Stigma and Self-Fulfilling Expectations of Criminality

February 7, 1995

Eric Rasmusen

Abstract

A convicted criminal suffers not only from public penalties, but from stigma, the reluctance of others to interact with him economically and socially. Conviction can convey useful information about a person, which makes stigmatization an important and legitimate function of the criminal justice system, quite apart from moral considerations. Whether stigma will operate in this way depends on expectations and the crime rate, however, which can lead to multiple, pareto-ranked equilibria with different amounts of crime and stigma.

Indiana University School of Business, Rm. 456,

10th Street and Fee Lane, Bloomington, Indiana, 47405. Office: (812) 855-9219. Fax: 812-855-3354. Internet: Erasmuse@.indiana.edu.

I thank James Coleman, Jeffrey Grogger, John Lott, A. Mitchell Polinsky, Peter Siegelman, Gary Schwartz, the editors and referees of this journal, and participants in workshops at the University of Chicago, the University of Illinois, and UCLA for helpful comments.

I. INTRODUCTION

The economic approach to crime accepts that internal motivations such as conscience are important in determining whether someone commits a crime, but focuses on more easily measured and manipulated external incentives such as criminal penalties. This approach is theoretically attractive, consistent with common sense, and has had some degree of success in explaining empirical variation in crime rates.[1] At first glance, the pattern of crime in the United States supports the importance of external penalties. From 1960 to 1980, the number of prisoners per crime fell by 58% and the number of crimes per youth rose by 51%, as data in Section IV of this article will show. By 1990, however, the number of prisoners per crime had returned to almost its 1960 level, but the number of crimes per youth was 166% higher. This does not imply that penalties did not deter crime in 1990, but it does seem that something happened to make the penalties a less powerful disincentive.

The economic model of crime has been elaborated over the years, but we still do not have a satisfactory explanation for the decreased impact of criminal penalties. A number of articles have explored variants on what I will call the "overload theory": that when crime increases, law enforcement funding does not increase enough to prevent the expected penalty from declining, which increases crime still further.[2] The overload theory can explain how a society might move from an equilibrium with low crime to one with high crime, but the

amount of crime is still mediated by the expected penalty, so it cannot explain the U. S. pattern.

---

[1] The seminal theoretical article is: Gary Becker, Crime and Punishment: An Economic Approach, 76 Journal of Political Economy

169 (1968). Empirical studies range from the seminal article by Isaac Ehrlich, Participation in Illegitimate Activities: A Theoretical and Empirical Investigation, 81 Journal of Political Economy 521 (1973); to the recent article by

Helen Tauchen, Ann Witte, & Harriet Griesinger, Criminal Deterrence: Revisiting the Issue with a Birth Cohort, 126 Review of Economics and Statistics 399 (1994).

[2] The idea of the overload theory is mentioned as early as Ehrlich, *supra* note 1, and can be found formalized in Francis Lui, A Dynamic Model of Corruption Deterrence, 32 Journal of Public Economics 215 (1986); Jens Andvig & Karl Moene, How Corruption May Corrupt,

13 Journal of Economic Behavior and Organization 63 (1990); Scott Freeman, Jeffrey Grogger & Jon Sonstelie, The Spatial Concentration of Crime, Working paper, Dept of Economics, University of California, Santa Barbara, July 1989; Raj Sah, Social Osmosis and Patterns of Crime, 99 Journal of Political Economy 1272 (1991); and Joel Schrag & Suzanne Scotchmer, The Self-Reinforcing Nature of Crime, Working paper, Graduate School of Public Policy, University of California, Berkeley, May 1994.

Over a period as long as thirty years, it may be that social influences are more important determinants of changes in crime rates than are the incentives traditionally studied by economists. Some social influences, such as the present-orientedness or the effect of conscience, are the kinds of tastes that economists take as given in their models. Stigma, the social influence to be studied in this article, is not.

Stigma refers to the reluctance of people to interact with a person who has a criminal record. For the criminal, stigma is an external incentive, like a jail term, not an internal motivation, like conscience. Standard economic modelling can be used to ask how the criminal will respond to stigma and why people

find it in their self-interest to treat criminals differently from noncriminals.

Stigma can be either economic (a lower wage) or social (difficulty finding a spouse). Economic stigma is the easier of these to measure, and a number of scholars have tried to estimate its impact.[3] Whether stigma is found to be important seems to depend on the context. Lott, for example, finds a short-run income reduction of 39% from bank embezzlement and 41% from bank larceny,[4] and Grogger finds that arrests can explain about two-thirds of the black/white youth employment differential in his sample.[5] In two other studies, Grogger finds only a short-lived effect of arrests on youth earnings.[6]

These articles sought to measure the amount of stigma, rather than to explain

[3] This literature includes:

John Lott, The Effect of Conviction on the Legitimate Income of Criminals, 34 Economics Letters 381 (1990); Freeman, Richard, Crime and the Employment of Disadvantaged Youth, in Adele Harrell and George Peterson, eds., Drugs, Crime and Social Isolation: Barriers to Urban Opportunity, Washington: Urban Institute Press, 1992; John Lott, An Attempt at Measuring the Total Monetary Penalty from Drug Convictions: The Importance of an Individual's Reputation, 21 Journal of Legal Studies 159 (1992); Jonathan Karpoff & John Lott, The Reputational Penalty Firms Bear from Committing Criminal Fraud, 36 Journal of Law and Economics 757 (1993); and Joel Waldfogel, The Effect of Criminal Conviction on Income and the Trust 'Reposed in the Workmen', 29 Journal of Human Resources

62 (1994).

[4] John Lott, Do We Punish High-Income Criminals Too Heavily?, 30 Economic Inquiry 583 (1992).

[5] Jeffrey Grogger, Arrests, Persistent Youth Joblessness, and Black-White Employment Differentials, 74 Review of Economics and Statistics 100 (1992).

[6] Jeffrey Grogger, The Effect of Arrest on the Employment and Earnings of Young Men, Quarterly Journal of Economics, forthcoming; Jeffrey Grogger, Criminal Opportunities, Youth Crime, and Young Men's Labor Supply, working paper, Dept. of Economics, University of California, Santa Barbara, California, February 1994.

its presence or absence. One approach to modelling stigma would be to use the theory of repeated games.

If a prisoner's dilemma is repeated an infinite number of times with sufficiently little discounting, then the two players may each choose to cooperate for fear that a betrayal would lead to a cessation of cooperation by the other player. The reputation model of Klein and Leffler relies on essentially the same reasoning: a firm produces high-quality products because if it ever betrays consumers with a low-quality product, they will cease buying.[7] David Hirshleifer and myself have shown how a model of this kind can support costly ostracism: members of a group can be given the incentive to expel an offending member even if his presence would add to the group's wealth.[8] This distrust of a player who has deviated from cooperation seems especially apt for situations where a criminal has offended against the person who stigmatizes him—-stealing from his employer, for example, who thereupon fires him.

The present article will take a different approach, more suitable for modelling the reluctance of an outsider who is unaffected by the particular crime to interact with the criminal. In such a case, it would seem that stigma is an informational phenomenon, based on public disclose of the character of the stigmatized person. Section II of the article constructs two formal models of the interaction between the decisions of potential criminals to commit crime and of employers to stigmatize detected criminals. Both models show how multiple equilibria could exist, so that in some cases stigma is

present and crime is low and in other cases stigma is absent and crime is high. Section III explores the implications of stigma for public policy on enforcement, punishment, and disclosure. Section IV examines the empirical plausibility of the model, and applies it to the increase in crime since 1960. Section V concludes.

