PAIN, SUFFERING, AND JURY AWARDS: A STUDY OF THE COST OF CRIME TO VICTIMS

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Previous studies of the cost of crime have focused on the out-of-pocket expenses incurred by victims. This approach significantly underestimates the cost of crime to victims by ignoring the pain, suffering, and fear caused by crime. Other studies have attempted to infer the cost of crime by estimating property value differences in high versus low crime areas. However, this approach does not permit one to determine the cost of individual crimes. The purpose of this paper is to estimate the cost of individual crimes by examining the pain, suffering, and fear endured by crime victims. Actual victim injury rates are combined with jury awards in personal injury accident cases to estimate monetary values for pain, suffering, and fear. I combine crime-related death rates with estimates of the value of life to arrive at monetary values for the risk of death. My estimate of the aggregate annual cost of crime to victims of FBI index crimes is $92.6 billion. These estimates are shown to have several direct policy applications.

I. INTRODUCTION

Criminal activity imposes many costs on society. Federal, state, and local governments spend approximately $35 billion each year for police protection, public defenders, and correctional programs such as jails, prisons, and prosecutors (BJS, 1985a). An additional $22 billion is spent annually by private firms and institutions for burglar alarms, guards, and the like. Households spend billions more on locks, burglar alarms, watchdogs, and other protection (Zedlewski, 1985: 774).[1]

Despite the money spent on preventing crime and detaining

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[1] An additional component of the social cost of crime is borne by individ-

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criminals, every year approximately one in every four homes in the United States are victimized by crime. About 6 million Americans are victimized by a violent crime (rape, robbery, or assault), while an additional 30 million are victimized by thefts or burglaries (BJS, 1986). The cost of crime to these victims is an important—and often underestimated—component of the social cost of crime.

Crime victims not only incur out-of-pocket expenses (such as stolen or lost property, medical costs, and lost wages), but they also bear the cost of pain, suffering, and fear. Previous studies of the cost of crime to victims have generally relied on one of two approaches—either direct or indirect estimation. Direct estimation is usually based on surveys of actual out-of-pocket expenses. For example, a recent study by the Bureau of Justice Statistics (BJS) estimated that in 1981, the purely out-of-pocket cost of crime to victims was $10.9 billion. Indirect estimation primarily focuses on the effect of crime rates on property values (see, for example, Thaler, 1978 and Hellman and Naroff, 1979). Although this approach does result in estimates that include a pain, suffering, and fear component, it does not yield crime-specific cost estimates.[2]

The purpose of this research is to combine both direct and indirect methods of estimation to arrive at crime-specific estimates of the cost of the pain, suffering, and fear endured by victims. My estimates are based on the actual risk of injury and death confronting victims. The conversion of risks into dollar amounts is based on court awards in personal injury cases for similar injuries and on estimates of the value of life.

Table 1 contains an estimate of the aggregate cost to victims of personal and household crimes as well as the per capita (and per household) costs. It is important to note that the estimates in this paper are based on the "average" crime, including unsuccessful attempts.[3] For example, the cost associated with the average robbery (from Table 3) is $12,594. The probability of becoming a robbery victim is estimated to be .0059. Thus, I estimate the per capita cost of robbery to be $74 ($12,594 $\times$ .0059), and the aggregate annual cost of crime to robbery victims to be $14 billion.[4]

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uals who change their routine behavior to reduce the risk of becoming a victim. For a good survey of such costs, see Gray (1979).

[2] One other study has attempted an indirect estimate of the monetary cost of individual crimes. Phillips and Votey (1981) used a few independent observations on out-of-pocket crime costs and the value of life to estimate a log-linear relationship between dollars and survey-based seriousness scores. However, because most independent estimates of crime costs were based solely on actual out-of-pocket losses, their estimates did not adequately account for the risk of injury and death for most crimes.

[3] All monetary estimates in this paper are in 1985 dollars. Also, except for bank robbery, arson, and bombings (not shown in Table 1), crimes against businesses are generally excluded. Instead, this paper focuses on personal and household crimes.

[4] The estimated risk of becoming a robbery victim is based on a base pop-

Table 1. Individual and Aggregate Cost of Crime to Victims

Crime	Cost to Victims	Risk	Per Capita Cost	Aggregate Cost (Billion $)
Personal (per individual)				
Rape	$51,058	.00095[a]	$ 49[a]	$ 9.1
Robbery	12,594	.0059	74	14.0
Assault	12,208	.0247	297	56.0
Larceny	181	.07316	13	2.5
Household (per household)				
Motor Vehicle	$ 3,127	.01573	$ 49	$ 4.2
Burglary	939[b]	.0662	62[b]	5.3[b]
Larceny	173	.1027	18	1.5
Aggregate Cost of Crime to Victims				$92.6

[a] This is based on the entire population. Since most rape victims are female, risk and per capita costs to females are higher. However, aggregate costs remain unchanged.

[b] The cost of burglary is estimated to be $1,372 in Table 3. However, all but $939 of this amount is due to the risk that the burglary will result in contact with the victim, which changes the burglary into a robbery, assault, rape, and the like. To avoid double counting, the burglary estimates exclude costs associated with more severe crimes.

I estimate the aggregate annual cost of crime to victims of all personal and household crimes to be $92.6 billion. This compares to the BJS direct out-of-pocket cost estimate of $10.9 billion.[5] If one were to add the estimated aggregate cost to victims of $92.6 billion to estimates of the other components of the social cost of crime mentioned earlier, plus victim costs for crimes not shown in Table 1 such as arson, kidnappings, and bombings, the total tab to society would certainly exceed $200 billion a year—or about $800 to $1,000 per year for every man, woman, and child in the United States.

