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*Journal of Law and Economics*, Vol. 42, No. 2. (Oct., 1999), pp. 611-642.

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*Journal of Law and Economics* is currently published by The University of Chicago Press.

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# THE AGGREGATE BURDEN OF CRIME\*

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## ABSTRACT

This study estimates the total annual cost of criminal behavior in the United States. While past research has typically focused on particular costs, regions, or crime categories, this general study estimates all of the direct and indirect costs of crime for the entire nation. In addition to aggregating expenses commonly associated with unlawful activity, it considers ancillary costs that have not yet been included in an overall formula for the cost of crime. Beyond the expenses of the legal system, victim losses, and crime-prevention agencies, the burden of crime encompasses the opportunity costs of victims', criminals', and prisoners' time; the fear of being victimized; and the cost of private deterrence. More accurate information on the repercussions of crime could guide our legal, political, and cultural stance toward crime and allow informed prioritization of programs that curtail criminal activity. The net annual burden of crime is found to exceed \$1 trillion.

## I. INTRODUCTION

SOCIETY will never rid itself of crime, but consideration of the resources that could be conserved or reallocated in the ideal state of moral compliance would allow individuals and organizations to appropriately prioritize efforts leading in that direction. Distinct from previous studies that have focused on selected crimes, regions, or outcomes, this study attempts an exhaustively broad estimation of the crime burden. The resulting reflection on the value of compliance could guide our legal, political, and cultural stance toward crime and allow informed prioritization of law enforcement, education, and social programs that are found to hinder criminal activity.<sup>1</sup>

\* The 3M Foundation and the Teagle Foundation provided financial support for this project. I wish to thank Mark Cohen, David Friedman, George Priest, Eric Rasmusen, W. Kip Viscusi, and an anonymous referee for helpful suggestions and Sarah M. Harvieux, Charles Hokayem, Karring Moan, Meagen Peden, Alissa Saufley, and Madison Silvert for excellent research assistance. All errors are mine.

<sup>1</sup> For example, Brandon Centerwall, *Television and Violent Crime*, 111 *Public Interest* 56 (Spring 1993), reviews evidence that television increases aggression among children by as much as 160 percent. The results of the Perry Preschool Project, *Significant Benefits: The High/Scope Perry Preschool Study through Age 27* (L. J. Schweinhart & D. P. Weikart eds. 1993), indicate that individuals who attended high-quality preschool programs are one-fifth as likely to experience multiple arrests and about one-fourth as likely to be arrested for drug crimes as those who attended no preschool program. And several communities have documented decreases in crime between 19 and 77 percent after implementing Neighborhood

[*Journal of Law and Economics*, vol. XLII (October 1999)]

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Overt annual expenditures on crime in the United States include \$47 billion for police protection, \$36 billion for correction, and \$19 billion for prosecution (the legal and judicial costs) of state and local criminal cases.<sup>2</sup> (Unless otherwise noted, all figures are adjusted to reflect 1997 dollars using the Consumer Price Index.) In a typical year, crime victims suffer \$876 million worth of lost workdays, and guns cost society \$25 billion in medical bills and lost productivity.<sup>3</sup> Beyond the costs of the legal system, victim losses, and crime-prevention agencies, the crime burden includes the costs of deterrence (locks, safety lighting and fencing, alarm systems, and munitions), the costs of compliance enforcement (nongendarme inspectors and regulators), implicit psychic and health costs (fear, agony, and the inability to behave as desired), and the opportunity costs of time spent preventing, carrying out, and serving prison terms for criminal activity.

This study estimates the impact of crime taking a comprehensive list of the repercussions of aberrant behavior into account. While the standard measures of criminal activity count crimes and direct costs, this study measures the impact of crimes and includes indirect costs as well. Further, the available data on which crime cost figures are typically based are imprecise. Problems with crime figures stem from the prevalence of unreported crimes, inconsistencies in recording procedures among law enforcement agencies, policies of recording only the most serious crime in events with multiple offenses, and a lack of distinction between attempted and completed crimes. This research does not eliminate these problems, but it includes critical crime-prevention and opportunity costs that are measured with relative precision and thus places less emphasis on the imprecise figures used in most other measures of the impact of crime.

The importance of a dual analysis of public and private crime costs and the inclusion of victim losses as well as prevention costs arises in part because losses in one area can substitute for losses in another. Public expenditures on crime prevention can displace private expenditures, and vice

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Watch programs. See National Crime Prevention Council, *Neighborhood Watch Organizers Guide* (1997), on-line at <http://www.ncpc.org/2neig1dc.htm>. More accurate information on the cost of crime will allow better assessments of the value of such programs.

<sup>2</sup> Sourcebook of Criminal Justice Statistics, 1995, at 3 (Kathleen Maguire & Ann L. Pastore eds. 1996).

<sup>3</sup> Wendy Max & Dorothy P. Rice, *Shooting in the Dark: Estimating the Cost of Firearm Injuries*, 12 *Health Aff.* 171 (1993). Some studies suggest that guns deter crime; see John R. Lott, Jr., & David B. Mustard, *Crime, Deterrence, and Right-to-Carry Concealed Handguns*, 26 *J. Legal Stud.* 1 (1997). Others find that increased access to guns might increase crime rates; see Jens O. Ludwig, *Concealed-Gun-Carrying Laws and Violent Crime: Evidence from State Panel Data*, 18 *Int'l Rev. L. & Econ.* 239 (1998). In either case, the net costs or benefits are reflected in the measures below.

versa.<sup>4</sup> If an outlay of \$1,000,000 for additional law enforcement officers has no effect on the crime rate, but private expenditures on crime are able to decrease by \$1,500,000, society is better off. In many ways, police protection embodies the nonexcludability and nonrivalness-in-consumption characteristics of a “public good”; that is, according to economic theory, increases in expenditures by the government can be more than offset by decreases in expenditures by individuals for a given level of protection. The inclusion of private crime-prevention expenditures captures the important role of police protection as a public good capable of reducing both the crime rate and the total societal outlays for crime deterrence.

This paper does not take up the debate over what should and should not be considered a crime. Arguments can be made for the ability of bribery to promote commerce, for example, and particular religions, age groups, and special interest groups would each have a perspective on what should be punishable under the law. In this study, the burden of crime is defined to include all costs that would not exist in the absence of illegal behavior under current U.S. law. This research does not simply establish the cost of enacting and enforcing laws. If there were no laws but what is currently deemed criminal behavior continued, the cost of law enforcement might be zero, but the damage and deterrence costs of said behavior would not cease. The comparison in this study is against an ideal state in which there is no occurrence of behavior deemed criminal by current law. Although differing interpretations of morality are readily available, the practical impossibility of finding an alternative definition with general appeal should not prohibit the important task of determining the cost of this debatable, but well-defined, set of behaviors.

Valid questions remain regarding the inclusion of various cost components as part of the crime burden. This research will sidestep unsolvable debates to the extent possible by allowing numerous formulations for the cost figures (for example, with and without estimates of the cost of psychological duress resulting from crimes; with and without the value of transfers from victim to criminal). Readers can customize a cost figure related to their particular interest from the list of crime ramifications and their financial consequences I provide; that is, it is the reader’s prerogative to remove undesired figures from the bottom line. For those who prefer more guidance, my recommended aggregation is made explicit in the conclusion.

<sup>4</sup> For evidence of the trade-off between public and private expenditures on crime prevention, see Tomas J. Philipson & Richard A. Posner, *The Economic Epidemiology of Crime*, 39 *J. Law & Econ.* 405 (October 1996); and David A. Anderson, *Private Responses to Crime: Prevention Elasticities and Thresholds* (mimeographed, Centre College 1999).

TABLE 1  
SUMMARY OF PREVIOUS CRIME COST STUDIES

Previous Study	Focus	Not Included	\$ (Billions)
Colins (1994)	General	Opportunity costs and miscellaneous indirect components	728
Cohen, Miller, & Wiersema (1995)	Victim costs of violent and property crimes	Prevention, opportunity, and indirect costs	472
<i>U.S. News and World Report</i> (1974)	General	Opportunity costs and miscellaneous indirect components	288
Cohen, Miller, & Rossman (1994)	Cost of rape, robbery, and assault	Prevention, opportunity, and indirect costs	183
Zedlewski (1985)	Firearms, guard dogs, victim losses, and commercial security	Residential security, opportunity costs, and indirect costs	160
Cohen (1990)	Cost of personal and household crime to victims	Prevention, opportunity, and indirect costs	113
President's Commission on Law Enforcement (1967)	General	Opportunity costs and miscellaneous indirect components	107
Klaus (1994)	National Crime Victimization Survey crimes*	Prevention, opportunity, and indirect costs	19

\* National Crime Victimization Survey crimes include rape, robbery, assault, larceny, burglary, and motor vehicle theft.

