

The Cost of Crime

By David A. Anderson

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Abstract

The size of crime's burden informs the prioritization of crime-prevention efforts and influences our legal, political, and cultural stance toward crime. This research quantifies crime's burden with an estimate of the annual cost of crime in the United States. While most existing studies focus on particular regions, types of crime, or cost categories, the scope of this article includes the direct and indirect cost of all crime in the United States. Beyond the expenses of law enforcement, criminal justice, and victim losses, the cost of crime includes expenditures on private deterrence, the implicit cost of fear and agony, and the opportunity cost of time lost due to crime. The estimated annual cost of crime, net of transfers from victim to criminal, is \$1.7 trillion.

1

Introduction

This article provides estimates of the annual cost of crime in the United States. A better understanding of the repercussions of crime could guide the prioritization of law enforcement, education, and social programs that deter criminal activity. For example, Evans and Owens (2007) estimate that a 1-percent increase in the number of police officers decreases crime rates by up to 1 percent. Without estimates of the cost of crime, the value of a 1-percent reduction in crime is unknown, and policymakers cannot determine whether the benefit of an expanded police force exceeds the cost. While most crime-cost studies have focused on particular types of crime, geographical areas, or direct repercussions of crime, this article addresses the overall cost of all crime in the United States.

Traditional measures of criminal activity count crimes or estimate direct costs that typically include the costs of policing, corrections, criminal justice, and replacing stolen merchandise. This study estimates the burden of a broad set of crime's repercussions, both direct and indirect, to tell a more complete story. The indirect costs of crime include the opportunity cost of time lost to criminal activities, incarceration, crime prevention, and recovery after victimization. The threat

of crime elicits private expenditures on deterrents such as locks, safety lighting, security fences, alarm systems, antivirus software programs, and armored car services. The threat of noncompliance causes myriad federal agencies to dedicate resources to the enforcement of regulations. And the implicit psychological and health costs of crime include fear, agony, and the inability to behave as desired.

The largest direct outlays stemming from crime in the United States include annual expenditures of \$113 billion for police protection, \$81 billion for correctional facilities, and \$42 billion for the legal and judicial costs of state and local criminal cases (Kyckelhahn, 2011). Several of the less visible costs are also substantial. For example, in a typical year, U.S. citizens spend \$164 billion worth of time locking and unlocking doors. The psychic cost of crime-related injuries is \$103 billion, and computer viruses and other computer security issues cost businesses \$78 billion annually (FBI, 2006).

This study places less emphasis on imprecise counts of crimes than most previous measures of crime's burden. Problems with some crime statistics 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.

Figure 1.1 shows that crime victimizations decreased steadily from 40 million in 1995 to 18.7 million in 2010. The reduction in crime suggests a reduction in the burden of victimization. However, the size of the reduction may not be proportional to the decrease in victimizations if the scale of the average crime has increased or decreased over that period. If the decrease in victimizations resulted from increased spending on crime prevention, the aggregate cost of crime may have increased, decreased, or stayed the same.

The comprehensive approach adopted here captures several types of cost shifting that can result from crime prevention efforts. Police protection is a public good, in that public expenditures on law enforcement create an environment of relative safety that is nonrival and nonexcludable. A dual analysis of the public and private costs of crime measures the net benefit of public crime prevention expenditures that substitute for private expenditures, and vice versa. Increases



Fig. 1.1 Annual crime victimizations, 1995–2010.
Source: National Crime Victimization Survey, (1995–2010).

in government expenditures can more than offset decreases in expenditures by individuals for a given level of protection. For example, in 2010, Grove City, Pennsylvania increased its law enforcement budget by \$678,394 to expand the police force. If the added coverage had no effect on the crime rate, but allowed private crime-related expenditures to decrease by \$1,000,000, society would be better off. For evidence of the tradeoff between public and private expenditures on crime prevention, see Philipson and Posner (1996). The inclusion of private crime prevention expenditures in this study captures the potential for public expenditures to reduce total societal outlays for crime, with or without a decrease in the crime rate.

The comprehensive scope of this study also accounts for regional shifts in crime. Suppose the increase in law enforcement in Grove City simply drives an unchanged quantity of criminal activity to nearby

Harrisville. A city-level measure would suggest a reduction in crime's burden, whereas the total expenditure on crime has increased by the amount Grove City spent to send the crime elsewhere. This study examines costs for the entire nation, which accounts for the possibility of losses in one region of the United States substituting for losses in another.

For the purposes of this research, the cost of crime is defined to include all costs that would not exist in the absence of illegal behavior under current U.S. law. Members of particular political parties, religions, age groups, and special interest groups have their own perspectives on what should be punishable under the law. For example, arguments can be made for the legalization of bribery as a means of promoting commerce, and for the criminalization of alcohol and tobacco products. Debates over what should or should not be against the law are outside the scope of this article.

The benchmark in this study is perfect compliance with the law. Nonetheless, this research does not simply determine the cost of laws. The cost of law enforcement would fall to zero if there were no laws, but the damage and deterrence costs of currently illegal behavior would continue. 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.

The cost of crime does speak to the benefits of cooperation and ethical behavior. In the ideal state of voluntary legal compliance, there would be no need for expenditures on crime prevention, no costly repercussions of criminal acts, and no losses due to fear and distrust. We will not reach that ideal state, but with knowledge of the full cost of crime, we also know the benefit of eliminating a more realistic fraction of that cost.

Valid questions remain regarding the inclusion of particular cost components in the calculation of crime's burden. The approach here is to sidestep unsolvable debates by providing itemized lists of crime-cost elements. This enables the reader to adopt customized formulations for the cost of crime. For example, the calculation can be made with or without estimates of the psychic cost of crime, the value of transfers

from victim to criminal, and the opportunity cost of criminals' time. It is the reader's prerogative to remove undesired figures from the bottom line.

Section 2 of this article reviews the previous literature on the cost of crime. Section 3 explains each of the four crime-cost categories. Section 4 specifies the source of each cost estimate. Section 5 summarizes the findings. Section 6 discusses the implications of the research. Section 7 concludes the article.

2

Literature Review

The importance of crime's toll on society elicits myriad examinations of the resulting damage. The FBI's annual *Uniform Crime Reports* (UCR) provide a measure of the level of crime based on counts of the acts of murder and nonnegligent manslaughter, forcible rape, robbery, aggravated assault, burglary, larceny-theft, motor vehicle theft, and arson each year. Data for the UCR are collected under the hierarchy rule that, except in the case of arson, only the most serious offense in a multiple-offense situation must be counted. As strictly a count of crimes, the UCR Program offers no mechanism for the placement of weights on various criminal acts according to their severity. In a decade with fewer acts of arson, burglary, theft, or assault, society might be worse off than before if the severity of the acts is disproportionately large. From a societal standpoint, what matters most is the extent of damage inflicted by these crimes, which the UCR does not measure.

Previous studies of the cost of crime showcase a variety of estimation techniques. Most early estimates are tallies of market expenditures associated with crime. These include the direct costs of deterrence, property loss, medical care, and criminal justice. Market-based estimates are necessarily incomplete because many of the costs of crime have no associated market. With the contingent valuation method,

investigators use surveys to estimate values for non-market cost components such as fear and pain. The primary drawback to this approach is its basis on surveys that are vulnerable to bias. For example, bias can result from the hypothetical nature of survey questions, interviewer bias that influences the wording of questions, or self-selection of respondents with strong opinions. Hedonic methods yield estimates of crime-cost components drawn from crime's effect on prices paid for goods or services. For example, other things being equal, the difference in home prices in areas with low and high crime rates reflects the burden home buyers feel from the greater prevalence of crime.

Cohen (2010) describes a "bottom-up" approach of piecing together each of crime's cost components. Estimates based on market prices, contingent valuation, and hedonic pricing can all play a role in bottom-up calculations. A more holistic "top-down" approach is based on the public's willingness to pay for reductions in crime as stated in responses to contingent-valuation surveys. The present study and most of the studies discussed in this section are essentially bottom-up investigations. Examples of top-down studies include Cohen et al. (2004) and Atkinson et al. (2005). Heaton (2010) surveys methods for estimating the cost of crime.

