A Human Capital Perspective
on Criminal Careers

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Abstract

The existing economics literature has traditionally viewed crime as a choice-making process, where the potential criminal chooses among alternatives based upon the costs and benefits of each. Models by Becker, Rogers, Tullock, and Hellman , have generally portrayed the criminal choice equation as static and not allowed for the dynamic changes that may occur to the criminal's aptitude, and income over long time horizons. This paper develops a dynamic choice model of criminal behavior over a criminal career including the acquisition process for both legal and criminal human capital. Psychic and monetary benefit and cost factors are discussed as well as the standard arguments concerning the probabilities of apprehension and conviction. The model suggests that to alter the criminal's choice pattern and, therefore, his education toward legal income-producing activities, the first instance of incarceration is the most crucial and that (1) A learning multiplier exists for the criminal in both legal and illegal learning. (2) Greater segregation of prison populations by ordinal magnitude of offense could better separate criminal students from criminal mentors and further reduce criminal education. (3) Higher order legal skills training in the penal system may shift the education decision to legal educational pursuits. (4) Redefining the legal and constitutional rights afforded felons could increase the probability of repeat apprehension and reduce the incentive to repeat offenses.

Introduction

During the last 25 years, criminal behavior has been examined by most of the social sciences. Becker's work (1968) represents the first and perhaps most notable among economists. The essence of his work in this area is that the benefits and costs of criminal behavior vary across individuals. In this view, some individuals engage in profit-taking by violating the law because it simply represents their optimal income-earning opportunity. As a result, some individuals become criminals, and others do not. An implication of this hypothesis is that increasing the cost of crime to the individual (i.e. increasing the probabilities of prosecution and incarceration, among other things) would help to deter crime.

Using Becker's theoretical foundations, many economists have empirically examined various aspects of criminal behavior. In a survey of the literature, Cameron (1988) has summarized the results of many recent benchmark studies. These studies have focused primarily on the deterrence effects of certainty and severity of punishment, but have not reached a consensus because of measurement error.

Block and Heineke (1975) modified Becker's theoretical model and determined that changes in wealth, the payoff to illegal activity, enforcement, punishment and the degree of certainty related to punishment had little impact on criminal behavior. This finding is not consistent with the theoretical results obtained by Becker and suggests that empirical determination, in addition to theoretical prediction, is required for meaningful policy recommendations.

Sociologists and criminologists employ a different paradigm than that of economists to explain criminal behavior. While their theories are many and varied, one common theme tends to pervade their explanations: criminal behavior can be attributed to environmental differences. Contrary to the economist's view, the possibility of punishment seems relatively unimportant in explaining criminal behavior. Rather, the individual who engages in criminal activity is influenced by social conditioning and tends not to acknowledge the costs and benefits of his behavior. Social conditioning includes exposure to television violence, organized religion, family setting, etc. (Wilson and Herrnstein, 1985; Hirschi and Gottfredson, 1989).

Given their different paradigms, it is not surprising that economists place more confidence in the findings of deterrence studies than their counterparts in sociology and criminology.

The existing economics literature has traditionally viewed crime as little more than a choice-making process, where the potential criminal chooses among alternatives based upon the costs and benefits of each. Static models by Rogers, Tullock, and Hellman [Rogers, 1973; Tullock, 1975; and Hellman, 1981] have generally portrayed the choice equation to look something like this: Select the illegal activity over the legal activity if and only if the benefits are greater than the costs;

$$M_b + P_b > O_{cm} + O_{cp} P_a P_c \qquad (1.0)$$

M_b = The monetary benefit to the criminal of committing the crime; for example, the value of the stolen property

P_b = The psychic benefit of committing the crime; for example, the respect of one's peer criminals or even, possibly, a feeling of vindication against society or individuals

O_{cm} = Monetary opportunity cost of committing the crime, generally viewed as synonymous with the foregone monetary income incurred by serving out a criminal sentence. If the criminal could legally earn \$10,000 per year, a three year sentence would cost him \$30,000.

O_{cp} = Psychic opportunity cost of committing a crime such as the fear or apprehension of punishment, guilt, etc.

P_a = The probability of apprehension for a specific time

P_c = The probability of conviction for a specific crime

The psychic benefit and cost factors in the equation are extremely difficult to quantify and more in the realm of the sociologist and psychologist than the economist. The monetary cost and benefit factors are, on the other hand, very much the concern of the economist. [Rossi, 1980; Gray, 1974]. By assuming, for the time being, that P_b and O_{cp} are relatively constant, we realize that to change criminal behavior at the margin, one need change only the costs or benefits to the criminal of committing a specific crime. This type of theory is, of course, much more applicable to crimes against property (i.e., robbery, burglary) than crimes against persons (i.e., rape, assault) [Wilson and Clark, 1992].

