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The Risks and Rewards of Criminal Activity: A Comprehensive Test of Criminal Deterrence

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Whereas previous analyses of criminal deterrence have focused on the effect of criminal enforcement on crime rates, this study analyzes the existence of compensating differentials for criminal pursuits. By analyzing the risk-rewards trade-off, this approach represents a more comprehensive test of the criminal deterrence hypothesis. The sample consisted of black inner-city youths who reported their crime participation, crime income, and self-assessed risks from crime. The risk premiums for the three principal adverse outcomes (arrest, conviction, and prison) constituted between one-half and two-thirds of all crime income on the average, providing strong support for the criminal deterrence hypothesis.

I. Introduction

The economic approach to crime closely parallels the analysis of hazardous jobs. In the case of job safety, it is the probability of an injury and its severity that constitutes the unattractive feature of the job. For

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criminal pursuits, the probability is that of apprehension and conviction, while the loss is that imposed by the individual's incarceration. The parallels are most direct for risk-neutral individuals who view the adverse outcomes in terms of monetary equivalents; in each case there is some expected loss from the risky undertaking. For individuals to be willing to incur these risks, there must be some other offsetting advantage, such as a compensating wage premium for risk or a comparatively high financial return from crime.¹

Notwithstanding the similarities in the conceptual structure of the individual's decision problem, there has been very little relation between the empirical tests of the two theories. Whereas the analysis of the risks from legitimate opportunities has focused on compensating differentials for risk, the crime literature has dealt with the effect of variations in criminal enforcement on the degree of criminal activity. The research that has been undertaken in this vein provides evidence in support of criminal deterrence that is relatively strong and diverse, as Freeman (1983) indicates in his recent overview of the crime literature.

The existence of a variety of studies in support of criminal deterrence does not, however, imply that the criminal deterrence findings are not controversial. Many of the results have been questioned, for reasons that stem largely from the nature of the aggregative data used in past studies. There have been four principal criticisms.² First, measurement error regarding the number of crimes generates a spurious correlation between the crime rate dependent variable and criminal enforcement variables, such as the total arrests per crime. Second, criminal enforcement levels and crime rates may be simultaneous, leading to a complicated identification problem since there is no solid conceptual basis for excluding predetermined variables. Third, the clearance rate variables (e.g., arrests per crime or prison admissions per crime) do not reflect homogeneous crime activities, and the mix of crimes is affected by criminal enforcement efforts. Finally, some of the time series crime rate equations have not been stable and yield results that are sensitive to the particular functional form.

In addition to these criticisms that have appeared in the literature there is an additional potential problem since past studies have focused primarily on the relation between crime and criminal enforcement. Ideally, one should also take into account the financial rewards from

¹ The principal initial formulation of this economic model of criminal behavior was by Becker (1974). For a review of the sizable conceptual literature on crime, see Heineke (1978).

² With the exception of the observations on the clearance rate, which appear in Cook (1980), all four empirical problems are reviewed by Taylor (1978). Also see Ehrlich (1973) for an influential empirical analysis and Witte (1980) for a recent study.

crime since these payoffs affect both the crime rate and the level of enforcement chosen by the community. The primary matter of concern to the potential criminal is not the crime risk per se but whether the frontier of criminal rewards–crime risks offers a crime option that is superior to his legitimate job alternatives.

The statistical tests presented in this paper consequently have a twofold purpose. First, by focusing on the relation between crime income and crime risks for individual criminal behavior, I avoid the types of shortcomings associated with investigations of aggregative crime statistics. Second, obtaining direct estimates of the dollar premiums for crime risks provides an alternative and more comprehensive type of test for the effectiveness of criminal deterrence measures. If this analysis yields similar results, one's confidence in the earlier research findings should be bolstered.

Section II provides an overview of the research approach and a description of the NBER minority youth sample that was used for this study. This survey includes detailed information on self-reported crime income and criminal enforcement risks, making it possible to make the direct linkage required for a risk premium analysis. In Section III, I analyze the respondents' perceptions of various risks of criminal activity and the relation of these risks to overall income levels for crimes of different types. Section IV presents the compensating differential estimates for both monthly and yearly criminal behavior. As predicted, especially hazardous forms of criminal endeavor command compensating differentials not unlike those for risky legitimate pursuits.

II. Research Approach and Description of the Sample

A. Conceptual Framework

The relation between the compensating differential research and analyses of criminal behavior can best be illustrated by considering their similar conceptual foundations. Although there is not a demand for crime per se, individuals do create an implicit demand for crime through their actions. A decision to purchase a more expensive car raises the potential rewards to a car thief, but the installation of a burglar alarm or an ignition cutoff device reduces the probability of incurring a crime-related loss.

Such individual consumption decisions, including those related to self-protection, generate a set of criminal opportunities. The protective individual actions in conjunction with criminal enforcement efforts lead to a risk p associated with the potential crime income, where for simplicity one might view this risk as the chance of apprehension and conviction. In practice, there are multiple risks, such as arrest without conviction, arrest with conviction, prison terms of differing length, and

different probation conditions. The risk-rewards frontier of such opportunities is all that is relevant since, for crimes with an identical riskiness, the more lucrative ventures will dominate those with a lower payoff.