Table 2.1 summarizes the findings of nine previous crime-cost studies. These and all figures in this article are adjusted to reflect the purchasing power of 2012 dollars using the Consumer Price Index. Like this study, most previous studies assemble estimates from sources that include other studies, while adding new components. The previous literature suggests an escalating crime burden, partly due to true increases in the cost of crime and partly due to improved recognition of crime's broad repercussions. The first of these studies was performed by the President's Commission on Law Enforcement and Administration of Justice (1967), which placed crime's cost at \$151 billion. This estimate includes the direct cost of crimes against persons and property, and expenditures on illegal goods and services. Also included are public expenditures on police, criminal justice, corrections, and some types of private prevention.

U.S. News and World Report (1974) estimated a \$408 billion crime burden for the United States. That estimate includes \$27.6 billion for

Table 2.1.

Previous study	Focus	Not Included	\$ (billions)
Anderson (1999)	General	Investigation services, locksmiths	2419
Collins (1994)	General	Opportunity costs, miscellaneous indirect components	1032
Cohen et al. (1995)	Victim costs of violent and property crimes	Prevention, opportunity, and indirect costs	706
<i>U.S. News</i> (1974)	General	Opportunity costs, miscellaneous indirect components	408
Cohen et al. (1994)	Cost of rape, robbery, and assault	Prevention, opportunity, and indirect costs	259
Zedlewski (1985)	Firearms, guard dogs, victim losses, commercial security	Residential security, opportunity costs, indirect costs	227
Cohen (1990)	Cost of personal and household crime to victims	Prevention, opportunity, and indirect costs	161
President's Commission on Law Enforcement (1967)	General	Opportunity costs, miscellaneous indirect components	151
Klaus (1994)	National crime victimization survey crimes	Prevention, opportunity, and indirect costs, full medical costs	27

private crime-fighting costs, with no breakdown or other details. Collins (1994) updated the *U.S. News and World Report* crime study with a cost estimate of \$1.03 trillion. The updated study included a \$97.6 billion estimate for private protection, again with no breakdown. Collins included the value of shoplifted goods, bribes, kickbacks, embezzlement, and other thefts among the costs of crime. As transfers from victims to criminals, these values represent costs to victims, but not net losses to society. Collins also expanded the scope of crime-cost calculations by including \$410 billion for pain and suffering and lost wages. As with the 1974 study, opportunity costs were not considered.

Zedlewski (1985) estimated crime-related expenditures on firearms, guard dogs, victim losses, criminal justice, and commercial security to

be \$227 billion. In his report, Zedlewski noted the exclusion of expenditures on residential security, opportunity costs, and indirect costs. Cohen (1990) 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, auto theft, burglary and larceny. Cohen concluded that the aggregate annual cost of personal and household crime to U.S. victims is \$161 billion.

In a study of the costs of violent behavior in the United States, Cohen et al. (1994) estimated the aggregate cost of rape, robbery, and assault to be \$259 billion. Miller et al. (1995) estimated that violent and property crimes cost victims \$670 billion per year including pain, suffering, and reduced quality of life. In those studies, the investigators considered an impressive array of costs, primarily to victims of violent crime, but did not attempt to measure the costs of broader categories of crime to the nation as a whole.

In a narrower, more recent study, McCollister et al. (2010) estimated the tangible and intangible per-offense costs of 13 crimes. Following the “jury compensation method” of Cohen (1988), they estimated the intangible cost of pain, suffering, and fear using the total jury awards in personal injury cases, less the direct economic loss to the victim. The tangible cost was estimated using Department of Justice data on medical expenses, cash losses, property theft or damage, and lost earnings caused by crime victimization. Their combined (tangible plus intangible) estimates include \$9,470,931 per murder, \$253,857 per rape/sexual assault, \$112,834 per aggravated assault, and \$44,609 per robbery (p. 105).

In the precursor to the present article, Anderson (1999), I combined data from existing sources with new data on the ancillary cost of crime to generate a more comprehensive measure of the aggregate burden of crime. Using predominantly the same methods described in the present article, the earlier research yielded an estimate of \$2.4 trillion for the annual cost of crime in the United States, including transfers of \$856 billion worth of assets from victims to criminals. The cost of lost productivity, crime-related expenses, and diminished quality of life amounted to an estimated \$1.6 trillion. The current study updates the first to permit comparison — with caveats — between the cost of crime

in the 1990s and the cost of crime more recently. This study also reflects crime-related expenditures in the post-9/11 era of heightened sensitivity to terrorist threats, and adds expenditures on investigation services and locksmiths, for which data were previously unavailable.

3

Elements of the Cost of Crime

For this study the elements of crime's cost are divided into four categories depending on whether the loss results from: (1) crime-induced production, meaning that the goods or services would not be needed in the absence of crime; (2) the opportunity cost of time spent on crime-related activities; (3) implicit costs associated with risks to life and health; or (4) transfers from victims to criminals. This section examines the ramifications of costs in each of these categories.

3.1 Crime-Induced Production

The existence of crime alters the allocation of resources. For example, when the threat of crime increases, more resources are allocated to the production of security fences, burglar alarms, safety lighting, protective firearms, and electronic surveillance. The growing enormity of crime's burden warrants larger outlays for police, private security personnel, and government agencies that enforce the law. As more criminals are apprehended, expenditures on the criminal justice system and correctional facilities grow. In the absence of crime, the resources absorbed

by crime-induced production could be used for the creation of benefits rather than the avoidance of harm — \$50 spent on a door lock is \$50 that cannot be spent on groceries. The foregone benefits from such alternatives represent a real cost of crime. Thus, expenditures on crime-related products are treated as a loss to society.

The purposes of crime-induced production are not limited to deterrence, justice, and incarceration. Crimes against property necessitate production for the purposes of repair and replacement. Violent crimes necessitate the use of medical care and mental health resources. In each case, 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. 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.

3.2 Opportunity Costs

Criminals are risk takers and instigators — characteristics that could make them entrepreneurs and contributors to society if their 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 apprehension and incarceration. Many individuals make crime a full-time occupation. Society is deprived of the goods and services a criminal would have produced in the time consumed by crime if that person's life had taken a different path.

Figure 3.1 illustrates the escalation in the number of prison and jail inmates from 500,000 in 1980 to over 2 million in 2010. After three decades of increases, the number of incarcerated individuals leveled off in 2008 and fell in 2009 and 2010. Nonetheless, 1,518,104 adults were held in U.S. prisons and 748,728 were held in U.S. jails in 2010 (Glaze, 2011, p. 3). Society faces the opportunity cost of these potential workers' productivity.

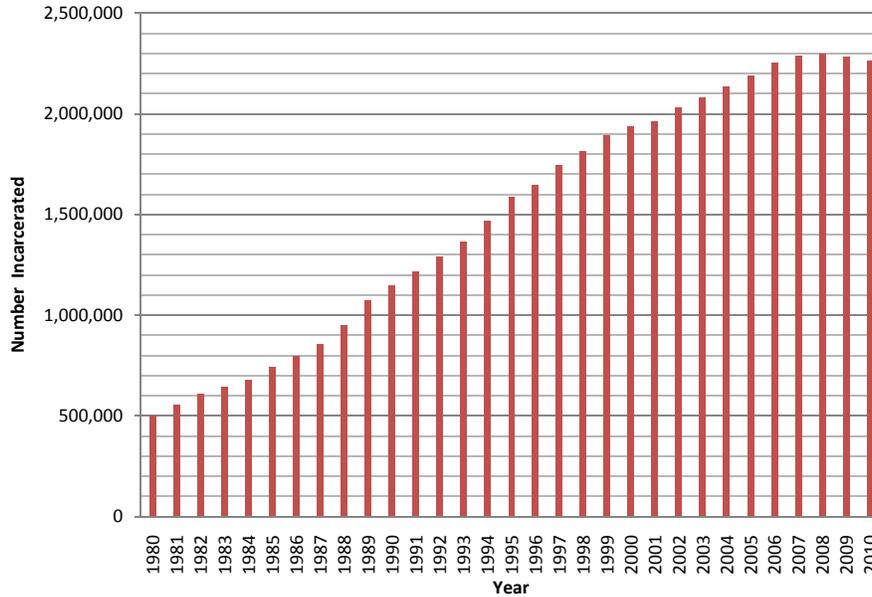


Fig. 3.1 Number of sentenced prisoners in state and federal institutions, 1980–2010.