II. MODELLING STIGMA

The idea to be modelled is that a public declaration of a person's criminality makes other people reluctant to interact with him. For modelling purposes, this reluctance will take the form of employers paying lower wages to those convicted

[7]Benjamin Klein & Keith Leffler, The Role of Market Forces in Assuring Contractual Performance, 89 Journal of Political Economy 615 (1981).

[8]David Hirshleifer & Eric Rasmusen, Cooperation in a Repeated Prisoner's Dilemma with Ostracism, 12 Journal of Economic Behavior and Organization 87 (1989).

of crimes.[9]

Two models will be developed, both based on the idea that conviction conveys information about criminality and that employers prefer not to hire criminals but do not have a direct taste for stigma.[10] In the moral hazard model, all workers begin with equal marginal products, but any worker who engages in crime becomes less productive. In the adverse selection model, crime has no effect on productivity, but some workers begin with lower marginal products regardless of whether they commit crimes, and these workers have a greater tendency to commit crimes.

A. The Moral Hazard Model

The decisionmakers in the model are risk-neutral workers and risk-neutral employers. The workers must decide whether to commit crimes, unobserved by employers unless they are caught and convicted, and the employers must decide how much to pay convicted and unconvicted workers.

If a worker decides to engage in crime, he is caught and convicted with exogenous probability $\alpha \in (0,1)$. The direct reward from crime is V and the public penalty from being convicted is P.[11] There is a continuum of workers, so $\theta \in [0,1]$, the proportion that choose crime, is unaffected by any individual's decision. Workers are identical except for a heterogeneity parameter u with cumulative distribution $F(u)$ across the population, where a positive u denotes an individual whose aversion to crime is greater for unmodelled reasons such as

[9]The same model could be used for social stigma with appropriate changes in interpretation, e.g., friends do fewer favors for those convicted of crimes, because they are revealed as less likely to reciprocate.

[10]The most obvious link between crime and productivity is employee theft and the precautions needed to avoid it. Dickens, Katz, Lang and Summers cite studies claiming that employee theft costs American business between 15 and 56 billion dollars per year, accounts for between 5 and 30 percent of business failures, and induces spending of 12 billion dollars per year on prevention. See William Dickens, Lawrence Katz, Kevin Lang, & Lawrence Summers, Employee Crime and the Monitoring Puzzle, 7 Journal of Labor Economics, 331 (1989) at 332, 335.

[11]The exogeneity of α, V and P is a simplifying assumption made to highlight the effect of stigma. Quite plausibly, the reward for crime

falls as the amount of crime rises, because of competition for criminal opportunities. The public penalty might either rise (from growing public concern over crime) or fall (the "overload theory" of Section I). These effects are ruled out in the present model. Note also that in this model courts do not use character evidence to stigmatize defendants, the idea behind multiple equilibria in Joel Schrag & Suzanne Scotchmer, Crime and Prejudice: The Use of Character in Evidence in Criminal Trials, 10 Journal of Law, Economics, and Organization 319 (1994).

moral scruples, lack of skill, or poor criminal opportunities.[12] Let $F'(u) > 0$ for any u, which implies that some people will choose crime no matter how high the penalties and some people will refrain from crime no matter how low the penalties.

Whether a worker has been convicted or not, he offers himself for employment. Crime hurts net productivity. In legitimate employment, the criminal's marginal product is m and the noncriminal's is $m + y > m$. This may be so for a variety of reasons, including employee theft, resistance to authority, and lack of attention to acquiring legitimate skills. Employers compete with each other for workers, but all they observe are convictions, not criminality or marginal product.

In equilibrium, a convicted worker will earn his marginal product of m. A worker whose innocence was known would receive $m + y$, but the category of unconvicted workers pools noncriminals with unconvicted criminals, so the wage for an unconvicted worker, w, will lie in the interval $[m, m + y]$ and depend on the proportion of unconvicted workers believed to be criminals. Fraction α of the θ criminal workers are convicted, leaving proportion $(1 - \alpha\theta)$ of the population unconvicted, which is the denominator for the expected-value expression (1) below. Of the unconvicted $(1 - \alpha\theta)$, amount $(1 - \theta)$ are noncriminal and have marginal product $m + y$, while amount $\theta(1 - \alpha)$ are unconvicted criminals with marginal product m. Hence, the average marginal product in the unconvicted population is

$$\begin{aligned} w &= \left(\tfrac{1-\theta}{1-\alpha\theta}\right)(m + y) + \left(\tfrac{\theta(1-\alpha)}{1-\alpha\theta}\right) m \\ &= m + \tfrac{1-\theta}{1-\alpha\theta} y. \end{aligned} \tag{1}$$

It can immediately be seen that the wage of the unconvicted worker falls with the amount of crime:

$$\frac{\partial w}{\partial \theta} = -\left(\frac{1 - \alpha}{(1 - \alpha\theta)^2}\right) y < 0. \tag{2}$$

Depending on whether he is criminal or noncriminal, the worker's expected payoff is

$$\pi_c = (V - \alpha P) + (1 - \alpha)w + \alpha m - u \tag{3}$$

or

$$\pi_{nc} = w. \tag{4}$$

[12]Heterogeneity is imposed so that statements can be made about how the amount of crime changes with the parameters, since if individuals are identical either all are criminal or all are noncriminal. The conclusion found below that multiple equilibria can exist would remain valid even if all individuals were identical.

The worker will choose to be criminal if A, the attractiveness of crime, is positive. Using (1), (3), and (4), its value is

$$\begin{aligned} A &\equiv \pi_c - \pi_{nc} \qquad (5) \\ &= V - \alpha P + (1-\alpha)w + \alpha m - u - w \\ &= (V - \alpha P) - \alpha \left(\frac{1-\theta}{1-\alpha\theta} \right) y - u. \qquad (6) \end{aligned}$$

PROPOSITION 1: The attractiveness of crime is: (a) increasing in the direct reward to crime, V; (b) decreasing in the personal disutility of crime, u;

(c) decreasing in the criminal penalty, P; (d) decreasing in the productivity damage, y; (e) decreasing in the probability α of conviction, even if P = 0; and

(f) increasing in the aggregate crime rate, θ.

Proof: Points (a) through (d) are obvious from inspection of equation (5). Regarding point (e):

$$\frac{\partial A}{\partial \alpha} = -P - \left(\frac{1-\theta}{(1-\alpha\theta)^2} \right) y. \qquad (7)$$

This expression is negative. Regarding point (f):

$$\begin{aligned} \tfrac{\partial A}{\partial \theta} &= \tfrac{\alpha y}{1-\alpha\theta} - \tfrac{\alpha^2(1-\theta)y}{(1-\alpha\theta)^2} \\ &= \alpha y \left(\tfrac{1-\alpha}{(1-\alpha\theta)^2} \right). \end{aligned} \qquad (8)$$

This expression is positive under our assumption that $0 < \alpha < 1$. Q.E.D.

Increasing the probability and amount of punishment reduce the attractiveness of crime, but the effects of α (the probability of conviction) and P (the penalty) diverge. P exerts a negative effect only once in equation (6), when it is multiplied by α in the official punishment. α exerts two additional negative effects. If the probability of conviction is high, then (i) the probability of being convicted and stigmatized is higher and (ii) the amount of stigma is greater. Contrary to simpler models of crime, enforcement has more impact than punishment: holding the expected penalty αP constant at 2, a value of $P = 20$ combined with $\alpha = .1$ would not deter crime as strongly as $P = 4$ and $\alpha = 0.5$. Even if $P = 0$, the threat of stigma might be sufficient to deter crime by itself.