Two such frontiers are $Y_1(p)$ and $Y_2(p)$, shown in figure 1. These curves have been drawn as being upward sloping for two reasons. First, the potential for greater potential losses from crime will increase the desire to diminish these through various kinds of protective actions, which in turn will increase the risk p .³ For similar reasons, police protection in more affluent areas should be greater to the extent that this is the collective mechanism for reflecting the greater demand for self-protection. Second, if there are any dips or flat spots in the frontier, they will not be relevant to individual choice since, as will be shown below, criminals will choose to be on only upward-sloping portions of $Y(p)$.

Indifference curves for three representative individuals are also sketched in figure 1. These curves are upward sloping since individuals will necessarily demand a compensating differential for increases in the risk of crime so long as apprehension and conviction is less attractive than a successful criminal endeavor.

The nature of the choice problem is reflected in the following simple model. Let there be two states, state 1, in which the individual is successful with the crime, and state 2, in which he is not. The utility of income x is given by $U^1(x)$ and $U^2(x)$, respectively, where

$$U^1(x) > U^2(x); \quad U_x^1, U_x^2 > 0; \quad U_{xx}^1, U_{xx}^2 \leq 0.$$

For any given income level, the individual would prefer to be successful at crime because of the unattractiveness of being incarcerated. Even if criminal success did not affect one's income level, individuals would desire a compensating differential for crime risks.

These effects are bolstered when one takes into account the financial loss. Criminal success leads to a crime income $Y(p)$ plus outside legitimate income W , whereas failure leads to income Z , where

$$W + Y(p) > Z.$$

The choice problem for the potential criminal is to select his optimal crime risk level or to

$$\max V = (1 - p)U^1[Y(p) + W] + pU^2(Z),$$

³ Such statements assume a relatively homogeneous class of crimes and self-protection relations. Some goods may be valuable but can be protected less effectively than others.

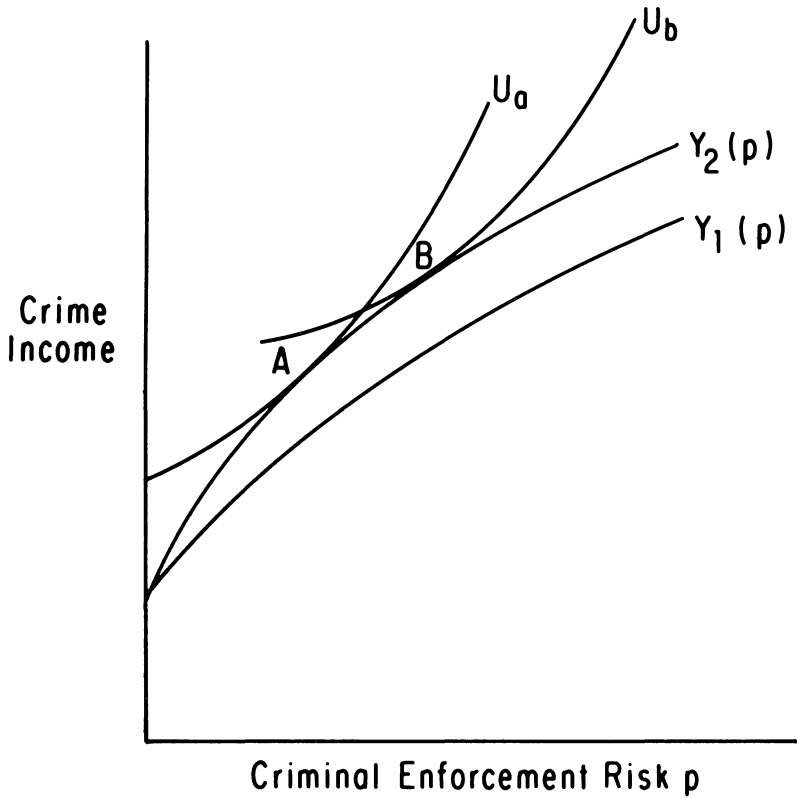


FIG. 1.—The market for illegitimate income

which leads to the requirement

$$\frac{dY}{dp} = \frac{U^1 - U^2}{(1-p)U_x^1} > 0.$$

Acceptable crime opportunities will always be on the upward-sloping portion of the criminal opportunities curve. Any observed criminal behavior arising as a consequence of this market for illegitimate income consequently will involve risk premiums.⁴ In the case of the opportunities curve $Y_2(p)$, the optimal risk-rewards combination will be *A* for a person with preferences U_a and *B* for a person with preferences U_b . While these indifference curves represent the highest welfare levels attainable from available criminal opportunities, for these options to be desirable they

⁴ This result generalizes to other situations such as time allocation models. Appendix A in Viscusi (1979) presents a time allocation model for job risks that has many parallels with the model of risky criminal choices.

must offer greater rewards than legitimate job alternatives.⁵ Competition among criminals will drive down any rents from criminal activity so that there will be no financial incentive for criminals to enter particular lines of criminal pursuit when the market for illegitimate income is in equilibrium.

The focus of the compensating crime risk differential analysis in this paper is to estimate the path traced out by points such as *A* and *B*.⁶ The observed locus of crime income–risk combinations will have a positive slope if there are compensating differentials for crime risks. The test of the validity of the criminal deterrence hypothesis consequently is whether crime income is positively related to the perceived risk of crime. If there is no deterrence effect, points such as *A* and *B* should lie along a horizontal line.

The traditional focus in the literature has been quite different. Rather than estimate the slopes of such curves directly, the emphasis has been on factors influencing crime rates. In particular, what is the probability that the individual will choose the no crime corner solution rather than a point along the crime income schedule $Y_1(p)$ or $Y_2(p)$? As the crime opportunities curve shifts upward, more individuals should choose to engage in crime because the relative rewards from criminal activity have risen. The underlying reasoning is the same as in the compensating differential approach, except that the focus is on discrete choices rather than the slope of the frontier.