Although this is the first study to estimate the monetary cost of pain, suffering, and fear caused by individual crimes, it would be of little more than academic interest if its only purpose were to reinforce the obvious fact that crime is a major problem in the United States. Instead, the estimates derived in this paper have important policy applications.

ulation over the age of 12 of 188.48 million (BJS, 1984: 286). The base number of households is 85.2 million.

[5] The estimates in this paper can be divided into three categories: direct (out-of-pocket), $17.5 billion; pain and suffering, $39 billion; and risk of death, $36.1 billion. The $17.5 billion out-of-pocket cost is higher than the BJS estimate of $10.9 billion for two reasons. First, inflation (1981 to 1985) increases the estimate by $2 billion. The remaining $4.6 billion is due to the inclusion of estimated lost wages and medical costs for psychological injury.

The remainder of this paper is structured as follows: I first examine jury award data to estimate dollar values for the cost of pain, suffering, and fear to crime victims. Then I estimate the total cost of crime to victims by combining information on the distribution of injuries and deaths with estimates of the monetary value of the pain, suffering, fear, and death. Next I present several examples of how the estimates derived in this paper might be used for policy analysis. A few concluding remarks are reserved for the final section.

II. THE USE OF JURY AWARDS AS A MEASURE OF PAIN AND SUFFERING

To estimate the cost of pain and suffering to crime victims, one could theoretically ask victims how much they would be willing to pay to have avoided the pain they recently endured or, alternatively, the amount of compensation that would be required to make them accept the injury.[6] However, there is no reason to expect such a survey to elicit meaningful responses.

Another approach might be to estimate the willingness to pay for reductions in similar work-related injuries by examining worker wage differentials. For example, Viscusi (1983) estimates the value of the average work-related nonfatal injury to be between $26,000 and $40,000. Miller *et al.* (1986) review thirteen studies of more serious work-related injuries and estimate the aftertax value of "lost-day" injuries (those that typically involve the loss of 15 days from work) to range from $85,000 to $105,000. Unfortunately, these studies are unable to estimate the value of specific types of injuries, and there is no reason to believe that the average work-related injury is identical to the average crime-related injury.

Absent data on willingness to pay for reductions in specific crime-related injuries, this study will examine recent compensatory damage court awards for various injuries. Individuals who are injured by accidents often bring suit against the party responsible for the injury. Court awards may compensate the victim for "special" damages (medical expenses and lost wages) and "general" damages (pain and suffering).[7]

The legal theory behind compensatory damages is ostensibly "to give the injured party a sum of money which will restore him, as nearly as possible, to the position he would have been in if the

[6] The willingness-to-pay approach will generally yield lower estimates than the compensation approach. For a comparison of these two approaches, see Cook and Graham (1977).

[7] Courts often award "punitive" damages in addition to the compensatory damages studied here. Punitive damage awards are used either to punish negligent defendants or to deter others from causing similar accidents. Since such awards are not meant to compensate victims for pain and suffering, they are excluded from this study.

wrong had not been committed; in other words, to make the plaintiff whole" (Bender, 1986: § 3.01). This theory would be difficult to implement in the case of pain and suffering awards, since it is virtually impossible for a third party to verify the amount of money that another individual would require to be made whole. Further, for many injuries, no amount of money would fully compensate some individuals for their pain and suffering. Courts have recognized this problem by reformulating the standard of compensation to be "an amount such as a reasonable person would estimate to be fair compensation" and by allowing jurors wide latitude in determining the ultimate award (ibid.). Moreover, instructions to juries apparently do not reflect the full compensation standard. Instead, jurors are given general instructions that permit them to award a "fair" or "reasonable" amount as compensation for pain and suffering (ibid., § 4.61).

Although drawing inferences from jury decisions is not an ideal method of determining the monetary value of pain and suffering, jury awards tend to be both predictable and stable. Furthermore, since society has chosen the civil court system as a means of redressing victims, jury awards are a logical way to approximate society's assessment of the pain and suffering incurred by victims.

The data used here to assess court awards were published by Jury Verdict Research, Inc., a private company that attempts to collect virtually all damages awarded by civil courts in personal injury cases in the United States. Although we do not have access to the raw data, the company asserts that it has analyzed more than one hundred thousand cases and that estimates of average claims can accurately predict court awards within plus or minus 7 percent. The data exclude out-of-court settlements, cases that were dismissed, and those in which zero damages were awarded.

Accidents that result in a jury trial are obviously not a representative sample of all accidents. Cases that go to trial tend to be those involving the most severe injuries or those in which the parties have different perceptions of the probability of winning or the expected award. Moreover, out-of-court settlements for the identical injury are likely to be *smaller* to account for the savings in litigation costs and the possibility that the defendant would win in a trial.[8]

Although sparse, the empirical evidence on out-of-court settlements versus trial awards does suggest that there is little difference in expected outcomes for *comparable* injuries (and degrees of negligence). For example, Franklin *et al.* (1961: 19) found that although the average settlement for accidents in which the injured parties did not bring suit was lower than those in which parties

[8] For a discussion of many of these results, see Gould (1973) and Shavell (1982).

sued, "the value of a case will not be substantially increased solely by the act of suing or going to trial."

Danzon and Lillard (1983: 370), in a study of medical malpractice claims, found that although the average jury award was $102,000 compared to $26,000 for cases settled out of court, "the fact that cases going to verdict typically involve much larger stakes accounts for over three times as much of the explained discrepancy between mean verdict and mean settlement as the tendency of cases to settle for less than their potential verdict."

