Habitual Offender Statutes and Criminal Deterrence

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I. INTRODUCTION

The past two decades have seen an explosive growth in the inmate population of the United States. In 1980, inmates in the nation's jails and prisons totaled just over 500,000.[1] By 1999, that number had grown to over 1.8 million.[2] The growth in the inmate population was due mostly to tougher criminal penalties rather than higher offense rates.[3] Offense rates have fluctuated, dropping in the mid-1980's, rising in the late 1980's and early 1990's and then dropping through the mid and late 1990's. The prison population, on the other hand, increased every year.[4]

A prominent feature of the "get tough" approach to crime was the enactment of habitual offender statutes, such as "Three Strikes" laws, that provided for extremely long sentences for repeat offenders.[5] The harshest of the Three Strikes laws was enacted by the California Legislature in 1994.[6] Under that statute, an offender receives a "strike" if he or she is

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[1] See BUREAU OF JUSTICE STATISTICS, U.S. DEP'T OF JUSTICE, CORRECTIONAL POPULATIONS IN THE UNITED STATES, 1980-2000, at http://www.ojp.usdoj.gov/bjs/glance/tables/corr2tab.htm (last visited Oct. 6, 2001) (on file with the Connecticut Law Review) [hereinafter CORRECTIONAL POPULATIONS] (listing jail and prison populations from 1980-1999).

[2] Id.

[3] See Linda S. Beres & Thomas D. Griffith, Do Three Strikes Laws Make Sense? Habitual Offender Statutes and Criminal Incapacitation, 87 GEO. L.J. 103, 104-08 (1998) (noting that stiffer penalties and the "war on drugs" caused the dramatic increase in the prison population).

[4] CORRECTIONAL POPULATIONS, supra note 1.

[5] See Beres & Griffith, supra note 3, at 110-11.

[6] Walter J. Dickey, The Impact of "Three Strikes and You're Out" Laws: What Have We Learned?, in CAMPAIGN FOR AN EFFECTIVE CRIME POLICY 1, 12 (1996) [hereinafter CAMPAIGN FOR AN EFFECTIVE CRIME POLICY] (reporting that California has the most far-reaching Three Strikes law); PHILLIP G. ZIMBARDO, CTR. ON JUV. AND CRIM. JUST., TRANSFORMING CALIFORNIA'S PRISONS INTO

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convicted of a "violent" or "serious" felony[7] such as robbery,[8] burglary[9] or selling drugs to a minor,[10] after having been previously convicted of a "serious and/or violent felony offense."[11] Offenders with two prior strikes who are convicted of a third felony are subject to a minimum sentence of twenty-five years to life even if the third felony is neither violent nor serious.[12] The California Three Strikes statute also provides for enhanced sentences for offenders with one prior strike.[13]

Supporters of harsh habitual offender statutes such as Three Strikes argue that the focus on repeat offenders makes sense on the grounds of both deterrence and incapacitation.[14] They note that studies suggest that a small number of high-rate offenders are responsible for a majority of the serious crime.[15] Thus, they argue, Three Strikes can have a significant impact on

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PRISONS INTO EXPENSIVE OLD AGE HOMES FOR FELONS: ENORMOUS HIDDEN COSTS AND CONSEQUENCES FOR CALIFORNIA'S TAXPAYERS 2 (1994) (calling California's Three Strikes law the "strictest and broadest version" in the nation); Richard C. Reuben, *Get-Tough Stance Draws Fiscal Criticism*, A.B.A. J., Jan. 1995, at 16 (noting that California's Three Strikes law is the toughest and broadest of all states which have three strikes or habitual offender statutes); *Only California Using "3 Strikes" Law Widely*, SACRAMENTO BEE, Sept. 10, 1997, at A3, 1996 WL 331569 (noting that five hundred felonies can count as the third strike under California's stringent Three Strikes law). California also leads the nation in enforcing "Three Strikes" legislation. CAMPAIGN FOR AN EFFECTIVE CRIME POLICY, *supra* note 6, at i (reporting that of the twenty-three jurisdictions that have adopted Three Strikes laws, only California has used it widely); Arlene Levenson, *State Three Strike Laws Swing, Miss at Deterring Criminals*, HOUS. CHRON., Oct. 1, 1995, at A20, 1995 WL 9406688 (reporting that while California heavily enforces its three strikes law such statutes are seldom used elsewhere).

[7] CAL. PENAL CODE § 667(c) & (d) (West 1999 & Supp. 2001).

[8] *Id.* § 667.5(c).

[9] *Id.* § 1192.7(c).

[10] *Id.*

[11] *Id.* § 667(a)-(c).

[12] *See id.* § 667(e)(2)(A).

[13] *Id.* § 667(e)(1).

[14] Michael Vitiello, *Three Strikes: Can We Return to Rationality?*, 87 J. CRIM. L. & CRIMINOLOGY 395, 397 (1997) (stating that incapacitation and deterrence are the main justifications for Three Strikes laws).

[15] *See* William Claiborne, *"Three Strikes": Tough on Courts Too; California's Sentencing Law Leads to Criminal Justice Logjam*, WASH. POST, Mar. 7, 1995, at A1, LEXIS, News Library, Wpost File (noting comment of California Secretary of State who sponsored Three Strikes law that seven percent of the criminals commit nearly two-thirds of serious offenses); Timothy Egan, *A 3-Strike Law Shows Its Not as Simple as It Seems*, N.Y. TIMES, Feb. 15, 1994, at A1 (noting claim by supporters of Washington state's Three Strikes law that federal statistics show six percent of criminals commit seventy percent of crimes). The oft-repeated claim that a small number of criminals commit most of the crimes is itself suspect. The idea is largely based upon a misreading of statistics generated by two studies on two cohorts of teenage boys born in Philadelphia in 1945 and 1958. *See* PAUL E. TRACY ET AL., DELINQUENCY CAREERS IN TWO BIRTH COHORTS (1990) (describing cohorts in both studies); MARVIN E. WOLFGANG ET AL., DELINQUENCY IN A BIRTH COHORT 27 (1972) (describing cohort in 1945 study). These studies showed that a relatively small percentage of the *boys* in each cohort committed more than half of the crimes. *Id.* at 105 (reporting on 1945 cohort results); TRACY, *supra*, at 279-80 (reporting on 1958 cohort results). These boys, however, represented a much larger percentage (roughly three times as high) of the *offenders* in each of the cohorts. *Id.* at 38-39. For a discussion of

the crime rate[16] by either deterring these career criminals from committing further crimes[17] or, if they are not deterred, by removing them from the street by sentencing them to long prison terms.[18]

Opponents of Three Strikes, on the other hand, argue that Three Strikes is unlikely to be an effective deterrent[19] and that long sentences mandated for repeat offenders will fall mostly on aging criminals near the end of their criminal careers.[20]

This Article uses a simple model to examine the deterrent and incapacitation effects of punishment generally and habitual offender statutes in particular. In Part II, we look at some of the issues surrounding modeling deterrence. We note that citizens tend to overestimate the impact of public policy changes on the crime rate. We then consider how the changes in the actual probability and severity of punishment are likely to be perceived by potential offenders. In Part III, we use a simple model to examine the optimal criminal sanction under a variety of empirical assumptions and consider whether subjecting repeat offenders to harsher sanctions than first-time offenders reduces crime more effectively than sentencing all offenders

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these studies and a criticism of the idea that imprisoning a small number of offenders would cause a large decline in the crime rate, see Beres & Griffith, *supra* note 3, at 114-15.

[16] *See, e.g.*, OFF. OF THE ATT'Y GEN., "THREE STRIKES AND YOU'RE OUT"—ITS IMPACT ON THE CALIFORNIA CRIMINAL JUSTICE SYSTEM AFTER FOUR YEARS (1998) [hereinafter ATT'Y GEN.'S REPORT]. For an analysis of this report see Linda S. Beres & Thomas D. Griffith, *Did "Three Strikes" Cause the Recent Drop in California Crime? An Analysis of the California Attorney General's Report*, 32 LOY. L.A. L. REV. 101, 101-02 (1998) (finding no evidence for report's conclusion that "Three Strikes" played a large role in the drop in California crime).

[17] *E.g.*, Claiborne, *supra* note 15 (noting belief of supporters that the crowding of state court dockets due to Three Strikes cases would abate over time, as the deterrent effect of the law reduced crime); Dan Lungren, *Three Cheers for 3 Strikes: California Enjoys a Record Drop in Crime*, POL'Y REV.: J. AM. CITIZENSHIP, Nov.-Dec. 1996, at 34, 36-37 (stating that California's Three Strikes law was having a dramatic deterrent effect); Walt Yost, *"Three Strikes" Law is Hardball That Works, Says Scully*, SACRAMENTO BEE, Apr. 21, 1996, at N7 (noting remarks of the Sacramento County District Attorney that the Three Strikes law deters criminals and has had a dramatic effect on the California crime rate).