The empirical approach in the deterrence literature has been more narrow, however, as crime participation is related only to variables pertaining to the crime risk, such as arrest rates for crime, thus excluding crime income as an explicit concern. This approach will be correct if one is analyzing situations in which there are no differences in crime income levels. In effect the value along the vertical axis in figure 1 is assumed to be constant so that crime participation in the stringent enforcement region $Y_1(p)$, which imposes a greater risk per unit of crime income earned, will be less than in the weaker enforcement situation for $Y_2(p)$.

Such equality of crime income levels need not prevail, however. The stringent enforcement region may be coupled with extraordinarily high criminal rewards, making crime more attractive than in the weak enforcement area. Such a pattern is particularly likely to be the case to the extent that areas with greater crime income opportunities (e.g., more affluent areas) opt for greater levels of police protection. Given the very close interrelation between the potential financial gains from crime and

⁵ If there are individuals who choose to engage in crimes at very low risks, then the economic returns from crime will approach those from a legitimate job as the risk becomes increasingly small.

⁶ For two early formal treatments of the hedonic approach underlying this paper, see Rosen (1974) and Thaler and Rosen (1976).

both the incentive to commit crime and society's desire to protect such losses from occurring through criminal enforcement, it is clearly not ideal to examine only variations in crime risk and their relation to crime rates.

To the extent that the economic incentives to commit crime have been analyzed in past analyses it has been through the inclusion of variables such as the area's poverty rate or the unemployment rate, but these measures are directed more at the potential criminal's legitimate opportunities than at the income crime might generate. By undertaking an analysis that includes both the positive and the negative features of criminal behavior, we can obtain results that give us a more comprehensive perspective on the factors that influence criminal behavior.

B. Description of the Sample

The sample I will use is the NBER Survey of Inner City Black Male Employment. This survey, which was undertaken in 1979–80, provides detailed information on the characteristics and activities of a sample of 2,358 inner-city minority youths from Boston, Chicago, and Philadelphia. The age span included in the survey was 15–24, which is a high crime group that accounts for 60% of all criminal arrests.⁷ Moreover, black youths account for a disproportionate share of these arrests, so that the survey addresses a major segment of the overall criminal population.

In addition to including the usual survey questions on personal characteristics and legitimate activities, the NBER survey included questions on the individual's criminal activity, his income from crime, and the perceived risks from criminal activity. Their self-reported crime activity variables will be the focus of the empirical analysis since, in terms of the analysis presented earlier, they provide information pertinent to both dimensions of the diagram sketched in figure 1.

Self-reported variables are potentially the most reliable sources of information on the individual's assessment of the risks of crime and its rewards. Unfortunately, the sensitivity of these questions may lead respondents to understate the extent of their criminal involvement. This underreporting problem is particularly severe for black sample populations, such as the one in the NBER sample.⁸ As a result, I have estimated that the annual crime rate for the sample may be more than twice as large as the 19% rate of crime that the respondents reported for the past year.⁹

⁷ The crime statistics cited in this paragraph pertain to 1981.

⁸ For a review of this evidence, see Hindelang, Hirschi, and Weis (1981).

⁹ In Viscusi (1986), I present several estimates on the extent of the reporting bias using the Hindelang et al. (1981) self-reporting bias estimates, data on juvenile delinquency, and consistency of the reported crime rates in the sample and their rates of past imprisonment. All three approaches yielded bias factor estimates in the range of 2–4.

Although understatements of criminal behavior may create potential problems for the empirical analysis, the study by Hindelang et al. (1981) suggests that the underreporting primarily affects the intercepts of the regression equations; the coefficients are not distorted provided that the regression focuses on within-group behavior. The NBER sample only includes information on black youths, so the biases that arise in across-group comparisons will not enter. Since the Hindelang et al. study's focus on juvenile delinquency closely parallels the emphasis of the NBER survey, the findings of that study are closely related to the likely characteristics of the NBER sample.

Table 1 provides a glossary of the variables, and table 2 lists the sample means and standard deviations for the full sample, for those who committed crime in the past month, and for those who engaged in crime during the past year. The personal characteristics variables that play such an instrumental role in analyses of legitimate earnings display little variation across one's criminal status. Age, education, and marital status levels are similar for all three sample groups. Since there is very little variation in these variables, the differences that might be evident in a survey of a broader population group are not apparent. Participation in crime is strongly related to personal characteristics such as whether one drinks, takes drugs, or smokes marijuana. Church attendance is negatively related to criminal behavior.

The majority of the sample was either employed or attending school, with one-third of all respondents in neither of these categories. For the criminal subsamples, the degree of idleness is particularly great, as roughly half those who commit crime are not employed or in school.

The NBER survey included several crime-related background questions. During the past 13 months, the time spent on probation (PROBT) or in jail (JAILT) was small for the entire sample but much larger for the criminal population. Membership in a gang or having friends in a gang (GANG) was positively related to criminal involvement, as was the perceived existence of a problem of crime in the neighborhood.