The variable θ, representing the proportion of criminals, is endogenous; it determines the individual worker's decision, but itself is determined by the

decisions of all workers. When θ rises, the wage loss from conviction falls. The payoffs of both criminal and noncriminal workers decline, but the payoff of noncriminal workers declines more. From equations (3) and (4) it can be seen that $\frac{\partial \pi_{nc}}{\partial \theta} = \frac{\partial w}{\partial \theta}$, and $\frac{\partial \pi_c}{\partial \theta} = -(1-\alpha)(\frac{dw}{d\theta})$. Since $\frac{\partial \pi_c}{\partial \theta} = -(1-\alpha)\frac{\partial \pi_{nc}}{\partial \theta}$, a high crime rate hurts the noncriminal more than the criminal.

There exist cutoff levels of u such that individuals with heterogeneity parameters in the interval $[-\infty, \underline{u}]$ will always engage in crime, those in the interval $(\underline{u}, \overline{u})$ will decide based on θ, and those in the interval $[\overline{u}, +\infty]$ will always refrain from crime.[13] In this interval, let $\tilde{\theta}(u)$ be the crime level at which an individual of type u is indifferent between crime and noncrime. For $\theta > \tilde{\theta}(u)$ he will choose crime, and for smaller θ he will not. $\tilde{\theta}(u)$ is increasing in u, and this implies that if $\theta = \tilde{\theta}(u)$, all individuals in the interval $[-\infty, u]$ will choose crime. Figure 1 puts $F(u)$ and $\tilde{\theta}(u)$ on the same diagram. Any intersection (u^*, θ^*) between the curves $\tilde{\theta}(u)$ and $F(u)$ will be an equilibrium. At θ^*, the marginal criminal, with utility parameter u^*, will be indifferent about choosing crime because $A(u^*, \theta^*) = 0$, while the $F(u^*)$ individuals with lower levels of u will choose crime and the $(1 - F(u^*))$ with higher levels will refrain from crime.

PROPOSITION 2: Depending on the distribution of the taste for crime, $F(u)$, there may exist multiple equilibria. If there are three equilibria, with crime levels $\theta^- < \theta^* < \theta^+$, then the two outer equilibria are stable and the middle one is unstable. The equilibria can be pareto-ranked, with lower crime levels being superior.

Proof. (i) Existence. An equilibrium is at an intersection of $\tilde{\theta}(u)$ and $F(u)$.

$\tilde{\theta}(\underline{u}) = 0$ and $\tilde{\theta}(\overline{u}) = 1$ by definition of $\underline{u}$ and $\overline{u}$. That $\tilde{\theta}(u)$ is increasing and continuous

[13] The values of u that bound the intervals can be found by setting $A = 0$ and θ equal to zero or to one in equation (6), giving $\underline{u} = (V - \alpha P) - \frac{\alpha}{1-\alpha} y$ and $\overline{u} = (V - \alpha P)$.

can be seen as follows. $\tilde{\theta}$ is found by setting A equal to zero and solving for θ in equation (6):

$$V - \alpha P - \frac{1-\theta}{1-\alpha\theta}\alpha y - u = 0, \tag{9}$$

which implies that

$$\tilde{\theta} = \frac{V - \alpha P - \alpha y - u}{\alpha(V - \alpha P - y - u)}. \tag{10}$$

The derivative of (10) with respect to u exists and is

$$\frac{\partial\tilde{\theta}}{\partial u} = \frac{-1}{\alpha(V - \alpha P - y - u)} + \frac{\alpha(V - \alpha P - \alpha y - u)}{\alpha^2((V - \alpha P) - y - u)^2} = \frac{y(1-\alpha)}{\alpha(V - \alpha P - y - u)^2}, \tag{11}$$

which is positive because $\alpha \in (0, 1)$.

Because $\tilde{\theta}(u)$ is continuous, increasing, and takes every value between 0 and 1, and F is nondecreasing, continuous, and restricted to values between 0 and 1, there must be some u^* at which $F(u^*) = \tilde{\theta}(u^*)$. Thus, an equilibrium exists. The curve F might intersect $\tilde{\theta}(u)$ at more than one point, generating the multiple equilibria of Figure

1, or it might intersect just once.

(ii) Stability. An equilibrium θ is stable with respect to a dynamic process if for arbitrarily small ϵ and an initial state $(\theta + \epsilon)$ or $(\theta - \epsilon)$, the limit of the dynamic process is θ. The simplest dynamic process is myopic: "In period t, individuals make their decisions as if they believe that θ_t will equal θ_{t-1}," but any equilibrium stable with respect to myopic dynamics will also be stable with respect to a rational-expectations dynamics in which the equilibrium jumps instantly to the value to which myopic dynamics would converge slowly.

An equilibrium's stability depends on whether F cuts $\tilde{\theta}(u)$ from above or below. If F cuts $\tilde{\theta}(u)$ from above (that is, if $F(u^* - \epsilon) > \tilde{\theta}(u^* - \epsilon)$ and $F(u^* + \epsilon) < \tilde{\theta}(u^* + \epsilon)$), then the equilibrium is stable. Suppose that these inequalities are true and the system starts at $\theta' < \theta^*$ where $u = u^* - \epsilon$. The amount of crime will increase, because $F(u) = \theta'$, which is greater than $\tilde{\theta}(u)$,the amount of crime that induces individual u to undertake crimes. If F intersects $\tilde{\theta}(u)$ from above, then F must have a gentler slope than $\tilde{\theta}(u)$ at $u^* - \epsilon$, so the increase in crime will not overshoot u^*, and myopic dynamics will converge at u^*.

If F does not cut $\tilde{\theta}(u)$, but rather intersects it at the extreme value of $\overline{u}$ or $\underline{u}$, then the equilibrium is still stable. The previous paragraph's argument still applies to dynamics starting from values of u nearer 0 than u^*, and if the system starts at a more extreme value of u, even myopic dynamics instantly lead back to u^*. If there is a single equilibrium, then $F(u)$ either intersects $\tilde{\theta}(u)$ at an extreme value, in which case the same argument shows it is stable, or $F(\underline{u}) > 0$ and $F(\overline{u}) < 1$. But if this is the case and F is continuous, then

F, starting greater than $\tilde{\theta}(u)$ and ending smaller than $\tilde{\theta}(u)$, must cut $\tilde{\theta}(u)$ from above, and the equilibrium is stable. If there are three equilibria, then any equilibrium at $\underline{u}$ or $\overline{u}$ is an outer equilibrium, and is stable by the same argument. That argument also shows that the smallest equilibrium must either be at $\underline{u}$ or (given that $\tilde{\theta}(u)$ is upward sloping) at a point where $F(u)$ cuts $\tilde{\theta}(u)$ from above. But if F cuts $\tilde{\theta}(u)$ from above at the first equilibrium, then it must cut from below at the middle equilibrium, u^*. And if it cuts from below at u^*, then for slightly larger u, $F(u)$ lies above $\tilde{\theta}(u)$, and it must cut $\tilde{\theta}(u)$ from above at the final equilibrium. Hence the two outer equilibria are stable, and the middle equilibrium is not.

(iii) Optimality. Even from the point of view of the potential criminals, the high-crime equilibrium is dominated by the low-crime equilibrium. Inequality (2) shows that w falls in θ, and equations (3) and (4) show that w is a component of the payoffs of both the criminal and the noncriminal, so the high-crime equilibrium has lower payoffs for all. Q.E.D.