[18] *See, e.g.*, Egan, *supra* note 15, at A18 (describing claims by proponents that Washington's Three Strikes law would remove from society a core group of incorrigible violent criminals).

[19] FRANKLIN ZIMRING ET AL., CRIME AND PUNISHMENT IN CALIFORNIA: THE IMPACT OF THREE STRIKES AND YOU'RE OUT (1999) (finding no significant deterrent effect from the first two years of California's Three Strikes law); Mike Males & Dan Macallair, *Striking Out: The Failure of California's "Three Strikes and You're Out" Law*, 11 STAN L. & POL'Y REV. 65, 68 (analyzing the effects of California's Three Strikes law and finding no evidence to show a deterrent effect); Mary Anne Ostrom, *Record Fails to Bear Out Fears Over "3 Strikes Law," Impaction on Prisons*, BUFFALO NEWS, Mar. 7, 1997, at F3, 1997 WL6422653 (noting that some researchers say there is little evidence that the Three Strikes law deters new criminals); Reuben, *supra* note 6, at 16 (quoting remarks of one commentator that marginal deterrence of three strikes law is "probably zilch" given the number of repeat offender laws previously enacted in California).

[20] *E.g.*, MICHAEL TONRY, SENTENCING MATTERS 139 (1996) (noting that by the time they have sufficient convictions to be labeled high-rate serious offenders, many criminals will be nearing the age of desistance of criminal activity); ZIMBARDO, *supra* note 6, at 9-11 (discussing high costs of incarceration and low rates of recidivism for individuals aged forty-five and older).

equally.

II. DETERRENCE

A. *Responsiveness of Offenders to Changes in the Expected Sanction*

Opinion polls suggest that large numbers of Americans believe that increasing the probability or severity of punishment is likely to have a significant effect on crime. In a recent poll by the Pew Research Center, 46% of respondents believed that increasing the size of the police force would have a large effect on the violent crime rate[21] and 49% believed that longer sentences would have a large effect.[22] Similarly, 65% of the respondents in an NBC News-*Wall Street Journal* poll thought that laws providing for mandatory life imprisonment for a third violent felony would be "very effective" at reducing crime.[23] The opinion that tougher sentences reduce crime is likely to be based in part on the incapacitation effect of longer prison terms. Nevertheless, it seems clear that people also have faith in deterrence. When asked whether tougher penalties would deter crime, for example, 59% of the respondents in one poll stated that such penalties would "help a lot."[24]

The popular confidence that tougher law enforcement would have a great impact on crime appears to be part of a widespread belief that human

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[21] Of the 1000 respondents, 46% stated that an increase in the number of police on the streets would reduce violent crime "a lot." THE PEW RES. CTR. FOR THE PEOPLE & THE PRESS, A YEAR AFTER COLUMBINE 7 (Apr. 2000), *available at* http://www.people-press.org/april00rpt.htm (last visited Aug. 28, 2001) (on file with the Connecticut Law Review) [hereinafter PEW RES. CTR.]. This is consistent with a 1994 poll by ABC News in which 46% of the respondents believed that an increase in the number of police would be "very effective" at reducing crime and 44% found it would be "somewhat effective." ABC NEWS, ABC NEWS NIGHTLINE CRIME POLL, (Nov. 17, 1994), *available at* ftp://ropercenter.uconn.edu/abc/usabc1994-5472/usabc1994-5472.pdf (last visited Sept. 18, 2001) (on file with the Connecticut Law Review) [hereinafter ABC NEWS POLL]; BUREAU OF JUSTICE STATISTICS, U.S. DEP'T. OF JUST., SOURCEBOOK OF CRIMINAL JUST. STATISTICS 1994, 169 tbl. 2.35 (Kathleen Maguire & Ann L. Pastore eds. 1995) [hereinafter SOURCEBOOK] (giving 1994 poll data indicating that 79% of respondents favored providing federal tax dollars to local communities to hire more police).

[22] PEW RES. CTR., *supra* note 21 (showing 49% of respondents found longer sentences would reduce violent crime "a lot"). *See also* ABC NEWS POLL, *supra* note 21 (reporting that 52% of respondents found longer sentences to be "very effective" and 31% found them to be "somewhat effective" at reducing crime).

[23] NBC NEWS & WALL ST. J. POLL (May 6, 1994), Westlaw, Poll Database (on file with the Connecticut Law Review). *See also* SOURCEBOOK, *supra* note 21 (giving 1994 poll data indicating that 74% of respondents favored a three strikes law with a mandatory sentence of life without parole).

[24] CTR. FOR SURVEY RES., UNIV. OF VA., 1996 SURVEY OF AMERICAN POLITICAL CULTURE (April 14, 1996), Westlaw, Poll Database (on file with the Connecticut Law Review). Interestingly, when police chiefs and county sheriffs were polled as to the primary way to reduce violent crime, longer sentences ranked fourth and more police officers ranked fifth. SOURCEBOOK, *supra* note 21, 172 tbl. 2.40. Reducing drug abuse was ranked first by the respondents. *Id.*

behavior is malleable. Over 60% of respondents to one poll believed, for example, that government programs providing increased job opportunities would have a large impact on the violent crime rate.[25] The apparent popular belief that people are malleable may help explain why social ills frequently are blamed on the incompetence of the government rather than on the intractability of the underlying problems.

Unfortunately, studies of the impact of actual changes in criminal penalties or police enforcement methods suggest that it is difficult to change the behavior of potential offenders. Most research has found that increasing either the severity of punishment or the certainty of apprehension has only a modest deterrent effect.[26] Increases in certainty generally are found to have a larger deterrent effect than increases in severity.[27] But increases in certainty also are more difficult (and more costly) to produce.[28]

Using a carrot to change offender behavior is no less difficult than using a stick. Although the likelihood that an individual will engage in criminal activity is strongly correlated with economic status, there is little evidence that government programs designed to improve the economic prospects of potential offenders have a large impact on the crime rate, at least in the short run.[29]

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[25] PEW RES. CTR., *supra* note 21 (reporting that 63% of respondents found that increasing job and community programs for young people would reduce violent crime "a great deal"). *See also* ABC NEWS POLL, *supra* note 21 (reporting that 52% of respondents found that decreasing unemployment among young people would be "very effective" at reducing crime while 31% found it "somewhat effective").

[26] *See* Isaac Ehrlich, *Crime, Punishment, and the Market for Offenses*, 10 J. ECON. PERP. 43, 55-63 (surveying the research and discussing the methodological problems in measuring deterrence). *See also* PETER W. GREENWOOD ET AL., RAND CORP., THREE STRIKES AND YOU'RE OUT: ESTIMATED BENEFIT AND COST OF CALIFORNIA'S MANDATORY NEW SENTENCING LAWS 16 (1994) (finding that in modeling California's three strikes laws the assumption of no deterrent effect was consistent with recent research). *But see* Daniel Kessler & Stephen D. Levitt, *Using Sentence Enhancements to Distinguish Between Deterrence and Incapacitation*, 42 J.L. & ECON. 343 (1999) (finding significant deterrent effect).

[27] Alfred Blumstein, *Prisons, in* CRIME 387, 408-09 (James Q. Wilson & Joan Petersilia eds., 1995) (noting that deterrence research has shown less of a deterrent effect from severity than certainty of sanctions); Frank H. Easterbrook, *Criminal Procedure as a Market System*, 12 J. LEGAL STUD. 289, 295 & n.7 (1983) (citing studies that show that increases in the probability of apprehension and conviction have a greater deterrent effect than increasing the sentence).

[28] *See* Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 184 (1968) (cost of increasing the probability of conviction explains why countries have severe sentences and low conviction rates).

[29] For an analysis and summary of the impact of economic opportunities on crime, see generally Richard B. Freeman, *Why Do So Many Young American Men Commit Crimes and What Might We Do About It?*, 10 J. ECON. PERSP. 25, 30 (1996). Even the most successful programs have a success rate that is much less than 100%. Drug treatments programs, for example, appear to be one of the most successful ways of reducing the use of illegal drugs. *E.g., Treatment: Effective (But Unpopular) Weapon Against Drugs*, RAND RES. REV., Spring 1995, at 3. RAND Corporation found drug treatment programs were seven times more cost-effective than the next best alternative, domestic enforcement, at reducing cocaine consumption. *Id.* Nevertheless, only 13% of heavy users stop or reduce heavy use after release from the drug program and even for some of those the benefit is temporary. *Id.* at 4.