What the literature has traditionally argued, with extreme oversimplification, is that crime could be substantially reduced by increasing the penalties for crimes against property [O_{cm}] (i.e., handing out stiffer sentences)

or increasing either the probability of arrest [P_a] or the probability of conviction [P_c] [Tullock, 1979]. In the theoretical absolute, it is difficult to argue with this basic conclusion. The static choice models of the past do not, however, give us very much insight into the dynamic nature of a criminal career. The literature, in most cases, has been content to assume that the monetary and probabilistic terms in the choice equation remain relatively constant over time. This renders the current models incapable of accurately predicting criminal choice beyond one time horizon. The intent of this paper is to discuss a more dynamic choice model of criminal behavior which can explain and predict criminal careers in the context of the learning and human capital literature of economics.

The Generalized Criminal Choice Model

We have not attempted to formally model criminal behavior, but rather present a largely expository statement of the nature of the problem, albeit in a static setting. Hence, the nature of the problem facing the criminal may be simplified by collapsing the time allocation problem into one between activities producing legal income and illegal activities. Let utility be written as a function of legal income Y and illegal activities I;

$$U = U(Y,I) \qquad (2)$$

where $U(Y,I)$ is assumed to be continuous and twice differentiable with positive first partials and negative second partials for both arguments. Accumulated knowledge, K, is produced by a production function (assumed to be linear for simplicity, where β_0 denotes an initial endowment of knowledge, β_1 learning ability, S time allocated to learning legal income producing skills.

$$K = \beta_0 + \beta_1 S \qquad (3)$$

Legal income is assumed for simplicity to be proportional to knowledge, with g denoting the factor or proportionality;

$$Y = gK \qquad (4)$$

Substituting (3), and a time budget constraint T = I + S, into (4) yields;

$$Y = g[\beta_0 + \beta_1(T - I)] \qquad (4')$$

Maximizing (1) subject to (4'), and then solving for the change in time allocated to learning consequent on a change in learning ability, yields;

$$S/\beta_1 = (- D_{11} + SD_{31}) g/D \qquad (5)$$

where Dij is the i,j determinant of the corresponding Hessian. We may rewrite (5) as;

$$S/ ß_1 = [(S/ ß_1)U + S S/ ß_0] \qquad (5')$$

which is the familiar Slutsky equation in the context of time costs, where $(S/ ß_1)$ is the uncompensated learning ability effect, $(S/ ß_1)U$ is the compensated learning ability (substitution) effect, and $(S S/ ß_0)$ is the income, or initial endowment of knowledge effect. Since the substitution effect is positive, and the endowment effect is negative (assuming that illegal activity is viewed by the criminal as a normal good), the total effect is, as usual, indeterminate.

Assume now that the criminal is initially maximizing utility at a point where the rate at which he can substitute leisure for income equals his willingness to do so. Say that there is now an exogenous increase in learning ability (alternatively, say that we look at a more capable criminal). As $ß_1$ increases, we also find that at any given level of illegal activity, a higher Y is attainable and that time spent on I may now be transformed into Y at a greater rate.

Clearly, any number of possible time allocation patterns can result from this change depending on the relative magnitudes of the substitution and income effects. As $ß_1$ rises, the time price of legal income falls, and the price of illegal activities rises so that if the resulting substitution effect on illegal activities dominates the income effect, it will yield an increase in time allocated towards learning and a reduction in illegal activities time. Alternatively, if the opposite is true, then we will observe a higher level of illegal activities and a lower amount of time allocated to legal learning.

The criminal does face a very real time constraint. Therefore, at least in the static, one time horizon model presented here, the opportunity cost of incremental income Y is the foregone utility from time taken away from illegal activities I.

Disadvantages Of Static Models

Under this model, the criminal can now maximize his utility by maximizing legal income, illegal activity or some combination of the two, given his respective aptitudes. This general equilibrium model offers more flexibility in explaining or perhaps even empirically testing the true impact of monetary benefits and costs in the criminal choice process. It does not, however, allow for the dynamic changes that may occur to the criminal's aptitude, and income over long time horizons. We believe a general choice equilibrium may exist, but that it is not static. It is

in a constant state of flux as the criminal's choice-making determinants change over time.

Advantages Of A Dynamic Learning Model

Let us now incorporate a learning feature into the criminal choice process. This implies that criminals who commit crimes against property make rational decisions based upon information they have; that they do, in fact, learn over time. From this, it is reasonable to expect that criminal behavior may change with learning. That change may be either toward or away from more criminal activity based upon the costs and benefits to the criminal of the learning activity and the relative criminal aptitude for legal versus illegal learning and earning activities.