Proposition 2 establishes the possibility of multiple, pareto-ranked, stable equilibria. Every individual, whether his particular tastes lead him to be criminal or noncriminal, prefers the low-crime equilibrium, in which stigma has a strong effect and convicted criminals receive large cuts in their wages. This is less paradoxical when it is rephrased: every individual prefers the equilibrium in which lack of a criminal record is rewarded by a wage premium. The punishment of stigma and the reward of a wage premium for a clean record are equivalent; what matters is that a wedge between the wages of the convicted and the unconvicted deter crime.

B. An Adverse Selection Model of Stigma

The moral hazard model captures the channels in which stigma operates when crime reduces productivity. Stigma can be effective, however, even when crime does not reduce productivity. In that case, whether an employee committed crimes in the past would not affect his wage in a world of perfect information, but under imperfect information, employers might use criminality as a proxy for low productivity.

To model this, let m be the marginal product of the low-ability workers, who always commit crimes and who form proportion $\overline{\theta}$ of the population. Let $m + y$ be the marginal product of high-ability workers, who choose whether or not to commit crimes and who form proportion $1 - \overline{\theta}$ of the population. The total proportion of criminal workers is $\theta > \overline{\theta}$. A criminal is caught and convicted with probability α, and crime has no effect on productivity. Let us assume, for simplicity, that there is no other worker heterogeneity of the kind

$F(u)$ represented in the moral hazard model.

In equilibrium, the wage for a convicted worker is not necessarily m, as in the moral hazard model, because high-ability workers might be convicted too. Low and high-ability workers are convicted at the same rate, so all that matters is the relative proportion in the criminal population. The wage for the convicted is

$$w_c = \left(\frac{\overline{\theta}}{\theta}\right) m + \left(\frac{\theta - \overline{\theta}}{\theta}\right) (m + y), \tag{12}$$

which equals m only if $\theta = \overline{\theta}$.

The unconvicted population is composed of unconvicted criminals with low ability (proportion $\overline{\theta}(1 - \alpha)$), unconvicted criminals with high ability ($(\theta - \overline{\theta})(1 - \alpha)$), and noncriminals with high ability ($1 - \theta$), a total probability mass of $1 - \alpha\theta$. The unconvicted wage is therefore

$$w = \left(\frac{\overline{\theta}(1 - \alpha)}{1 - \alpha\theta}\right) m + \left(\frac{1 - \overline{\theta} - \alpha(\theta - \overline{\theta})}{1 - \alpha\theta}\right) (m + y). \tag{13}$$

The adverse selection model has two equilibrial: a pooling, high-crime equilibrium in which the high-ability workers choose crime and the unconvicted wage equals the convicted wage; and a separating, low-crime equilibrium in which the high-ability workers refrain from crime and conviction carries stigma.

In the low-crime equilibrium, only low-ability workers commit crimes, and convicts are paid the low-ability wage. High-ability people refrain from crime, because they do not want to risk being pooled with the low-ability convicts. The unconvicted are paid a wage between the low- and high-ability wages, because low-ability criminals who are not caught are indistinguishable from high-ability workers. In the high-crime equilibrium, everyone commits crimes, and the wage for the convicted and the unconvicted is the same.

Formally, in the low-crime equilibrium, none of the high-ability workers choose crime. This means that $\theta = \overline{\theta}$,

$$w_c = m, \tag{14}$$

and

$$w = \left(\frac{\overline{\theta}(1 - \alpha)}{1 - \alpha\overline{\theta}}\right) m + \left(\frac{1 - \overline{\theta}}{1 - \alpha\overline{\theta}}\right) (m + y). \tag{15}$$

In the high-crime equilibrium, all of the high-ability workers choose crime. This means that $\theta = 1$,

$$w_c = \overline{\theta} m + (1 - \overline{\theta})(m + y), \tag{16}$$

and

$$\begin{aligned} w &= \left(\frac{\overline{\theta}(1-\alpha)}{1-\alpha}\right) m + \left(\frac{1-\overline{\theta}-\alpha(1-\overline{\theta})}{1-\alpha}\right)(m + y) \\ &= \overline{\theta} m + (1 - \overline{\theta})(m + y). \end{aligned} \tag{17}$$

The wage is the same for both convicted and unconvicted workers in the high-crime equilibrium. Neither equilibrium is Pareto-dominant, in contrast to the moral hazard model. The low-ability workers prefer the high-crime equilibrium, but the high-ability workers prefer the low-crime equilibrium.

The moral hazard and adverse selection models make similar predictions, except that a move from low to high crime leaves the wage for the convicted unchanged in the moral hazard model and raises it in the adverse selection model. This is because in the adverse selection model, the average wage is independent of the number of criminals. As criminality increases, the wage of the unconvicted falls but the wage of the convicted rises. The biggest difference is perhaps in the welfare implications, since in the adverse selection model the cost of high crime is limited to the crime itself rather than to ill effects on worker productivity.

III. STIGMA AND PUBLIC POLICY

A. The Government's Choice of the Probability of Conviction

In the standard economic model of crime, only the expected penalty matters for deterrence, and the division between punishment and probability of conviction is important only to the government's expense of punishment. In the stigma model, the probability of conviction, α, has a double deterrent effect, operating via not only the public punishment P but private stigma. Even if $P = 0$, if stigma is sufficiently great, crime is deterred.[14]

[14]In many cases, $P = 0$ is a reasonable approximation. The stigma arises from arrest, even if no trial follows, or conviction is followed by probation instead of imprisonment. Only 51% of federal and an estimated 46% of state felony convictions were followed by incarceration in a typical year (Federal: from 1 July 1985 to 30 June 1986, Bureau of Justice Statistics, U.S. Dept of Justice, Technical Appendix, Report to the Nation on Crime and Justice, Second Edition

(1988) at 54. State: 1986 data, Bureau of Justice Statistics, U.S. Dept of Justice, Sourcebook of Criminal Justice Statistics, 1988, Table 5.31.

Paradoxically, the productivity loss from crime can be beneficial to the potential criminal and to society, because

it permits a low-crime equilibrium to exist even when official penalties are low. The productivity loss helps to explain the lower crime rates of the affluent, since for many well-paying jobs a large productivity loss is plausible.

Lott has shown empirically that a larger portion of the punishment for a wealthier person is indeed in the form of wage loss.[15] Facing a heavier penalty, he is more strongly deterred. Stigma

may also

help explain why crime rates are so high among the young. For reasons unrelated to crime, young people are less likely to be employed, and therefore less likely to suffer immediate economic stigma if caught. Although the participation rate for males aged 18-19 is only 68.1%, it rises to 94.3% for males aged 25 to 34.[16] The situation is self-reinforcing, since employers are more relucant to hire the young if they are disproportionately criminal.

The probability of conviction is thus a more powerful policy tool than the official penalty when stigma is

effective. What conviction probability is optimal? That depends on the relative costs of enforcement and crime, which equilibrium is in effect, and the likelihood of random shocks to individual tastes for crime.

Figure 1 showed $F(u)$, the distribution of individual aversions to crime, and $\tilde{\theta}(u)$, the critical levels of crime that induce different individuals to engage in crime. In Figure 2, a reduction in enforcement (the probability α or the size P of punishment) shifts down $\tilde{\theta}(u)$ from $\tilde{\theta}_0(u)$ to $\tilde{\theta}_1(u)$ If the system begins at E_0, then whether enforcement should be increased or reduced depends on their costs compared to the costs of crime— productivity loss, victim precautions, and so forth. If crime is costly compared to enforcement, then $\tilde{\theta}(u)$ should be shifted up by increasing the amount of enforcement. If enforcement is more costly, then $\tilde{\theta}(u)$ should be shifted down. Figure 2 shows the effect of reduced enforcement: $\tilde{\theta}(u)$

[15] Lott, 1992, *supra* note 3.