The first of the criminal activity variables is CHANCE, which is the number of opportunities to make money illegally that the respondent encounters per week. Based on the performance of this variable, which is reported in Viscusi (1986), CHANCE serves primarily as a measure of the intensity of criminal activity. Those who engaged in crime during the past month have an average of 1.4 such illegal earnings opportunities weekly, as compared with .71 options for the entire sample. The crime participation dummy variables (CRIME-MO and CRIME-YR) will not explicitly enter the empirical analysis but will serve as the primary variables for stratifying the monthly and yearly crime subsamples.

The primary focus of the empirical analysis will be on the level of crime income during the past month (CRIMEY-MO) and during the past year (CRIMEY-YR). Although reported crime income accounts for

Table 1
Glossary of Variables

AGE	= Age in years
EDUCATION	= Years of schooling
MARRIED	= Marital status dummy variable (d.v.); MARRIED = 1 if respondent is married, 0 otherwise
DRINK	= Drinking d.v.; DRINK = 1 if respondent ever drinks beer, wine, or hard liquor, 0 otherwise
DRUGS	= Drugs d.v.; DRUGS = 1 if respondent ever uses drugs such as cocaine, heroin, barbituates, amphetamines, or LSD; 0 otherwise
POT	= Marijuana d.v.; POT = 1 if respondent currently uses marijuana, 0 otherwise
RELIGION	= Religion d.v.; RELIGION = 1 if respondent attends services at least once a month, 0 otherwise
JOB	= Employed d.v.; JOB = 1 if respondent was working most of the last week; 0 otherwise
SCHOOL	= School d.v.; SCHOOL = 1 if respondent was going to school most of the last week, 0 otherwise
PROBT	= Number of months on probation during the time line period
JAILT	= Number of months in jail during the time line period
GANG	= Gang membership d.v.; GANG = 1 if respondent was a member of a gang or had friends in a gang, 0 otherwise
CNBD	= Crime in neighborhood d.v.; CNBD = 1 if respondent believed that it was true that crime and violence in the neighborhood was a serious problem, 0 otherwise
CHANCE	= Number of chances respondent has to make money illegally per week
CRIME-MO	= Crime d.v.; CRIME-MO = 1 if respondent committed criminal acts in last four weeks, 0 otherwise
CRIMEY-MO	= Crime income in the past month
CRIME-YR	= Crime d.v.; CRIME-YR = 1 if respondent committed criminal acts in last year, 0 otherwise
CRIMEY-YR	= Crime income in the past year
ARREST-HI	= Respondent assesses chance of getting arrested as being high; 0-1 d.v. for perceived risks
ARREST-LO	= Respondent assesses chance of getting arrested as being low; 0-1 d.v.
CONVICT-HI	= Respondent assesses chance of getting convicted (conditional on arrest) as being high; 0-1 d.v.
CONVICT-LO	= Respondent assesses chance of getting convicted (conditional on arrest) as being low; 0-1 d.v.
PRISON-HI	= Respondent assesses chance of going to prison (conditional on conviction) as being high; 0-1 d.v.
PRISON-LO	= Respondent assesses chance of going to prison (conditional on conviction) as being low; 0-1 d.v.
ARREST	= Weighted arrest risk; high = .75, medium = .5, and low = .25
CONVICT	= Weighted conviction risk; high = .75, medium = .5, and low = .25
PRISON	= Weighted prison risk; high = .75, medium = .5, and low = .25
LOW	= Chance of arrest, conviction, and prison are all low; 0-1 d.v.
RISK	= Overall crime risk; ARREST × CONVICT × PRISON
BOS	= Regional d.v.; BOS = 1 if respondent lives in Boston, 0 otherwise
CHI	= Regional d.v.; CHI = 1 if respondent lives in Chicago, 0 otherwise
PHILA	= Regional d.v.; PHILA = 1 if respondent lives in Philadelphia, 0 otherwise

under 10% of the sample's total income, for those who commit crime illegal income is relatively large—\$272 monthly for those who committed crime in the past month and \$1,504 annually for those who committed crime in the past year. To put these amounts in perspective, it is

Table 2
Sample Characteristics: Means and Standard Deviations

Variable	Full Sample	Crime in Last Month	Crime in Last Year
Personal characteristics:			
AGE	19.1 (2.6)	19.8 (2.6)	19.6 (2.6)
EDUCATION	10.8 (1.6)	10.8 (1.4)	10.6 (1.4)
MARRIED*	.036	.043	.043
DRINK*	.59	.82	.82
DRUGS*	.03	.16	.14
POT*	.36	.71	.68
RELIGION*	.33	.22	.23
LABOR market status:			
JOB*	.26	.24	.25
SCHOOL*	.40	.22	.25
Crime-related background:			
PROBT	.04 (2.0)	1.5 (3.4)	1.4 (3.4)
JAILT	.01 (.84)	.03 (1.5)	.03 (1.4)
GANG*	.08	.17	.16
CNBD*	.39	.52	.52
Criminal activity:			
CHANCE	.71 (1.15)	1.39 (1.34)	1.36 (1.35)
CRIME-MO (month) (\$)*	.15	1.0	.97
CRIMEY-MO	40.28 (439.71)	272.15 (520.90)	213.65 (477.91)
CRIME-YR (year) (\$)*	.19	.77	1.0
CRIMEY-YR	279.99 (1,325.98)	1,688.41 (3,689.57)	1,503.92 (3,370.69)
Criminal enforcement:			
ARREST-HI	N.A.	.058†	N.A.‡
ARREST-LO	N.A.	.734†	N.A.‡
CONVICT-HI	N.A.	.074†	N.A.‡
CONVICT-LO	N.A.	.791†	N.A.‡
PRISON-HI	N.A.	.142†	N.A.‡
PRISON-LO	N.A.	.710†	N.A.‡
ARREST	N.A.	.332†	.463‡
CONVICT	N.A.	.321†	.427‡
PRISON	N.A.	.358†	.470‡
LOW	N.A.	.583†	.412‡
RISK	N.A.	.052†	.188‡
Location:			
BOS*	.32	.30	.32
CHI*	.34	.29	.28
PHILA*	.34	.41	.40
Sample size	2,358	349	439

NOTE.—Standard deviations are in parentheses. N.A. = not applicable.