We will assume that increasing aptitude and the stock of knowledge in a particular earning activity, i.e., $(ß_1$ and $ß_0)$ respectively will increase income Y in the long-run. If this is the case, then the criminal has an incentive to learn more (increase his aptitude $ß_1$ and stock of specific income earning knowledge $ß_0$). In attempting to increase knowledge and aptitude, the criminal, in effect, becomes a student. He is both producer and consumer of a learning product. He not only "learns more on his own" but also uses the services of an "on-the-job trainer," mentor, teacher or whatever description might be appropriate for the source of knowledge. This may be a welder while the criminal is a welder's apprentice, a corporate training director who teaches clerks the business of clerking, or in the illegal sense, if he is incarcerated, he may learn safe cracking from a senior incarcerated safe cracker. On the street, the criminals will still tend both to learn from senior criminals and perhaps even teach more junior criminals. The criminal produces learning by consuming the output of the trainer and adding to that output with knowledge of his own.

One major dilemma in the analysis of crime deals with repeat offenders. It appears that very few criminals commit an illegal act, receive and serve a sentence, and then return to society as productive citizens, never to break the law again. Instead, the individual appears to develop a criminal career. In this process, the penal institutions become institutions of higher education in crime. Individuals make the original cost/benefit calculation in equation 1.0, commit a series of crimes, are apprehended, sentenced and sent to prison. Their price of admission to the criminal university system appears to be the fact that they not only chose to break the law, but did it so poorly or so frequently that they were caught. Once incarcerated, the criminal's cost/benefit equation changes significantly. Returning to equation 1.0, the criminal may now realize that to rationally repeat his illegal efforts in the future, he must be able to increase his monetary or psychic benefits

of crime (M_b , P_b) or decrease his costs (O_{cm} , O_{cp}) in committing a crime. He may do this by reducing his probability of apprehension (P_a) or conviction (P_c) as well as his opportunity cost of the sentence served. Let us examine each of these factors individually.

Changing Income and Probabilities

First, the fact that the criminal now has a record produces two effects. One is that as a convicted felon, his civilian earnings will probably decline. In other words, he may not be able to find civilian employment at his pre-conviction wage after he has served his sentence. This, obviously, reduces his opportunity cost (O_{cm}) of committing an additional crime after he is released. On the other hand, the present probabilities of apprehension and conviction for future crimes may have increased. Obviously, when a series of cat burglaries are occurring in an area, the police start their search with the list of convicted cat burglars living in that area. Appearing before a judge and jury with a prior conviction for the same crime one is accused of may well increase the probability of a guilty verdict. Equation 1.0 now looks like this:

$$M_b + P_b > O_{cm} + O_{cp} \quad P_a \quad P_c \qquad (1.0a)$$
$$\text{Same} \quad \text{Same} \quad \text{Lower} \quad \text{Same} \quad \text{Higher} \quad \text{Higher}$$

Periodic VS. Cumulative Probabilities Of Incarceration And Recidivism

It is important to note that the model is not concerned with how criminal behavior effects cumulative lifetime probabilities incurred by the criminal but only with how the costs and benefits that affect his choice at a given point in time change over time. For example, the longer the criminal is incarcerated, the fewer time periods are available for future crimes. Obviously, regardless of the probability of committing a crime during any one period, the longer the sentence served, the lower will be the cumulative probability of committing another. In the hypothetical extreme, a life sentence could preclude the commission of any future crimes on the street regardless of what criminal skills were acquired in prison. However, to include such factors, this would require a model of much greater complexity without a great deal more explanatory power. Accordingly, the authors have confined their analysis only to the effect of periodic probabilities.

Psychic Benefits and Costs

We may discuss the question of psychic benefits and costs here as well. Once in the criminal environment (i.e., prison), it is highly probable that there are benefits both in terms of prestige and the quality of prison life to a higher

position in the criminal pecking order than a lower one. Therefore, while incarcerated, one begins to take on the value system of the entire incarcerated community. Incarcerates are likely to both praise and value higher order criminals (i.e., those with distinguished criminal careers) and value lower order criminals less (i.e., petty thieves). This behavior, in terms of equation 1.0a, increases the psychic benefits (P_b) of future crime and reduces the psychic opportunity cost (O_{cp}) of future crimes. For a detailed explanation of the role of cognitive dissonance in changing the psychic costs and benefits of future choices, see Clark and Davis, 1990, 1991, 1991. The criminal finds a new community (i.e., incarcerates) who values crime and does not, in general, pass on psychic costs regarding past crimes. One is not shamed by bank robbers for committing past bank robberies. Equation 1.0a now appears as:

$$M_b + P_b > O_{cm} + O_{cp} \quad P_a \quad P_c \qquad (1.0b)$$
$$\text{Same} \quad \text{Higher} \quad \text{Lower} \quad \text{Lower} \quad \text{Higher} \quad \text{Higher}$$