[16] This is 1988 data, from: Bureau of Labor Statistics, U.S. Dept of Labor, Handbook of Labor Statistics, 1989, pp. 26, 137. Unemployment rates were 14.6% for age 18-19, 5.3% for 25-34. The corresponding figures for black males alone are: participation for ages 18-19, 56.0%; participation for ages 25-34, 89.3%; unemployment for ages 18-19, 31.7%; unemployment for ages 25-34, 11.0%.

shifts to $\tilde{\theta}_1(u)$ and the equilibrium moves smoothly from E_0 to higher crime at E_1.

E_1 will be the optimal equilibrium from the point of view of the government for a wide range of costs of enforcement. If enforcement is reduced any further, then $\tilde{\theta}(u)$ shifts to $\tilde{\theta}_2(u)$ and the equilibrium shifts discontinuously to much higher crime at E_2. E_1 is the equilibrium with the lowest level of enforcement that still enables private stigma to effectively supplement public punishment.

Equilibrium E_1, however, is not robust to small shocks in α, P, and $F(u)$. If enforcement dips slightly, or individuals become less averse to crime, then the low-crime equilibrium disappears, and crime increases discontinuously. A small shock can be drastically multiplied. Since the expectations that maintain the low-crime equilibrium are a form of valuable social capital, the presence of random shocks would make a higher level of enforcement optimal than would otherwise be the case, and the optimal expected amount of crime would be less than $\tilde{\theta}(u)$.

The optimal level of enforcement also depends on which equilibrium is in effect. Suppose that enforcement has fallen enough that E_2 is the equilibrium. If enforcement increases, the $\tilde{\theta}(u)$ curve returns to $\tilde{\theta}_1(u)$, but the equilibrium does not return to drastically lower crime at E_1, but to slightly lower crime at E_3. Thus, although enforcement levels resulting in $\tilde{\theta}_1(u)$ may be optimal starting from $\tilde{\theta}_0(u)$ or $\tilde{\theta}_1(u)$, if the system begins at $\tilde{\theta}_2(u)$ a lower level of enforcement may be optimal. If crime is low, long jail sentences may be optimal to maintain stigma, but if crime is high, and stigma has ceased to work, the authorities should give up and become more lenient. The optimal enforcement effort can actually fall as crime increases. The stigma model also suggests that a "big push" would be the most effective way to reduce crime. It may be worth investing resources to push the system back to the low-crime equilibrium, even if it is not worthwhile trying to ameliorate the high-crime equilibrium.

B. The Advantages of Stigma as a Punishment

One of the oldest issues in the economics of crime is how society can deter crime efficiently. Imprisonment is costly, and Becker has suggested that fines be used wherever possible because they are transfers rather than social costs.[17] If the fine is large and the probability of detection small, the expected penalty can be large enough to yield deterrence at a low social cost. This policy has well-known practical problems, of which the most important is the inability of criminals to pay substantial fines. High fines also raise the concern that the government may be tempted to prosecute the innocent for the sake of revenue.

Stigma avoids these problems. Although many people have little liquid wealth, the market value of most people's future labor rents is substantial. Stigma is like a fine drawn on those future rents, a fine which can be collected regardless of the criminal's present wealth. Since it is the private sector that imposes the punishment, stigma is neither costly to the government, like imprisonment, nor revenue-raising, like fines, so neither concern will distort the government's decision.

At the same time, stigma retains the advantage of fines in deterring the criminal without creating real costs, because it transfers wealth from the criminal to the rest of society. Stigma actually increases efficiency, because allocative efficiency increases as information is disclosed. The stigma from automobile speeding, for example, is that the offender will pay more for automobile insurance after being identified as a fast driver with a disdain for regulations. This comes closer to matching the social cost of the offender's driving with the private cost to himself, and in some cases he will quit driving. The effect in the labor market is similar.

Prior to his conviction, the criminal's labor is overvalued in the market. His loss of income after stigmatization is a gain for noncriminal workers who would otherwise be pooled with him and paid less than their marginal products so he could be paid more.[18]

This benefit of stigma is different from the conventional functions of punishment—- deterrence, incapacitation, rehabilitation, and retribution. Stigma has advantages

[17]Becker, *supra*, note 1.

[18]Posner mentions that stigma can supplement official punishment for white-collar crime, but he misses this point, claiming instead that "The economic objection to relying on stigma for deterrence is that, like imprisonment, it is more costly to society than the pure fine (or civil penalty) because it does not yield any revenue" (Richard Posner, Optimal Sentences for White–Collar Criminals, 17 American Criminal Law Review 409 (1980) at 416).

as a deterrent, and may even serve to incapacitate the criminal by removing him from jobs that would give him opportunities for crime, but in disclosing information it serves a distinctly different function. Even if stigma had no effect on the amount of crime, it would improve efficiency.

C. Publicizing Government Records

Because stigmatization is distinct from deterrence, courts need to convey accurate information to the public, rather than just inflicting the appropriate penalty. For deterrence, it may not matter if the court declares someone guilty of counterfeiting rather than their actual crime of burglary, so long as the penalty is appropriate for burglary. For stigmatization, however, the exact charge is important, because different kinds of people commit these crimes.

This has implications for plea bargaining. In a plea bargain, the accused often pleads guilty to a crime milder than that for which the prosecutor has good evidence. From the point of view of stigmatization, it would be much better for the plea bargain to take the form of a guilty plea to the original crime, but with a recommendation of a reduced sentence. The public penalty would be the same, but stigma could be more accurately applied.

The social utility of stigma is also relevant to the question of whether criminal records should be open to the public. Court dockets are open as a matter of constitutional right, and daily police arrest blotters are traditionally open, but the availability of records filed by name varies state by state.[19] State legislatures have passed a wide variety of statutes ranging from Florida's completely open records to Illinois' restriction of access to providers of child care, volunteer organizations associated with children, detective agencies, security-guard organizations, schools, and liquor-license holders. Moreover, juvenile records are often kept secret even when adult records are not.

The argument for keeping criminal records secret is that by preventing discrimination against workers with criminal pasts it gives them higher wages in legitimate employment and greater motivation for a fresh start.

[19]There seems no constitutional objection to disclosure. In 1976, the U.S. Supreme Court established that a police department could even circulate the names of those arrested for shoplifting (even though not convicted) to local merchants (*Paul v. Davis*, 424 U.S. 693 (1976)). The discussion in this paragraph and the next is from Bureau of Justice Statistics, U.S. Dept of Justice, Public Access to Criminal History Record Information (1988): blotters, p. 2; dockets, p. 3; Florida, p. 19; Illinois, p. 25; and Bureau of Justice Statistics, U.S. Dept of Justice, Use and Management of Criminal History Record Information: A Comprehensive Report (1993).

This is sometimes joined to the argument that employers are unreasonably prejudiced against workers with criminal records, because criminality is not associated with productivity. This argument is weak because it depends on outside observers knowing workers' productivity better than employers do.[20] Even if the argument were valid, however, and stigma were based on mistaken beliefs about productivity, it would not be conclusive, because stigma would still be useful as a punishment. Stigma based on mistaken beliefs would be a costly punishment because of its effect on the labor market, more like imprisonment than fines, but it might still be an optimal part of punishment.

A stronger argument against stigma is based on an externality from employing criminals.