* Standard deviations of 0–1 dummy variables are omitted since they can be calculated from their fraction m in the sample, where the standard deviation is $(m - m^2)^{0.5}$.

† Perceived.

‡ Constructed.

noteworthy that the average legal income level for the sample was just over \$2,800.

The next set of variables pertained to the perceived risks of criminal enforcement. This set of questions was only administered to respondents who had engaged in criminal activity in the past month. The principal questions concerned whether at the time he committed his crimes the respondent believed the risk of arrest, the risk of conviction conditional on arrest, and the risk of prison conditional on conviction were high, medium ("about 50-50"), or low.

For the monthly criminal subsample, the respondents' answers were used to create a series of perceived crime risk variables. The first set of variables pertained to whether the respondent believed that the risks of arrest (ARREST-LO), conviction (CONVICT-LO), and prison (PRISON-LO) were low. In each case, about three-fourths of the sample assessed the risks as being low. The high-risk response (ARREST-HI, CONVICT-HI, and PRISON-HI) will not be used in the empirical analysis but are reported here to provide a broader perspective on the responses. The high risks tend to increase somewhat as one moves through the criminal justice system, reaching a peak of .14 for the risk of prison conditional on conviction.

The next group of variables represented scaled versions of these dummy variables where a medium risk received a value of .5, which is tantamount to the "about 50-50" wording of the questionnaire. The low-risk response received a value at the midpoint of the lower range, .25, while the high-risk responses received a value of .75. All the scaled ARREST, CONVICT, and PRISON variables had comparable values that ranged from .32 to .36. These three variables were all highly interrelated, with simple correlation coefficients around .85.

Two variables were created to reflect the entire sequence of risks the individual faced. The first of these is LOW, which is a dummy variable that takes on a value of one only if the respondent believes that the risks of arrest, prison, and conviction are all low; that is, it is the product of ARREST-LO, CONVICT-LO, and PRISON-LO. Somewhat strikingly, about three-fifths of the sample assessed all these criminal enforcement risks as being low. The second variable, RISK, is the product of ARREST, CONVICT, and PRISON. If one were to treat the scaling of the component variables as being meaningful in probabilistic terms, the overall risk of being caught and ultimately convicted is about .05. (In reality, the risk is much lower since the scaling of low risk as being .25 overstates these risk levels.) When compared with the component-scaled risk variables, RISK is only one-sixth the size of these values, which suggests that the succession of risks that one must face before being sent to prison gives a criminal a fairly good chance of escaping criminal punishment at some juncture.

Although comparable perceived risk data were not available for the yearly criminal responses, a lengthy computer algorithm utilized the monthly data to construct objective risk measures for each individual. The crime risk responses were matched to the particular crimes the individual committed in the past month, weighted on a proportional basis in the case of multiple criminal pursuits. The linkage between the monthly and the yearly crime responses was this crime risk \times activity variable. The risk assigned to the individual's annual criminal activities corresponded to the risks associated with the crimes he committed in the past year, where in the case of multiple criminal pursuits the crimes were weighted proportionally. The constructed risk consequently is the overall risk posed by the individual's criminal pursuits.

Unlike the perceived risks, this variable is not affected by individual differences in thresholds regarding what, for example, constitutes a high risk. This greater objectivity is a positive feature, and, as a result, both objective risk variables and perceived risk variables will be used in analyzing the monthly crime data. The perceived risk variables offer the offsetting advantage that they may better reflect the risks posed by the individual's particular crimes and his manner of committing them. Neither variable is clearly preferable on a priori grounds.

Finally, a series of dummy variables for different locations was created. The respondents were roughly evenly distributed across the three survey sites. All those interviewed were black inner-city youths, whose general attachment to the legitimate labor market is quite low.

III. Risks and Rewards of Criminal Activity

When individuals commit a crime, they incur a sequence of criminal enforcement lotteries. Before an individual can be sent to prison, he must first be arrested and convicted. Although imprisonment is not the only sanction that affects the undesirability of crime (e.g., establishing an arrest record may also be unattractive), it is instructive to examine the sequence of links in the criminal enforcement system.