Sources: Sourcebook of Criminal Justice Statistics Online (2009), Glaze (2011).

Additional opportunity costs arise due to crime victimization and prevention. Victims lose work time recovering from mental and physical harm caused by crime. Virtually everyone beyond early childhood spends time locking and unlocking doors, securing assets, and looking for lost keys. Many adults also spend time purchasing and installing locks and other crime-prevention devices, and watching out for crime, for example as members of neighborhood-watch groups.

3.3 The Value of Risks to Life and Health

Although the costs associated with risks to life and health are perhaps the most difficult to ascertain, a considerable literature is devoted to their estimation. The psychic costs of violent crime include the fear of being injured or killed and the agony of being victimized. Direct expenditures on crime prevention are intended to address these costs, but preventive measures are limited in their ability to deter crime.

Because crime persists, so does the substantial burden of risks to life and health.

3.4 Transfers

Among the repercussions of fraud, robbery and theft is the transfer of assets from victims to criminals. If a criminal sells a stolen item to a third party for its value to the 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 because the victims will replace what they have lost. Thus, it is likely that replacement purchases by victims in the legal market offset legal purchases foregone due 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 forego, 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.

In the presence of a legal market for the goods that is known to all relevant parties, illegal activity is not needed to create efficient transfers, nor should a market for stolen goods result in net losses. 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. Anecdotal evidence of this includes “Reward: No Questions Asked” signs frequently posted on kiosks to create a market for the repurchase of stolen goods. For these reasons, the transfer component of theft, as opposed to the opportunity cost and other repercussions, should not cause a net loss to society.

This study, like most previous studies, does consider the value of transfers. Though not a social cost, they do represent an external cost of crime. And as discussed in Section 6, Becker (1968) and others argue that the value of transfers approximates the cost of fencing operations, criminals’ time, and other inputs to criminal activity. This study offers crime-cost estimates based on that reasoning, but providing estimates based on more conservative figures in the final assessment.

Many crimes fall into multiple 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. In this study, each crime-cost element is sorted into one of the four non-overlapping categories just described. See Cohen (2005) for an overview of issues related to crime-cost assessments.

4

Data and Methods

All of the monetary values in this article are adjusted to reflect the purchasing power of dollars in 2012. Cost estimates are based on the most recent data available, and most are from the past five years. Many elements of the estimated cost of crime were assembled from the findings of existing studies. Those sources were evaluated on the basis of their data collection methods, objectivity, and corroboration from similar studies. When several equally credible estimates were available, the numbers were averaged.

This study approaches the estimation of crime's costs from several angles that include market-based approaches, hedonic pricing, and contingent valuation methods. Market expenditures on goods such as security fences and services such as graffiti removal provide values for production necessitated by crime. The estimated value of the risks to health and life resulting from crime are based on hedonic valuation. And values found with the contingent valuation method serve as checks on estimates of the burden of violent crime and the value of time lost to locking and unlocking assets.

Some goods purchased for crime-related purposes are also purchased for reasons unrelated to crime. Examples include guns, fences, and medical care. In these cases, only the portions of expenditures on those goods

that are estimated to be attributable to crime are incorporated into the crime-cost estimates. For instance, only expenditures on security fences and the medical care of crime victims, and not all expenditures on fences and medical care, are included in the estimated cost of crime. Specific explanations for each cost component are provided below.

4.1 Crime-Induced Production

4.1.1 Police, Corrections, Justice System

The Bureau of Justice Statistics provides expenditure figures for police protection, \$113 billion; corrections, \$81 billion; and crime-related state and local expenditures on judicial and legal services, \$42 billion Kyckelhahn (2011). The various categories of federal expenditures on crime-related judicial and legal services were obtained from the Office of Management and Budget (2012, pp. 140–141).

4.1.2 Drugs and Alcohol

In a report prepared for the Office of National Drug Control Policy, Abt Associates (2001) estimates that drug trafficking accounts for \$84 billion in direct annual expenditures. The Office of National Drug Control Policy (ONDCP) reports a national drug control budget of \$26 billion (2011). This includes \$1.7 for educational programs meant to prevent drug use, \$8.9 billion for early intervention and treatment services for abusers, \$9.5 billion to supplement domestic law enforcement efforts, \$3.9 billion for drug interdiction, and \$2.1 billion used to disrupt the international supply chain of illegal drugs. Additional expenditures related to drugs, including expenditures by the National Institute on Drug Abuse and the Organized Crime and Drug Enforcement Task Force, appear among the listings for federal agencies in Section 5.1. These figures do not include criminal justice system expenditures or the cost of crimes committed as a result of drug use, which appear in other crime-cost categories.

The Mothers Against Drunk Driving (MADD) organization and its 200 chapters in the United States spend over \$42 million annually in efforts to curtail the crime of driving drunk.

Solomon (2011, p. 1) reports that an arrest for driving under the influence of alcohol (DUI) will cost the average offender \$10,092. This includes fines, fees, penalties, auto insurance premium increases, and attorney fees. Solomon's figure does not include lost pay, injuries, or vehicle damage, some of which are captured in other categories of this study. Given the 1,412,223 DUIs reported in 2010 (FBI, 2010b, p. 1), the corresponding expenditure on the included cost components was \$14.3 billion.

Hay (1991, p. 215) estimates that prenatal exposure to cocaine and heroin cost society \$40 billion annually. This includes the cost of victims' care in a neonatal intensive care unit, other hospital care, and the cost associated with neurological damage and infant mortality. In a survey of the literature, Kalotra (2002) reports a \$951,117 to \$1,775,419 lifetime cost of caring for an individual with prenatal exposure to illicit drugs or alcohol. On the basis of the low end of the cost estimates by Kalotra, the prenatal exposure of 42,056 infants to illicit drugs would cost \$40 billion. Young et al. (2009) estimate that each year 94,139 infants are exposed to illicit drugs through the third trimester of pregnancy, with 286,510 and 130,976 exposed in the first and second trimesters, respectively. Thus, the Hay estimate appears to be conservative and is used in the present study.

4.1.3 Computer Viruses and Security

The FBI estimates that computer viruses and other computer security incidents cost businesses \$78.1 billion annually (FBI, Federal Bureau of Investigation (2006)). Their figure is based on a survey of 2066 businesses, 64.1 percent of which had experienced financial losses from computer security incidents in the previous year. The most common incidents were caused by viruses, including worms and Trojans, and by spyware. To be "very conservative" and to address concern that businesses with incidents were more likely to respond to the survey, the FBI assumed that only 20 percent of all businesses have computer security incidents, rather than 64.1 percent. The FBI computer crime survey included measures of the cost of theft and fraud that are counted in other categories of the present study. To avoid double counting, only

the \$53 billion spent on non-overlapping incidents such as viruses and network sabotage is counted as part of this category.

4.1.4 Security Systems

The U.S. Department of Commerce (2011, p. 130) reports expenditures of \$16.2 billion on security systems. This includes the cost of security alarms and monitoring systems, the cost of installing and repairing these systems, and expenditures on remote monitoring services.

4.1.5 Medical Care

Miller et al. (1995) estimate the losses per crime for each type of criminal victimization due to, among other things, medical care and social/victim services. These values form the basis for crime-cost estimates in Cohen and Piquero (2009), McCollister et al. (2010), and other studies. The present study uses the medical care and social/victim services elements of these crime-specific estimates, which are broken down for each crime into with- and without-injury costs. Multiplying these figures by the number of victimizations in 13 crime categories yields the \$12.4 billion estimated cost of medical care and related services due to violence.

The National Drug Intelligence Center (2011) estimates that \$10.3 billion is spent annually on medical care for illicit drug users. This includes specialty treatments such as detoxification along with hospital and emergency room visits. It does not include the expenditures related to prenatal drug exposure or drug-related homicides that are factored in elsewhere in the present study.

Since the estimated values for the risks of injury and death come from wage-risk tradeoffs 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 estimates in this study. On the other hand, the estimated risk values are based on data collected before the Mental Health Parity Act of 1996 expanded mental health care coverage for employees. Even now, employers have discretion over the

extent and scope of mental health benefits, and coverage under workers' compensation is sporadic and incomplete. Because mental health costs would be paid by the victims of work-related injuries, they are included within the estimated risk values used in this study and are not added in a separate category.