If employers were forbidden access to criminal records, they would overestimate the convicted criminal's productivity and pay him a higher wage. The direct effect would be to hurt allocative efficiency, since employers would pay a uniform wage which would exceed the criminal workers'

marginal product and be less than the noncriminal workers' marginal products. At the higher wage, however, more criminals would choose to be employed in legitimate jobs, and this would raise the opportunity cost of crime.[21] This social benefit does not figure in the employer's calculations, so it may be socially beneficial to keep

criminal records secret.[22] The tradeoff is between the beneficial effect of secrecy on recidivism and the harmful effects on deterrence of first crimes and on allocative efficiency.

[20]Discrimination against criminals is generally legal, but it has become entangled in racial discrimination suits. In one case, a plaintiff was refused employment because of his 14 arrests. Judge Hill said: "There is no evidence to support a claim that persons who have suffered no criminal convictions but have been arrested on a number of occasions can be expected, when employed, to perform less efficiently or less honestly than other employees. In fact, the evidence in the case was overwhelmingly to the contrary. Thus, information concerning a prospective employee's record of arrests without convictions is irrelevant to his suitability or qualification for employment." *Gregory v. Litton Systems, Inc.*, 316 F. Supp. 401, 2 FEP 842 (C.D. Cal 1970), affirmed 472 F 2.d 631, 5 FEP 267 (9th Cir. 1972).

[21]Note, however, that the opportunity cost of crime would fall for workers who had not been criminal in the past, since they would receive the same pooled wage as the criminal workers.

[22]A subtly different argument with similar

implications is that by raising the criminal's income, legitimate employment reduces his marginal utility of income and his temptation to commit property crimes. See Eric Rasmusen, An Income-Satiation Model of Efficiency Wages, 30 Economic Inquiry 467 (1992).

Against this benefit must be set the disadvantage that lack of stigma increases the incentive for crime in the first place. No policy that tries to induce the convicted criminal to refrain from crime by increasing the benefits of legitimate work can escape this incentive problem, but not all policies create the allocative distortions of secret records. Those distortions could be avoided by tackling the externality problem directly, by keeping records open but subsidizing the wage of ex-criminals. Such a subsidy would weaken the deterrence effect of stigma, but it would not distort the labor market.

IV. EMPIRICAL APPLICATION OF THE STIGMA MODEL

Even during the 1950s, crime in the United States was increasing at a slow but steady rate, but it then accelerated, increasing by 139 percent during th 1960's. As Table 1 shows, crime continued to increase since then, though at a slower rate and with occasional dips, of which the most notable was a decline in the early 1980's.

Part of the increase was due to the baby boom, which increased the population of young males starting in the 1960's. Crime increased faster, however, as the trends for crime per youth in Table 1 and Figure 3 show, and since 1981 the number of youths has actually declined.

Decline in punishment is an obvious explanation for the increase in crime. The criminal justice system became strikingly lenient in the 1960s. Serious ("index") crimes rose from 3.4 million to 8.1 million crimes per year during the 60's, and arrests for index property crimes per 100,000 population rose from 570 to 840, but the number of people entering prison fell from 88,575 to 79,351.[23] Not only did imprisonment fail to keep up with the amount of crime, it fell in *absolute* terms .

The problem with this explanation is that when prison populations increased

[23] Arrest rates are from: Federal Bureau of Investigation, U.S. Dept of Justice, Crime in the United States, annual, 1960, p. 16 and 1970, p. 23. Crimes and prison entrants are from Table 1.

in the 1970s and 1980s, the crime rate did not fall correspondingly. Crime per youth increased by

59% from 1965 to 1975, a time when prisoners per crime fell from 0.018 to 0.011, but crime per youth did not fall correspondingly from 1981 to 1991, when prisoners per crime actually rose 92%, from 0.012 to 0.023. By 1991, prisoners per crime was back to the 1963 level, but crime per youth was almost twice as large. The seeming ineffectiveness of punishment is surprising given the cross-sectional estimates of the elasticity of crime with respect to expected punishment, such as the elasticity of -1.14 that Ehrlich

found using 1960 data comparing different states.[24]

At least part of the answer may lie in a failure of stigma. The theoretical model has shown that multiple equilibria are possible, and that changes in the probability of punishment have asymmetric effects depending on whether the changes are increases or decreases. A large enough increase in the crime rate is self-sustaining, because it reduces stigma enough to make crime profitable for a much larger group of young people.

The stigma model suggests the following story. In 1960, the United States was at a low-crime equilibrium, in which a combination of public punishment and private stigma deterred crime. In the 1960s, a number of things happened to make crime more attractive, including possibly a general decline in morality (a shift rightwards of $F(u)$ in Figure 2) and certainly a lenient government policy (a decline in P and α). This shifted the $F(u)$ curve of Figure 2 to the right and the $\tilde{\theta}(u)$ curve downwards. Eventually there existed just one equilibrium, with high crime, and the value of θ started to move towards it as expectations changed.

By 1970 it was clear that the punishment rate was too low, and the number of people imprisoned began to rise sharply. According to the stigma model, increasing the punishment rate would shift $\tilde{\theta}(u)$ up again, reducing the amount of crime slightly, but if the crime rate in 1970 were greater than the middle, unstable, equilibrium, then the adjustment process would shortly continue to push the crime rate up to the high-crime equilibrium. Thus, the 1970-73 crackdown reduced crime per youth slightly, but crime soon rose again, albeit more slowly, until 1981. The increase in punishment had only a temporary effect, and did not reduce crime to its original level. Although arrest rates did not increase much during the 1980s (from 1,056 per 100,000 in 1980 to 1,124 in 1988)[25], imprisonment rates rose

[24]Ehrlich, *supra* note 1.

[25]Crime in the United States, *supra*, note 23, 1980-25 and 1988-25.

sharply, which caused a decline in crime in the early 1980s. The decline was small compared to the increase in the 1960s, because the tough policy of the 1980s was not tough enough to restore stigma. In the late 1980's, crime began to increase again, for reasons outside the model (e.g. crack cocaine).

Support for the stigma explanation is provided by changes in the pattern of

arrest rates by age categories, shown in Table 2.

Young people have become more criminal and old people less criminal. This is curious because the 35-year-old of 1985, whose arrest rate was lower than the 1961 35-year-old's, is the same person as the 21-year-old of 1971 whose arrest rate was so much higher than the 1960 21-year-old's.[26] The explanation may be that stigma can decline for a subpopulation such as young men even if it retains its strength for the middle-aged. The young have not yet established a reputation for productivity in the labor market and their employers are at more of an informational disadvantage. As a result, the decline in stigma may have had a disproportionate effect on youth crime.[27] The increase in official punishment since 1971, on the other hand, has affected both young and old, so that arrests of older people increased less, or even declined. Grogger notes that between 1973 and 1988, real wages paid to young men who worked full-time fell 23%, which would more than explain the increase in youth arrest rates over that period, according to the elasticity of crime with respect to wages that he estimates.[28] The stigma model suggests that causality went both ways, and real wages fell because crime increased.

If the increase in crime is to be largely explained by a reduction in stigma, it must also be true that

a significant proportion of the population—or at least of subpopulations such as young males— has become criminal. The shift in the proportion of criminals need not be from 0% to 100%, but if the change is merely from 1% to 5% the effect on average productivity and thus on stigma will be small.

Criminality is indeed very common among young males, as various studies

[26]The relevant numbers are underlined in Table 2.

[27]The effect on black males, a subpopulation easily identified by employers, may have been especially strong. The percentage of black males aged 20-24 not participating in the labor force rose from 10.2% in 1965 to 18.5% in 1971 and 21.1% in 1980. For white males, the figures are 14.7%, 16.8%, and 12.9% (from Table 8 of Murray, *supra*, Table 1 of this paper).

