cases. Different criminal justice systems grant differing amounts of discretion to different agencies at different points in time. For example, in the US during the 1960s, judges and parole boards had substantial discretion. The determinate sentencing movement limited the discretion of judges and parole boards. Discretion was not eliminated; it was simply shifted to prosecutors from judges and parole boards. How much discretion in criminal justice systems is optimal? Where should the discretion be lodged?

Public finance economists have provided valuable work on optimal taxation. As far as we are aware, there has been little work on optimal criminal law or optimal criminal justice funding. What acts should we criminalise? What is the optimal level of funding for the police, prosecutors, courts and corrections? What should the split between private and public spending be? While private prisons have received some attention, private policing has received less.

Much criminal justice research has focused on preventing crime through the punitive actions of the criminal justice system (for example, deterrence and incapacitation). Another line of research has focused on preventing crime by working with high-risk youth. The two lines of research are not well integrated. Yet an optimal portfolio of crime prevention strategies requires a combination of punitive and supportive efforts.

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¹⁵There has been some work by economists in the US on plea bargaining (see Reinganum (1988)).

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