## II. PREVIOUS STUDIES

Several studies have estimated the impact of crime; however, none has been thorough in its assessment of the substantial indirect costs of crime and the crucial consideration of private crime-prevention expenditures. The FBI Crime Index provides a measure of the level of crime by counting the acts of murder, rape, robbery, aggravated assault, burglary, larceny, motor vehicle theft, and arson each year. The FBI Index is purely a count of crimes and does not attempt to place weights on various criminal acts based on their severity. If the number of acts of burglary, larceny, motor vehicle theft, or arson decreases, society might be better off, but if there is no measure of the severity of the crimes, such a conclusion is necessarily tentative. From a societal standpoint what matters is the extent of damage inflicted by these crimes, which the FBI Index does not measure.

Over the past three decades, studies of the cost of crime have reported increasing crime burdens, perhaps more as a result of improved consideration of the broad repercussions of crime than due to an actual increase in the burden itself. Table 1 summarizes the findings of eight previous studies.

In 1967, the President's Commission on Law Enforcement and Administration of Justice reported an overall crime cost of \$107 billion annually.<sup>5</sup> This figure includes the direct cost of crimes against persons and property and expenditures on illegal goods and services. It also includes public expenditures on police, criminal justice, and corrections and some costs of private prevention.

In December of 1974, *U.S. News and World Report* estimated a \$288 billion annual crime burden for the United States. That report includes a figure of \$19.5 billion for private crime-fighting costs, with no breakdown or elaboration on sources. In 1994, Sara Collins updated the *U.S. News and World Report* study with an annual crime cost estimate of \$728 billion.<sup>6</sup> The updated study includes a \$69 billion figure for private protection, again with no breakdown. Although they represent transfers from victim to criminal rather than net losses to society, the *U.S. News and World Report* study includes the value of shoplifted goods, bribes, kickbacks, embezzlement, and other thefts at face value among the costs of crime. The study also includes \$290 billion for pain and suffering and lost wages. As with the 1974 study, opportunity costs were not considered.

Edwin W. Zedlewski of the National Institute of Justice estimated crime-related expenditures on firearms, guard dogs, victim losses, criminal justice, and commercial security to be \$160 billion annually.<sup>7</sup> In his report, Zedlewski noted the exclusion of expenditures on residential security, opportunity costs, and indirect costs. Mark A. Cohen estimated the cost of crime to victims, including the cost of pain, suffering, and risk of death, but not prevention costs, for rape, robbery, assault, car theft, burglary, and larceny.<sup>8</sup> Cohen concluded that the aggregate annual cost of personal and household crime to U.S. victims is \$113 billion. In a study of the costs and consequences of violent behavior in the United States, Mark A. Cohen, Ted R. Miller, and Shelli B. Rossman estimated the aggregate cost of rape, robbery, and assault to be \$182 billion annually.<sup>9</sup> A subsequent study by Miller, Cohen, and Brian Wiersema estimated that violent and property crimes cost victims \$472 billion per year including pain, suffering, and the reduced quality of

<sup>5</sup> See President's Commission on Law Enforcement and Administration of Justice, *Crime and Its Impact: An Assessment* 44 (1967).

<sup>6</sup> Sara Collins, *Cost of Crime: 674 Billion*, *U.S. News & World Rep.*, January 17, 1994, at 40.

<sup>7</sup> Edwin W. Zedlewski, *When Have We Punished Enough?* 45 *Pub. Admin. Rev.* 771 (November 1985).

<sup>8</sup> Mark A. Cohen, *A Note on the Cost of Crime to Victims*, 27 *Urb. Stud.* 139 (1990).

<sup>9</sup> Mark A. Cohen, Ted R. Miller, & Shelli B. Rossman, *The Costs and Consequences of Violent Behavior in the United States* (1994).

life.<sup>10</sup> These papers by Cohen and his coauthors consider an impressive array of costs primarily to victims of violent crime, but they do not attempt to measure the costs of broader categories of crime and related distrust to the nation as a whole.

Patsy A. Klaus of the Bureau of Justice Statistics estimated a direct economic loss due to crime of \$19 billion annually based on the National Crime and Victimization Survey (NCVS), which includes rape, personal robbery, assault, household burglary, personal and household theft, and motor vehicle theft.<sup>11</sup> The Bureau of Justice Statistics also uses the NCVS to compute its "households-touched-by-crime" indicator, which measures the number and percentage of households that are victimized by at least one crime during the year.<sup>12</sup> These studies have limited their scope to include only direct costs and counts of crimes. The present study combines data from existing sources, such as these with new data on ancillary costs, to generate a more comprehensive measure of the impact of crime.

### III. THE EFFECTS OF CRIME

The effects of crime fall into several categories depending on whether they constitute the allocation of resources due to crime that could otherwise be used more productively, the production of ill-favored commodities, transfers from victims to criminals, opportunity costs, or implicit costs associated with risks to life and health. This section examines the meaning and ramifications of each of these categories of crime costs.

#### A. *Crime-Induced Production*

Crime can result in the allocation of resources toward products and activities that do not contribute to society except in their association with crime. Examples include the production of personal protection devices, the trafficking of drugs, and the operation of correctional facilities. In the absence of crime, the time, money, and material resources absorbed by the provision of these goods and services could be used for the creation of benefits rather than the avoidance of harm. The forgone benefits from these alternatives represent a real cost of crime to society. (Twenty dollars spent on a door lock is \$20 dollars that cannot be spent on groceries.) Thus, expenditures on crime-related products are treated as a loss to society.

<sup>10</sup> Ted R. Miller, Mark A. Cohen, & Brian Wiersema, *Crime in the United States: Victim Costs and Consequences* (Final Report to Nat'l Inst. Just. 1995).

<sup>11</sup> Patsy A. Klaus, *The Cost of Crime to Victims* (U.S. Dept. Just. Crime Data Brief NCJ-145865, January 1994).

<sup>12</sup> U.S. Department of Justice, *Households Touched by Crime* (1992).

Crimes against property also create unnecessary production owing to the destruction and expenditure of resources, and crimes against persons necessitate the use of medical and psychological care resources. In each of these cases, crime-related purchases bid up prices for the associated items, resulting in higher prices for all consumers of the goods. In the absence of crime, the dollars currently spent to remedy and recover from crime would largely be spent in pursuit of other goals, bidding up the prices of alternative categories of goods. For this reason, the net impact of price effects is assumed to be zero in the present research.<sup>13</sup>

### *B. Opportunity Costs*

As the number of incarcerated individuals increases steadily, society faces the large and growing loss of these potential workers' productivity. Figure 1 illustrates the upward climb in the number of state and federal inmates to over 1 million. An additional 500,000 individuals are being held in jails at any given time. Criminals are risk takers and instigators—characteristics that could make them contributors to society if their entrepreneurial talents were not misguided. Crimes also take time to conceive and carry out and, thus, involve the opportunity cost of the criminals' time regardless of detection and incarceration. For many, crime is a full-time occupation. Society is deprived of the goods and services a criminal would have produced in the time consumed by crime and the production of "bads" if he or she were on the level. Additional opportunity costs arise owing to victims' lost workdays and time spent securing assets, looking for keys, purchasing and installing crime-prevention devices, and patrolling neighborhood-watch areas.

### *C. The Value of Risks to Life and Health*

The implicit costs of violent crime include the fear of being injured or killed, the anger associated with the inability to behave as desired, and the agony of being a crime victim. Costs associated with life and health risks are perhaps the most difficult to ascertain, although a considerable literature is devoted to their estimation. The implicit values of lost life and injury are included in the list of crime costs below; those not wishing to consider them can simply subtract these estimates from the aggregate figure.

### *D. Transfers*

One result of fraud and theft is a transfer of assets from victim to criminal. If the criminal sells the stolen item to a third party for its value to the

<sup>13</sup> The validity of this assumption rests on the shape of the supply and demand curves for the relevant goods, the estimation of which is beyond the scope of this research.