[28]See Grogger, *supra*, note 6.

have shown.[29] Ball, Ross and Simpson found that as early as 1960, 20.7% of the boys and 5.3% of the girls in Lexington, Kentucky had appeared in juvenile court.[30] Tillman examined a comprehensive set of arrest records to discover the probability of being arrested for Californians who were 18 in 1974.[31] His results are summarized in Table 3: 34% of the white males and 66% of the black males were arrested (41% of the black males for a felony).

Simply comparing arrests with population is instructive. In 1987, 543,000 arrests (132,000 for index offenses) were made out of a population of 1,889,000 18-year-old males.[32] More broadly, the Department of Justice estimates that 40 million Americans have an arrest record for a non-traffic offense,[33] an especially shocking figure since the number of arrests is lower than the number of crimes committed.[34] Enough people have engaged in crime that if crime and productivity are linked, average productivity could be seriously affected.

V. CONCLUDING REMARKS

Since Becker's seminal article in 1968, economists studying crime have focussed on how

[29]These studies are summarized in Christy Visher & Jeffrey Roth, Participation in Criminal Careers, in Alfred Blumstein, Jacqueline Cohen, Jeffrey Roth, & Christy Visher, editors, Criminal Careers and "Career Criminals", Volume 1, (1986).

[30]John Ball, Alan Ross, & Alice Simpson, Incidence and Estimated Prevalance of Recorded Delinquency in a Metropolitan Area, 29 American Sociological Review 90 (1964).

[31] Robert Tillman, The Size of the 'Criminal Population': The Prevalence and Incidence of Adult Arrest, 25 Criminology

561 (1987).

[32] Of 420,950 arrests of males aged 18 , 102,000 were for index offenses, in the reporting population of 188,928,000. (Crime in the United States, *supra*, note 23, 1988, Table 34). The total U.S. resident population was 243,400,000 in 1987 (SA-89-2). Scaling up the number of arrests by 1.29 and rounding gives 543,000 and 132,000. The figure of 1,889,000 males of age 18 in 1987 is found by dividing the population aged 15-19 by 5 (SA-89-13).

[33] Bureau of Justice Statistics, U.S. Dept of Justice, Report to the Nation on Crime and Justice, Second Edition, NCJ-105506, March 1988, p. 40.

[34]In 1988, there were an estimated 2,888,600 arrests for index crimes (out of a total of 13,812,300 arrests). 13,923,086 index crimes were reported, and since an estimated 36.9% of index-crime victimizations were reported, the total number of index crimes was about 37,731,940. (Crime in the United States, *supra*,

note 23, 1988, Tables 2 and 24, and Sourcebook, *supra*,

note 14, Table 3.4. See *supra*, note 32 for how these figures were adjusted for the size of the reporting population.

the probability and severity of punishment deters a potential criminal bent on maximizing his utility. This approach emphasizes the criminal justice system, not the moral disapproval of the

society in which the system operates. Reversing the usual pattern, economists stress the role of the government and non-economists the private sector in preventing crime.

The private sector, however, unofficially punishes known criminals by stigmatizing them. Once the criminal's behavior becomes known, many other individuals become more reluctant to interact with him. This private reluctance may be as powerful a disincentive to crime as public punishment. The model above described economic stigma, a reduction in the wage employers are willing to pay someone with a criminal record either because engaging in crime reduces productivity (the moral hazard model) or because it correlated with low productivity for other reasons (the adverse selection model). Social stigma could be modelled similarly, as a reduction in the concessions that potential friends or spouses are willing to make to a convicted individual for the privilege of social interaction with him. Whatever its nature, the stigma of a criminal record depends on the informativeness of that record, and thus on the likelihood that someone without a conviction is nonetheless criminal. It was shown that this

generates multiple equilibria, because if crime is sufficiently prevalent, a criminal record loses its informativeness and thus its stigmatizing effect.

Stigma makes the private sector an important part of criminal deterrence, but the government remains useful as a source of detection and publicity for criminality. The government also influences which of the multiple equilibria is in effect, since a reduction in the public penalty increases the amount of crime, which in turn reduces the effectiveness of stigma. This may help explain the asymmetry of the American experience with crime over the past three decades, when the initial decrease in public penalties seems to have encouraged crime more than the later increase discouraged it.

Table 1
Crime Trends in the United States
(columns (a), (b) and (c) are in 1000's)

Year	Index Crimes reported (a)	Youths aged 16-24 (b)	Prisoners received from courts (c)	Crimes/ Youth (a)/(b)	Prisoners/ Crime (c)/(a)
1960	3,397	9,642	89	.35	.026
1961	3,488	9,956	94	.35	.027
1962	3,752	10,075	89	.37	.024
1963	4,110	10,736	88	.38	.021
1964	4,565	11,386	88	.40	.019
1965	4,740	12,019	88	.39	.018
1966	5,224	12,321	78	.42	.015
1967	5,903	12,514	78	.47	.013
1968	6,720	12,810	72	.52	.011
1969	8,073	13,307	75	.61	.009
1970	8,127	14,006	79	.58	.010
1971	8,614	14,941	97	.58	.011
1972	8,291	15,766	117	.53	.014
1973	8,781	16,284	124	.54	.014
1974	10,348	16,612	104	.62	.010
1975	11,380	17,084	130	.67	.011
1976	11,458	17,481	129	.66	.011
1977	11,109	17,765	128	.63	.012
1978	11,348	18,002	126	.63	.011
1979	12,400	18,183	131	.68	.011

Table 1 (continued)
Crime Trends in the United States

Year	Index Crimes reported (a)	Youths aged 16-24 (b)	Prisoners received from courts (c)	Crimes/ Youth (a)/(b)	Prisoners/ Crime (c)/(a)
1980	13,408	18,283	142	.73	.011
1981	13,452	18,208	160	.74	.012
1982	13,001	18,015	177	.72	.014
1983	12,124	17,799	187	.68	.015
1984	11,897	17,494	180	.68	.015
1985	12,431	17,021	198	.73	.016
1986	13,212	16,773	219	.79	.017
1987	13,509	16,530	242	.82	.018
1988	13,923	16,249	261	.86	.019
1989	14,251	15,854	316	.90	.022
1990	14,476	15,602	343	.93	.024
1991	14,873	15,443	337	.96	.023

NOTES.— (a) “Index crimes” do not include arson. (b) “Youths” are civilian non-institutional males. (c) “Prisoners” refers to persons with at least a one-year sentence in state and federal prisons.

SOURCE.— (a) 1960-80: Charles Murray, Losing Ground: American Social Policy 1950-1980 (1984)

Table 18. 1981-87: SA-89-277, 1988-91:

SA-93-300. Murray’s figures, taken from unpublished FBI data, are more accurate than those in the *Statistical Abstract.* He gives crime rates, not total crime, and the figures here are his

crime rates multiplied by the total resident population, from SA-89-2.

(b) 1960-87: Handbook of Labor Statistics, 1989, *supra*, note 16, pp. 13-14. 1989-91: p. 9 of August issues of Employment and Earnings, U.S. Department of Labor, Bureau of Labor Statistics. (c) 1950-54: SA-57-186. 1955-70: *Historical Statistics*, H1138. 1971-73: SA-75-290. 1974: SA-76-291. 1975: SA-77-315. 1976-78: SA-80-

342. 1979: SA-81-330. 1980-82: SA-84-325. 1983-86: SA-89-318. 1987-91:

SA-93-343. The 1990-91 figures are the levels for state prisons multiplied by 1.062, one plus the 1989 ratio of federal to state prisoners.