Figure 2 sketches the sequence of lotteries and the average frequencies associated with each component lottery. Unless the individual is arrested, there is no possibility of an actual loss imposed by criminal enforcement measures. About three-fourths of those committing crime view the risk of arrest as being low, which is consistent with prevailing views that few criminals are ever caught. The conditional risks of conviction closely parallel the arrest perceptions. Almost all those who assess the arrest risks as being low believe that if they are arrested the chance of conviction is low. Those assessing the arrest risk as being medium also tend to believe that the risk of conviction is medium. Finally, those assessing arrest risks as being high tend to view conviction risks as being

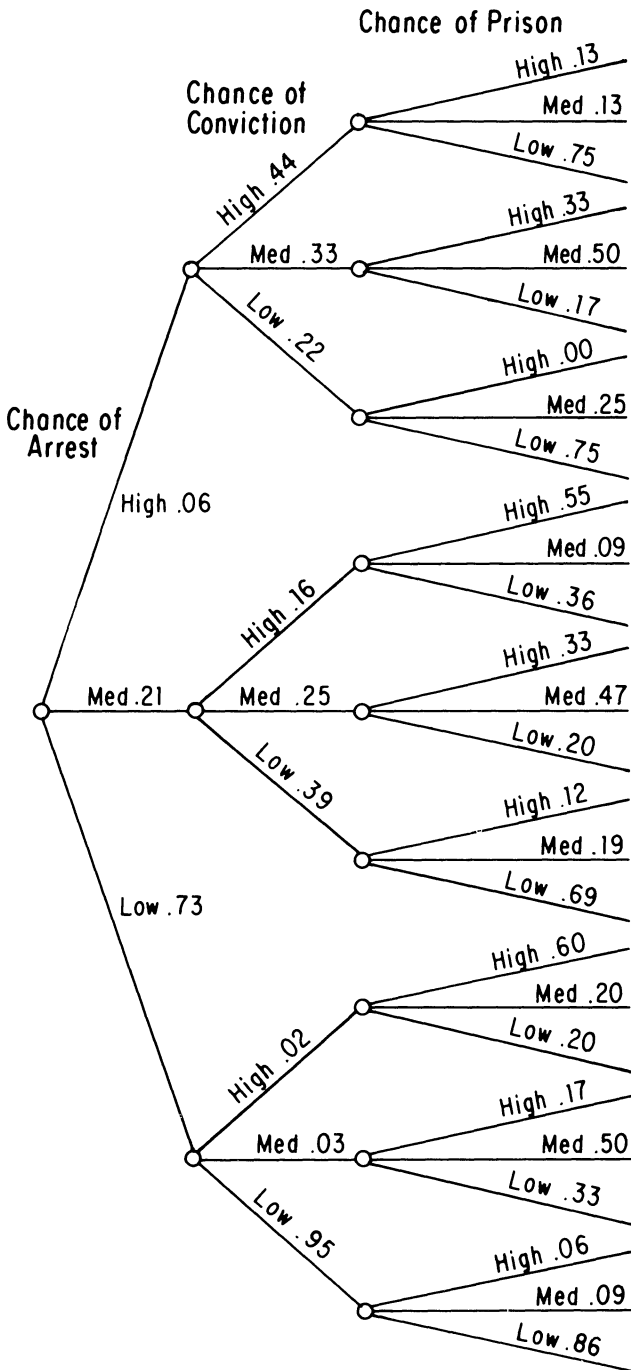


FIG. 2.—Sequence of criminal enforcement linkages

low. In the case of medium and high arrest risks, however, a substantial portion view the conviction risk as being low, so that there is a large potential for escaping punishment in the second stage of the criminal justice system.

The final set of lotteries on imprisonment involves relatively small samples, particularly for the upper portion of the chance fork diagram, since most respondents went down the initial low-arrest-risk path. It is noteworthy that the prospects for ultimately escaping criminal sanctions are quite high since at least one of the three sequential risks is usually low. Most respondents who assessed the arrest risk as being high, for example, viewed the chance of imprisonment conditional on conviction as being low.

The same general pattern displayed by the arrest and conviction risks also holds for risks of imprisonment since there is a strong correlation among the various risks. The positive correlation among the various risks is not unexpected. These risks are based on the types of crimes the individual commits. Gambling, for example, is likely to be a low-risk crime compared with armed robbery, irrespective of whether one is considering the risk of arrest, the risk of conviction, or the risk of prison. The emphases of the different phases of the criminal justice system should all reflect society's assessment of the severity of the offense. Other factors may also enter, such as the ease of identifying crimes that have been committed. "Victimless" crimes such as drug dealing are rarely reported, whereas muggings are reasonably well reported, so that arrest rates for reported crimes may not always reflect the likely consequences facing the individual should he be caught. As a broad generalization, however, the positive correlation of the different criminal sanction risks appears to be an accurate reflection of the actual enforcement process.

Individual perceptions also enter, particularly in the case of biased beliefs. Those who systematically underestimate arrest risks are likely to underassess the risks of conviction and imprisonment, thus compounding their errors. The constructed risk variables based on average perceived risks across crime categories are intended to alleviate this difficulty.

The extent to which perceived risks vary by crime category is reflected in the breakdowns presented in table 3. The respondents indicated which of 10 different crimes they committed: numbers and illegal gambling, selling and fencing stolen goods, selling marijuana or other drugs, burglary and larceny, muggings and purse snatchings, shoplifting or theft from cars, cashing or forging stolen checks, con games and frauds, robberies and holdups, and other illegal activities. The average number of crime categories in which criminals participated was 1.6. In the case of multiple criminal pursuits the risks associated with the crimes were weighted proportionally.