Since cases that are settled by juries tend to be those involving more severe injuries, it would be inappropriate to use average jury awards for pain and suffering as estimates of the average pain and suffering incurred by all victims. Instead, one can estimate a functional relationship between the "specials" (medical costs and lost wages) and the pain and suffering awards, and combine this with the actual distribution of injuries (including those that never go to trial). I did this for the physical and mental injuries normally sustained by crime victims. For example, the regression equation for gunshot victims is estimated to be:

$$\text{pain} + \text{suffering} = \$17{,}957 + \$5.20\ (\text{medical} + \text{wage})^{9}$$

Thus, if a gunshot wound results in $1,000 of medical costs and lost wages, the estimated pain and suffering award is $23,157 ($17,957 + [$5.20 × $1,000] = $23,157). Further, each additional dollar of medical costs and lost wages results in an additional $5.20 in pain and suffering.

Ideally, one would like to know the average medical cost and lost wages associated with crime victims who suffer from each type of injury. One way to estimate average costs would be to combine information about the distribution of injuries (that is, where the injury occurs on the body and the severity of the injury) with estimates of the cost of treatment. Unfortunately, data on the distribution of crime-related injuries are not available. Instead, estimates of the distribution of injuries that occur in consumer-product-related accidents are available from the Consumer Product Safety Commission (CPSC),[10] whose data base contains over 10 million actual consumer-product-related injuries as reported by seventy-four hospital emergency rooms throughout the country.

In addition to the distribution of accident-related injuries, injury-specific estimates of medical costs are available from insurance claims at the Civilian Health and Medical Program for the

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[9] Note that this regression equation results in an adjusted R-squared close to 1, since this procedure is simply reconstructing the regression equations apparently estimated by Jury Verdict Research, Inc. Similarly, the t-statistic on the independent variable (direct costs) is very high.

[10] The model is fully described in Technology and Economics (1980).

Uniformed Services (CHAMPUS) of the Department of Defense.[11] I obtained cost estimates for fractures, burns, concussions, contusions and abrasions, puncture wounds (knives), and foreign bodies (gunshot wounds). These estimates are body-part specific. For example, we know the average cost for fractured shoulders, fingers, wrists, and legs. They also indicate whether inpatient hospital treatment was necessary. Finally, I obtained information concerning the number of lost work days by type of injury from the National Health Interview Survey.

Based on these three data sources (distribution of injuries by body part from CPSC, medical costs from CHAMPUS, and lost work days), one can estimate the average medical costs and lost wages for broad categories of injuries, such as gunshot wounds, broken bones, or internal injuries. For example, the average outpatient expense for embedded foreign objects is $434. Using the regression equation for pain and suffering incurred by gunshot wound victims (shown above), the corresponding pain and suffering is $33,001. I estimated the average inpatient medical expense to be $6,118, with pain and suffering as $76,926.[12] Based on an estimated 40 percent outpatient and 60 percent inpatient ratio, the average medical cost and lost wages is $3,844 and the pain and suffering is $59,355.[13]

Average medical costs for psychological injury are based on the average medical expense reported in jury award cases. This appears to be a reasonable procedure, since by definition none of these psychological injuries are minor and the estimated probability of psychological injury used in this paper includes only severe cases. Moreover, the average medical costs for jury award cases appear reasonable. For example, at $80 per hour for psychiatric care, they imply that the average patient suffering from a traumatic neurosis requires 52 visits and that a patient suffering from a severely disabling injury requires 310 visits.

Pain and suffering may also result from injuries that are not medically treated. In particular, the fear of injury or death may cause mental anguish and distress. In some states, courts recognize the mental anguish associated with such fear as a compensable damage in negligence cases. Although Jury Verdict Research, Inc., does not categorize jury awards in this manner, another

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[11] These estimates were provided by William Zamula of the CPSC. The CPSC uses these data in their injury-cost model.

[12] Although CPSC data contain information about many types of injuries, there is no category that directly compares with gunshot wounds. For minor gunshot wounds that do not require hospitalization, CPSC estimates for embedded foreign objects were used. The estimate for gunshot wounds resulting in inpatient care is based on a sample of actual hospital gunshot wound cases in 1982, provided in private correspondence by Philip J. Cook.

[13] According to data from BJS, approximately 60% of crime victims who require hospital treatment are treated on an inpatient basis. The corresponding figure for consumer products is only about 5%.

source of information on personal injury awards is available—a thirteen-year compilation of all pain and suffering awards in the Louisiana appellate courts (*Loyola Law Review*, 1986). Of the several thousand cases listed, only ten involved payment for incidents in which there was no physical injury and no evidence of psychological injury other than some transitory "fear." Although this is an extremely small sample, it does encompass the entire population of appellate court cases in Louisiana over this period. Moreover, the situations involved in these cases fairly closely resemble fear of injury in crime situations.

To account for differences in the degree of risk and fear, I divided these ten cases into two groups. The first group consists of two cases in which gunshots were fired, one case of a boat sinking, during which the plaintiff feared imminent drowning, and one boating incident that almost resulted in the decapitation of the plaintiff. I grouped these cases since they appear to be instances in which the individual was in imminent danger of severe injury or death. The awards ranged from $2,820 to $9,712, with the average being $4,398. According to Jury Verdict Research, Inc., Louisiana court awards are 3 percent below the national average. I therefore inflated the estimated award for fear by 3 percent, to $4,535. This group has been labeled "fear with weapon" in Table 2.

The second group of cases, which involved no weapons, consists of four auto accidents in which there was no actual injury and

Table 2. Medical Costs, Lost Wages, and Pain and Suffering Estimates for Various Injuries

Injury	Average Medical Cost and Lost Wages	Average Pain and Suffering
Severely disabling psychiatric injury	$ 24,750	$ 97,556
Traumatic neurosis	4,127	76,514
Gunshot wound	3,844	59,344
Burns	1,750	40,541
Internal injuries or concussion[a]	2,553	23,366
Broken bones or teeth[b]	1,700	15,273
Multiple minor injuries (cuts, bruises, etc.)	1,168	3,318
Fear with weapon present	—	4,535
Fear without weapon	—	2,240

[a] This estimate was derived from a composite of court awards in cases resulting in damage to the heart, lungs, spleen, bladder, liver, gall bladder, and kidneys, as well as injuries resulting in simple concussions and concussions resulting in residual effects.