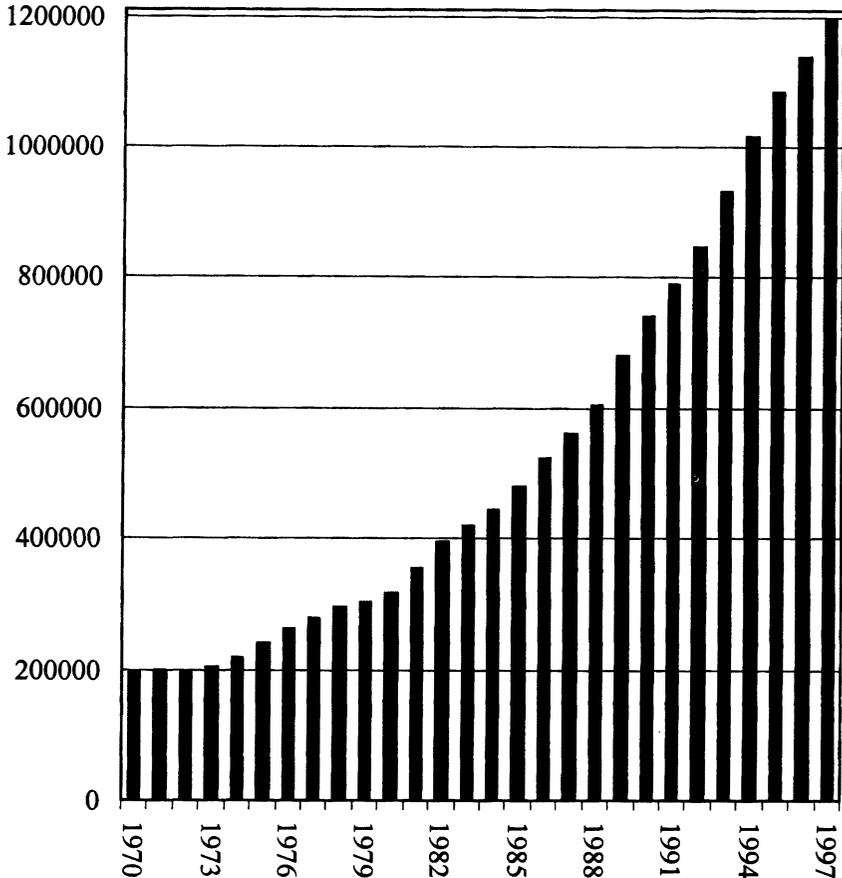


FIGURE 1.—Number of sentenced prisoners in state and federal institutions. Source: U.S. Department of Justice, Bureau of Justice Statistics, *Sourcebook of Criminal Justice Statistics, 1997* (Washington, D.C.: U.S. Government Printing Office, 1998).

third party, the transfer is still from the victim to the criminal, as the purchaser is simply making an exchange of money for an asset. If the third-party purchaser pays less for the item than its value, part of the transfer is to the purchaser. Although the purchase of stolen goods often substitutes for the purchase of legal goods, it is also likely that the antecedent theft will lead to an equivalent purchase of legal goods by the victims who seek to replace what they have lost. Thus, it is likely that replacement purchases by victims in the legal market balance legal purchases forgone owing to the availability of stolen goods. That is, the transfer of stolen goods does not necessitate additional production of similar items. On the other hand, if low

prices on stolen merchandise entice some people to buy items they would otherwise forgo, some of these “transfers” may necessitate additional production.

It is possible that a third-party purchaser will place greater value on the stolen merchandise than did the victim. If the purchase of stolen goods takes the place of legal purchases, the question is moot as the purchaser can realize the added value with or without the crime. However, if the stolen item is unique—a work of art or a vintage car—then the crime would be efficient in the sense that it would produce a net gain for society. Similarly, the transfer of an item with sentimental value could produce a net loss if it were valued less by the purchaser than by the victim. Illegal activity is not needed to create efficient transfers, nor should it be able to create net losses in the presence of a market for the goods that is known to all relevant parties. If a stolen work of art were worth more to the illegal recipient than to the victim, both parties would benefit from a legal sale of the item to the collector who valued it the most. Similarly, an item of sentimental value could be repurchased by the victim who values it more than the illegal recipient.<sup>14</sup> For these reasons, the transfer component of thefts, as opposed to the opportunity costs and other repercussions, should not be considered to cause a net loss to society.<sup>15</sup>

Many crimes fall into several cost categories. For example, a robbery may create a transfer from victim to criminal, health and psychic costs for the victim and neighbors, and the opportunity cost of the criminal’s time. Insurance also falls into several crime cost categories. If insurance prices were actuarially fair, meaning that premium payments equaled the expected value of indemnity, then insurance costs would constitute a transfer of funds from insurance bearers who do not suffer losses to those who do. Rather than result in a transfer from the victim to the criminal, insured theft results in a transfer from all insurance purchasers to the criminal. Risk-averse individuals are willing to pay more than an actuarially fair rate for insurance in exchange for the elimination of the risk of losses imposed by crime. The portion of insurance costs that exceeds indemnity costs is thus considered crime-induced production as it goes toward insurance company resources that would otherwise not be purchased. In the next section, crime costs are divided into nonoverlapping categories for crime-induced production, opportunity costs, the value of risks to life and health, and transfers.

<sup>14</sup> Anecdotal evidence of this includes “Reward: No Questions Asked” signs frequently posted on kiosks to create a market for the repurchase of stolen goods.

<sup>15</sup> For a recent discussion of the cost of criminal rent-seeking activities and the economic rationale for criminal sanctions, see Fred S. McChesney, *Boxed In: Economists and Benefits from Crime*, 13 *Int’l Rev.* 225 (1993).

TABLE 2  
THE COSTS OF CRIME-INDUCED PRODUCTION

Crime-Induced Production	\$ (Millions)
Drug trafficking	160,584
Police protection	47,129
Corrections	35,879
Prenatal exposure to cocaine and heroin	28,156
Anticrime components of federal agency budgets (see Table 3)	23,381
Judicial and legal services, state and local	18,901
Guards	17,917
Drug control	10,951
DUI costs to driver	10,302
Medical care for victims	8,990
Computer viruses and security	8,000
Alarm systems	6,478
Passes for business access	4,659
Locks, safes, and vaults	4,359
Vandalism (except arson)	2,317
Small arms and small arms ammunition	2,252
Replacements due to arson	1,902
Surveillance cameras	1,471
Safety lighting	1,466
Protective fences and gates	1,159
Airport security	448
Nonlethal weaponry (for example, mace)	324
Electronic retail article surveillance	149
Theft insurance (less indemnity)	96
Guard dogs	49
Expenditures by Mothers against Drunk Driving	49
Library theft detection	28
Total	397,395

#### IV. NUMERICAL FINDINGS

##### A. *Crime-Induced Production*

The methodology and sources used to calculate each of the specific cost estimates are explained in detail in the Appendix. Crime-induced production accounts for about \$400 billion in expenditures annually. Table 2 presents the costs of goods and services that would not have to be produced in the absence of crime. Drug trafficking accounts for an estimated \$161 billion in expenditure.<sup>16</sup> With the \$28 billion cost of prenatal drug exposure and almost \$11 billion worth of federal, state, and local drug control efforts (including drug treatment, education, interdiction, research, and intelli-

<sup>16</sup> President's Commission on Organized Crime, Drug Abuse, Drug Trafficking, and Organized Crime (1986).

gence), the combined cost of drug-related activities is about \$200 billion. Findings that over half of the arrestees in 24 cities tested positive for recent drug use and about one-third of offenders reported being under the influence of drugs at the time of their offense suggest that significant portions of the other crime cost categories may result indirectly from drug use.<sup>17</sup>

About 682,000 police and 17,000 federal, state, special (park, transit, or county), and local police agencies account for \$47 billion in expenditures annually. Thirty-six billion dollars is dedicated each year to the 895 federal and state prisons, 3,019 jails, and 1,091 state, county, and local juvenile detention centers.<sup>18</sup> Aside from guards in correctional institutions, private expenditure on guards and related security services amounts to more than \$18 billion annually.<sup>19</sup> Security guard agencies employ 55 percent of the 867,000 guards in the United States; the remainder are employed in-house.<sup>20</sup> While guards are expected and identifiable at banks and military complexes, they have a less conspicuous presence at railroads, ports, golf courses, laboratories, factories, hospitals, retail stores, and other places of business. The figures in this paper do not include receptionists, who often play a dual role of monitoring unlawful entry into a building and providing information and assistance.

The crime-prevention activities of the U.S. Department of Justice are complemented by 30 government agencies that play some role in law enforcement. Table 3 lists these agencies and the portion of their budgets devoted to crime-related expenses. For example, the Administration for Children and Families spends \$1,276 million on the net cost of child support enforcement, \$35 million on state and discretionary child abuse grants, \$12 million on abandoned infants assistance, and \$62 million on family violence grants. All budget figures in this section come from the Budget of the United States Government.<sup>21</sup> Excluded from Table 3 are government expenditures that appear separately in Table 2, including those for drug control, police, and corrections.

### B. Opportunity Costs

In their study of the costs of murder, rape, robbery, and aggravated assault, Cohen, Miller, and Rossman estimate that the average incarcerated

<sup>17</sup> U.S. Department of Justice, Fact Sheet: Drug-Related Crime (1994).

<sup>18</sup> Maguire & Pastore, *supra* note 2, at 3.

<sup>19</sup> U.S. Bureau of the Census, Service Annual Survey: 1995, at 24 (1997).

<sup>20</sup> U.S. Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook (1996).

<sup>21</sup> Office of Management and Budget, Budget of the United States Government, Fiscal Year 1998 (1997).