Table 3
Relation of Criminal Enforcement Risks to Monthly Crime Categories

Crime Category	Risk Perception													
	Risk of Arrest			Conditional Risk of Conviction			Conditional Risk of Prison			Risk Perception				
	High	Medium	Low	High	Medium	Low	High	Medium	Low	ARREST	CONVICT	PRISON	LOW	RISK
Numbers	.034	.158	.808	.050	.090	.859	.100	.093	.863	.303	.307	.311	.628	.045
Fenced	.150	.270	.580	.180	.170	.660	.210	.260	.530	.386	.361	.474	.352	.091
Drug dealer	.066	.222	.712	.078	.153	.770	.136	.209	.654	.370	.338	.367	.468	.063
Burglary	0	.582	.418	.221	.393	.386	.255	.456	.252	.374	.402	.545	.127	.098
Mugging	.105	.366	.529	.052	.255	.693	.192	.211	.597	.380	.337	.480	.316	.082
Shoplifting	0	.520	.480	0	.520	.480	.218	.302	.480	.409	.409	.524	.375	.010
Forgery	.102	.259	.639	.130	.109	.760	.238	.124	.637	.341	.313	.413	.429	.090
Con games	0	.511	.489	.056	.400	.544	.334	.368	.298	.364	.361	.634	.267	.089
Robbery	0	.238	.762	.136	.102	.762	0	.102	.898	.263	.268	.258	.714	.042
Other	0	.134	.866	0	.088	.912	.160	.065	.775	.288	.287	.363	.612	.042

There is considerable disparity in the crime risks associated with the different types of crime. Shoplifting is a relatively safe crime, as few of the respondents believed that the risk of arrest or conviction was high, and the overall RISK level is at its lowest value. This crime does tend to pose more medium risks than do other categories so that the overall value of the LOW variable is not as great as for some other categories. The most frequently committed crime category, numbers and illegal gambling, also is quite safe both in terms of the scaled RISK variable and in terms of the degree to which all the three sequential crime risks assume a low value (i.e., LOW). This pattern accords with the actual risks from gambling since this activity is seldom reported to police.

At the high end of the criminal risk spectrum are predatory crimes such as burglary. The prison linkage conditional on conviction is especially strong, as the risks rise steadily as one moves through the criminal justice system.

Chief among the crimes posing an intermediate risk is drug dealing, which is the second most prevalent crime category. Unlike crimes such as con games and burglary, the risk of suffering punishment for selling drugs does not escalate as one passes through the successive steps toward conviction. Many respondents believe that the chance of arrest for this crime is quite low, which is what one would expect since there is little incentive for the purchasers of drugs to report the sellers to the police.

Table 4 summarizes the fraction of the criminal subsamples who commit each particular group of crimes and the average income associated with each crime class.¹⁰ The two principal sources of reported crime income are gambling and drug dealing. This ranking parallels the assessments by the U.S. Internal Revenue Service, which estimates that 90% of all illegal income comes from drug dealing and various forms of illegal gambling.¹¹

Although numbers and illegal gambling are the most prevalent crimes, as two-thirds of all criminals engage in such pursuits, the average crime income yielded by this activity is near the middle of the crime income spectrum. Numbers and gambling are quite attractive, however, since the risk associated with these crimes is not great.

Drug dealing is also quite widespread, with one-third of the sample engaging in such efforts. The rewards from selling drugs are among the highest for all crime categories. Another chief source of illegal income is fencing stolen goods, which is the third most prevalent criminal pursuit and one of the most financially rewarding.

¹⁰ In the case of multiple crime categories, the income was divided proportionally among the crime categories.

¹¹ This estimate was prepared by the U.S. Internal Revenue Service for the U.S. Department of Treasury, the Council of Economic Advisers, and the U.S. Office of Management and Budget (see U.S. Internal Revenue Service 1980).

Table 4
Crime Participation and Income Level by Crime Category

Category	Monthly Criminal Behavior		Yearly Criminal Behavior	
	Fraction Who Commit	Average Crime Income (\$)	Fraction Who Commit	Average Crime Income (\$)
Numbers	.668	103.01	.631	565.14
Fenced	.166	191.78	.185	720.85
Drug dealer	.324	189.42	.371	994.54
Burglary	.054	134.56	.114	760.78
Mugging	.023	94.61	.132	744.36
Shoplifting	.089	149.03	.034	373.17
Forgery	.020	120.95	.068	891.48
Con games	.160	133.84	.030	337.67
Robbery	.043	242.78	.159	624.39
Other crimes	.046	443.51	.066	1,928.98

By far the most lucrative crime category is the residual “any other illegal activities” grouping, which captures not only the illegal effort categories that were not listed but also the crimes committed by individuals who were reluctant to reveal the nature of their crimes. Since the average crime income in the other crime activity group is double that of the second highest category, this group includes many of the most financially successful criminals. The risks associated with the other crime category are not particularly large (see table 3), so that the level of rewards does not appear to represent a compensating differential per se. These overall relations do not, however, take into account the intensity of the criminal activity or other variables that influence the risk-rewards trade-off.

IV. Estimates of Compensating Differentials

The structure of the equations used to estimate the relation between crime income and the associated risks was dictated in part by the nature of the survey. Respondents who did not engage in crime in the past month or the past year were not included in the estimation since these individuals were not asked the crime risk questions; nor was there any crime activity information that could be used to construct such a risk measure.

For the criminal group subsamples it was possible to construct a series of crime risk variables. As discussed above, those who engaged in crime during the past month gave self-assessed crime risk responses that were used to construct eight perceived crime risk variables. For the four perceived crime risk variables that represented continuous crime risk levels (i.e., ARREST, CONVICT, PRISON, and RISK) rather than 0–1 dummy variables, I constructed risk variables for specific crimes that were then matched to the self-reported crimes to obtain a constructed

risk measure for both the monthly and the yearly criminal subsamples. In all, there were twelve crime risk variables for the monthly subsample and four crime risk variables for the yearly subsample.