[b] This estimate was derived from a composite of court awards for injuries to the teeth, forearms, and lower legs.

two cases of trespassing on a residential property that led to a fear of becoming a crime victim. Based on the awards in these cases, I estimated the average injury to be $2,240. Table 2 summarizes the average medical expenses, lost wages, and pain and suffering for the injuries analyzed in this paper.

III. THE COST OF CRIME TO VICTIMS

As stated at the outset, the cost of crime to victims has three main components: (1) direct monetary or out-of-pocket costs; (2) pain, suffering, and fear of injury; and (3) risk of death. This section combines estimates of these three costs to arrive at an overall victim cost for each type of crime, reported in the last column of Table 3.[14] The first column of the table reports the direct

[14] Throughout, I have made many assumptions where gaps in the data precluded more precise estimates. Some of the gaps suggest that my estimates may be somewhat high, others that they are too low; the reader should thus use some caution in interpreting them. They also indicate the need for further research on both victim-impact assessments and jury awards. One possible source of data is the growing trend of courts to permit third-party damage suits in criminal cases. For examples, see Carrington, 1983; and Sherman and Klein, 1984.

The estimates in this paper might be too high for two reasons: (1) fear without injury might be an overestimate because society generally does not compensate; and (2) victims of crime might have lower valuations of their own life and health than the average accident victim. Conversely, the estimates might be too low because: (1) victim injury rates are based on crimes against strangers, while crimes against nonstrangers have higher injury rates; (2) pain, suffering, fear, loss of affection, and the like endured by family members is not included; and (3) fear incurred by multiple victims of the same crime might not be included.

First, the estimate of the cost of fear for crime victims who are not physically injured is subject to a good deal of uncertainty. My estimate is based on only a handful of cases, some of which do not closely resemble crime situations. Nevertheless, I find the estimated "cost" of fear endured by a violent crime victim who is not otherwise injured to be reasonable ($2,240 with no weapon present and $4,535 with a weapon). Furthermore, the aggregate cost estimates are not significantly affected by the exclusion of these estimates. For example, even if it were assumed that there is no fear component of crime, the aggregate annual cost of FBI index crimes to victims would drop from $92.6 billion to $80 billion. A related problem is the fact that for some crimes (e.g., bank robbery, arson, and bombings), more than one victim may suffer from fear. For these crimes, my estimates are probably too low.

Second, the cost of pain and suffering endured by family members of victims has been ignored. Unfortunately, there is a lack of data on both the incidence of family suffering and the costs associated with the suffering of those who have witnessed either criminal acts or their effects or both. A more thorough study of personal injury cases might uncover useful information in this area.

Finally, I have assumed that society values all identical injuries the same. For example, if the victim of an assault provoked the attacker, that victim's personal valuation of "life" may be well below "average." In addition, that victim's tolerance for pain and aversion to risk is likely to be below "average." Thus, to the extent that victims of crime provoke the incident, these estimates may be considered somewhat high. However, the estimates already underestimate the cost of crime by using injury rates based on the risk of injury caused by strangers, rather than the higher injury rates that would result if crimes committed by nonstrangers were included.

Table 3. Average Cost of Crime to Victims

Crime	Direct Losses	Pain and Suffering	Risk of Death	Total
Kidnapping	$ 1,872	$15,797	$92,800	$110,469
Bombing	24,737	7,586	44,800	77,123
Rape	4,617	43,561	2,880	51,058
Arson	14,776	6,393	12,380	33,549
Bank robbery	4,422	10,688	3,700	18,810
Robbery	1,114	7,459	4,021	12,594
Assault	422	4,921	6,685	12,028
Car theft	3,069	—	58	3,127
Burglary	939	317	116	1,372
Larceny				
Personal	179	—	2	181
Household	173	—	—	173

or out-of-pocket costs incurred by crime victims, including any property or theft losses, medical and psychological counseling expenses, and time lost from work.[15]

In the section above, I used jury award data to estimate the monetary value of pain and suffering for specific physical and mental injuries. To convert these estimates into the average pain and suffering endured by crime victims, one must obtain estimates of the distribution of injuries for each crime type. Estimates of physical injury rates are available from several government and private sources.[16] Although estimates of physical injury are widely published, no comprehensive national surveys or studies are available for a significant injury to victims—the psychological effects of the crime not directly associated with physical injury. This exclusion is particularly important for rape. Rape trauma syndrome is a well-established medical phenomenon that may result in severe psychological injury.

For example, a study by McCahill *et al.* (1979) of 213 Philadelphia rape victims between 1972 and 1975 found that 30 percent to 50 percent of the victims had at least one of the symptoms of rape trauma syndrome immediately following their rape. In addition, 20 percent to 40 percent still had these symptoms one year after

[15] These data are based primarily on the National Crime Survey (see Shenk and Klaus, 1984). Estimates for lost work days, psychological counseling, and crimes not covered by the survey are taken from various sources, described in more detail in Cohen (1987).