TABLE 3  
ANTICRIME COMPONENTS OF FEDERAL AGENCY BUDGETS

	\$ (Millions)
Department of Agriculture:	
Forest Service	60
Food and Consumer Service	106
Department of Commerce:	
International Trade Administration	30
Export Administration	20
Department of Defense:	
Corps of Engineers, Civil	23
Department of Health and Human Services:	
Administration for Children and Families	1,385
Department of the Interior:	
Land and Minerals Management	34
Department of Justice:	
General Administration	31
United States Parole Commission	5
Legal Activities	1,838
Federal Bureau of Investigation	2,165
Immigration and Naturalization Service	2,153
Office of Justice Programs	582
Violent Crime Reduction Trust Fund	4,683
Department of Labor:	
Pension and Welfare Benefits Administration	61
Employment Standards Administration	177
Occupational Safety and Health Administration	203
Mine Safety and Health Administration	150
Department of Transportation:	
Coast Guard	1,071
Federal Aviation Administration	645
Federal Highway Administration	40
National Highway Traffic Safety Administration	18
Federal Railroad Administration	45
Office of Inspector General	40
Department of the Treasury:	
Departmental Offices	232
Federal Law Enforcement Training Center	62
Bureau of Alcohol, Tobacco, and Firearms	353
United States Custom Service	1,555
Internal Revenue Service	4,220
United States Secret Service	582
Other independent agencies:	
Equal Employment Opportunity Commission	220
Federal Communications Commission	18
Federal Emergency Management Agency	2
Federal Trade Commission	34
National Labor Relations Board	137
Nuclear Regulatory Commission	300
Securities and Exchange Commission	103
Total	23,381

SOURCE.—Office of Management and Budget, Budget of the United States Government, Fiscal Year 1998 (1997).

NOTE.—The figures in this table are for departments and items not listed in Table 1.

offender costs society \$5,700 in lost productivity per year.<sup>22</sup> Their estimate was based on the observation that many prisoners did not work in the legal market prior to their offense, and the opportunity cost of those prisoners' time can be considered to be zero. The current study uses a higher estimate of the opportunity cost of incarceration because, unlike previous studies, it examines the relative savings from a crime-free society. It is likely that in the absence of crime, including drug use, some criminals who are not presently employed in the legal workforce would be willing and able to find gainful employment. This assumption is supported by the fact that many criminals are, in a way, motivated entrepreneurs whose energy has taken an unfortunate focus. In the absence of more enticing underground activities, some of the same individuals could apply these skills successfully in the legal sector.

Since males with limited education represent about 95 percent of the prison population and the numbers of blacks and whites in that population are approximately equal, the probability of unemployment was calculated as the average of the unemployment rates for black males and white males with a high school education. The opportunity cost of criminals' time, both in committing crimes and in prison, was estimated to be \$13.14 per hour—\$9.41 in wages plus \$3.73 in benefits and legally mandated employment expenses. This is based on the median wage for males 16 and over in non-salaried positions, weighted to reflect the racial makeup of the inmate population. The figure is \$.02 below the average amount 120 convicted criminals stated as the wage they could have earned in honest work, not including benefits and other employee costs.<sup>23</sup> The \$13.14 figure is also a conservative estimate of worker productivity because the costs an employer is willing to incur to retain a worker should be less than or equal to the value of the worker's contribution. On this basis, after subtracting the value of prison production, the average incarcerated worker is estimated to represent \$23,286 in lost productivity per year.

The opportunity cost of time spent preventing crimes is also significant. On the basis of over 150 observations of individuals locking and unlocking cars, offices, buildings, mail boxes, and gym lockers, and of survey data on the number of times each type of item is locked and unlocked daily,<sup>24</sup> I estimate that each adult spends 2 minutes locking and unlocking doors each

<sup>22</sup> Cohen, Miller, & Rossman, *supra* note 9, at 137.

<sup>23</sup> David A. Anderson, *Penal Obsolescence and the Irrational Criminal* (mimeographed, Centre College 1999).

<sup>24</sup> I surveyed a national random sample of 1,000 homes in 1997 with a 14 percent response rate. The results indicate that individuals lock or unlock possessions an average of 12 times per day and spend over 2 minutes per day looking for keys. Observations of locking/unlocking episodes suggest that each one takes an average of about 10 seconds.

TABLE 4  
OPPORTUNITY COSTS

	\$ (Millions)
Time spent securing assets	89,567
Criminals' lost workdays:	
In prison	35,097
Planning and executing crimes	4,109
Victims' lost workdays	876
Time spent on neighborhood watches	655
Total	130,305

day and just over 2 minutes per day looking for keys. This represents \$89.6 billion worth of time lost to such crime-prevention activities. Stated differently, I estimate that the average adult would be willing to pay at least \$437 per year to avoid the need to lock or unlock his or her home, car, office, gym locker, bicycle, and so forth. For the 140 respondents to the survey described in note 24 above, the stated willingness to pay to avoid locking or unlocking assets for a year averaged \$804, although this figure is likely to be exaggerated because the subjects did not actually have to pay the amount they indicated. As a reference point for individuals' willingness to pay to avoid a single category of locking and unlocking, the average keyless entry system for an automobile costs about \$260.<sup>25</sup> The estimated opportunity cost of time spent locking doors and recovering from criminal assaults was based on the average employer cost for employee compensation per hour, the cost that economic theory would equate with the productive value of an additional hour of a worker's time.<sup>26</sup> Taken together, the opportunity costs due to crime represent a total burden of \$130.3 billion annually (see Table 4).

### C. *The Value of Risks to Life and Health*

Table 5 presents estimates of the implicit costs of violent crime. The value of life and injury estimates used here reflect the amounts individuals are willing to accept to enter a work environment in which their health state might change. The labor market estimates do not include losses covered by workers' compensation, namely, health care costs (usually provided without

<sup>25</sup> This is an average of estimates from Ford, General Motors, and Chrysler dealerships.

<sup>26</sup> This calculation does not rely on the assumption that the time saved in the absence of crime would be spent working. If time freed from crime prevention would be devoted to leisure rather than work activity, this indicates that the leisure time is valued more highly than the monetary rewards from additional work.

TABLE 5  
VALUE OF RISKS TO LIFE AND HEALTH

	\$ (Millions)
Value of lost life	439,880
Value of injuries	134,515
Total	574,395

dollar or time limits) and lost earnings (within modest bounds, victims or their spouses typically receive about two-thirds of lost earnings for life or the duration of the injury). The values do capture perceived risks of pain, suffering, and mental distress associated with the health losses. If the risk of involvement in violent crime evokes more mental distress than the risk of occupational injuries and fatalities, the labor market values represent conservative estimates of the corresponding costs of crime. Similar estimates have been used in previous studies of crime costs.<sup>27</sup>

As the result of self-selection on the part of workers, these figures underestimate the general value of life because those who place the lowest value on their health are more likely to enter risky jobs. A comparable self-selection exists if those who suffer the least from the risk of injury or death are more prone to enter into or live in proximity to crime. Although the value-of-life studies found most of their risk-level variation among young males with limited education, there is a similar bias for victims of murder, drunk driving, and drug-related death. That is to say, the value-of-life figures are largely based on the same segment of the population that is most vulnerable to crime-related death: about 78 percent of murder victims are male, 50 percent are black, and 70 percent are between 15 and 40 years of age.

Crime and occupational maladies each cause about 1.8 million victims per year to lose time from work. Crime victims who missed work lost an average of 3.4 days per crime; the median loss (the average is not available) among victims of occupational injury and illness who missed work beyond the day of the incident is 5 workdays.<sup>28</sup> It is likely that these figures would be even more similar if data on occupational illness and injuries included those workers who lost less than a day of work. The modal rate of occupa-

<sup>27</sup> Cohen, *supra* note 8.

<sup>28</sup> Klaus, *supra* note 11, at 2. Bureau of Labor Statistics, Lost-Worktime Illnesses and Injuries 3 (1997).

tional fatalities in the value-of-life studies is the same as the current risk of murder—about 1 in 10,000.<sup>29</sup>

The average of 27 previous estimates of the implicit value of human life, as reported by W. Kip Viscusi, is \$7.1 million.<sup>30</sup> Removing two outlying estimates of just under \$20 million about which the authors express reservation, the average of the remaining studies is \$6.1 million. Viscusi points out that the majority of the estimates fall between \$3.7 and \$8.6 million (\$3 and \$7 million in 1990 dollars), the average of which is again \$6.1 million. The \$6.1 million figure was multiplied by the 72,111 crime-related deaths to obtain the \$440 billion estimate of the value of lives lost to crime. Similarly, the average of 15 studies of the implicit value of nonfatal injuries, \$52,637,<sup>31</sup> was multiplied by the 2,555,520 reported injuries resulting from drunk driving and boating, arson, rape, robbery, and assaults to find the \$135 billion estimate for the implicit cost of crime-related injuries.<sup>32</sup>

#### D. Transfers

More than \$603 billion worth of transfers result from crime. After the \$204 billion lost to occupational fraud<sup>33</sup> and the \$123 billion in unpaid taxes,<sup>34</sup> the \$109 billion lost to health insurance fraud represents the greatest transfer by more than a factor of two, and the associated costs amount to almost 10 percent of the nations' health care expenditures.<sup>35</sup> Robberies, perhaps the classic crime, ironically generate a smaller volume of transfers (\$775 million) than any other category of crime.<sup>36</sup> The transfers of goods and money resulting from fraud and theft do not necessarily impose a net burden on society, and they may, in fact, increase social welfare to the extent that those on the receiving end value the goods more than those losing them. Nonetheless, as Table 6 illustrates, those on the losing side bear a \$603 billion annual burden.