The failure to find evidence of large deterrent effects does not prove, of course, that deterrence does not work. Several factors make it difficult to measure the deterrent effect of increasing criminal sanctions. First, we have no direct measure of the crime rate, but must rely on either the Federal Bureau of Investigation Uniform Crime Reports ("UCR") or the National Crime Victimization Surveys ("NCVS"). The UCR only shows reported crimes and the NCVS is dependent upon the memory of the individuals surveyed and the method of questioning.[30]

Second, many factors other than changes in the criminal sanction can affect the crime rate, so that it is difficult to determine the cause of changes that do occur. Third, tougher criminal penalties will be an effective deterrent only if potential offenders are aware of them. Offenders may become aware of the new penalties over a period of years, diluting the impact in the year the change is enacted and making measurement of a causal relationship difficult.

Fourth, lengthening the prison sentence for a crime will have an incapacitation effect as well as a deterrent effect. Thus, even if evidence suggests that the tougher sanction reduces crime, it may be difficult to determine what portion of the reduction is due to deterrence rather than incapacitation. Fifth, the likelihood of apprehension is 5% or less for most crimes, so even the harsh sanction may have a limited deterrent effect on offenders who believe that they will not be caught.[31]

Despite difficulties of proof, common sense suggests that human beings respond to rewards and punishment. It is hard to imagine that drivers would continue to put coins in parking meters at the same rate if the threat of a parking ticket did not exist. It is less clear, however, how much additional deterrence would be produced by a marginal increase in parking fines or in the number of parking enforcement officers.

Despite these measurement difficulties, we will find it useful to estimate the responsiveness of potential offenders to changes in the perceived criminal sanction. This is measured by the elasticity of the offense rate—the percentage change in the rate that is produced by a 1% change in the

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[30] National Crime Victimization Surveys, for example, showed a high level of crime when survey participants received prompts from the surveyors. BUREAU OF JUST. STATS., U.S. DEP'T OF JUST., CRIMINAL VICTIMIZATION IN THE UNITED STATES 2 (1994), *available at* http://www.ojp. Us-doj.Gov/bjs/pub/pdf/evius941.pdf (on file with the Connecticut Law Review) (noting that revision of National Crime Victimization Survey questionnaire which has incorporated detailed prompts to help trigger respondents' memories has led to a substantial increase in the number of reported assault and sexual crimes).

[31] For estimates of the probability of arrest and the probability of conviction and incarceration given arrest, see WILLIAM SPELMAN, CRIMINAL INCAPACITATION 35-38, 168-72 (1994).

severity of punishment.[32] We will use an elasticity of -0.3 as our central value, indicating that a 1% increase in the perceived criminal sanction reduces the offense rate by 0.3%. This figure is consistent with the literature and suggests that doubling the perceived severity of a criminal sanction reduces the number of offenses committed by about 19%.[33]

B. *Perceived Severity of the Criminal Sanction*

The deterrent effect of a criminal sanction depends on the potential offender's perception of the severity of the sanction and the likelihood that it will be imposed. An offender who thinks that he could serve several years in prison without much discomfort will not be deterred even if, in fact, he will find the actual prison experience extremely unpleasant. Similarly, an offender who believes that he has a low probability of apprehension may commit a crime even if the actual probability is high. Not surprisingly, offenders generally are better informed about criminal sanctions than the average citizen.[34]

Law enforcement officials may attempt to induce potential offenders to overestimate the probability of arrest and the harshness of prison life. Dummy security cameras,[35] highly publicized police raids,[36] highway signs warning of radar that does not exist,[37] and even mannequins[38] or cardboard

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[32] $\lambda = kS^\varepsilon$, where λ crime rate, S is the perceived severity of the expected prison term, E is the elasticity of the offenders' crime rate with respect to changes in the perceived severity of the sentence and k is a constant indicating the propensity of the offenders to commit crimes.

[33] $\dfrac{k(2S)^{-0.3}}{kS^{-0.3}} = \dfrac{2^{-0.3}}{1} = .81$. An elasticity of -0.3 is the central value used by Philip J. Cook in

Criminal Incapacitation Effects Considered in an Adaptive Choice Framework, in THE REASONING CRIMINAL: RATIONAL CHOICE PERSPECTIVES ON OFFENDING 202, 210-12 (Derek B. Cornish & Ronald V. Clarke eds., 1986).

[34] *Id.* at 205-06 (noting that active offenders are more informed about changes in sentencing and prosecution practices than the public at large).

[35] Kathleen Parrish, *Buses to Have Cameras, Northampton School Students to be Videotaped,* ALLENTOWN MORNING CALL, Jan. 3, 1997, at B1, LEXIS, News Library, Mrncll File (noting that while some school buses would be equipped with real cameras to monitor wrongdoing most buses would be equipped with dummy cameras); *Security Cameras to be Added to Some Phoenix Transit Buses,* ARIZ. REPUBLIC, July 25, 1993, at B2, LEXIS, News Library, Azrep File (noting transit authority's plan to install dummy cameras on some buses to stop wrongdoers).

[36] *See* Paul Marks, *Commentary Perspective on LAPD: We Sowed Seeds of Rampart Scandal,* L.A. TIMES, Dec. 20, 1999, at B7, LEXIS News Library, Lat File (noting highly publicized police sweeps and subsequent drop in crime); Richard de Uriate, *Front-Page Decisions Can Be Agonizing for Editors, Readers,* ARIZ. REPUBLIC, Sept. 15, 1996, at B1, LEXIS, News Library, Azrep File (noting that publicity surrounding impending police activities may deter criminals).

[37] Scott L. Miley, *Better Say "Sir" to Be Safe: City's New Helper Is Quite Lifelike, But His Total Air of Indifference Can Be Quite Alarming,* INDIANAPOLIS STAR, Sept. 6, 1996, at B2, LEXIS, Ind Library, Instar File (noting use of portable radar sign that flashes driver's speed but does not result in citation).

[38] *Dummy Cop Puts Brakes on Speeding Tourists,* HOUS. CHRON., May 26, 1991, at A30, 1991 WL 3923004 (reporting on police department's use of uniformed mannequin holding working radar

police officers[39] have been used to mislead potential offenders into believing that the chance of apprehension is higher than the true probability. Youth programs like "Scared Straight" take adolescents on prison tours where they receive lectures by inmates emphasizing the oppressive nature of prison life.[40]

The effectiveness of such programs, however, is far from clear. The initial reaction to Scared Straight, for example, was overwhelmingly favorable,[41] and the film depicting the program won the Oscar for best documentary.[42] Subsequent analysis, however, found no evidence that Scared Straight had any positive impact on the behavior of youths who participated in the program[43] and may, in fact, have had harmful effects.[44]

C. *Discounting of the Prison Term*

Habitual offender statutes such as Three Strikes attempt to deter potential offenders by increasing the length of the prison term for repeat offenders.[45] The marginal deterrent effect will depend upon the perceived addi-

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gun in parked patrol car to deter speeders); Terri P. Guess, *Franklin Twp. Mannequin "Sits In" for Cops*, NEWARK STAR-LEDGER, Dec. 22, 1996, at A39, 1996 WL 11901958 (reporting on use of mannequins in police cars to deter speeders and loitering juveniles); Miley, *supra* note 40 (same); *see also Cop Prop Dummy Deputy Spooks Speeders*, L.A. DAILY NEWS, Jan. 23, 1996, at T3, 1996 WL6543981 (reporting on statement of police officer that the department's use of a uniformed mannequin in patrol car serves as "a much needed presence in residential areas where it's not cost-effective to station a deputy all day").

[39] Mayrav Saar, *Cardboard Crime Fighter*, L.A. TIMES, Feb. 1, 1996, at B4, LEXIS, News Library, Lat File (reporting on use of life-sized cardboard photo image of police officer atop roof of Wal-Mart to deter shoplifters); *Southeast: Council Expands Cardboard Cop Security Program*, L.A. TIMES, Mar. 6, 1996, at B5, LEXIS, News Library, Lat File (reporting on city subsidized program for merchants which uses a video monitors and a cardboard police officer to deter robberies).

[40] *See generally* Anthony Petrosino et al., *Well-Meaning Programs Can Have Harmful Effects! Lessons From Experiments of Programs Such as Scared Straight*, 46 CRIME & DELINQ. 354 (2000) (describing the original "Scared Straight" program and the subsequent use of the name to describe all such programs). For a detailed description of Scared Straight and other such programs, see generally JAMES O. FINCKENAUER, SCARED STRAIGHT! AND THE PANACEA PHENOMENON (1982).

[41] *See* Petrosino et al., *supra* note 40, at 356 (noting the widespread adoption of such programs after initial broadcast of the documentary on the original "Scared Straight" program).