Table 2
Arrest Rates per 100,000 Population

	Under 18	18-20	21-24	25-29	30-34	35-39	40-44	45-49	50+	All ages
1961	1,586	8,183	8,167	6,859	6,473	6,321	5,921	5,384	2,594	3,877
1966	2,485	8,614	7,425	6,057	5,689	5,413	5,161	4,850	2,298	3,908
1971	3,609	11,979	9,664	6,980	6,016	5,759	5,271	4,546	2,011	4,717
1976	3,930	13,057	10,446	7,180	5,656	5,205	4,621	3,824	1,515	4,804
1981	3,631	15,069	11,949	8,663	6,163	5,006	4,176	3,380	1,253	5,033
1985	3,335	15,049	13,054	9,847	7,181	5,313	4,103	3,155	1,088	5,113

NOTE.— Over 50% of arrests are for "public order" offenses (e.g. drunk driving, prostitution), especially for older people. The underlined entries are mentioned in the text.

SOURCE.— Technical Appendix, *supra*, note 14, pp. 26-27.

Table 3
The Probability of an Individual Being Arrested Between 1974 and 1985

	All Offenses		Felony Index Offenses	
	Male	Female	Male	Female
Black	66	30	41	14
White	34	10	15	3
Total	35	11	17	4

NOTES.– Californians aged 18 in 1974. "All Offenses" excludes drunk driving, public drunkenness, and possession of less than 28.5 grams of marijuana. "Felony index offenses" is a narrower category than "FBI index offenses".

SOURCE.– Tillman , *supra*, note 31.

REFERENCES

Andvig, Jens & Karl Moene. "How Corruption May Corrupt." *Journal of Economic Behavior and Organization* 13 (1990): 63-76.

Ball, John, Ross, Alan, and Simpson, Alice. "Incidence and Estimated Prevalance of Recorded Delinquency in a Metropolitan Area." *American Sociological Review* 29 (1964): 90-93.

Becker, Gary. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76 (March/April 1968): 169-217.

Bureau of the Census, U.S. Dept. of Commerce. *Historical Statistics of the United States: Colonial Times to 1970.* White Plains, New York: Kraus International Publications, 1989 (reprint).

Bureau of Justice Statistics, U.S. Dept of Justice, *Report to the Nation on Crime and Justice, Second Edition*, NCJ-105506, March 1988.

Bureau of Justice Statistics, U.S. Dept of Justice, *Technical Appendix, Report to the Nation on Crime and Justice, Second Edition*, NCJ-112011, July 1988.

Bureau of Justice Statistics, U.S. Dept of Justice. "Public Access to Criminal History Record Information." NCJ-111458, November 1988.

Bureau of Justice Statistics, U.S. Dept of Justice. "Use and Management of Criminal History Record Information: A Comprehensive Report," NCJ-143501, November, 1993.

Bureau of Labor Statistics, U.S. Dept of Labor. *Sourcebook of Criminal Justice Statistics*, 1988.

Bureau of Labor Statistics, U.S. Dept of Labor. *Handbook of Labor Statistics*, 1989.

Dickens, William, Katz, Lawrence, Lang, Kevin, and Summers, Lawrence. "Employee Crime and the Monitoring Puzzle." *Journal of Labor Economics* 7 (July 1989): 331-347.

Ehrlich, Isaac."Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy* 81 (1973): 521-65.

Federal Bureau of Investigation, U.S. Dept of Justice, *Crime in the United*

States. Annual.

Freeman, Richard. "Crime and the Employment of Disadvantaged Youth," in Adele Harrell and George Peterson, eds., *Drugs, Crime and Social Isolation: Barriers to Urban Opportunity,* Washington: Urban Institute Press, 1992

Freeman, Scott, Grogger, Jeffrey and Jon Sonstelie. "The Spatial Concentration of Crime." Working paper, Dept of Economics, University of California, Santa Barbara, July 1989.

Grogger, Jeffrey. "Arrests, Persistent Youth Joblessness, and Black-White Employment Differentials." *Review of Economics and Statistics* 74 (February 1992): 100-106.

Grogger, Jeffrey. "Criminal Opportunities, Youth Crime, and Young Men's Labor Supply," working paper, Dept. of Economics, University of California, Santa Barbara, California, February 1994.

Grogger, Jeffrey. "The Effect of Arrest on the Employment and Earnings of Young Men." *Quarterly Journal of Economics* 90 (February 1995): 51-72.

Hirshleifer, David & Eric Rasmusen "Cooperation in a Repeated Prisoner's Dilemma with Ostracism." *Journal of Economic Behavior and Organization* 12 (August 1989): 87-106.

Karpoff, Jonathan & John Lott. "The Reputational Penalty Firms Bear from Committing Criminal Fraud." *Journal of Law and Economics* 36 (October 1993): 757-802.

Klein, Benjamin & Keith Leffler. "The Role of Market Forces in Assuring Contractual Performance" *Journal of Political Economy.* 89 (August 1981): 615-41.

Lott, John. "The Effect of Conviction on the Legitimate Income of Criminals." *Economics Letters* 34 (1990): 381-385.

Lott, John. "An Attempt at Measuring the Total Monetary Penalty from Drug Convictions: The Importance of an Individual's Reputation." *Journal of Legal Studies* 21 (January 1992): 159-188.

Lott, John. "Do We Punish High-Income Criminals Too Heavily?" *Economic Inquiry* 30 (October 1992): 583-608.

Lui, Francis. "A Dynamic Model of Corruption Deterrence." *Journal of Public Economics* 32 (1986): 215-236.

Murray, Charles. *Losing Ground: American Social Policy 1950-1980*. New York: Basic Books, 1984.

Posner, Richard. "Optimal Sentences for White–Collar Criminals." *American Criminal Law Review* 17 (1980): 409-418.

Rasmusen, Eric. "An Income-Satiation Model of Efficiency Wages." *Economic Inquiry* 30 (July 1992): 467-478.

Sah, Raj. "Social Osmosis and Patterns of Crime." *Journal of Political Economy* 99 (December 1991): 1272-1295.

Schlei, Barbara & Paul Grossman. *Employment Discrimination Law*, Second Edition, Washington: The Bureau of National Affairs, Inc.

Schrag, Joel & Suzanne Scotchmer. "Crime and Prejudice: The Use of Character in Evidence in Criminal Trials." *Journal of Law, Economics, and Organization* 10 (October 1994): 319-342.

Schrag, Joel & Suzanne Scotchmer. "The Self-Reinforcing Nature of Crime." Working paper, Graduate School of Public Policy, University of California, Berkeley, May 1994.

Tauchen, Helen, Ann Witte & Harriet Griesinger. "Criminal Deterrence: Revisiting the Issue with a Birth Cohort." *Review of Economics and Statistics* 126 (August 1994): 399-412.

Tillman, Robert. "The Size of the 'Criminal Population': The Prevalence and Incidence of Adult Arrest." *Criminology* 25 (1987): 561-579.

U.S. Dept. of Commerce, Bureau of the Census. *Statistical Abstract of the United States*. Washington: Superintendant of Documents, U.S. Government Printing Office. Annual.

Visher, Christy and Roth, Jeffrey. "Participation in Criminal Careers." In Blumstein, Alfred, Cohen, Jacqueline, Roth, Jeffrey, and Visher, Christy, editors, *Criminal Careers and "Career Criminals", Volume 1*. Washington: National Academy Press, 1986.

Waldfogel, Joel. "The Effect of Criminal Conviction on Income and the Trust

‘Reposed in the Workmen’. ” *Journal of Human Resources* 29 (1994): 62-81.