According to economic theory, the value of transfers may also approximate the cost to criminals of carrying out their crimes, including the ex-

<sup>29</sup> U.S. Bureau of the Census, *Statistical Abstract of the United States*, 1996, at 433 (116th ed. 1996).

<sup>30</sup> W. Kip Viscusi, *The Value of Risks to Life and Health*, 31 *J. Econ. Literature* 1926 (1993).

<sup>31</sup> *Id.* at 1933.

<sup>32</sup> This estimate is conservative because many aggravated assaults go unreported.

<sup>33</sup> Association of Certified Fraud Examiners, *Report to the Nation on Occupational Fraud and Abuse* 14 (1996).

<sup>34</sup> U.S. General Accounting Office, *Tax Administration: Tax Compliance Initiative and Delinquent Taxes* (Testimony GAO/T-GGD-95-74, February 1, 1995); Internal Revenue Service, *Federal Tax Compliance Research*, at v (Publication 1415, April 1996).

<sup>35</sup> National Health Care Anti-Fraud Association, *Fact Sheet* 1 (1995).

<sup>36</sup> Klaus, *supra* note 11, at 2.

TABLE 6  
TRANSFER COSTS

	\$ (Millions)
Occupational fraud	203,952
Unpaid taxes	123,108
Health insurance fraud	108,610
Financial institution fraud	52,901
Mail fraud	35,986
Property/casualty insurance fraud	20,527
Telemarketing fraud	16,609
Business burglary	13,229
Motor vehicle theft	8,913
Shoplifting	7,185
Household burglary	4,527
Personal theft	3,909
Household larceny	1,996
Coupon fraud	912
Robbery	775
Total	603,140

pected cost of time spent in prison. Gary Becker and others have theorized that rational criminals will commit crimes until the marginal benefit equals the marginal cost, provided that benefits exceed costs at some point.<sup>37</sup> Their cost calculation will include the opportunity cost of time spent planning and carrying out crimes and the expected value of time spent in prison. If the marginal crime is similar to the average crime, assuming rationality and full information, the total value of the criminals' gains—loot and psychic benefits—will approximate the value of time and resources devoted to crime. Given these assumptions, the \$603 billion transfer figure is a conservative estimate of criminals' costs to the extent that it does not include the psychic benefits of criminals or the value of stolen assets that are not reported.

The argument for marginal analysis by criminals is not without flaws, especially with regard to the assumptions of rationality and full information for criminals. For example, the results of 219 inmate interviews in a medium-security state prison and a county jail indicate that when their crimes were committed, 77 percent of the inmates did not think about apprehension or punishment, thought there was a zero risk of apprehension, or had no idea of the likely punishment if they were convicted.<sup>38</sup> Marginal analysis on the part of criminals could not be performed accurately under any of these

<sup>37</sup> Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 *J. Pol. Econ.* 169 (1968).

<sup>38</sup> Anderson, *supra* note 23.

circumstances. Underestimates of the likelihood of apprehension and the severity of punishment would lead otherwise rational criminals to indulge beyond the point where their marginal benefits fell below their marginal costs and could result in negative net benefits from crime. At the same time, if the average crime did not resemble the marginal crime, in that the first crimes generated significantly more benefits than costs, this would indicate positive net benefits. Under the assumptions of rationality, full information, and similarity of crimes or under the assumption that net losses due to over-indulgence balance net gains from initial crimes for which marginal benefits exceed marginal costs, the value of assets transferred to criminals can be used as a proxy for the cost of crime to criminals.

Criminals' apparent belittling of the risks and repercussions of their activities has the added implication that the psychic cost to the criminal may be small. This and the minimal capital expenditures required for most crimes suggest that the majority of criminals' costs are opportunity costs associated with the type of human capital acquired, missed opportunities for legal employment, and imprisonment. For these reasons, the calculations in this study include explicit estimates of the value of time spent planning and carrying out crimes and the expected value of time spent in prison as alternatives to loot-based estimates of the cost of crime to criminals.

There are additional cost categories that are not included here, largely because measures that are included absorb much of their impact. Nonetheless, several are worth noting. Richard Thaler, Daryl A. Hellman and Joel Naroff, and Rizzo have estimated the erosion of property values per crime.<sup>39</sup> An average of their figures, \$2,024, can be multiplied by the total number of crimes reported in 1994, 13,992, to estimate an aggregate housing devaluation of \$28 billion.<sup>40</sup> Although this figure should reflect the inability to behave as desired in the presence of crime, it also includes psychic and monetary costs imposed by criminal behavior, which are already included in this paper.

Julie Berry Cullen and Stephen D. Levitt discuss urban flight resulting from crime.<sup>41</sup> They report a nearly one-to-one relationship between serious crimes and individuals parting from major cities. The cost component of this is difficult to assess because higher commuting costs must be measured against lower property costs in rural areas, and the conveniences of city liv-

<sup>39</sup> Richard Thaler, A Note on the Value of Crime Control, 5 J. Urb. Econ. 137 (1978); Daryl A. Hellman & Joel Naroff, The Impact of Crime on Urban Residential Property Values, 16 Urb. Stud. 105 (1979); Mario J. Rizzo, The Cost of Crime to Victims: An Empirical Analysis, 8 J. Legal Stud. 177 (1979).

<sup>40</sup> U.S. Bureau of the Census, *supra* note 29, at 201.

<sup>41</sup> Julie Berry Cullen & Stephen D. Levitt, Crime, Urban Flight, and the Consequences for Cities (NBER Working Paper No. 5737, September 1996).

TABLE 7  
AGGREGATE BURDEN OF CRIME

	Value
Crime-induced production (\$ billion)	397
Opportunity costs (\$ billion)	130
Risks to life and health (\$ billion)	574
Transfers (\$ billion)	603
Gross burden (\$ billion)	1,705
Net of transfers (\$ billion)	1,102
Per capita (\$)	4,118

ing must be compared with the amenities of suburbia. Several other categories of crime costs receive incomplete representation owing to insufficient data and, therefore, make the estimates here conservative. These include the costs of unreported crimes (although the National Crime Victimization Survey provides information beyond that reported to the police), lost taxes due to the underground economy, and restrictions of behavior due to crime.

When criminals' costs are estimated implicitly as the value of the assets they receive through crime, the gross cost of crime (including transfers) is estimated to exceed \$2,269 billion each year, and the net cost is an estimated \$1,666 billion. When criminals' costs are assumed to equal the value of time spent planning and committing crimes and in prison, the estimated annual gross and net costs of crime are \$1,705 billion and \$1,102 billion, respectively. Table 7 presents the aggregate costs of crime based on the more conservative, time-based estimation method. The disaggregation of this and the previous tables facilitates the creation of customized estimates based on the reader's preferred assumptions. Each of the general studies summarized in Table 1 included transfers, so the appropriate comparison is to the gross cost estimate in the current study. As the result of a more comprehensive treatment of repercussions, the cost of crime is now seen to be more than twice as large as previously recognized.

## V. CONCLUSION

Previous studies of the burden of crime have counted crimes or concentrated on direct crime costs. This paper calculates the aggregate burden of crime rather than absolute numbers, includes indirect costs, and recognizes that transfers resulting from theft should not be included in the net burden of crime to society. The accuracy of society's perspective on crime costs will improve with the understanding that these costs extend beyond victims' losses and the cost of law enforcement to include the opportunity costs of

criminals' and prisoners' time, our inability to behave as desired, and the private costs of crime deterrence.

As criminals acquire an estimated \$603 billion worth of assets from their victims, they generate an additional \$1,102 billion worth of lost productivity, crime-related expenses, and diminished quality of life. The net losses represent an annual per capita burden of \$4,118.<sup>42</sup> Including transfers, the aggregate burden of crime is \$1,705 billion. In the United States, this is of the same order of magnitude as life insurance purchases (\$1,680 billion), the outstanding mortgage debt to commercial banks and savings institutions (\$1,853 billion), and annual expenditures on health (\$1,038 billion).<sup>43</sup>

As the enormity of this negative-sum game comes to light, so, too, will the need for countervailing efforts to redefine legal policy and forge new ethical standards. Periodic estimates of the full cost of crime could speak to the success of national strategies to encourage decorum, including increased expenditures on law enforcement, new community strategic approaches, technological innovations, legal reform, education, and the development of ethics curricula. Economic theory dictates that resources should be devoted to moral enhancement until the benefits from marginal efforts are surpassed by their costs. Programs that decrease the burden of crime by more than the cost of implementation should be continued, while those associated with negligible or positive net increments in the cost of crime should be altered to better serve societal goals.