[42] FINCKENAUER, *supra* note 40, at 99 (noting that the film won the Oscar and numerous other prestigious awards). In addition to receiving critical acclaim, the documentary was an overwhelming success with television viewers. *Id.* at 97-98 (describing high ratings for broadcast and the large number of laudatory letters sent to stations that carried it).

[43] Petrosino et al., *supra* note 40, at 357 (noting that researchers evaluating Scared Straight programs generally did not find they had a deterrent effect). *See also* Ruth Teichroeb, *Popular Methods of Youth Crime Prevention May Not Always Be Best*, SEATTLE POST-INTELLIGENCER, Sept. 13, 2000, at B2, LEXIS, News Library, Bdtlin File (noting remarks of criminal justice expert Peter Greenwood on the ineffectiveness of Scared Straight programs).

[44] Petrosino et al., *supra* note 40, at 362-67, 371 (describing the preliminary findings of systematic review of experimental evidence on Scared Straight and concluding that the program likely has harmful effects and increased crime by the program participants).

[45] CAL. PENAL CODE § 667 (West 1999 & Supp. 2001). For offenders with two prior strikes, the additional prison time added by the California Three Strikes statute is inversely related to the serious-

tional severity of the longer prison term.

Offenders are likely to discount prison time to be served in the future so that a year in prison to be served five years from now will be viewed as less of a punishment than a year to be served immediately.[46] Thus doubling the sentence length for an offense does not double the perceived severity of the sentence.

Discounting future pleasures and pains is not confined to potential offenders. Many people value immediate pleasure more than future pleasure, as illustrated by the nation's record levels of consumer debt. Moreover, even if an individual values present and future pleasure equally, he may discount prison time to be served in the future because of a belief that he may die before actually serving the time or that he might be released early because of a change in government policy.[47]

The exact rate at which offenders discount prison time to be served in the future is unknown. In general, however, criminals are less willing to defer gratification than the non-criminal population, so it is plausible that they discount time to be served in the future at a relatively high rate.[48] It seems reasonable, then, to assume an annual discount rate of at least 10%, and some scholars have assumed a rate as high as 25%.[49]

The discounted present harm or perceived severity, S_i, of a prison term to offender i can be calculated using Equation 1.

$$S_i = \frac{1 - e^{-r_i y_i}}{r_i} \qquad (1)$$

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ness of the third felony: the less serious the felony, the greater the sentence enhancement. This is because offenders with two prior violent or serious felonies who commit a third violent felony like kidnapping or forcible rape would be sentenced to very long sentences in the absence of Three Strikes. For repeat offenders who commit a nonviolent felony like shoplifting, on the other hand, the minimum sentence of twenty-five years to life required under Three Strikes will be much harsher than the sentence they otherwise would have received. *Id.*

[46] *See generally* A. Mitchell Polinsky & Steven Shavell, *On the Disutility and Discounting of Imprisonment and the Theory of Deterrence,* 28 J. LEGAL STUD. 1 (1999) (discussing the way factors, such as public costs of imprisonment, the discounting of future incapacitation, and the variation in individual incapacitation with the length of the sentence affect the theory of deterrence). *See also* Michael K. Block & Robert C. Lind, *An Economic Analysis of Crimes Punishable by Imprisonment,* J. LEGAL STUD. 479, 481 (1975); Easterbrook, *supra* note 27, at 294-95; Isaac Ehrlich, *Participation in Illegitimate Activities: A Theoretical and Empirical Investigation,* 81 J. POL. ECON. 521, 552, 562 (1973); Richard A. Posner, *An Economic Theory of the Criminal Law,* 85 COLUM. L. REV. 1193, 1213-14 (1985).

[47] Easterbrook, *supra* note 27, at 294.

[48] *See id.* at 294-95.

[49] Cook assumes a discount rate of 25% in his numerical simulation. Cook, *supra* note 33, at 210. Easterbook uses discount rates of 10% and 20% in his examples. Easterbrook, *supra* note 27, at 295.

where r_i is the discount rate and y_i is the number of years to be served.[50]

Figure 1 shows the relationship between the length of the prison term and its perceived severity for various offender discount rates.

Figure 1: Perceived Severity of Prison Sentence and Offender Discount Rate
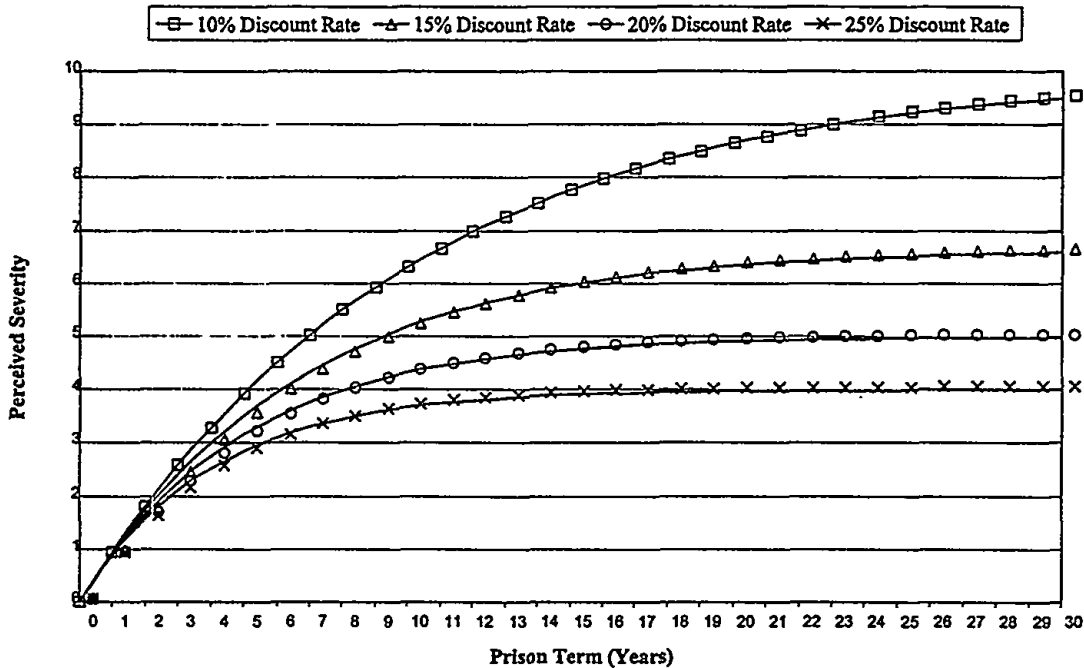
Lengthening short prison terms has a significant impact on the potential offender's assessment of the sentence severity. Doubling a one-year prison term to two years, for example, increases the perceived severity by 90%, if the discount rate is 10%, and by 78%, if the discount rate is 25%. For longer prison terms, however, lengthening the term has much less of an impact. Doubling a ten-year prison term to twenty years, for example, increases the perceived severity by only 37%, if the discount rate is 10%, and by a mere 14 %, if the discount rate is 25%.

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[50] Equation 1 assumes that the prison term will begin immediately. If the prison term begins in the future then the value of S calculated by Equation 1 must be divided by $(1+r)^w$, where w is the number of years in the future when the sentence will begin.

Figure 2 illustrates the declining marginal impact of increasing the prison term on perceived sentence severity for various discount rates.[51]

Figure 2: Marginal Perceived Severity of Lengthening Prison
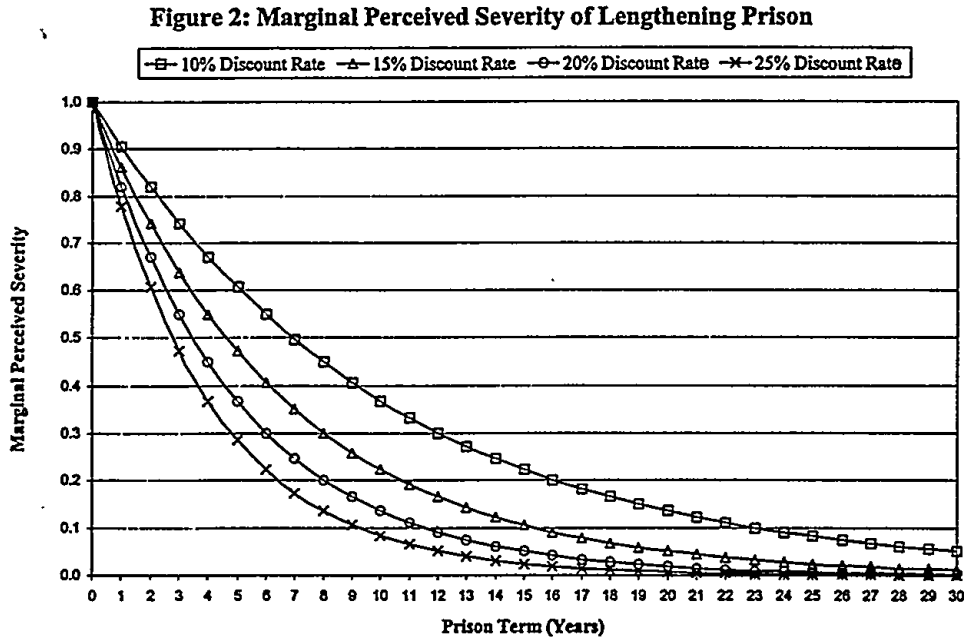
The declining marginal impact of lengthening the prison term means that, all else being equal, deterrence is maximized by providing equal prison terms for all offenses. There are good reasons, of course, not to punish all offenses equally. Serious crimes are more important to deter than minor crimes. If minor crimes were punished as harshly as serious crimes, offenders would have no incentive to restrict their criminal activities to lesser offenses.[52] Moreover, individuals may believe that fairness requires punishing serious offenses more harshly than minor offenses.