4.1.6 Security Guards and Patrol Services

The Service Annual Survey (Department of Commerce, 2011) reports \$20.2 billion in annual expenditures on security guards and patrol services. These include guards hired to deter crime at banks, movie theaters, shopping malls, and special events.

4.1.7 Locks, Safes, Vaults, and Locksmiths

The \$6.1 billion cost of door locks, key blanks, and padlocks came from the 2007 Economic Census (U.S. Census Bureau, 2008). The U.S. Department of Commerce (2011, p. 130) reports expenditures of \$1.5 billion on locksmiths. The sales figure for safes and vaults comes from industry revenue data provided by IBISWorld (2011), adjusted to reflect a 50 percent retail margin.

4.1.8 Recovery from Vandalism/Graffiti

Klaus (2007, p. 1) reports that 4.4 percent of households experienced vandalism in 2005. The \$559 average cost per incident comes from the Bureau of Justice Statistics (2007). When applied to the 114.2 million U.S. households, these figures yield a \$2.8 billion estimate for the annual cost of household vandalism.

The National Federation of Independent Business (Dennis, 2008, p. 6) reports that over a 3-year period, 10.6 percent of businesses with employees were victims of vandalism once, 10.1 percent were victims "occasionally" (more than once), and 1.4 percent were victims "often." To be conservative, the present study uses a survey-based estimate from the U.S. Small Business Administration (Fisher, 1997, p. 2) that 3.5 percent of businesses are victims of vandalism. The average value of property damage reported in that study was \$4667. The product of

the percent of businesses vandalized, the number of U.S. firms with employees, 6.05 million, and the average value of damage yields a \$988 million estimate for the annual cost of firm vandalism.

The NoGraf Network (2005) conducted a survey of 47 cities as the basis for their \$4.5 billion estimate of the annual cost of graffiti vandalism.

4.1.9 Firearms, Safety lighting, and Protective Fences

Studies by Lott and Mustard (1997) and others find that guns deter crime. Ludwig (1998) is among those finding that increased access to guns might increase crime rates. In either case, guns are purchased both to carry out crimes and to deter them, and the net cost or benefit of these purchases is reflected in the overall cost of crime.

The estimated expenditure on crime-related small arms and ammunition came from the *2009 Annual Survey of Manufactures* (U.S. Bureau of the Census, 2009). Carrol (2005) found that 67 percent of gun owners use their gun to help prevent crime. However, a majority of gun owners also use their guns for target shooting and hunting. For the present study, it was assumed that half of small arms and small arms ammunition would not be purchased in the absence of crime, and that the retail margin is 50 percent. On this basis, crime-related expenditures amount to \$2.06 billion for small arms and \$3.3 billion for ammunition annually.

The \$1.95 billion estimate for the cost of safety lighting came from the 2007 Economic Census (U.S. Bureau of the Census, 2008). The \$3.5 billion estimate for the cost of security fencing is based on a report by SBI Energy (2006). Half of fences and outdoor lighting equipment are assumed to be purchased with the intent of deterring crime. The standard 50-percent margin assumption was applied.

4.1.10 Armored Car Services and Investigation Services

Expenditures on armored car services and investigation services are reported in the Service Annual Survey (Department of Commerce, 2011). Because both of these services are generally provided directly to the customer by the service industry rather than involving an

intermediary, no retail margin was included. Spending on armored car services amounts to \$2.5 billion annually. Investigation services companies are hired to look into crimes including insurance fraud, corporate fraud, and computer security violations. However, roughly half of their services involve the investigation of non-criminal behavior for divorce proceedings, corporate client analysis, and other purposes. For this reason, half of the expenditures on investigation services, \$1.9 billion, were assumed to relate to crime.

4.1.11 Replacements Due to Arson

Karter (2011, p. 16) of the National Fire Protection Association estimates that property losses from intentionally set structure fires caused \$609 million in losses in 2010, a 14.5 percent decrease since 2009. This includes the direct loss of structures and their contents, but not the indirect cost of business interruption or temporary shelter. Karter (p. 15) also estimates that arson caused \$93 million worth of damage to vehicles in 2010, a 17.6 percent decrease since the previous year. These figures come from a survey of 3000 fire stations that serve 36 percent of the U.S. population. Combined, arson damage to structures and vehicles amounts to an estimated \$702 million annually.

4.1.12 Theft Insurance

The cost of insurance falls into several crime-cost categories. If insurance prices were actually 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 resulting 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 towards insurance company resources that would otherwise not be purchased.

The Insurance Information Institute (2012) reports that \$174 million in burglary and theft premiums were paid in 2010. This represented a 9.9 percent increase over 2009 premiums, but a decrease relative to 2007 and 2008 expenditures in constant dollars. 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. In the broader category of property and casualty insurance for which data is available (Insurance Information Institute, 2012), indemnity amounts to 61 percent of premiums. Assuming the indemnity rate is the same for burglary and theft insurance, 39 percent of the \$174 in premiums — \$68 million — constitutes crime-induced production.

4.1.13 Non-lethal Personal Defense Products

In response to the threat of crime, citizens make private expenditures on personal defense products such as pepper spray and whistles. Extrapolating from sales and market share information from Mace Security International, Inc., and assuming a 50 percent retail margin, annual expenditures on these products are estimated to exceed \$45 million (Roll, 2012). The cost of classes in the martial arts and other forms of self defense were not included because it is possible that such classes would exist as recreational activities in the absence of crime.

4.2 Opportunity Costs

4.2.1 Time Spent Securing Assets

The estimated opportunity cost of time spent locking and unlocking doors was based on the average employer cost for employee compensation per hour. Economic theory equates this with the productive value of an additional hour of a worker's time. 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.

The opportunity cost of time spent preventing crimes is substantial. Anderson (1999) surveyed a randomly selected national sample of 1000

households about locking behavior with a response rate of 14 percent. The results indicate that individuals lock or unlock possessions an average of 12 times per day and spend over two minutes per day looking for keys. On the basis of over 250 observations of individuals locking and unlocking cars, offices, buildings, mail boxes, and gym lockers, and the Anderson (1999) survey data on the number of times each type of item is locked and unlocked daily, I estimate that each adult spends 1 minute and 50 seconds locking and unlocking doors each day. This represents \$164.5 billion worth of time lost to these crime-prevention activities. This estimate implies that the average adult would be willing to pay \$665 per year to avoid the need to lock or unlock anything. This figure is likely to be conservative given the amount spent on electronic short-cuts to locking and unlocking cars and homes. As a reference point, the 2012 retail price for a Kaba EPS2000 keyless door lock for a home was \$675. When the respondents to the household survey described above were asked what they would be willing to pay to avoid locking or unlocking assets for a year, the average answer was \$1137. This figure may be biased because the subjects did not actually have to pay the amount they indicated.

4.2.2 Criminals' Lost Work Days

In their studies of the cost of violent crime and the value of keeping high-risk youth out of crime, Cohen et al. (1994); Cohen (1998) estimate that the average incarcerated offender costs society \$10,561 in lost productivity per year. Their estimate is based on the median pre-arrest income from the 1978 Survey of Inmates of Local Jails (Bureau of Justice Statistics, 1980). The current study uses similar survey data collected for the purpose of this research. However, the approaches differ somewhat because the present study looks at the potential for criminals in the absence of crime. The surveys asked criminals about their options if crime were not part of their life, and wages and unemployment rates were assumed to be the same as for non-criminals with the same demographic characteristics. Cohen et al. (1994) examined the pre-incarceration wage for criminals in the presence of crime.

Males make up 91 percent of the U.S. inmate population. About 39 percent of inmates are black, 34 percent are white, and 21 percent are Hispanic. The typical inmate has a high school education but no college. For these reasons, the estimated probability that the inmate population would be unemployed in the absence of crime, 9.94 percent, is a weighted average of the unemployment rates for black, white, and Hispanic males, adjusted to reflect the higher probability of unemployment among those with a high school education but no college.