## APPENDIX

### SOURCES OF COST ESTIMATES

Unless otherwise noted, all estimates are adjusted to reflect the purchasing power of 1997 dollars. Cost estimates were obtained from the most recent data available unless abnormal events occurred in the year(s) from which the data were collected. When existing estimates were used, sources were evaluated on the basis of their data collection methods, objectivity, and support from similar estimates. When several equally credible estimates were available, the numbers were averaged. Only the component of each cost category that is attributable to crime is used. Specific explanations are provided below.

#### A. *Crime-Induced Production*

*Drugs.* The President's Commission on Organized Crime estimates that drug trafficking accounts for \$161 billion in annual expenditures.<sup>44</sup> The Office of Na-

<sup>42</sup> When respondents to the survey described in Anderson, *supra* note 4, were asked what they would be willing to pay to live in a society without crime, the average response was a notably similar \$4,095.

<sup>43</sup> U.S. Bureau of the Census, *Statistical Abstract of the United States 1997*, at 153, 794, 533 (117th ed. 1997).

<sup>44</sup> President's Commission on Organized Crime, *supra* note 16.

tional Drug Control Policy (ONDCP) reports that state and local governments spent \$15,907 million on drug control in 1991, a 13 percent increase over the \$14,075 million spent during fiscal year 1990.<sup>45</sup> After removing police, judicial and legal, and corrections expenditures to avoid double counting, \$3,407 million 1991 dollars (\$4,002 million 1997 dollars) were spent on drug control activities, including education, health and hospitals, and "other" justice expenses. The ONDCP also estimates that \$6,948 million 1997 dollars were spent on federal drug control programs in 1994.<sup>46</sup> The combined \$10,951 million figure does not include criminal justice system expenditures, which are counted separately.

Joel W. Hay estimates that prenatal exposure to cocaine and heroin cause \$26.7 billion and \$1.5 billion worth of expenditures, respectively.<sup>47</sup> Mothers against Drunk Driving (MADD) and its 500 chapters nationwide spend over \$48 million annually in efforts to curtail the crime of driving drunk.<sup>48</sup> Jeff Collins reports that the average cost of a first driving-under-the-influence (DUI) offense is \$9,512.<sup>49</sup> This includes fines, fees, penalties, auto insurance premium increases, and attorney fees, but not lost pay, injuries, or vehicle damage, some of which are listed separately below. Subsequent offenses would involve even greater expenses. Given the 1,083,000 DUIs reported in 1994, the expenditure on these components of drunk driving for that (typical) year was approximately \$10.3 billion.<sup>50</sup>

*Police, Corrections, Justice System.* Figures for police protection, corrections, and state and local crime-related judicial and legal expenditures are from the *Sourcebook of Criminal Justice Statistics, 1995*.<sup>51</sup> The most recent numbers available for each of these categories are from 1992. Federal expenditures on crime-related judicial and legal services appear in Table 3 and were obtained from the *Budget of the United States Government, Fiscal Year 1998*.<sup>52</sup>

*Guards.* The U.S. Census Bureau reports expenditures of \$17.9 billion dollars on detective, guard, armored car, and security services.<sup>53</sup> Multiplying the 867,000 noncorrectional guard jobs reported by the Bureau of Labor Statistics (BLS)<sup>54</sup> by \$20,000 (the unadjusted annual guard income used by David N. Laband and John P. Sophocleus)<sup>55</sup> yields a very similar figure of \$17.3 billion. Laband and Sophocleus estimate that over \$220 billion is spent annually on guards.<sup>56</sup> Their figure is based on the 1983 Victim Risk Supplement to the National Crime Survey, which

<sup>45</sup> Office of National Drug Control Policy, Fact Sheet: Drug Data Summary 5 (1995).

<sup>46</sup> *Id.* at 5.

<sup>47</sup> Joel W. Hay, *The Harm They Do to Others: A Primer on the External Costs of Drug Abuse, Searching for Alternatives: Drug-Control Policy in the United States* 215 (1991).

<sup>48</sup> Mothers against Drunk Driving, CBBB Philanthropic Advisory Service Report 3 (1997).

<sup>49</sup> Jeff Collins, *Street Smarts*, Orange County Register, January 7, 1996, Metro Section, at 1.

<sup>50</sup> U.S. Bureau of the Census, *supra* note 29 at 209.

<sup>51</sup> Maguire & Pastore eds., *supra* note 2, at 3.

<sup>52</sup> Office of Management and Budget, *supra* note 21.

<sup>53</sup> U.S. Bureau of the Census, *supra* note 19, at 24.

<sup>54</sup> U.S. Department of Labor, *supra* note 20, at 20.

<sup>55</sup> David N. Laband & John P. Sophocleus, *An Estimate of Resource Expenditures on Transfer Activity in the United States*, 107 Q. J. Econ. 959 (1992).

<sup>56</sup> *Id.* at 975.

asked "What kind of security (is/was) there [at your workplace]?"<sup>57</sup> Thirty percent of respondents checked the box indicating that there were "police or guards for protection," and Laband and Sophocleus multiplied this percentage by the total number of establishments (16,488,992), the estimated annual income of guards (\$20,000), and the estimated number of guards per establishment (1.5). Their figure is not used in this paper owing to the possible ambiguity of the selected response. For example, some respondents might have said they were protected by "police or guards" because of the availability of police in their city. Others might have responded positively because one or more guards protected an entire mall or shopping center. Under the assumption that the average guarded establishment has at least 1.5 guards, the total number of guards reported by the BLS would indicate that fewer than 5 percent of establishments employ guards, rather than 30 percent.

*Medical Care.* Cohen et al. estimate medical costs for murder, rape, robbery, and assault to be \$4,112 (not including funeral expenses), \$530, \$175, and \$215 respectively.<sup>58</sup> Multiplying these costs by the number of murders reported by the U.S. Department of Justice<sup>59</sup> and the number of victimizations reported in the National Crime Victimization Survey<sup>60</sup> yields the estimated cost of medical care due to violent crime, \$2.5 billion. Collins reports that medical costs resulting from drunk driving amount to \$6.48 billion per year, or just over \$6,000 per injury.<sup>61</sup> The same figure is reported in the statistics of MADD.<sup>62</sup>

A note on mental health costs: Since the estimated values for the risk of injury and death come from wage-risk trade-offs in the labor market, medical care costs for the subjects in question would be largely covered by workers' compensation and would not be figured into the higher wages required to compensate for higher injury risks. Thus, the cost of crime-related medical care is added separately to the figures in this study. On the other hand, mental health care is not generally included in workers' compensation, so its costs should be encompassed within the estimated values above.

*Nonlethal Weaponry, Alarm Systems.* Andrew E. Serwer reports that the fear of crime has brought Americans to spend \$324 million annually on nonlethal weaponry, including defensive sprays and stun guns.<sup>63</sup> He explains that in 1993, 32 percent of new homes were built with alarm systems, and alarm sales reached \$6.47 billion. This figure is somewhat larger than the \$5.12 billion estimated by Laband and Sophocleus<sup>64</sup> for residential and commercial burglar alarms in 1985, but appropriate given the significant increases in preventative expenditures in the past decade.<sup>65</sup> According to Kate Fitzgerald, security industry executives estimate that residential security alone is a \$5.4 billion market.<sup>66</sup>

<sup>57</sup> U.S. Bureau of Justice Statistics, *Crime Prevention Measures* (1986).

<sup>58</sup> Cohen, Miller, & Rossman, *supra* note 9, at 143.

<sup>59</sup> U.S. Department of Justice, Federal Bureau of Investigation, *Uniform Crime Reporting Program Press Release* (October 13, 1996).

<sup>60</sup> U.S. Bureau of the Census, *supra* note 29, at 206.

<sup>61</sup> Collins, *supra* note 6, at 41.

<sup>62</sup> Mothers against Drunk Driving, *Statistics 1* (1997).

<sup>63</sup> Andrew E. Serwer, *Crime Stoppers Make a Killing*, *Fortune*, April 4, 1994, at 109.

<sup>64</sup> Laband & Sophocleus, *supra* note 55, at 263.

<sup>65</sup> Serwer, *supra* note 63, at 109; Kate Fitzgerald, *Gizmos Turn Home Protection into a Boom*, *Advertising Age*, January 10, 1994, at S-1.

<sup>66</sup> Fitzgerald, *supra* note 65, at S-1.

*Computer Viruses and Security.* The \$8 billion estimate for the cost of computer-related crime is supported by several sources. Mark Stuart Gill quotes this exact amount.<sup>67</sup> Jeffrey Young reports an estimate in excess of \$10 billion from Management Analytics, a Hudson, Ohio, consulting company that specializes in information assurance and security.<sup>68</sup> The National White Collar Crime Center describes estimates between \$100 million and \$40 billion.<sup>69</sup> Even in 1991, FBI Director William Sessions estimated that computer-related crime cost American companies as much as \$5.87 billion per year.<sup>70</sup> When combined with related costs to individuals and governments and adjusted for the increasing use of computers, this estimate would also be similar to that used for the present study.