[16] The primary source of data is BJS (1982), which estimates injury rates for most crimes committed by strangers. Unfortunately, this understates the injury rates somewhat, since the aggregate injury rate for victims who knew their attackers was 35.1%, compared to 28.1% for those who did not know their attackers (BJS, 1986). For a more detailed discussion as well as a complete listing of the many private sources used to fill in the gaps found in BJS data, see Cohen (1987).

the rape. Williams and Holmes (1981) found that about half of 61 rape victims in San Antonio complained of similar symptoms. A recent survey of 2,000 women in Charleston, South Carolina, found that rape (and attempted rape) victims suffered nervous breakdowns at a rate of over 13 percent, compared to about 3 percent for nonvictims. In comparison, robbery (and attempted robbery) victims had a nervous breakdown rate of about 5 percent. Assault victims were not found to have a significantly higher rate of psychological problems (Berglas, 1985). Other studies of rape victims found similar short-term and long-term effects.[17]

Based on these studies, I estimate that about 40 percent of rape victims suffer traumatic neurosis and that an additional 10 percent suffer from more severe psychological injuries. I also estimate robbery (and attempted robbery) victims to have a 2 percent rate of severe psychological injury.

Using the estimated distribution of injuries, the "average" pain and suffering for a crime can now be calculated as simply the fraction of victims who incur each type of injury, multiplied by the respective pain and suffering estimate. Table 4 illustrates how this calculation is done for the crime of rape. I estimate that the average rape (or attempted rape) victim incurs $43,561 in pain and suffering.[18] Fear is counted only for those victims who suffer no other physical or mental injury, estimated to be 5.5 percent of all victims. Jury awards for pain and suffering when actual injury occurs (presumably) already account for fear. The second column of Table 3 reports the pain and suffering estimates for all other crimes, based on the methodology described above.

One of the possible consequences of a violent crime is that the victim will be killed. Although the criminal may eventually be charged with murder, for purposes of this study murders will be

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[17] For example, Resick (1984), reports that, based on several studies, 18% of rape victims show short-term signs of depression and an additional 14% exhibit severe depression. Ellis *et al.* (1981) studied rape victims who had been assaulted at least one year earlier, and found that 22% were still in psychotherapy, with half of those being severely depressed and half moderately depressed. In the short-term, 48% had sought some form of psychiatric treatment.

[18] One of the potential problems with Table 4 is double counting. For example, most of the rape victims who suffered psychological trauma probably also experienced some physical injury. To the extent that jury awards for gunshot wounds (for example) include an evaluation of long-term psychological effects, there is some overlap between these two categories, and the actual pain and suffering estimate should be lower. However, most jury awards are for accidental injuries, not violent crimes. Psychological injury is probably less frequent in accidents. Furthermore, the estimate of jury awards for psychological injury specifically excludes cases in which significant physical injury also occurs. On the other hand, it is possible that the presence of both physical and psychological injury may compound the pain and suffering, so that instead of double counting, an underestimation of damages for those who are injured in both ways results. Finally, this double counting problem is less likely to occur for most other crimes, for which a separate estimate of psychological trauma has not been included.

Table 4. Pain and Suffering Endured by Rape Victims

Injury	Probability	Pain and Suffering	Total
Traumatic neurosis	.40	$76,514	$30,606
Severe psychiatric	.10	97,556	9,756
Minor injuries	.31	3,318	1,029
Internal/unconscious	.04	23,366	935
Broken bones/teeth	.02	15,273	305
Gunshot/knife	.005	59,344	297
Other*	.07	6,825	478
Fear (not otherwise injured)	.055	2,825	155
Average pain and suffering	1.00		$43,561

* The pain and suffering figure for other injuries is estimated to be a composite of other physical injuries, weighted by their incidence in rape cases.

apportioned to the underlying crime. This allows an estimate of the "average" cost of the underlying crime, based on the risk imposed on the victim.

The probability of death is derived by dividing the number of murders associated with each type of crime by the number of those crimes committed.[19] I apportioned murders where the underlying circumstances are unknown to each crime type based on the percentage of known murders in that crime category. Note that the estimate for assault may be too high, since all murders that the FBI classified as being the result of felony behavior and not classified in one of the other crimes were assumed to be assaults. This includes many murders that may not have been committed by strangers, such as family quarrels and fights over the proceeds of illegal narcotics income.

The third column of Table 3 estimates the monetary value of the risk of death associated with each crime. These estimates are computed by multiplying the probability of death for each crime by the estimated value of a statistical life of $2,000,000. This number is based on numerous studies of workers' willingness to pay for reductions in the risk of death through wage rate differentials.[20]

[19] The number of murders resulting from each crime type was based on FBI (1984).

[20] For a survey of this literature, see Viscusi (1983). More recently, a group of researchers at the Urban Institute, Washington, D.C. (Miller, *et al.*, 1986) have reviewed all available estimates of the value of reductions in the risk of death, including those derived in other contexts, such as highway safety and consumer purchasers of smoke detectors and cigarettes. Despite the disparate sources and types of data used, the estimates are extremely close, generally ranging from $1.0 to $2.5 million, with a mean of $1.75 million. A more detailed discussion of the validity of using these estimates is contained in Cohen (1987).

The probability of a victim being killed is relatively small for most violent crimes, ranging from less than 1 in 10,000 for burglary and larceny to about 1 in 1,000 for rape or robbery. These probabilities are very similar to the probability of accidental death facing workers. Thus, it may be reasonable to use the value of life estimates derived from low probability risks of death as a proxy for the willingness to pay to save a statistical life for most violent crimes.[21]

Finally, note that the risk of death estimates are based on the objective probabilities of death. To the extent victims believe their death is a near certainty (or higher than it really is), they might be willing to pay considerably more to avoid the risk of death.

IV. EXAMPLES OF POLICY APPLICATIONS USING VICTIM COST ESTIMATES

Without a full accounting of the costs of crime, even the most careful study of a program's effectiveness can reach the wrong conclusion. That is apparently what happened in a recent analysis of the Illinois early release program.[22] Austin's (1986: 404) well-documented study of the effect of the early release program on both reducing prison population and increasing crime concludes:

> Between 1980 and 1983, the Illinois Department of Corrections made an early release of over 21,000 inmates in response to a prison crowding crisis. During this period, over 5,900 prison years were averted and the projected prison population was reduced by approximately 10 percent. . . . Also, early release substantially accelerated the amount of crime suffered by the public, but contributed to less than 1 percent of all crimes reported in Illinois. . . . However, overall early release proved to be cost-effective.