Although equal punishments for crimes of varying seriousness makes little sense, providing equal punishments for crimes of equal seriousness in order to maximize deterrence seems reasonable. However, if the perpetrators of a particular crime have a systematically higher offense rate than the perpetrators of another equally serious crime, then it might be desirable to punish the crime that attracts high-rate offenders more severely. This possibility is considered in Part III.

D. *Certainty Versus Severity of Punishment*

Offender discounting of prison terms is consistent with empirical evidence suggesting that increasing the probability of conviction is a more

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[51] The marginal change in the perceived sentence severity from a change in the prison term is

$$\frac{\partial S_i}{\partial y_i} = e^{-r_i y_i}.$$

[52] This assumes that the probability of apprehension is the same for each offense and that the more serious crimes offer greater rewards to the perpetrator.

effective deterrent than increasing the severity of the sentence.[53] Suppose, for example, that there is a 5% chance of conviction for burglary and that the sentence if convicted is two years in prison. The expected time served for burglary, then, is 0.1 years. The expected time served could be doubled to 0.2 years in two ways: doubling the probability of conviction or doubling the sentence if convicted.

For deterrent purposes, however, what matters is not the actual severity of the sanction, but the severity perceived by the potential offender. Assuming the potential offender is aware of the change, doubling the conviction rate will double the perceived severity of the sanction.[54] As noted in the last section, the same is not true about doubling the sanction if the offender discounts time to be served in the future. Rather, doubling the sentence from two to four years increases the perceived severity of the sentence by 82% for an offender with a 10% discount rate and by 61% for an offender with a 25% discount rate.

The likelihood that increasing the probability of conviction provides a more effective deterrent than increasing the sentence length does not mean that increasing the conviction rate is a less costly method of increasing deterrence. The reason is simple: it may be more expensive to increase the probability of conviction than to increase the severity of the punishment.[55] An expected prison term of one month can be achieved by a 100-month sentence and a 1% chance of conviction, or by a ten-month sentence and a 10% chance of conviction. Leaving aside the deterrent effects, the costs of prison are identical under each alternative.[56] The costs of apprehension, such as police salaries and trial expenses, however, will be much higher in order to maintain a 10% conviction rate.[57] It is unclear whether increasing the severity of the prison term is a more cost-effective method of increasing deterrence than increasing the probability of conviction. Moreover, the choice of policy depends not only on deterrence, but also on other factors such as incapacitation effects, rehabilitation policy and notions of fairness.

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[53] Easterbrook, *supra* note 27, at 295.

[54] Recent studies show that individuals may not correctly evaluate changes in the probability of events. For example, people may treat all very low probabilities as identical, so that a one in 100,000 chance of an event occurring may be viewed as the same as a one in ten million chance. Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decisions Under Risk*, 47 ECONOMETRICA 263, 265-67 (1979) (discussing studies in which people's preferences systematically violate expected utility theory in that such preferences fail to properly weigh the probable outcome).

[55] *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 249 (5th ed. 1998).

[56] In equilibrium, incarcerating 10% of the offenders for ten months produces the same size prison population as incarcerating 1% of the offenders for 100 months. If the deterrent effect of the higher apprehension rate is greater than the deterrent effect of the longer sentence, then fewer crimes will be committed and prison costs will be lower with a higher apprehension rate. *See id.*

[57] *See id.*

E. *Perceived Severity and Habitual Offender Statutes*

As the perceived severity of the criminal sanction increases, potential offenders will chose to commit fewer crimes. The relationship between perceived severity and the crime rate is expressed in Equation 2.[58]

$$\lambda_i = k_i S_i^E \qquad (2)$$

where λ_i is the number of crimes per year committed by offenders of type i, S_i is the discounted present severity of the expected prison term for committing an offense, E is the elasticity of the offenders' crime rate with respect to changes in the perceived severity of the sentence and k_i is a constant that indicates the propensity of offenders of type i to commit crimes.[59] Combining Equations 1 and 2, the offense rate of offender i is

$$\lambda_i = k_i \left(\frac{1 - e^{-r_i y_i}}{r_i} \right)^{E_i} \qquad (3)$$

In Part III, we will use Equation 3 to model the impact of habitual offender statutes on the crime rate.

F. *Three Strikes and Selective Incapacitation*

Supporters of "Three Strikes" and other habitual offender statutes argue that repeat felons are likely to be high-rate offenders.[60] On average, this is likely to be true. The average criminal career lasts five to ten years.[61] The apprehension and conviction rate for burglary and robbery— the most common offenses qualifying as strikes—is probably no greater than 5%.[62] Unless he is particularly clumsy, an offender who commits only a few crimes per year is unlikely to accumulate three convictions during his criminal career. An offender who commits many crimes each year, on the other hand, faces a substantial risk of accumulating three or more convictions. Table 1 shows the probability of accumulating three or more convictions in five years of street-time for different types of offenders on

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[58] The notation used here follows that used by Cook, *supra* note 33, at 209-10.

[59] *Id.*

[60] *See, e.g.,* Daniel E. Lungren, Editorial, *Financial Costs of '3 Strikes' Law,* L.A. TIMES, Jan. 10, 1996, at B8 (describing claim by state Attorney General Lungren that California's three strikes law is "having an immediate impact on the 7% of all criminals who commit between 50% and 70% of all crimes").

[61] *See* 1 CRIMINAL CAREERS AND "CAREER CRIMINALS" 94 (Alfred Blumstein et al. eds., 1986).

[62] *See* SPELMAN, *supra* note 31, at 35-37 (showing analysis of 1987 RAND survey that estimated probability of arrest in California at 5.6% for street robbery, 9.1% for business robbery and 3.3% for burglary).

the assumption that there is a 3% chance of incarceration each time an offense is committed.[63]

Table 1

Offenses per Year	Probability of Three Convictions in 5 Years on the Street (Conviction Rate = 3%)
2	0.3%
5	3.8%
20	58.0%
50	98.1%

High-rate offenders are likely to make up a much higher percentage of third convictions than the percentage of convictions generally. Suppose, for example, that the offender population consists of 1000 low-rate offenders who commit five crimes per year and 100 high-rate offenders who commit fifty crimes per year. Each group of offenders will commit 25,000 offenses in five years of street-time. At a conviction rate of 3%, each group will account for 750 convictions. High-rate and low-rate offenders, therefore, each will account for half of the total offenses and half of the total convictions.

The results are different, however, with respect to third convictions. Compared to ninety-eight of the 100 high-rate offenders, only thirty-eight of the 1000 low-rate offenders will accumulate three or more convictions in five years on the street. High-rate offenders thus will make up 72% of those convicted three or more times.[64]

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[63] Probabilities in Table 1 were calculated by the authors using the binomial distribution function in Microsoft Excel. A 3% chance of incarceration is within the range of estimates in the literature. *See id.*

[64] Ninety-eight high-rate offenders out of 136 total offender equals 72%. For offenders who are apprehended and incarcerated it will take more than five chronological years to accumulate five years of street-time. The number of additional years required will depend upon the offense rate, the likelihood of incarceration and the length of the prison term if incarcerated. For high-rate offenders, it will take many additional years to accumulate five years of street time. This is because high-rate offenders will spend most of their criminal careers behind bars even if the likelihood of incarceration is low and the sanction—if incarcerated—is modest. For example, if an individual faces a 3% chance of incarceration for each offense and is given a two-year prison sentence if incarcerated, then an offender who commits fifty crimes per year will spend 75% of his criminal career in prison. It will take such an individual twenty chronological years to accumulate five years of street-time. We will consider the

Because habitual offender statutes fall more heavily on high-rate offenders, they may provide more efficient incapacitation than simply extending the prison terms for all offenders. This result should be viewed with caution, however. Efficiency gains from habitual offender statutes like Three Strikes due to selective incapacitation may be outweighed by efficiency losses due to other factors.