*Vandalism.* *U.S. News and World Report* estimated vandalism costs to exceed \$4.22 billion, including arson, which amounts to \$1.90 billion per year, as explained below.<sup>71</sup> The nonarson component of vandalism is thus \$2.32 billion. Of this, \$400 million is attributable to nonarson school vandalism,<sup>72</sup> and \$600 million is attributable to replacements of glass due to glass etching.<sup>73</sup> On the basis of a 1993 survey, Jay Beswick estimated the total cost of graffiti vandalism to exceed \$7 billion, although the more conservative \$2.32 billion vandalism figure is used for the purposes of the current study.

*Surveillance Cameras, Electric Retail Article Surveillance, Guard Dogs, Passes for Business Access, Airport Security.* Laband and Sophocleus performed a thorough examination of resource expenditures on transfer activity that included estimates for the above items.<sup>74</sup> The U.S. Bureau of the Census reports the percentages of businesses using passes, 19 percent; surveillance cameras, 16 percent; and guard dogs, 2 percent.<sup>75</sup> Laband and Sophocleus applied these figures to the total number of businesses and the estimated cost of each item to calculate the total expenditures. Their estimated life expectancies for passes, surveillance cameras, and guard dogs were 1, 10, and 5 years, respectively. Their estimate for airport security includes metal detectors, X-ray machines, and personnel.

*Replacements due to Arson.* The Bureau of the Census reports direct property losses from structure fires of suspicious or incendiary origin to have cost \$1.56 billion in 1994.<sup>76</sup> This figure is the lowest since 1990, owing in large part to the California wildfires and World Trade Center bombing in 1993, the civil disturbance in

<sup>67</sup> Mark Stuart Gill, *Cybercops Take a Byte out of Computer Crime*, Smithsonian, May 1997, at 114.

<sup>68</sup> Jeffrey Young, *Spies Like Us*, Forbes ASAP, June 3, 1996, at 70.

<sup>69</sup> National White Collar Crime Center, *How Much Does White Collar Crime Cost?* 2 (1997).

<sup>70</sup> Federal Bureau of Investigation, 60 FBI Law Enforcement Bull. 12 (1991).

<sup>71</sup> *The Losing Battle against Crime in America*, U.S. News & World Rep., December 16, 1974, at 32.

<sup>72</sup> James H. VanScriber & Joseph F. Marcoline, *How to Combat School Vandalism* (National Association of Secondary School Teachers 1986).

<sup>73</sup> Jay Beswick, *The National Cost of Graffiti Vandalism* (National Graffiti Information Network 1997).

<sup>74</sup> Laband & Sophocleus, *supra* note 55.

<sup>75</sup> U.S. Bureau of the Census, *Statistical Abstract of the United States*, 1988, at 166 (108th ed. 1988).

<sup>76</sup> U.S. Bureau of the Census, *supra* note 19, at 223.

Los Angeles in 1992, and the Oakland wildfire in 1991. John R. Hall of the National Fire Protection Agency (NFPA) reports that \$268 million worth of vehicles and \$72 million worth of outdoor areas and other items were lost owing to incendiary and suspicious fires in 1992.<sup>77</sup> The NFPA includes proportional shares of fires with unknown cause in its calculations. Combining structural, vehicular, and outdoor damages, the cost of arson is \$1.90 billion.

*Locks.* Expenditures on door locks, lock sets, lock trim, cabinet locks, rim locks, and "other locking devices" come from the *1992 Census of Manufactures*, with the assumption of a 50 percent retail margin.<sup>78</sup> On the basis of consultation with Jack Couser, sales representative for Pella Windows, 5 percent of window hardware costs were attributed to the lock mechanism. Protection plates, push-pull bars, and lock trim are assumed to make up half of the \$140 million of expenditures in the category that also includes push plates and pulls. The Census data do not include complete data on padlocks, but Philip E. Settecase, vice president of sales and marketing at American Lock, indicated in a letter of May 30, 1995, that annual padlock expenditures in the United States have reached \$682 million. Installation costs were not included, as most locks require little or no additional installation beyond the installation of the door, doorknob, or window to which they are attached. The value of safe and vault sales came from the *1995 Annual Survey of Manufactures*, with the same assumption of a 50 percent retail margin.<sup>79</sup>

*Firearms, Safety Lighting, and Protective Fences.* The costs for these items also came from the *1995 Annual Survey of Manufactures*,<sup>80</sup> with the exception of barbed and twisted wire costs, which came from the *Census of Manufactures: Industry Series*,<sup>81</sup> with the standard 50 percent margin assumption. Half of small arms and small arms ammunition are assumed to be purchased with crime deterrence or involvement in mind. Half of fences, gates, and outdoor lighting equipment are also assumed to be erected for the purpose of deterring crime. Laband and Sophocleus estimate expenditures of \$1.96 billion on gates alone, based on estimates of the percentage of businesses using gates (16 percent) and the cost of gates (\$7,435).<sup>82</sup> The present study's census-based estimate for gates and fences combined is a relatively conservative \$1.16 billion.

*Theft Insurance.* The Insurance Information Institute reports that \$138 million in burglary and theft premiums were paid in 1994.<sup>83</sup> This represented an 11 percent increase over 1993 premiums, but this level was typical over the previous decade. The combined ratio—the percentage of each premium dollar spent on indemnity and expenses—was 59.3, the lowest level in at least 10 years. For the purposes of this study, the average portion of insurance premiums that is returned to policyholders as indemnity should not be included as an expense of crime. Assuming, based on consultation with insurance executives, that indemnity amounted to 30 percent

<sup>77</sup> John R. Hall, *U.S. Arson Trends and Patterns*, 1993, at 4 (1994).

<sup>78</sup> U.S. Department of Commerce, *Census of Manufacturers: Industry Series*, at 34A-20 (1992).

<sup>79</sup> U.S. Department of Commerce, *Annual Survey of Manufactures 2-27* (1995).

<sup>80</sup> *Id.*

<sup>81</sup> U.S. Department of Commerce, *supra* note 78, at 34F-30.

<sup>82</sup> Laband & Sophocleus, *supra* note 55.

<sup>83</sup> Insurance Information Institute, *1996 Fact Book 29* (1996).

of premiums, the remaining 70 percent (\$96 million) constitutes crime-induced production.

*Library Theft Detection.* The *American Library Directory, 1996-1997*, reports that there are 32,666 libraries in the United States.<sup>84</sup> Samuel Brown, west division head of 3M Safety and Security, which manufactures library theft-detection devices, estimates that 70 percent of all libraries use detection devices; the average cost including installation of a single library's system is \$9,000; the expected lifetime of a system is 9 years; and each system runs on 24 volts of electricity. On the basis of these figures, over \$24 million is spent purchasing and running these devices each year.

Stan Campbell, library director of the Grace Doherty Library, reports that the metallic strips used in books to trigger detection devices cost \$0.13 each and take at least 15 seconds to insert. The U.S. Bureau of the Census indicates that about 20 million new volumes are added to college and university libraries each year.<sup>85</sup> Assuming that other libraries grow at a similar rate and that 70 percent of the 36 million new volumes receive metal strips for theft detection, the strips and associated labor costs result in \$3.9 million in annual expenditures. The total estimate for library theft detection is \$28 million. Laband and Sophocleus estimated library security (not including the purchase and installation of metal strips) to cost \$16 million in 1985, at which time there were fewer libraries and a smaller percentage of libraries using detection devices.

#### B. Opportunity Costs

Calculations of the values of criminals' lost workdays and the time spent on crime deterrence are explained in the body of this article.

*Victims' Lost Workdays.* On the basis of the National Crime Victimization Survey, Klaus estimates that 6.1 million workdays are lost to crime, an average of 3.4 days per crime.<sup>86</sup> The value of this time was found by multiplying the lost days by eight to find the total number of lost hours and then multiplying by the average cost of employee compensation per hour worked, \$17.95.<sup>87</sup> This is the lower bound for the value of lost work as employers are willing to pay compensation that is less than or equal to the full value of work performed.

*Neighborhood Watches.* The National Association of Neighborhoods and the National Association of Town Watch estimate that 20,000 neighborhood watch groups spend an average of 5 person-hours per day on crime watches.<sup>88</sup> Time for participants was valued at the average cost of employee compensation as explained above. Even if the time involved is drawn from leisure time, economic theory states that if leisure time were not valued at least as highly as work time, the marginal hour of leisure would be spent working.

#### C. The Value of Risks to Life and Health

*Value of Lost Life.* The construction of the \$6.1 million value of life estimate is described in the text. Crime-related deaths counted in this study include annual

<sup>84</sup> American Library Directory, 1996-1997, at xi (Beverly McDonough ed. 1996).

<sup>85</sup> U.S. Bureau of the Census, *supra* note 29, at 195.

<sup>86</sup> Klaus, *supra* note 11, at 2.