Since Austin did not have estimates of the pain and suffering endured by crime victims, he used BJS estimates of the out-of-pocket costs. If one were to use the estimates shown in Table 3 to recalculate the cost of the early release program, the opposite conclusion would be drawn. Austin estimated the program's benefits

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[21] However, the estimated probability of death for kidnapping and bombing is between 2 and 4 per 100 incidents. This is a much higher risk of death than that facing workers, which is used in studies of the value of life. Since individuals likely place a higher value per reduction in risk of death as the probability of death increases, the estimates for kidnapping and bombing may be too low. Unfortunately, researchers have not been successful in estimating variations in willingness to pay based on differences in risk, since individual workers tend to select jobs on the basis of their own aversion to risk. See Viscusi (1983: 102–106).

[22] This comment refers only to Austin's conclusion concerning the cost-effectiveness of the early release program. In fairness to Austin, he produced not only a comprehensive study but also an impartial analysis of a difficult short-term policy dilemma that also considers the practical and political realities of prison overcrowding. He concludes that his "study provided no firm answers to the question of whether early release is good or bad correctional policy."

to be about $49 million (due solely to averted prison costs) and its costs (including the additional criminal justice costs associated with supervising the early releasees and reprocessing recidivists into the system, as well as victim costs) to be $17 million. However, including the cost of victims' pain and suffering increases the cost of the program to about $110 million.[23] Stated in terms of the cost "per early-release inmate," Austin estimated that the program resulted in a *savings* of $1,480, while the inclusion of pain and suffering costs changes that savings into a *cost* of $2,870.

The estimates in this paper have many other direct policy applications. For example, a study of robbery offenders in Washington, D.C., in 1973 estimated that increasing the average sentence length per arrestee from .42 to .50 months—an overall increase in prison population of 7 percent—could reduce robberies by 8 percent (Cohen, 1983: 70–73). Until now, there was no objective way to determine whether this crime reduction was worth its cost. However, based on the number of robberies, inmates, and the estimated cost to victims of $12,594 per robbery, it can now be estimated that this incapacitation policy would have a benefit-cost ratio of about 3 to 1.[24]

Another potential use of these cost estimates is to determine whether the deterrent effect of increased sentence lengths is worth the cost of additional prison capacity. Previous attempts at such an analysis were hampered by the lack of crime-specific estimates, and thus were limited to recommendations concerning the average length of sentence for all crimes in general.[25] A study of this nature would require a careful analysis that included not only the estimates in this paper but also estimates of the deterrent effect of longer sentences as well as a thorough examination of current prison population and crime rates. In addition, it should also consider the costs and benefits of alternatives to prison. Although

[23] See Austin's Table 39 for the list of increased crimes. Following Austin, I have not included cost estimates for the last 5 crime categories he cites (such as disorderly conduct and drugs and weapons possession). However, I did not follow Austin's adjustment of victim costs to account for the recovery of stolen property and reimbursed medical expenses. A full estimate of the social cost of crime should include both of these items. Reimbursed medical expenses are obviously borne by insurers. For an argument to include stolen property, see Becker (1968: 171). These victim costs were then added to Austin's Table 40 to arrive at the total costs and benefits of the program.

[24] According to Table 21 of Cohen (1983), there were 1,543 inmates in 1973. A 7% increase would result in an additional 128 prison years, at a cost (in 1983 dollars) of $3.2 million. According to the FBI Uniform Crime Statistics for 1973, 7,751 robberies were known to police in Washington. An 8% reduction would result in 620 fewer robberies, at a cost savings of $7.8 million. Since it was claimed that there would be additional benefits through reduced rapes and auto thefts, the benefits are likely to be even higher.

[25] See, for example, Zedlewski (1985), who concludes that, in general, a benefit-cost analysis "indicates overwhelming support for more prison capacity." One exception is Hofler and Witte (1979), who used estimates of the value of life to arrive at benefit-cost estimates for different sentences for homicide.

such a study is beyond the scope of this paper, a preliminary analysis can be done, if we ignore the questions of alternatives to prison.

Lewis (1986: 48) recently surveyed forty-nine studies, involving fifty-two different data sets, on the deterrent effect of longer sentences, and estimated the mean "elasticity of severity," which he defined as "the percentage change in the crime rate for a specific crime divided by the percentage change in the average sentence served by prisoners convicted of that crime, other things being equal."[26]

Table 5 illustrates how one might use Lewis' estimates of the elasticity of severity to conduct a benefit-cost analysis of increased prison sentences for each crime on the FBI index. Assuming a 10 percent increase in time served, one can calculate the reduction in each type of crime. For example, a 10 percent increase in time served for rape would result in about 5,500 fewer rapes. Based on an estimated cost to victims of $51,058 (from Table 3), this would yield a benefit of $282 million. Of course, each convicted rapist would now spend 10 percent more time in prison, which would increase the average time from 54.3 months to about 60 months. Based on the number of incarcerated rapists and the cost of imprisonment, this results in an added prison cost of $104 million, or a benefit-cost ratio of 2.7.

The estimates in Table 5 suggest that longer prison sentences are warranted for rape, assault, and auto theft, and that shorter sentences might be warranted for burglary and larceny. It must be emphasized that these are *not* policy recommendations, as the estimates in Table 5 are extremely preliminary and only meant to stimulate further research and analysis. Furthermore, it is possible that alternatives to incarceration could yield higher benefit-cost ratios. Instead, the above example illustrates how victim cost estimates permit such an analysis.[27]

As another possible application, consider the problem of constructing an empirically based sentencing guideline system. The U.S. Sentencing Commission's (1987: 1.2–1.4) recently enacted federal guidelines are based on the current average sentence for various types of offense-offender characteristics. For example, the median sentence for a "basic" bank robbery where no weapon is present is thirty-seven months (ibid., pp. 2.17–2.18, 5.2). The sen-

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[26] Note that Lewis does *not* consider the potential deterrent effect from increasing the rate of imprisonment, which some argue has even higher benefits than increasing the length of sentences.