The opportunity cost of criminals' time, both in committing crimes and in prison, was estimated to be \$17.70 per hour. This includes \$12.48 in wages and \$5.22 in benefits and legally mandated employment expenses. This is the median wage for males 16 and over in non-salaried positions, weighted for the proportion of inmates who are black, white, and Hispanic. The race- and education-weighted unemployment rate was applied when calculating the opportunity cost of time. The \$12.48 base wage rate is conservative relative to the \$15.00 median wage that 98 convicted criminals at the Northpoint Training Center and Prison in Kentucky stated as the wage they could have earned in honest work. That survey data, collected in 2012 for the purpose of the present study, did not include benefits and other employee costs. The combined \$17.70 figure for wage and benefits is a conservative estimate of worker productivity because the amount an employer is willing to pay to retain a worker is less than or equal to the value of the worker's actual contribution. On this basis, after subtracting the value of prison production, the average incarcerated worker is estimated to represent \$30,769 in lost productivity per year.

Surveys of 376 criminals in a state prison and a county jail conducted for this research and for Anderson (1999) indicate that the average criminal incident takes slightly more than one work day to plan and execute. The number of hours spent on crime was estimated by multiplying the 18,725,710 criminal victimizations reported in the 2010 National Crime Victimization Survey (Truman, 2011) by the 8 hours in a typical work day. This time was valued at the \$17.70 figure for hourly inmate productivity and adjusted for the 9.94 percent unemployment rate explained above. The total estimated value of lost productivity while planning and executing crimes was

\$2.4 billion per year. This estimate is conservative to the extent that the National Crime Victimization Survey underestimates the number of crime victimizations.

4.2.3 Victims' Lost Work Days

The National Crime Victimization Survey obtains information on the number of work days lost as a result of crime. That data is reported in blocks of time, such as 1–5 days, 6–10 days, and so on. On the basis of a weighted average of the midpoints of those ranges, the average victim of a personal crime loses 4.49 work days and the average victim of a property crime loses 3.18 work days. The crime-type-weighted average of these figures, 3.49, is very similar to the estimate by Klaus (1994) of 3.4 lost work days per crime. The value of victims' lost work time was estimated by multiplying the lost work days by eight to find the total number of lost hours, and by the average cost of employee compensation per hour worked, \$28.50. The resulting estimate, \$14.7 billion, 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. This is also a conservative indication of the value of the time victims lose as the result of crime because it does not include the value of leisure time lost as the result of crime.

4.2.4 Neighborhood Watches

USA on Watch (2012) reports 25,000 registered Neighborhood Watch programs. The National Association of Neighborhoods and the National Association of Town Watch (1997, p. 6) estimate that neighborhood watch groups spend an average of 5 person-hours per day on crime watches. The National Association of Citizens on Patrol (2012) reports 5000 citizen patrol volunteers in the United States, who are assumed to patrol for an average of 1 hour per day. The value of participants' time was valued at the average cost of employee compensation for the reasons explained above in the paragraph on *Time Spent Securing Assets*. Multiplying the patrol time per year by the value of time yields a cost estimate of \$1.4 billion.

4.3 The Value of Risks to Life and Health

4.3.1 The Value of Lost Life

The estimate for the value of life comes from studies of wage-risk trade-offs made in the labor market. In work situations, as in a society with crime, there is a recognizable risk that lives will be lost. In both cases it is unknown who the victims will be. By studying the compensating wage differentials paid to individuals in work environments with varying risks of death, it is possible to estimate the value placed on a small risk of death and extrapolate to find the value of a statistical life (VSL). The values of life and injury estimated with this hedonic method capture the burden of risks of pain, suffering, and distress associated with health losses.

Being based on labor market behavior, these estimates do not include losses covered by workers' compensation. For example, workers' compensation usually covers health care costs without dollar or time limits. Lost earnings are also covered within modest bounds — victims or their spouses typically receive about two-thirds of lost earnings for life or for the duration of the injury. If the risk of violent crime victimization evokes more emotional distress than the risk of occupational injuries and fatalities, the labor market values represent conservative estimates of the corresponding cost of crime. Similar estimates appear in previous studies of the cost of crime, e.g., Cohen (1990) and Anderson (1999).

Self-selection among workers causes labor market VSL figures to underestimate the general value of life, because those who place the lowest value on their life are more likely to enter risky jobs. A comparable self-selection occurs if those who feel the lightest burden from the risk of violence are more prone to live in close proximity to crime. Although the VSL 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 mortality. That is, the VSL figures are based largely on the same segment of the population that is most vulnerable to violent crime: 77 percent of murder victims are male, 48 percent are black, and 73 percent are between 15 and 44 years of

age (Xu et al., 2010). The modal rate of occupational fatalities in the VSL studies is the same as the current risk of death due to crime (not including drug-induced crimes) — about 1 in 10,000.

Anderson (1999) applied \$10.05 million as the value of a statistical life (adjusted here, like all figures, to 2012 dollars). This is the average of 27 previous VSL estimates reported by Viscusi (1993), after removing two outliers. Among the 30 labor-market-based VSL studies summarized by Viscusi and Aldy (2003), 21 fall between \$7 million and \$27 million, and the average is \$10.63 million. Alternative approaches generally yield similar results. For example, Cohen et al. (2004) surveyed 1300 adults about their willingness to pay for hypothetical programs that would reduce the rates of specific crimes by 10 percent. The findings yield VSL estimates between \$11.2 million and \$14.5 million. All of these estimates closely resemble those used in Anderson (1999), and the same \$10.05 estimate is used in the present study for consistency and comparability.

The crime-related deaths counted in this study include deaths caused by illegal drugs, AIDS contracted via illegal drug use, drunk driving and boating, arson, murder, and nonnegligent manslaughter. Murphy et al. (2012) report that there were 37,792 drug-induced deaths in 2010, down from 39,147 in 2009. This does not include drunk driving, drunk boating, or AIDS deaths. The National Highway Traffic Safety Administration (2011) reports 10,839 drunk driving deaths in 2009. Those deaths were caused by drivers with a blood alcohol concentration of 0.08 grams per deciliter or higher. It is illegal to drive in that condition in all 50 states and the District of Columbia. The FBI (2012b, t. 1) reports 14,748 murders in 2010, the lowest number since 1968. Data from the Center for Disease Control and Prevention (2010; 2011) indicate that 1011 AIDS deaths were caused by injected drug use or sex with an injecting drug user in 2009. This figure is based on the assumption that among the deaths of men who had male-to-male sexual contact and inject drugs, half of the AIDS cases were caused by the drug use. The total of 64,999 crime-related deaths was multiplied by the \$10.05 million value of a statistical life to find the \$654 billion estimate for the value of lives lost to crime.

4.3.2 Value of Injuries

The estimated value of injury comes from labor market wage-risk trade-offs as described in the section above. The estimate reflects the amount individuals are willing to accept to enter a work environment in which their health state might change. The \$74,679 estimate is the average of 15 studies of the value of non-fatal injuries reported by Viscusi (1993). Alternative approaches yield similar results for crime-related injuries. For example, Cohen et al. (2004) used the contingent valuation method to estimate a range from \$75,140 to \$113,370 for the value of each serious assault averted. Crime-related injuries included 655,000 rapes, robberies with injuries, and aggravated assaults with injuries (U.S. Bureau of the Census, 2012, t. 315). The National Fire Protection Association reports 7550 arson-related injuries (Hall, 2010, p. i, v). The U.S. Coast Guard reports 293 drunk boating injuries (Copeland, 2011, p. 1). The estimate of 711,657 injuries caused by drunk driving is found by multiplying the 2,217,000 injuries caused by motor vehicle accidents (U.S. Bureau of the Census, 2012, t. 1106) by the 32.1 percent of driving fatalities caused by drivers with an illegal blood alcohol concentration (U.S. Bureau of the Census, 2012, t. 1110). The \$103 billion estimate for the implicit cost of crime-related injuries is the product of the \$74,679 value of non-fatal injuries of similar severity and the total number of crime-related injuries, 1,374,500.

4.4 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. The selected estimate was often not the largest estimate in the literature. The fraud and theft categories included in this study encompass the categories of what is sometimes classified as white-collar crime.