<sup>87</sup> U.S. Bureau of the Census, *supra* note 29, at 430.

<sup>88</sup> National Crime Prevention Council, *supra* note 1, at 6.

drug-induced deaths, AIDS cases, drunk driving deaths, and murders. The U.S. Bureau of Census reports 13,275 drug-induced deaths in 1993 (the year of the most recent available data).<sup>89</sup> That figure does not include drunk driving or AIDS deaths. The 13,016 figure for drunk driving deaths in 1994 assumes that accidents in which the highest blood alcohol level was below 0.10 percent were not caused by a criminal act (either because alcohol was not the cause or because the blood alcohol level was not illegal in that location), and accidents involving someone with a blood alcohol level of 0.10 percent or higher were.<sup>90</sup> The U.S. Department of Justice reports 21,597 murders in 1995, the lowest number since 1990.<sup>91</sup> And data from the Center for Disease Control and Prevention indicate that 23,228 new AIDS cases reported between July 1995 and June 1996 were caused by injected drug use or sex with an injecting drug user.<sup>92</sup> This figure is based on the assumption that of the 3,198 cases involving men who have sex with men and inject drugs, half of the AIDS cases were caused by the drug use. The total of 72,111 crime-related deaths was multiplied by the \$6.1 million value of life to arrive at the \$440 billion estimate for the value of lives lost to crime.

*Value of Injuries.* The \$135 billion estimate for the implicit cost of crime-related injuries was found by multiplying the average of 15 studies of the value of nonfatal injuries, \$52,637,<sup>93</sup> by the 1,522,000 reported rapes, robberies, and assaults with injuries,<sup>94</sup> the 1,028,800 automobile accident injuries involving drivers with blood alcohol levels at or above 0.10 percent,<sup>95</sup> the 3,495 arson-related injuries,<sup>96</sup> and the 1,225 drunk boating injuries.<sup>97</sup>

#### D. Transfers

Fraud estimates in the literature are numerous and varied. The estimates used here are from the sources the author judged to be the least self-interested and the most thorough. Detailed explanations of these decisions for the larger categories appear below. In no case was the selected estimate the largest estimate found. The fraud and theft categories included in this study encompass the categories of what is sometimes classified as white-collar crime.

*Occupational Fraud.* In its *Report to the Nation: Occupational Fraud and Abuse*, the Association of Certified Fraud Examiners (ACFE) defines occupational fraud and abuse as "the use of one's occupation for personal enrichment through the deliberate misuse or misapplication of the employing organization's resources

<sup>89</sup> U.S. Bureau of the Census, *supra* note 29, at 103.

<sup>90</sup> *Id.* at 629.

<sup>91</sup> U.S. Department of Justice, *supra* note 59, at 3.

<sup>92</sup> U.S. Department of Health and Human Services, HIV/AIDS Surveillance Report (Ctr. Disease Control 1996).

<sup>93</sup> Viscusi, *supra* note 30, at 1933.

<sup>94</sup> U.S. Bureau of the Census, *supra* note 29, at 206.

<sup>95</sup> *Id.* at 617, 629.

<sup>96</sup> Hall, *supra* note 77.

<sup>97</sup> U.S. Bureau of the Census, *supra* note 29, at 617; Jonathan Howland, Thomas W. Mangione, & Sara Minsky, Perceptions of Risk of Drinking and Boating among Massachusetts Boaters, 111 Pub. Health Rep. 373 (July-August 1996).

or assets.”<sup>98</sup> This includes asset misappropriation, fraudulent statements, bribery, and corruption. According to the ACFE, for years, experts have estimated the cost of such fraud to be around \$200 billion annually.<sup>99</sup> The ACFE now estimates the cost of occupational fraud to be over \$400 billion.<sup>100</sup> It arrived at this figure after asking its members to estimate the percentage of revenues lost to occupational fraud and abuse in the companies they have investigated. The average of these estimates, 6 percent, was applied to the national gross domestic product to arrive at the \$400 billion figure. This estimate may be accurate, but the method is not so decisive as to warrant the inclusion of such a humbling figure in this conservative study. Thus, the more accepted \$200 billion figure was used (adjusted for inflation).

*Unpaid Taxes.* The U.S. General Accounting Office testified before Congress that the “tax gap” in 1992 was \$144.8 billion.<sup>101</sup> This gap is made up of unreported income taxes by individuals and corporations, as well as reported but unpaid taxes. The Internal Revenue Service estimates that about 15 percent of this gross amount will be remitted late or collected as the result of enforcement, leaving a net tax gap for individuals and corporations of \$123.1 billion.<sup>102</sup>

*Health Insurance Fraud.* The National Health Care Anti-Fraud Association (NHCA) reports that, in 1992, on the basis of health insurance industry data, the U.S. General Accounting Office estimated that health care fraud amounts to 10 percent of the nation’s annual health care expenditure.<sup>103</sup> The 1994 U.S. Department of Commerce estimate places the total national health care costs at \$1.086 trillion, indicating that health care fraud costs around \$108.8 billion each year.<sup>104</sup> Results from a 1993 survey by the Health Insurance Association of America suggest that 43 percent of fraudulent health care costs are attributable to improper diagnoses, 34 percent are for billings for services not rendered, 21 percent are for waivers of patient deductibles or co-payments, and 2 percent are for “other.”<sup>105</sup>

*Financial Institution Fraud.* The Association of Certified Fraud Examiners reports “conservative” estimates from Guarantee Asset Protection Systems that financial institution fraud costs amount to \$52.9 billion in a typical year.<sup>106</sup> This figure does not include over \$1 billion in employee-initiated bank crime that would be part of the occupational fraud category above. Although many of its figures are from an unpublished, proprietary FBI report that could not be evaluated, the National White Collar Crime Center presents estimates for several categories of financial institution crime that go into the hundreds of billions of dollars.<sup>107</sup> For example, the annual cost of money laundering is estimated at \$100–\$215 billion, corporate financial crime costs \$200–\$565 billion, savings and loan and stock brokerage fraud costs \$8.1–\$25 billion, mortgage loan fraud costs \$30 billion, and

<sup>98</sup> Association of Certified Fraud Examiners, *supra* note 33, at 4.

<sup>99</sup> *Id.* at 14.

<sup>100</sup> *Id.* at 13.

<sup>101</sup> U.S. General Accounting Office, *supra* note 34.

<sup>102</sup> Internal Revenue Service, *supra* note 34, at v.

<sup>103</sup> National Health Care Anti-Fraud Association, *supra* note 35, at 1.

<sup>104</sup> *Id.*

<sup>105</sup> *Id.* at 2.

<sup>106</sup> Association of Certified Fraud Examiners, *Fraud Statistics 3* (1994).

<sup>107</sup> National White Collar Crime Center, *supra* note 69.

check fraud and counterfeiting costs \$0.815–\$10 billion annually. Those figures are not included in the current study, either because they overlap with occupational crime costs or because the methodology behind their calculation could not be evaluated. Nonetheless, they suggest that the \$52.9 billion figure used here is not excessive.

*Mail Fraud.* Richard Schroeder reports estimates averaging \$36 billion annually for mail fraud, including phony sweepstakes, overvalued merchandise, chain letters, and referral schemes.<sup>108</sup> Similar pyramid schemes now permeate internet newsgroup postings, posing an even greater threat via this faster and cheaper medium.

*Property/Casualty Insurance Fraud.* The Association of Certified Fraud Examiners reports “very conservative” estimates from the National Insurance Crime Bureau that more than \$20.5 billion is lost annually to fraudulent property and casualty claims.<sup>109</sup>

*Telecommunications Fraud.* The ACFE attributes the \$16.6 billion estimate for the cost of telecommunications fraud to the Alliance against Fraud in Telemarketing, saying that two-thirds of the losses come from phony investment scams.<sup>110</sup> Jon Healey states the same figure as the lower bound on the cost of telemarketing scams, which he suggests could exceed \$40 billion.<sup>111</sup>

*Business Theft.* Terri Thompson, David Hage, and Robert F. Black estimate that businesses lose \$13.2 billion worth of merchandise to burglaries and robberies and \$14.4 billion worth to pilferage and shoplifters each year.<sup>112</sup> This study uses \$7.2 billion as an estimate of the losses to shoplifting, assuming that the other half of the \$14.4 billion was the result of employee pilferage that is classified under occupational fraud above.

*Personal Theft.* Klaus estimates losses to crime victims based on the National Crime Victimization Survey.<sup>113</sup> This was the source for estimates of personal theft (\$3.9 billion), household burglary (\$4.5 billion), household larceny (\$2 billion), motor vehicle theft (\$8.9 billion), and robbery (\$775 million).

*Coupon Fraud.* Christopher Power reports Coupon Information Center estimates that coupon fraud costs companies \$912 million each year.<sup>114</sup> Sixty-two percent of the losses are attributed to coupons sent by retailers who did not receive them as the result of a sale; the remainder are results from fraudulent rebate forms.

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