[27] At a minimum, one would want to incorporate uncertainty into the estimation procedure to arrive at probable ranges of benefits and costs. For example, see Hofler and Witte (1979). One would also need to include the criminal justice resources saved by the lower crime rate. In addition, it should be noted that the estimates in Table 5 of the number of prisoners and average time served per crime are subject to a high degree of uncertainty. Further study of federal, state, and local prisoners would be needed to estimate these numbers adequately.

Table 5. Benefits and Costs of 10% Longer Prison Sentences*

Benefits and Costs	Rape	Robbery	Assault	Burglary	Larceny	Auto Theft
Benefits						
Number of crimes	78,920	506,570	653,290	3,129,900	6,712,800	1,007,900
× percentage reduction	7.0	4.7	6.0	3.4	2.8	2.4
= number reduction	5,524	23,809	39,197	106,417	187,958	24,190
× cost per crime	$51,058	$12,594	$12,028	$1,372	$180	$3,127
= total benefits (millions)	$282	$300	$471	$146	$34	$76
Costs						
Number of prisoners	9,611	46,259	25,776	78,372	44,791	8,031
× average months in prison	54.3	36.3	28.5	19.4	17.3	16.3
× $200[a]						
= total costs (millions)	$104	$336	$147	$304	$146	$28
Benefit-cost ratio	2.7	0.9	3.2	0.5	0.2	2.7

* *Sources*: Number of crimes: FBI, 1984. Number of prisoners: (federal) *Annual Report of the Attorney General*; (state) BJS (1983); (jail) BJS (1985b: 525). Average time served: BJS (1983: 6).

[a] The monthly cost of incarceration is estimated to be about $2,000 (Zedlewski, 1985). Since this example assumes a 10% increase in length of prison sentences, the current time served is multiplied by $200.

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Table 6. Comparison of Monetary Harm to Sentence Length for Bank Robbery

Offense Characteristic	Median Months Served under Sentencing Guidelines	Percent Marginal Increase in Sentence	Monetary Estimate of Harm to Victim	Percent Marginal Increase in Harm
Bank robbery without weapon	37	0%	$ 6,282	0%
Possession of weapon	58.5	58%	$ 21,100	236%
Bodily injury (weapon present)	70.5	20%	$ 25,586	21%
Serious bodily injury (weapon present)	87.5	24%	$ 54,535	113%
Permanent or life-threatening bodily injury (weapon present)	97.5	11%	$104,144	91%

tence is then adjusted upward as other factors are added to the offense, such as possession of a weapon or bodily injury. These sentences are based on current practice. An alternative approach might be to estimate the risk of injury and death associated with each stage of the bank robbery. These risks can then be converted into monetary equivalents based on the cost estimates developed here. This would provide an alternative estimate of the severity of each stage of the robbery that could then be compared to current practice.

Table 6 illustrates how the monetary estimates of harm can be helpful in constructing sentencing guidelines. The first column shows the median sentence length under the new federal guidelines. The second column computes the marginal increase in sentence length. For example, possessing a weapon increases the median sentence from 37 months to 58.5 months (a 58% increase); while causing minor bodily injury increases the median sentence from 58.5 months to 70.5 months (a 20% increase). The last two columns display similar information for the monetary estimates of harm. Although the estimates in Table 6 should not be used directly to determine sentence lengths for bank robbers, they do provide another piece of information that might be helpful to decision makers.[28] In particular, they suggest the need for an increase

[28] First, as stated above, more detailed data and a more thorough analysis of bank robberies would be required. Second, an "optimal" penalty is not solely based on the harm caused by the crime. Instead, it might also be based on the probability of detection and conviction and the responsiveness of criminals to sanctions. See Becker (1968). Finally, since we do not yet know how to translate dollars of harm into years of prison time, we cannot simply assume that a 50% increase in harm, for example, translates into a 50% increase in prison time. For a good discussion of this issue, see Posner (1980), especially p. 413.

in the marginal penalty for carrying a weapon in a bank robbery as well as for the more serious bodily injury categories. Similar analyses might assist guideline drafters in comparing the sentences of different crimes.

Finally, it should be noted that monetary estimates of the cost of crime to victims may be used to rank the severity of different crimes in a manner similar to that done elsewhere through public surveys of seriousness.[29] Such rankings may themselves prove useful for the development of sentencing guidelines.

V. CONCLUSION

This paper has had two main purposes: first, to provide concrete estimates of the cost to victims of individual crimes; second, to demonstrate the usefulness of these types of estimates in formulating government policy related to crime. Further empirical studies will no doubt find that some of the estimates in this paper can be improved. My hope is that the methodology developed here will encourage others to refine these estimates as well as to attempt serious policy analysis based on victim crime costs.

REFERENCES

AUSTIN, James (1986) "Using Early Release to Relieve Prison Crowding: A Dilemma in Public Policy," 32 *Crime and Delinquency* 404.

BECKER, Gary (1968) "Crime and Punishment: An Economic Approach," 78 *Journal of Political Economy* 169.

BENDER, Matthew (1986) *Damages in Tort Actions.* New York: Matthew Bender.

BERGLAS, Steven (1985) "Why Did This Happen to Me?" *Psychology Today* 44.

BJS: Bureau of Justice Statistics, U.S. Department of Justice (1986) *Criminal Victimizations in the U.S., 1984.* Washington, D.C.: GPO.