4.4.1 Occupational Fraud

In their *Report to the Nations on 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 or assets” (2010, p. 6). This includes asset misappropriation, fraudulent statements, bribery, and corruption. Also included in this is retail employee theft, which alone amounts to an estimated \$15.2 billion per year (National Retail Federation, 2010). Every two years the ACFE surveys certified fraud examiners to estimate the percentage of annual revenues lost to fraud within the organizations they investigate. The results have been in the range of 5–7 percent. For example, in 2008, the AFCE estimated that 7 percent of U.S. GDP, \$1.05 trillion, was lost to occupational fraud (2008, p. 4). For the purpose of the current study, the lower end of the range of estimates, 5 percent, was applied to the 2011 GDP of \$15.23 trillion to arrive at the \$762 billion estimate for transfers due to occupational fraud.

4.4.2 Unpaid Taxes

The Internal Revenue Service estimates that the tax gap was \$344 billion in 2010 (General Accounting Office, 2011). The tax gap is made up of taxes that are not paid because either no return is filed, income is unreported, or the amount due is not paid in full. The Internal Revenue Service (2012) estimates that 14.4 percent of this tax gap will be remitted late or collected as the result of enforcement, leaving a net tax gap for individuals and corporations of \$294 billion.

4.4.3 Health Insurance Fraud

The FBI (2011) estimates that fraudulent billing of health care amounts to between 3 and 10 percent of all public and private health care expenditures. The 10 percent figure matches previous estimates of the size of health care fraud made by the National Health Care Anti-Fraud Association (1995, p. 1). The Centers for Medicare and Medicaid Services (2012, p. 4) estimate that \$2.8 trillion will be spent on health care in 2012. Applying the average of the FBI estimates, 6.5 percent, to the \$2.8 trillion spending figure yields the \$183.6 billion estimate of the cost of health insurance fraud.

4.4.4 Retail Fraud

Javelin Strategy & Research (2010, p. 8) estimate that retail fraud costs merchants \$144.7 billion annually. Because \$12.4 billion in losses due to shoplifting are included in the theft category of the present study, they are subtracted here, leaving \$132.3 billion in non-theft retail fraud incurred by retailers. The same study reports \$5.8 billion in costs absorbed by consumers and \$5.3 billion in costs incurred by financial institutions. These figures include the costs of identity fraud and other fraudulent or unauthorized business transactions on the Internet, bounced checks, and fraudulent requests for refunds. Also included are associated costs such as lost wages due to time spent resolving fraud problems and legal fees for the investigation and prosecution of fraud cases. The figure does not include occupational fraud conducted by employees or other insiders.

4.4.5 Insurance Fraud

The FBI (2012b, p. 1) estimates a \$40 billion annual cost of insurance fraud, not including health insurance fraud. Common fraud schemes include the sale of phony insurance, insurance companies set up to fail after a series of insider intermediaries take commissions through reinsurance agreements, and the exaggeration or falsification of claims by policyholders. As an illustration of insurance fraud vulnerabilities, after Hurricane Katrina caused roughly \$116 billion in economic damages in 2005, insurance fraud accounted for as much as \$7 billion in expenditures (FBI, 2012b, p. 1).

4.4.6 Telemarketing Fraud

Commissioner Mozelle W. Thompson (1999) of the Federal Trade Commission describes the “heart” of a fraudulent telemarketing operation as a rented office from which scam artists can victimize anyone with a phone. Common schemes include the promotion of fraudulent sweepstakes, advance-fee loans, lotteries, credit cards, scholarships, and buyers clubs. The FBI (2012a) reports a particular problem with senior citizens being victimized by telemarketing scams involving low-cost

vitamins, health care products, free prizes, and inexpensive vacations. Thompson (1999) reports that consumers lose more than \$55 billion annually to telecommunications fraud. The same estimate was reported by the U.S. Congress in the establishment of the Telemarketing Consumer Fraud and Abuse Prevention Act (1994, p. 1).

Anderson (2007, p. 46) reports that telemarketing continues to be the most common method of selling fraudulent goods and services. Among other incidents of telemarketing fraud, Anderson estimates there were 8.6 million fraud cases involving the purchase of goods or services in 2005. That exceeds the estimated 6.4 million purchases of fraudulent goods or services over the Internet, the 6.3 million purchases by mail, and the 4.8 million purchases in stores. The National Consumers League's (NCL) Fraud Center (2007) reports the breakdown of telemarketing fraud complaints for the 10 most common scams types, which make up 88.4 percent of all complaints. On the basis of the NCL data, the 8.6 million telemarketing cases involving the purchase of goods or services make up 68.4 percent of telemarketing fraud cases. The remaining 31.6 percent or 4.0 million cases include such scams as fraudulent prizes and sweepstakes, advance-fee loans, lotteries, phishing, and upfront payments for money transfers. The NCL data also indicate the average loss for each type of scam. Multiplying the incident-weighted average loss by the estimated number of cases yields an estimate of \$55 billion, equivalent to the earlier estimates of the annual loss due to telemarketing fraud.

4.4.7 Retail Theft

The results of the National Retail Security Survey (National Retail Federation, 2010, p. 1) indicate that retailers lost \$12.4 billion to shoplifting in 2009. That does not include the \$15.2 billion lost to employee theft, which falls into the category of occupational fraud discussed above.

4.4.8 Other Theft

The Bureau of Justice Statistics (2010, t. 82) estimates losses to crime victims based on the National Crime Victimization Survey. This was the source for estimates of personal theft, \$6.8 billion; household

burglary, \$5.2 billion; motor vehicle theft, \$5.1 billion; and robbery, pocket picking, and purse snatching, \$727 million.

4.4.9 Mail and Coupon Fraud

Schroeder (1993, p. B7) reports estimates averaging \$51 billion annually for mail fraud. The practices include fraudulent sweepstakes, overvalued merchandise, chain letters, and pyramid marketing schemes. Similar Ponzi schemes also proliferate in Internet chat rooms and on social networking sites, where the transaction cost of recruiting is even lower. However, according to the Federal Trade Commission Fraud Survey (Anderson, 2007, pp. 44–46), direct mail was the method of initial contact in 7.6 million fraud cases and the method of ordering in 6.3 million fraud cases involving the purchase of goods or services in 2005. A representative of the U.S. Postal Inspection Service complaint center (2012) stated that modern technology makes it easier for criminals to produce fraudulent checks and coupons than in the past. The same source suggested that the weak economy between 2007 and 2012 motivated more criminals to attempt mail fraud and made more citizens susceptible to work-at-home scams and similar types of mail fraud.

Power (1992, p. 110) reports Coupon Information Center estimates that coupon fraud costs companies \$1.3 billion each year. 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 result from fraudulent rebate forms. Miller (2012) of the Coupon Information Center indicated that the use of counterfeit coupons is more prevalent than ever, but that there have been no new studies of the cost of coupon fraud. Similarly, there are no new studies of the financial cost of mail fraud for which a reliable source could be established. For that reason, and because evidence suggests that these types of fraud continue unabated, the earlier estimates were used for the purpose of this study.

4.5 Overlapping Alternatives

There are other notable cost categories that are not included here, largely due to overlap with existing measures. For example, Thaler (1978), Hellman and Naroff (1979), and Rizzo (1979) estimate the ero-

sion of property values caused by each incident of crime. The average of their estimates, \$2863, can be multiplied by the total number of crimes reported in 2010, 18,725,710 (Truman, 2011), to estimate an aggregate housing devaluation of \$54 billion. Although this figure captures the burden of not being able to behave as desired in the presence of crime, it also absorbs many of the psychic and monetary costs imposed by criminal behavior that are already included in this article.

Cullen and Levitt (1999) discuss urban flight resulting from crime. They report a nearly one-to-one relationship between serious crimes and individuals leaving 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 living must be compared with the virtues of suburbia.

Some of the costs of crime receive incomplete representation in this and other crime-cost studies due to limited data availability. This makes the crime-cost estimates conservative. Omissions include the cost of some unreported crimes. However, several crime-cost components are based on the estimated percentage of potential victims who experience a crime. In these cases the number of crime incidents factored into the estimate is not limited to the number reported. Note also that the National Crime Victimization Survey used as the source of crime counts for several of the estimates in this study provides information beyond that reported to the police. Other omissions include the value of lost work days for DUI offenders, the cost to children of offenders who are incarcerated or on drugs (although the cost of prenatal exposure to drugs is included), expenditures by nonprofit organizations on victim services, the cost of false imprisonment, and the value of leisure time (but not work time) lost by crime victims.