Realizing these factors, the convicted felon has two basic choices. He can bear the reduced civilian earning and attempt to learn the vocational skills (welding, machinist, carpentry) taught legally in prisons to try to increase his civilian earning after he is released. Alternatively, he can try to learn criminal skills from senior criminals which will impact on his criminal choice equation in four positive ways. First, if a mugger learns safe cracking, (i.e., a higher order crime), the potential monetary payoff (M_b) probably increases. In general, more money is found in a safe than in the pockets of citizens. Second, since safe cracking is a higher order crime than mugging, the psychic benefit to the criminal (P_b) increases and the psychic opportunity cost (O_{cp}) decreases. Third, with training from a senior criminal, it is highly possible that both the probabilities of apprehension and conviction may well be reduced for the criminal over what they would be without the training. Returning to equation 1.0, we see that the scales of choice have tipped heavily in favor of criminal learning as opposed to civilian, vocational learning.

$$M_b + P_b > O_{cm} + O_{cp} \quad P_a \quad P_c \qquad (1.0c)$$
$$\text{Higher} \quad \text{Higher} \quad \text{Lower} \quad \text{Lower} \quad \text{Lower} \quad \text{Lower}$$

This process tilts more and more heavily toward more criminal activity with each successive apprehension and incarceration. Recalling equation

$$K = B_O + B_1S \qquad (3.0)$$

we realize also that if the criminal acquires a larger stock of criminal income-producing knowledge, his criminal aptitude increases, and this may encourage him to allocate more time to criminal learning as opposed to legal

learning. The ability to produce income from illegal activity relative to legal activity could increase. The marginal utility of time allocated to criminal learning and criminal activity can become larger than the marginal utility of time allocated to legal income. Accordingly, the criminal may very well be choosing rationally. We hypothesize here that criminals who commit crimes against property are making rational choices based upon the individual costs and benefits which confront them, and that the development of a criminal career can indeed be a rational act [Reynolds 1992].

What Can Be Done?

The traditional economics literature on crime has suggested that increasing the punishment for crime (years sentenced) or increasing the probabilities of arrest and conviction would reduce the frequency of crime. This is of course, a clear attempt to increase the cost of crime to the criminal and, hopefully, turn his choice toward legal income-producing activity. The deterrence argument has weighed heavily in such suggestions. Deterrence by swift and certain justice has not, however, exhibited a great deal of historical impact on reducing or eliminating criminal careers [Cameron]. The established sociology of crime models still indicates a progression of "seriousness of offense" among criminals who commit crimes against property. Accordingly, it might be appropriate here to suggest some alternatives which could alter the time allocation choices of incarcerates between the acquisition of criminal versus noncriminal education.

Deterring Criminal Education: The initial stocks of knowledge for producing legal income and illegal activities are more closely equal up to and including the first incarceration. It is beyond that point that advanced criminal learning begins to take place. If, in fact, prisons become colleges of criminal knowledge, it would make sense to attempt to disrupt this learning process by separating the faculty (senior criminals) from their students (the first offense incarcerates). Two arguments appear to surface here. First, some segregation by offense already is practiced in penal institutions. This, however, is done primarily by the level of security placed upon the criminal. Attempts are made to place desperate killers, rapists, etc., in more secure institutions than burglars. This type of segregation, however, does not appear to effectively segregate faculty from student. Junior burglars on a relatively wide scale are in a position to associate with senior burglars, safe crackers, etc. A more concerted effort to segregate the beginners from the seasoned veterans who commit crimes against property might turn the education decision more in favor of acquiring legal, useful knowledge.