——— (1985a) *Justice Expenditure and Employment, 1982.* Washington, D.C.: GPO.

——— (1985b) *Sourcebook of Criminal Justice Statistics—1984.* Washington, D.C.: GPO.

——— (1984) *Sourcebook of Criminal Justice Statistics—1984.* Washington, D.C.: GPO.

——— (1983) *Prison Admissions and Releases.* Washington, D.C.: GPO.

——— (1982) *Violent Crime by Strangers.* Washington, D.C.: GPO.

CARRINGTON, Frank (1983) "Victims' Rights: A New Tort? Five Years Later," 19 *Trial* 50.

COHEN, Jacqueline (1983) "Incapacitation as a Strategy for Crime Control: Possibilities and Pitfalls," in M. Tonry and N. Morris (eds.), *Crime and Justice: An Annual Review of Research*, Vol. 5.

COHEN, Mark A. (1988) "Some New Evidence on the Seriousness of Crime," 26 *Criminology* 343.

——— (1987) "The Cost of Crime to Victims." Working Paper No. 87-12. Owen Graduate School of Management, Vanderbilt University.

COOK, Philip J., and Daniel A. GRAHAM (1977) "The Demand for Insurance and Protection: The Case of Irreplaceable Commodities," *Quarterly Journal of Economics* 143.

[29] I have compared the monetary estimates of crime seriousness to public surveys in Cohen (1988).

DANZON, Patricia Munch, and Lee A. LILLARD (1983) "Settlement out of Court: The Disposition of Medical Malpractice Claims," 12 *Journal of Legal Studies* 345.

ELLIS, Elizabeth M., Beverly M. ATKESON, and Karen S. CALHOUN (1981) "An Assessment of Long-Term Reaction to Rape," 90 *Journal of Abnormal Psychology* 263.

FBI: FEDERAL BUREAU OF INVESTIGATION (1984) *Crime in the United States—1983* (and various earlier volumes). Washington, D.C.: GPO.

FRANKLIN, Marc A., Robert H. CHANIN, and Irving MARK (1961) "Accidents, Money, and the Law: A Study of the Economics of Personal Injury Litigation," 61 *Columbia Law Review* 1.

GOULD, John P. (1973) "The Economics of Legal Conflicts," 2 *Journal of Legal Studies* 279.

GRAY, Charles M. (ed.) (1979) *The Costs of Crime*. Beverly Hills: Sage Publications.

HELLMAN, Daryl A., and Joel L. NAROFF (1979) "The Impact of Crime on Urban Residential Property Values," 16 *Urban Studies* 105.

HOFLER, Richard A. and Ann D. WITTE, "Benefit-Cost Analysis of the Sentencing Decision: The Case of Homicide," pp. 165 in Gray (1979).

JURY VERDICT RESEARCH, INC. "Personal Injury Valuation Handbook" (various dates and volumes). Solon, OH: Jury Verdict Research, Inc.

LEWIS, Donald E. (1986) "The General Deterrent Effect of Longer Sentences," 26 *British Journal of Criminology* 47.

LOYOLA LAW REVIEW (1986) "A Quantum Study of Pain and Suffering Awards for Personal Injury in the Louisiana Appellate Courts (1983–1985)," 31 *Loyola Law Review* 855. [This is the most recent title in a series of identical studies for earlier time periods, published by *Loyola Law Review* since 1975.]

McCAHILL, Thomas W., Linda C. MEYER, and Arthur M. FISCHMAN (1979) *The Aftermath of Rape*. Lexington, MA: Lexington Books.

MILLER, Ted, Glenn BLOMQUIST, Charles CALHOUN, Alan DILLINGHAM, and William GELLERT (1986) "Detailed Study and Data Analysis Plan: Task B Interim Report; Development of Alternative Accident Costs." Unpublished. Prepared under contract for the Federal Highway Administration (May).

PHILLIPS, Llad, and Harold L. VOTEY, Jr. (1981) *The Economics of Crime Control*. Beverly Hills: Sage Publications.

POSNER, Richard A. (1980) "Optimal Sentences for White-Collar Criminals," 17 *American Criminal Law Review* 409.

RESICK, Patricia A. (1984) "The Trauma of Rape and the Criminal Justice System," 9 *The Justice System Journal* 52.

SHAVELL, Steven (1982) "Suit Settlement, and Trial: A Theoretical Analysis Under Alternative Methods for the Allocation of Legal Costs," 11 *Journal of Legal Studies* 55.

SHENK, J. Frederick, and KLAUS, Patsy A. (1984) *The Economic Cost of Crime to Victims*. Washington, D.C.: Bureau of Justice Statistics, U.S. Department of Justice.

SHERMAN, Lawrence W., and Jody KLEIN (1984) "Major Lawsuits over Crime and Security: Trends and Patterns, 1958–1982." Unpublished. Institute of Criminal Justice and Criminology, University of Maryland (September).

TECHNOLOGY AND ECONOMICS, INC. (1980) "The Consumer Product Safety Commission Injury Cost Model: Complete Documentation." Unpublished (July 18). Consumer Product Safety Commission.

THALER, Richard (1978) "A Note on the Value of Crime Control: Evidence from the Property Market," 5 *Journal of Urban Economics* 137.

U.S. SENTENCING COMMISSION (1987) *Sentencing Guidelines and Policy Statements*. Washington, D.C.: GPO.

VISCUSI, W. Kip (1983) *Risk by Choice*. Cambridge: Harvard University Press.

WILLIAMS, Joyce E., and Karen A. HOLMES (1981) *The Second Assault: Rape and Public Attitudes*. Westport, CT: Greenwood Press.

ZEDLEWSKI, Edwin W. (1985) "When Have We Punished Enough?" 45 *Public Administration Review* 771.