5

Summary of Findings

5.1 Crime-Induced Production

Table 5.1 presents cost estimates for goods and services that would be obsolete in the absence of crime. Crime-induced production accounts for \$646 billion in annual expenditures. Almost half of that amount, \$300 billion, is spent on private efforts to prevent crime. This includes \$36 billion for security systems, \$20 billion for security guards and patrol services, and \$9 billion for locks, safes, vaults, and locksmiths.

Drug trafficking accounts for an estimated \$84 billion in expenditures. The cost of drug-related activities also includes the \$40 billion cost of prenatal drug exposure, the \$28 billion cost of federal drug control programs, the \$10.3 billion spent on medical care for illicit drug users (included in the Medical Care for Victims category), and the \$1.6 billion cost of drug-related programs listed among the Federal Agency expenditures in Table 5.1. This \$164 billion combined expense does not include the portion of the cost of policing, criminal justice, and corrections attributable to drug use.

In 2010, about 18,000 state and local police departments employed 794,000 officers and detectives for a median salary of \$57,266 (Bureau of Labor Statistics, 2012). The total annual cost of police protection is

Table 5.1.

Crime-induced production	\$ (millions)
Police protection	113,469
Drug trafficking	84,367
Corrections	81,233
Federal agencies (see Table 5.1)	76,084
Computer viruses and security	53,113
State and local judicial and legal services	42,442
Prenatal exposure to cocaine and heroin	39,946
Security systems	36,441
Federal drug control programs	28,282
Medical care for victims	22,704
Security guards and patrol services	20,239
DUI costs to driver	14,252
Locks, safes, vaults, locksmiths	9426
Recovery from vandalism/graffiti	8251
Small arms and small arms ammunition	5335
Protective fences and gates	3487
Armored car services	2524
Safety lighting	1955
Investigation services	1920
Replacements due to arson	702
Theft insurance (less indemnity)	68
Non-lethal personal defense products	45
Mothers against drunk driving	42
Total unfortunate production	646,327

\$113 billion. After policing and drug trafficking, the correctional system represents the largest source of crime-induced production. Housing the 2,266,832 inmates held in U.S. prisons and jails (Glaze, 2011, p. 3) requires expenditures of \$81 billion annually (Kyckelhahn, 2011).

The crime-prevention efforts of the Department of Justice are complemented by the work of other government agencies that play a role in law enforcement. Table 5.2 lists these agencies and their crime-related expenses. For example, the Department of Homeland Security (DHS) now houses Customs and Border Protection, Immigration and Customs Enforcement, the Secret Service, and Citizenship and Immigration Services, all of which have law enforcement duties. Also under the DHS is the Coast Guard, which enforces fisheries laws and has budgets for drug interdiction, migrant interdiction, and the security of ports and waterways. Under the Department of Transportation, the Federal Motor Carrier Safety Administration is the primary law enforcement agency

Table 5.2.

Anti-crime components of federal agency budgets (For items not listed separately in Table 5.1)		\$ (millions)	
Department of Agriculture	Forest Service Law Enforcement Operations	151	
	Animal & Plant Health Regulatory Enforcement	15	
	Office of the Inspector General	93	
Department of Commerce	Bureau of Industry and Security	40	
	NOAA, Nat Marine Fisheries Service	108	
Department of Defense	Army Corps of Engineers-Civil	26	
Dept of Health & Human Services	Administration for Children and Families	2470	
	Health Care Fraud and Abuse Control	1870	
	Elder Abuse Programs	5	
	Child Abuse Programs	97	
	National Institute on Drug Abuse	1080	
Dept of Homeland Security	Coast Guard	4791	
	Customs & Border Protection	11,738	
	Immigration & Customs Enforcement	5862	
	Secret Service	1912	
	Citizenship & Immigration Services	3078	
	Other	13,051	
	Regulation and Law Enforcement	85	
	Department of the Interior		
	Department of Justice	U.S. Attorneys	1949
U.S. Marshalls Service		1153	
General Legal Activities		874	
Federal Bureau of Investigation		7894	
Offices of Justice Programs		2720	
Bureau of Alcohol, Tobacco, and Firearms		1123	
Organized Crime & Drug Enf. Task Forces		532	
Other		3123	
Department of Labor		Employee Benefits Security Administration	130
	Legal Services	118	
	Occupational Safety and Health Administration	225	
	Enforcement of Fed. Mine Safety & Health Act	246	
	Civil Rights	7	
Department of Transportation	Federal Aviation Administration	14	
	National Highway Traffic Safety Administration	212	
	Federal Railroad Administration	50	
	Federal Motor Carriers Safety Administration	478	
	St. Lawrence Seaway Development Corp.	0.3	
	Office of Inspector General	103	

(Continued)

Table 5.2. (Continued)

Anti-crime components of federal agency budgets (For items not listed separately in Table 5.1)		\$ (millions)
Department of the Treasury	Departmental Offices	63
	Department and IRS Inspectors General	189
	Internal Revenue Service	5730
	Financial Crimes Enforcement Network	116
	Terrorism Insurance Program	2
Other	Equal Employment Opportunity Commission	363
	Federal Communications Commission	69
	Federal Emergency Management Agency	831
	Federal Trade Commission	145
	National Labor Relations Board	285
	Nuclear Regulatory Commission	40
	Securities and Exchange Commission	631
Total		76,084

Source: Office of Management and Budget, Budget of the United States Government, fiscal year 2013 (2012); corresponding departmental budgets.

responsible for the safe operation of large trucks and busses. And under the Department of the Treasury, the Internal Revenue Service spends \$5.7 billion enforcing tax laws. The budget figures in this section come from the Budget of the United States Government (Office of Management and Budget, 2012), sometimes supplemented with information from the budget of the particular agency. Excluded from Table 5.2 are government expenditures that appear separately in Table 5.1, such as those for police protection and corrections.

5.2 Opportunity Costs

The largest opportunity cost resulting from crime is the \$164 billion worth of time spent locking up assets, unlocking them, and looking for lost keys each year. Among the other substantial opportunity costs, criminals lose \$70 billion worth of productivity while incarcerated, and crime victims lose \$15 billion worth of work days annually. These costs, along with the opportunity costs of criminals' time spent planning and executing crimes and the time spent on citizen patrols, amount to an estimated \$253 billion annually, as shown in Table 5.3.

Table 5.3.

Opportunity costs	\$ (millions)
Time spent securing assets	164,495
Criminals' lost work days	
In prison	69,749
Planning and executing crimes	2389
Victims' lost work days	14,700
Time spent on neighborhood watches	1352
Total	252,685

Table 5.4.

The value of risks to life and health	\$ (millions)
Value of lost life	653,509
Value of injuries	102,646
Total	756,156

5.3 The Value of Risks to Life and Health

Estimates of the implicit cost of violent crime appear in Table 5.4. Multiplying the \$10.05 million value of a statistical life discussed in Section 3 by the 64,999 crime-related deaths yields the \$654 billion estimate of the value of lives lost to crime. Similarly, the \$103 billion cost of crime-related injuries is the product of the implicit value of non-fatal injuries, \$74,679, and the 1,374,500 reported injuries resulting from drunk driving and boating, arson, rape, robbery, and assault. The combined cost is \$756 billion annually.

5.4 Transfers

As discussed in Section 3.4, transfers of goods and money via fraud and theft do not necessarily impose a net burden on society. The transfers could cause social welfare to increase if the criminals who receive them place a higher value on them than the victims who lose them. Either way, those on the losing side bear a burden of \$1561 billion as shown in Table 5.5. The largest transfers result from occupational fraud, \$761 billion; unpaid taxes, \$294 billion; health insurance fraud, \$184 billion; and retail fraud, \$143 billion. Although robbery could be considered the

Table 5.5.