Consider, for example, the retirement of aging criminals. Under the California Three Strikes law, if an offender with two prior strikes is convicted of a third felony, however minor, he may be required to serve a minimum sentence of twenty-five years in prison.[65] Such an offender typically will be in his thirties at the time of his third conviction, so that he will not be released until he is over fifty.[66]

For many such offenders, the last half of such a prison term may prevent few crimes through incapacitation because the aging convict would no longer be an active offender if he were released. Recidivism rates of older parolees are much lower than those of younger men.[67] One survey of parolees showed that at ages seventeen or less more than 75% of parolees were rearrested within three years of their release.[68] By ages twenty-five to twenty-nine, the number dropped to 65% and at ages forty-five and older only 40.3% were rearrested.[69]

The ability of habitual offender statutes to selectively incapacitate high-rate offenders will also be reduced if the offense rate declines. If offenders commit fewer crimes as they age, they may be convicted of their third offense just as their criminal career is tapering off.[70]

In the model that follows, we ignore these caveats and assume that re-

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incapacitation effects of Three Strikes, *infra* pp. 70-71. For a detailed discussion of incapacitation and Three Strikes statutes, see Beres & Griffith, *supra* note 3.

[65] CAL. PENAL CODE §§ 667(e)(2)(A) (West 1999 & Supp. 2001). Note that minor theft is enough to qualify for the third strike provision. CAL. PENAL CODE § 487(c). *See also* Beres & Griffith, *supra* note 3, at 121-22 n.93 (stealing a pair of pants risks a sentence of "twenty-five-years-to-life").

[66] *See* Beres & Griffith, *supra* note 16, at 120 & n.87 (citing DATA ANALYSIS UNIT, CAL. DEP'T OF CORRECTIONS, THIRD STRIKE CASES: PROC UNIVARIATE ON AVERAGE AGE AT ADMISSION OF STRIKE CASE (July 31, 1998) (noting that as of July 1998 the average age of those sentenced for their third strike was thirty-six)).

[67] *See* U.S. DEP'T OF JUST.: SPECIAL REPORT, RECIDIVISM OF PRISONERS RELEASED IN 1983 5 (reporting on re-arrest rates of parolees released in 1983 and noting recidivism was inversely related to age).

[68] *Id.* at 5 & tbl. 7.

[69] *Id.* In general, criminal activity drops off dramatically with age. *See* Beres & Griffith, *supra* note 3, at 135-36. The reduction in criminality may be less, however, for offenders falling within the scope of Three Strikes since such offenders have demonstrated a stronger than average taste for crime. *Id.* One study estimated an individual who remains an active offender at age thirty-five could be expected, on average, to continue to be an active offender for an additional ten years. 1 CRIMINAL CAREERS AND "CAREER CRIMINALS", *supra* note 61, at 92, 94. Even for such a career criminal the last half of a twenty-year sentence is likely to be wasted for the purpose of incapacitation.

[70] For a more detailed analysis of the impact of incapacitation on criminal retirement, see Beres & Griffith, *supra* note 3, at 135-38.

peat offenders commit crimes at a much higher rate than first-time offenders and their crime rate will remain high indefinitely. These assumptions, while unrealistic, provide the best case for habitual offender statutes such as Three Strikes. As will be seen, however, even under these favorable assumptions, sentencing repeat offenders to very long prison terms may not be an effective method of reducing crime.

III. A MODEL OF HABITUAL OFFENDER STATUTES

A. *Two Types of Offenders*

Imagine a world with first-time offenders ("First-timers") and repeat offenders ("Repeaters"). From Equation 3,[71] the offense rate, λ_F, of First-timers is

$$\lambda_F = k_F \left(\frac{1 - e^{-r_F y_F}}{r_F} \right)^{E_F} \qquad (4)$$

The offense rate of Repeaters is

$$\lambda_R = k_R \left(\frac{1 - e^{-r_R y_R}}{r_R} \right)^{E_R} \qquad (5)$$

B. *Incapacitation Effects of Prison*

Prison incapacitates offenders as well as deterring them. Offenders will spend a fraction of their criminal careers in prison and a fraction on the street. The fraction of the criminal career of an offender, i, that will be spent on the street is[72]

$$\eta_i = \frac{1}{1 + \lambda_i J_i y_i} \qquad (6)$$

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[71] *See supra* p. 67.

[72] *See generally* Benjamin Avi-Itzshak & Reuel Shinnar, *Quantitative Models in Crime Control*, 1 J. CRIM. JUST. 185 (1973) (developing the basic model represented by this equation). Equation 1 is the equilibrium fraction of offenders who are on the street at any time. *See supra* p. 63. For a new cohort of offenders, the fraction on the street will be somewhat higher. On the first day, for example, all of the new cohort of offenders will be on the street. Equation 6, therefore, underestimates, to some extent, the portion of active offenders on the street.

where λ_i is the offense rate of offender i, J_i is the probability of conviction and y_i is the length of the prison term if convicted.

To understand the intuition underlying Equation 6, consider Bob who commits five crimes per year while on the street, who has a 5% chance of being imprisoned each time he commits a crime and who will receive a two-year sentence if convicted. On average, Bob will be convicted after committing twenty crimes. Since he commits five crimes per year, he will average four years on the street before a conviction. He will then serve two years in prison. Thus, Bob will spend two-thirds of his criminal career on the street (four years out of every six years) and one-third (two years out of every six years) in prison. This can be calculated using Equation 6.[73]

These results are easily expanded to the case of a large number of similar offenders. If there are N offenders of type i, then the expected number of crimes, C_i, committed by type i offenders in a given year is

$$C_i = \frac{\lambda_i N_i}{1 + \lambda_i J_i y_i} \qquad (7)$$

C. Governmental Goals and Constraints

The goal of the government is to choose the prison term that minimizes the total number of crimes, C_T, committed by First-timers and Repeaters subject to a budget constraint of a fixed prison population.[74] For our benchmark case, we assume that there are 900 First-time offenders and 100 repeat offenders. The offense rate of First-timers is λ_F. The offense rate of Repeaters is λ_R. We also assume that First-timers and Repeaters discount prison time to be served in the future at the same rate, are equally responsive to changes in the perceived severity of punishment and are equally likely to be convicted when they commit a crime.

D. Case One: Identical Offense Rates

If First-timers and Repeaters commit offenses at the same rate, then it is optimal to subject them to the same criminal sanction. Suppose, for example, that each type of offender will commit fourteen offenses per year if the prison term is two years and that the probability of conviction is 5%.[75] For each type of offender, 58.3% will be in prison at any given time for a total of 583 inmates.[76] Of these, 525 will be First-timers and 58 will

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[73] $\eta_i = \dfrac{1}{1 + \lambda_i J_i y_i}$; $\eta = \dfrac{1}{1 + (5 \times .05 \times 2)}$; $\eta = \dfrac{2}{3}$.

[74] $C_T = C_F + C_R$.

[75] This assumes $k_F = k_R = 16.26$. Evaluating Equations 4 and 5 for these values and for $y = 2$, $r = .2$ and $E = -.3$ produces $\{\lambda_F, \lambda_R\} = 14$. See supra pp. 14-15. The choice of an offense rate of fourteen is arbitrary, but lies within the range of estimates of the average offense rate of active criminals. See SPELMAN, supra note 33, at 12-18. In these numerical simulations numbers may not be exact due to rounding.

total of 583 inmates.[76] Of these, 525 will be First-timers and 58 will be Repeaters.[77] The 417 offenders on the street will commit 5833 crimes.[78] This is the minimum number of crimes obtainable without increasing the size of the inmate population.[79]

E.   *Case Two: Different Offense Rates with No Deterrent Effects*

The above example assumed that all offenders commit crimes at the same rate. It is plausible, however, that Repeaters commit crimes at a higher rate than First-timers.[80] Indeed, the notion that habitual offender statutes can incapacitate high-rate repeat offenders is a common argument made by advocates of such statutes.[81]

Habitual offender statutes are most effective if repeat offenders have a much higher crime rate than first-time offenders. In this section, we assume that Repeaters have an offense rate that is three times the rate of First-timers.[82] Further, we assume that all offenders will continue their criminal careers indefinitely at the same rate. Thus, no prison beds are wasted on aging inmates who would no longer be active offenders if free. Finally, we assume no deterrent effects. These assumptions, while somewhat unrealistic, provide the best case for habitual offender statutes. Not surprisingly, under these assumptions, sentencing Repeaters to longer sentences than First-timers may reduce crime without increasing the size of the inmate population.