The Learning Multiplier: The initial time allocation between $\beta_0 + \beta_1 S$ and illegal activities is much more important than it appears at first glance. This is so because the incarcerate's aptitude for learning in both legal and illegal learning depend heavily in future periods on the initial stock of knowledge of β_0. For example, when one learns mathematics, it is much easier to learn division after you have already learned multiplication. It is easier to learn multiplication after you have learned addition. The building of a stock of prior knowledge increases the ability and even speed by which an individual converts time spent thinking, studying, etc., into actual learning. Therefore, as β_0, the stock increases, β_1 (the aptitude) increases as well. This means that after the initial incarceration, much of the die is cast. If the incarcerate chooses to increase his stock of illegal income-producing knowledge, then his ability to assimilate this same kind of information in the future increases relative to his ability to assimilate legal income-producing knowledge. It would appear that the first incarceration is crucial. If the educational choice leading to a criminal career is ever to be reversed, it stands the greatest probability here. Expenditures to isolate the first offender from higher order criminals would appear to exhibit a higher potential cost/benefit ratio here rather than elsewhere in the penal system.

Costs of Learning vs. Costs of Segregation: A second major criticism of the segregation argument deals with costs. Penal institutions are already crowded, and segregation implies an increased demand for more penal facilities. While the fiscal evidence here is not refutable, it must be examined in light of the alternatives. Suggestions to increase sentence length in the existing literature carries the same flaw. Increased sentence length also implies a more pronounced need for additional facilities and, therefore, higher costs of incarceration borne by the public. It would appear that if the segregation argument is to be criticized on the basis of cost, that criticism must only be a matter of degree relative to the increased sentence argument. Given the model postulated here, it would appear that longer sentences might imply more criminal learning taking place and more career criminals while the multiplier effect, i.e., the $(\beta_0, \beta_1 S)$ interaction argues strongly that segregation effects might well reduce long-run costs of the penal system by reducing the number of criminals returning to prison at additional taxpayer cost and acquiring a postgraduate criminal education or actually joining the faculty of the penal institution [See Clark and Lee 1994].

A second suggestion to deal with criminal learning involves the opportunity benefits to the criminal of acquiring a legal income-producing skill. It is easy to argue that welding, machine tool operation, or other

vocational skills are, indeed, valuable learning to anyone trying to earn a living. Also, it could be argued that such education given to criminals discriminates against honest citizens who would also like to have such an education. Neither of these arguments, however, are likely to affect the incentives facing a convicted felon. If welding pays much less than the discounted and risk adjusted income from safe cracking, the rational decision of the felon is relatively clear. The wages of sin are, in fact, part of the competitive market in which mortal human beings make choices. Whether we like it or not, they do affect human behavior. Therefore, it is reasonable to contend that teaching higher-paying vocations in the penal system would increase the incentive for convicted felons to acquire more legal income-producing human capital ($ß_0$). There are, indeed, many higher paying occupations which require less time and effort to acquire than those now taught. Training as an optician or dental hygienist might be considered as examples.

A third suggestion in dealing with the economics of crime involves direct legislation. The more rights a potential felon is guaranteed under the constitution, the more difficult it is to convict. It is common behavior for a convicted felon to be highly aware of and to utilize those rights to burden the court system as much as possible and attempt to increase the costs to the state of not only his conviction, but his incarceration. In an already overproduced court system, plea bargaining is common to conserve the few available resources of the prosecution. Specifically, more liberal rules of evidence and investigation could easily increase the probability of conviction, especially for prior offenders. Items such as the possibility of legalized wire taps without a court order upon the telephones of paroled felons are not beyond consideration. The point is that the rights of both law abiding citizens and felons are specified by our legal code, and that legal code can be defined in any way that the society chooses to define it. Rights can be taken away as well as granted, and a specific analysis of what the costs and benefits of rights granted to convicted felons, and particularly repeat offenders, may be far overdue.

Summary and Conclusions

This paper has attempted to discuss the dynamic choice of criminal behavior over the many time horizons which could constitute a criminal career. Psychic and monetary benefit and cost factors have been discussed as well as the standard arguments concerning the probabilities of apprehension and conviction. Accordingly, it is suggested that to shift the criminal's choice pattern and, therefore, his education toward legal income-producing activities, the first instance of incarceration is the most crucial and that: (1) A learning multiplier exists for the criminal in both

legal and illegal learning; (2) Greater segregation of prison populations by ordinal magnitude of offense could better serve to separate criminal students from criminal mentors and further reduce criminal education; (3) Higher order legal skills training in the penal system might shift the education decision to legal educational pursuits; and (4) Redefining the legal and constitutional rights afforded felons could increase the probability of repeat apprehension and reduce the incentive to repeat offenses.

Suggestions For Future Research

Economists, sociologists, and criminologists, have modeled criminal choice for decades. However, little has been done in the way of interdisciplinary research. This article rests upon the literature in all three disciplines but is still not a full integration of their contributions. We have merely pointed out that dynamic models may have more to offer than previous static structures. Future research may benefit from further developing and empirically testing dynamic criminal choice models which consider the acquisition of legal and criminal human capital. 📖|

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