Transfers	\$ (millions)
Occupational fraud	761,635
Unpaid taxes	293,915
Health insurance fraud	183,554
Retail fraud	143,432
Telemarketing fraud	54,875
Mail fraud	51,055
Insurance fraud (non-health insurance)	40,000
Shoplifting	12,380
Personal theft	6819
Household burglary	5173
Motor vehicle theft	5096
Coupon fraud	1294
Business burglary	1052
Robbery	727
Total	1,561,006

Table 5.6.

The total cost of crime	\$ (billions)
Crime-induced production	646
Opportunity costs	253
Risks to life and health	756
Transfers	1561
Gross	\$3216
Net of transfers	\$1655
Net per capita (dollars)	\$5284

classic crime, it is the source of a relatively small volume of transfers: \$727 million.

5.5 The Aggregate Cost of Crime

Table 5.6 presents the total cost of crime and each of its major components. Including transfers, the gross annual cost is \$3,216 billion. The net cost is \$1655, which amounts to \$5284 per person in the United States. The disaggregated figures allow the reader to exclude particular cost components as desired. Each of the general studies summarized in Table 2.1 included transfers, so any comparisons should be made with the gross cost estimate in the current study.

6

Discussion

The findings provide an important alternative to crime counts as a gauge of crime's burden. The counts of many types of crime have followed a downward trend. Between 2004 and 2008, for example, the number of personal thefts decreased from 14.2 million to 12.3 million. Over the same period, the loss to theft victims increased from \$5.7 to \$6.8 billion in 2012 dollars (Bureau of Justice Statistics, 2006, 2009). This illustrates how counts can be misleading when a decrease in the number of offenses is accompanied by an increase in crime severity.

In some cases, as crime counts increase, the associated cost decreases. For example, the National Fire Protection Administration (Karter, 2011, p. 15) reports an estimated 27,500 intentionally set structure fires in 2010, an increase of 3.8 percent from 2009. In terms of the resulting property losses, this comparison is misleading because property losses actually decreased by 14.5 percent to \$585 million. In terms of civilian deaths, however, a focus on crime counts would be misleading in the other direction: the 3.8 percent increase in structure fires corresponded with a 17.7 percent increase in civilian deaths.

Caution is warranted when making broad comparisons between the cost of crime in the 1990s as studied by Anderson (1999) and the cost in

the 2000s as examined in the current research. In some cases there have been changes in the sources, the estimation methods of reporting agencies, or the availability of data. For example, Laband and Sophocleus (1992) was the source of the security cost estimates in the earlier study, whereas the Service Annual Survey (U.S. Department of Commerce, 2011) was the source for the present research. And there have been no new studies of the costs of coupon fraud or mail fraud, so the estimates for those components are simply adjusted for inflation. Some observations about the two studies are instructive, however, particularly in areas where the bases for estimates are largely unchanged.

Large increases in policing, corrections, and private deterrence efforts over the past 15 years have coincided with impressive decreases in crime counts. Since 1995, the number of violent crime victimizations has decreased from 10.02 million to 3.8 million and the number of property crime victimizations has decreased from 29.5 million to 14.8 million (Truman, 2011, p. 2; Ringel, 1997, p. 3). Expenditures on drug trafficking, replacements due to arson, and losses to robbery are also down. On the other hand, expenditures increased substantially on medical care for crime victims, recovery from vandalism, and financial losses due to crime-related lost work days. This suggests an increase in the severity of violent crime and vandalism incidents. However, comparisons should be interpreted with caution due to dramatic increases in the cost of health care and improvements in the availability of crime data.

Overall, the cost per capita has fallen from \$5842 to \$5284. This indicates that the increased public and private expenditures on deterrence may have helped to decrease not only the quantity of crime but the burden of crime on the average citizen. For a useful survey of the economics of crime deterrence, see Eide et al. (2006).

The findings facilitate cost-benefit analysis related to crime. For example, the introduction noted Evans and Owens' (2007) estimates which suggest that a 1 percent increase in policing would lead to a 1 percent decrease in the burden of crime. Based on the findings of the current study, a 1 percent increase in policing would cost \$1.13 billion. If the Evans and Owens finding applied broadly, a 1 percent decrease in the net cost of crime (excluding expenditures on police) would save \$15.42 billion. This would indicate that more policing would provide a

net gain for society. If studies find that particular types of crime respond to increases in enforcement, the response could likewise be applied to the cost of those types of crime for the purpose of cost–benefit analysis.

Economic theory suggests that the value of transfers may also approximate the cost to criminals of carrying out their crimes, including the expected cost of time spent in prison. Becker (1968) 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. A rational cost calculation by a potential criminal would include the opportunity cost of time spent planning and carrying out crimes, the cost of fencing operations, 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 \$1561 billion transfer figure is a conservative estimate of criminals' costs to the extent that it does not include the psychic benefits received by criminals or the value of stolen assets that are not reported.

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 \$4705 billion each year, and the net cost is an estimated \$3144 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 \$3216 billion and \$1655 billion, respectively.

The argument for marginal analysis by criminals is not without flaws, especially in regard to the assumptions of rationality and full information for criminals. Consider the findings of 219 inmate interviews in a medium security state prison and a county jail (Anderson, 2002). The results indicate that when their crimes were committed, 77 percent of the inmates either did not think about apprehension or punishment, thought there was no risk of apprehension, or had no idea of the likely punishment if they were convicted. Marginal analysis on the part of criminals could not be performed accurately under any of these circumstances.

Underestimates of the likelihood of apprehension and the severity of punishment would lead otherwise-rational individuals to carry out crimes beyond the point where the marginal benefits for the criminal fell below the marginal cost, and could result in negative net benefits from crime. On the other hand, if the average crime *does not* resemble the marginal crime, and instead the first crimes committed generate more benefits than costs, this would result in positive net benefits. Under the assumptions of rationality, full information, and similar crimes, or under the assumption that net losses due to overindulgence 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. These assumptions lead to the relatively high \$3144 billion estimate for the net cost of crime. The lower \$1655 billion estimate is favored in the present study to be conservative.

Criminals' apparent apathy toward the risks and repercussions of their activities as suggested by Anderson (2002) 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.

7

Conclusion

Estimates of crime's burden inform our legal, political and cultural stance toward crime. Most studies of crime's toll provide counts of criminal acts or concentrate on particular components of crime's cost. The present study estimates the aggregate burden of crime in the United States. To better gauge the full cost of crime, the study incorporates indirect costs such as the opportunity cost of time lost due to crime, the cost of health care for victims, and the burden of fear and agony caused by crime. Estimates of fraud- and theft-related transfers from victims to criminals are reported separately to reveal the net burden of crime to society.

Between 1995 and 2010 there was a 53-percent decrease in the number of crimes as measured by the National Crime Victimization Survey (Truman, 2011, p. 2; Ringel, 1997, p. 3). However, crime's burden depends not just on counts, but also on the types of crimes committed, the scale of those crimes, and the expenditures made to reduce crime. The estimated gross annual cost of crime has increased since the mid-1990s from \$2419 billion to \$3216 billion in constant 2012 dollars. The increase came largely from white-collar crimes such as occupational fraud, unpaid taxes, and insurance fraud, which cause

transfers rather than losses to society. Net of all such transfers, the annual loss to society increased slightly from \$1564 billion to \$1655 billion.

Criminals cause this \$1655 billion worth of lost productivity, crime-related expenses, and diminished quality of life while acquiring an estimated \$1561 billion worth of assets from their victims. Net of transfers, the losses represent an annual per-capita burden of \$5284. Including transfers, the total annual cost of \$3.2 trillion is of the same order of magnitude as the \$2.7 trillion annual expenditures on health care (Martin et al., 2012, p. 2) and the \$3.5 trillion outstanding mortgage debt held by commercial banks (Federal Reserve, 2012). The annual cost of crime is also roughly equivalent to the \$3.2 trillion estimated total cost of the wars in Afghanistan and Iraq, combined with the cost of U.S. military assistance to Pakistan, from 2001 through 2011 (Eisenhower Study Group, 2011).

Economic theory calls for more resources to be devoted to law enforcement and moral enhancement until the cost of additional efforts would surpass the benefit. The findings of this study help bring crime's cost to light, and inform the calculus of whether more countervailing efforts are in the best interest of society. If crime's cost is higher than previously thought, crime prevention warrants a larger than expected allocation of resources. It is left for future research to determine which strategies are the most effective in deterring crime.

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