To illustrate, suppose that the potential offenders consist of 900 First-timers who commit ten crimes per year and 100 Repeaters who commit thirty crimes per year. At a 5% conviction rate and two-year prison term if convicted, 50% of First-timers and 75% of Repeaters will be in prison at any given time.[83] Thus, there will be 450 First-timer and 75 Repeater inmates for a total prison population of 525. The 450 First-timers and 25 Repeaters still on the street will commit 4500 and 750 crimes, respectively,

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[76] Percentages calculated from Equation 6. *See supra* p. 15.

[77] The number of inmates of type $i = \dfrac{N_i \lambda_i J_i y_i}{1 + \lambda_i J_i y_i}$.

[78] This number is calculated from Equation 7. *See supra* p. 70.

[79] Optimization performed on Excel Solver.

[80] *See supra* Part II.F.

[81] *See* sources cited *supra*, note 71.

[82] Although repeat offenders will be disproportionately high-rate offenders, if the number of low-rate offenders is much higher than the number of high-rate offender then a significant portion of Repeaters will be low-rate.

[83] The portion of offenders of type *i* in prison is $\dfrac{\lambda_i J_i y_i}{1 + \lambda_i J_i y_i}$. First-timers $= \dfrac{10 \times .05 \times 2}{1 + (10 \times .05 \times 2)} = \dfrac{1}{2}$.

Repeaters $= \dfrac{30 \times .05 \times 2}{1 + (30 \times .05 \times 2)} = \dfrac{3}{4}$.

so total crimes committed will be 5250.[84]

Now suppose that the sentence for Repeaters is increased from two years to twenty years. Now 22 additional Repeaters will be imprisoned so that 97% of the 100 Repeaters will be in prison and only 3% will be on the street.[85] To keep the total prison size unchanged, the number of First-timer inmates will have to be reduced by 22 from 450 to 428. This requires reducing the length of the sentence for First-timers from two years to approximately 1.82 years.[86] Now the 472 First-timers on the street will commit 4720 crimes and the three remaining Repeaters on the street will commit 90 crimes for a total of 4810 crimes. Longer sentences for the high-rate Repeaters prevented 440 crimes without increasing the total size of the prison population.[87] These results are shown in Table 2.

Table 2
Repeaters with Higher Offense Rates: No Deterrent Effects

	In Prison	On the Street	Crimes
2- year sentence for all offenders			
First-timers	450	450	4500
Repeaters	75	25	750
Total	525	475	5250
20- year sentence for Repeaters & 1.82-year sentence for First-timers			
First-timers	428	472	4720
Repeaters	97	3	90
Total	525	475	4810

If Repeaters are disproportionately high-rate offenders, then longer sentences for repeat offenders can prevent more crimes through incapacitation than a uniform increase in penalties.[88] In the example above, crime was reduced by 8.4% without increasing the number of prison beds. This is clearly desirable. But the harsher sentences for repeat offenders do not produce the dramatic reduction in crime suggested by some supporters of habitual offender statutes.[89] Indeed, even in this best-case scenario, placing

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[84] $450 \times 10 = 4500$. $25 \times 30 = 750$. $4500 + 750 = 5250$.

[85] $\dfrac{\lambda_R J_R y_R}{1 + \lambda_R J_R y_R} = \dfrac{30 \times .05 \times 20}{1 + (30 \times .05 \times 20)} \approx .97$.

[86] Inmates who are First-timers $= \dfrac{N_F \lambda_F J_F y_F}{1 + \lambda_F J_F y_F} = \dfrac{900 \times 10 \times .05 \times 1.815}{1 + (10 \times .05 \times 1.815)} \approx 428$.

[87] The reduction in crime from sentencing repeat offenders to a twenty-year term assumes that such offenders would have continued to commit crimes at a high-rate for twenty years if they had remained on the street. If criminal retirement is considered, the crime reduction from long sentences for repeat offenders may be reduced or eliminated. *See* Beres & Griffith, *supra* note 3, at 135-38.

[88] Indeed, if there are no deterrent effects and there is no criminal retirement, then it would be optimal to sentence high-rate offenders to the longest possible prison terms.

[89] *See* sources cited *supra* note 16.

97% of high-rate offenders behind bars reduced crime by less than 10%. The reason is simple—even a two-year sentence imprisons high-rate offenders for 75% of their careers.[90]

Extended incarceration for repeat offenders will be even less effective under the more realistic assumptions that aging offenders may retire from a life of crime and that some repeat offenders commit crimes at a lower rate than first-time offenders. Statutes that mandate very long sentences for repeat offenders, therefore, are likely to produce modest reductions in the crime rate at best.

F. *Case Three: Different Offense Rates with Moderate Deterrent Effects*

The analysis in the preceding section did not consider the deterrent effect of habitual offender statutes. Perhaps if deterrence is taken into account, longer sentences for habitual offenders will have a greater impact on the crime rate. This possibility is considered in this section. The results are surprising—taking account of deterrence may actually reduce the effectiveness of longer sentences for repeat offenders.

As before, we assume that there are 900 First-timers who will commit ten crimes per year and 100 Repeaters who will commit thirty crimes per year if the prison term is two years. Now, however, we will add deterrence to the model by assuming that each type of offender has an elasticity of -0.3 with respect to changes in the perceived severity of the prison term; that is, a 1% increase in perceived severity produces a 0.3% reduction in the offense rate. Offenders are assumed to discount prison time to be served in the future at a 20% rate. As before, there will be 450 First-timer inmates and 75 Repeater inmates for a total inmate population of 525 if the prison term is two years for all offenders. Total crimes again will be 5250, with 450 First-timers on the street committing 4500 crimes and 25 Repeaters committing 750 crimes.[91]

Suppose, as before, that the prison term for Repeaters is increased to twenty years. The deterrent effect of the longer sentence reduces the of-

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[90] *See supra* note 75.

[91] $r_F = r_R = 0.2$. $E_F = E_R = -0.3$. Adding deterrence to the model requires adjusting the constant k_i to maintain the same offense rate for a 2-year sentence. The new constants are $k_F = 11.62$ and $k_R = 34.86$.

Thus: $\lambda_F = 11.62\left(\dfrac{1-e^{-0.2r_i}}{0.2}\right)^{-0.3} \cdot \lambda_R = 34.86\left(\dfrac{1-e^{-0.2r_i}}{0.2}\right)^{-0.3} \cdot y_F = y_R = 2$.

$\lambda_F = 11.62\left(\dfrac{1-e^{-0.2 \cdot 2}}{0.2}\right)^{-0.3} \approx 10$. $\lambda_R = 34.86\left(\dfrac{1-e^{-0.2 \cdot 2}}{0.2}\right)^{-0.3} \approx 30$. Note that $k_R = 3k_F$, indicating that Repeaters will commit three times the number of offenses of First-timers if they face the same penalty.

fense rate for Repeaters from 30 to about 21.6 offenses per year.[92] Despite the lower offense rate, the number of incarcerated Repeaters increases by 21 from 75 to about 95 because each convicted Repeater is imprisoned for a much longer period.[93] On average, about four Repeaters remain on the street.[94] The longer sentence reduces the total number of crimes committed annually by Repeaters from 750 to about 95.[95]

Keeping total prison size unchanged requires reducing the number of First-timer inmates by 21 to 429. This requires reducing the length of the sentence for First-timers from two years to about 1.77 years.[96] This increases the offense rate of First-timers to about 10.3 crimes per year.[97] The shorter sentence reduces the number of inmates who are First-timers to the required 429 despite the higher First-timer offense rate. This increases the number of First-timers on the street to 471 and the total number of crimes committed by First-timers from 4500 to about 4851 per year.[98] This is shown in Table 3.

Table 3
Repeaters with Higher Offense Rates: Moderate Deterrent Effects

	In Prison	On the Street	Crimes
2- year sentence for all offenders			
First-timers	450	450	4500
Repeaters	75	25	750
Total	525	475	5250
20- year sentence for Repeaters & 1.77-year sentence for First-timers			
First-timers	429	471	4851
Repeaters	96	4	95
Total	525	475	4946

[92] $\lambda_R = 34.86 \left(\dfrac{1-e^{-0.2r_r}}{0.2} \right)^{-0.3}$. $y_R = 20$. $\lambda_R = 34.86 \left(\dfrac{1-e^{-0.2 \times 20}}{0.2} \right)^{-0.3} \approx 21.63$.

[93] $\dfrac{N_R \lambda_R J_R y_R}{1+\lambda_R J_R y_R} = \dfrac{100 \times 21.63 \times .05 \times 20}{1+(21.63 \times .05 \times 20)} \approx 95.6$.

[94] $100 - 95.6 = 4.4$.

[95] $4.4 \times 21.6 \approx 95$.

[96] $\dfrac{N_F \lambda_F J_F y_F}{1+\lambda_F J_F y_F} = \dfrac{900 \times 10.31 \times .05 \times 1.77}{1+(10.31 \times .05 \times 1.77)} \approx 429$.

[97] $\lambda_F = 11.62 \left(\dfrac{1-e^{-0.2r_r}}{0.2} \right)^{-0.3}$. $y_F = 1.77$. $\lambda_F = 11.62 \left(\dfrac{1-e^{-0.2 \times 1.77}}{0.2} \right)^{-0.3} \approx 10.31$.

[98] $471 \times 10.3 = 4851$.

On balance, the combination of tougher penalties for Repeaters and lighter penalties for First-timers was efficient. The 4946 total crimes committed after the adoption of the new sentencing system is 304 fewer than under uniform sentencing. In the model without deterrence, however, longer sentences for Repeaters produced 440 fewer crimes.[99] Adding deterrence to the model thus reduced the effectiveness of longer sentences for Repeaters.

G. *Case Four: Different Offense Rates with Highly Responsive Offenders*

If potential offenders are highly responsive to the level of punishment, then longer sentences for high-rate offenders actually may increase the number of crimes committed. Suppose, for example, the facts are the same as in the previous section, except that all potential offenders have an elasticity of -0.8 with respect to changes in the perceived severity of the prison term.[100]

Now increasing the prison term from two years to twenty years for Repeaters reduces their offense rate from 30 to about 12.5 crimes per year[101] and increases the number of imprisoned Repeaters from 75 to about 93.[102] Approximately seven repeaters will remain on the street.[103] The longer sentence reduces the total number of crimes committed by Repeaters from 750 to roughly 93.[104]

Keeping total prison size unchanged requires reducing the sentence for First-timers from two years to 1.58 years, which increases the offense rate for First-timers from 10 to 11.7 crimes per year.[105] This reduces the number of imprisoned First-timers to the required 432.[106] The shorter sentence increases the number of First-timers on the street to 468 and the total number of crimes committed by First-timers from 4500 to 5476 per year.[107]

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[99] *See* discussion *supra* Part III.E.

[100] $k_F = 14.92$ and $k_R = 44.75$. $\lambda_F = 14.92\left(\dfrac{1-e^{-0.2 r_F}}{0.2}\right)^{-0.8}$. $\lambda_R = 44.75\left(\dfrac{1-e^{-0.2 r_R}}{0.2}\right)^{-0.8}$.

[101] $\lambda_R = 44.75\left(\dfrac{1-e^{-0.2 r_R}}{0.2}\right)^{-0.8}$. $y_R = 20$. $\lambda_R = 44.75\left(\dfrac{1-e^{-0.2 \times 20}}{0.2}\right)^{-0.8} \approx 12.53$.

[102] $\dfrac{N_R \lambda_R J_R y_R}{1+\lambda_R J_R y_R} = \dfrac{100 \times 12.53 \times .05 \times 20}{1+(12.53 \times .05 \times 20)} \approx 92.6$.

[103] $100 - 92.6 = 7.4$.

[104] $7.4 \times 12.5 \approx 93$.

[105] $\lambda_F = 14.92\left(\dfrac{1-e^{-0.2 r_F}}{0.2}\right)^{-0.8}$. $y_F = 1.58$. $\lambda_F = 14.92\left(\dfrac{1-e^{-0.2 \times 1.58}}{0.2}\right)^{-0.8} \approx 11.7$.

[106] $\dfrac{N_F \lambda_F J_F y_F}{1+\lambda_F J_F y_F} = \dfrac{900 \times 11.7 \times .05 \times 1.58}{1+(11.7 \times .05 \times 1.58)} \approx 432$.

[107] $468 \times 11.7 \approx 5476$.

This is shown in Table 4.

Table 4
Repeaters with Higher Offense Rates: Strong Deterrent Effects

	In Prison	On the Street	Crimes
2- year sentence for all offenders			
First-timers	450	450	4500
Repeaters	75	25	750
Total	525	475	5250
20- year sentence for Repeaters & 1.58-year sentence for First-timers			
First-timers	432	468	5476
Repeaters	93	7	93
Total	525	475	5569

In the case of highly responsive offenders, the combination of the tougher penalties for Repeaters and lighter penalties for First-timers was counterproductive, increasing the total number of crimes committed from 5250 to 5569.

H. *Summary*

In the preceding numerical examples, the effectiveness of sentencing high-rate Repeaters to longer prison terms than low-rate First-timers depended on how responsive potential offenders were to changes in the sanction. Longer sentences for Repeaters (and correspondingly shorter sentences for First-timers) were most effective in reducing crime when potential offenders were unresponsive to changes in the sanction. Where potential offenders were highly responsive to changes in the perceived sanction, very long sentences for Repeaters were counterproductive.[108] Put differently, the greater the deterrent effect, the more desirable it was to have uniform sentences for all potential offenders. This is illustrated in Figure 3.

Figure 3: Longer Sentences for Repeaters and Offender Responsiveness to Changes in the Perceived Severity of Sentencing
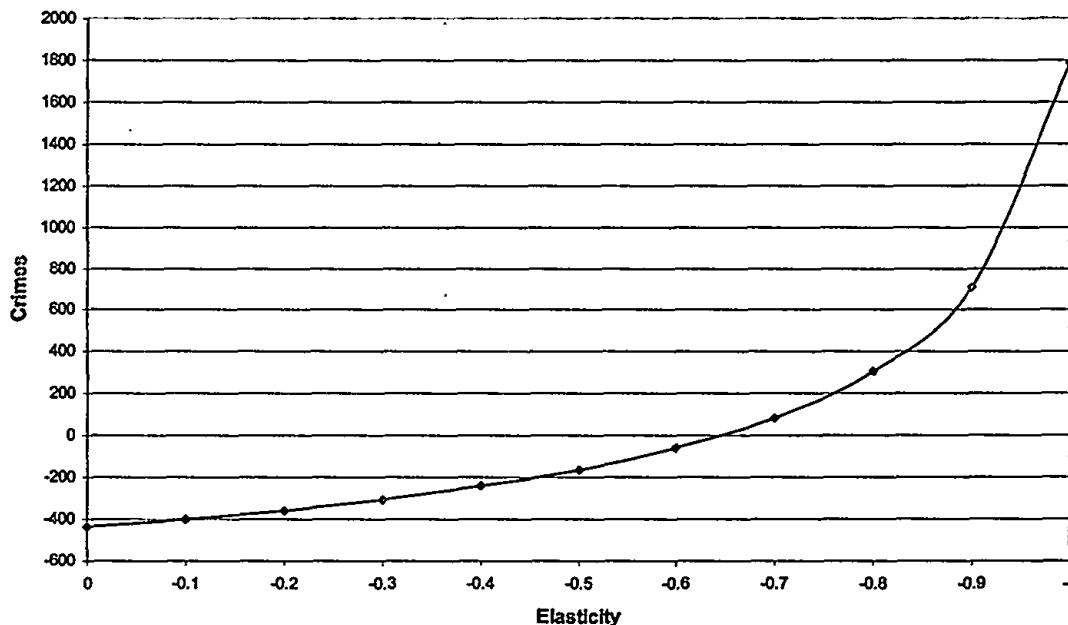
IV. CONCLUSION: INCAPACITATION, DETERRENCE AND THE SENTENCING STRUCTURE

A. *Incapacitation*

Supporters of habitual offender statutes argue that such laws can reduce crime significantly by the selective incapacitation of career criminals. Our analysis suggests that such a claim is only partially true. Looking only at incapacitation effects, sentencing repeat offenders to longer prison terms than first-time offenders will reduce overall crime if, as seems plausible, repeat offenders on average commit crimes at a higher rate than first-time offenders. The reduction in crime is surprisingly small, however, even where the offense rate of repeat offenders is several times that of first-time offenders. This is because most high-rate offenders will be incarcerated even if such offenders are sentenced to fairly short prison terms.

Our model assumed that high-rate offenders continue to commit crimes at a high-rate indefinitely. If it were assumed, more realistically, that some high-rate offenders reduce their offense rate as they age, then the incapaci-

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[108] Even if potential offenders are highly responsive to changes in the sanction, it is desirable to sentence Repeaters to somewhat longer sentences than First-timers.

tation effect of very long prison terms may be significantly reduced.

B. *Deterrence*

Supporters of habitual offender statutes argue that such laws reduce crime by deterring potential offenders. The deterrent effect of a sanction depends on its perceived severity. While lengthening a sentence increases its perceived severity, doubling the prison term is unlikely to double the perceived severity of the sanction because offenders are likely to discount time to be served in the future. Potential first-time offenders, moreover, are likely to be more numerous than potential repeat offenders, thus increasing the importance of deterring them. Sentencing repeat offenders to much longer sentences than first-time offenders thus may provide less effective deterrence than punishing all offenders equally.