The failure to obtain crime risk assessments from noncriminal groups is not ideal since it would be instructive to analyze how risk perceptions alter crime participation decisions. Even with such information we would still lack an observable nonzero crime income level for those who do not commit crime. All that we know is that the crime income level they perceived to be available was below the level they required to engage in crime. The observed crime income trade-off will consequently understate the premium per unit risk required by those who do not engage in crime.¹² The analysis below consequently addresses only the observed rates of trade-off one can reap through actual criminal behavior, that is, the economic structure of current criminal opportunities, which is what is pertinent to estimation of the crime income–risk trade-off schedule in figure 1. The estimates pertain to the rates of trade-off between crime income and crime risk for those who commit crime, which will be different from the trade-offs of noncriminals.

Each crime income equation included a group of human capital variables (AGE, EDUCATION, and MARRIED) that were not statistically significant and a set of personal attributes and regional variables (DRINK, DRUGS, POT, RELIGION, PROBT, JAILT, JOB, SCHOOL, CHANCE, GANG, CNBD, CHI, and BOS). The relation of these variables to criminal behavior follows the expected patterns and is explored in detail in Viscusi (1986). As a result, I will focus here on the crime risk coefficients, where in each case a single crime risk variable entered the equation.

From a conceptual standpoint, all three risk types should influence criminal behavior. To the extent that imprisonment is a pertinent negative payoff of crime, all three criminal enforcement risks must turn out unfavorably for this event to occur. Conviction without imprisonment also will impose a loss on the criminal, as may an arrest without conviction to the extent that it affects one's police record. Similarly, other enforcement-related outcomes such as probation will influence the desirability of criminal behavior. Exploratory regressions including two or more crime measures did not yield crime risk coefficients that were significant on an individual basis. Because of the strong interrelation among the probabilistic beliefs concerning the risk assessments, it was not feasible to estimate reliably more than a single crime risk variable

¹² A comparable self-selection problem arises in the job risk literature, as noted in Thaler and Rosen's (1976) study of high-risk jobs. In Viscusi (1983) I estimate the degree of heterogeneity in risk preference. Because the regressions are necessarily conditional on crime participation because of the nature of the survey, inclusion of a selectivity variable for whether one engages in crime is inappropriate.

in each equation. Similar difficulties often arise with respect to compensating differentials for job risks as most analyses focus on either nonfatal or fatal risks because of the difficulties encountered when both risk variables appear in the equation. The crime risk coefficients discussed below consequently are each based on otherwise identical equations that differ only in terms of the risk variable that was included.

Table 5 summarizes the estimates for the crime risk variables and the associated risk premiums implied by the coefficients. The standard deviations for these risk premiums in the final column were computed from estimates of the risk premiums for each individual in the sample. This statistic consequently is intended to reflect the range in risk premiums induced by the differences in risk levels across the sample

Table 5
Criminal Enforcement Risk Regression Results

	Coefficients*	Risk Premiums (\$)†
Perceived risks (monthly):		
ARREST-LO	-.526 (.146)	30.25 (527.00)
CONVICT-LO	-.446 (.162)	20.58 (524.02)
PRISON-LO	-.574 (.151)	34.74 (533.82)
LOW	-.564 (.136)	49.40 (531.69)
ARREST	1.584 (.450)	107.59 (523.88)
CONVICT	1.046 (.446)	75.58 (522.53)
PRISON	1.211 (.377)	92.02 (528.29)
RISK	2.535 (.850)	30.05 (525.39)
Constructed risks (monthly):		
ARREST	2.228 (.378)	157.67 (532.60)
CONVICT	2.698 (.475)	169.57 (530.61)
PRISON	3.060 (.504)	192.74 (529.43)
RISK	.981 (.300)	23.95 (531.94)
Constructed risks (yearly):		
ARREST	1.663 (.313)	757.38 (3,430.63)
CONVICT	1.973 (.389)	812.42 (3,422.63)
PRISON	1.980 (.422)	874.09 (3,416.95)
RISK	.637 (.175)	31.37 (3,424.37)

* Standard errors are in parentheses.

† Standard deviations are in parentheses.

rather than the precision of the crime risk coefficient estimates, which is reflected in the coefficients (standard errors) column.

For both the monthly and the yearly crime income equations there is consistently strong evidence of premiums for the risks of criminal activity. In the case of monthly criminal behavior, the scaled perceived risk variables (i.e., ARREST, CONVICT, PRISON, and RISK) as a group perform much better than the dummy variables. The effects reflected in the low-risk dummy variables are roughly one-third of those implied by their scaled risk counterparts, which better reflect differences in the degree of risk.

The scaled risk variable that does not perform particularly strongly is the RISK variable, which has a comparatively small effect. These patterns in the RISK effects throughout the empirical results suggest that it may not be the entire sequence of risks leading to imprisonment that is of paramount concern since the odds of experiencing this adverse outcome are not great. Rather the entire set of intermediate outcomes (arrest, conviction, probation, etc.) may be instrumental.

The monthly crime income estimates obtained using constructed risk measures suggest much larger risk premiums than did the perceived risk findings. Although the perceived risk variable may better capture the person-specific risks, the constructed risk may serve as a better objective measure of the crime risk insofar as individual differences in what constitutes a high or a low risk do not enter. For the three principal scaled risk variables, the average risk premium implied by the perceived risk variables is \$92 or 34% of monthly crime income, whereas the monthly risk premium implied by the constructed risks is \$173 or 64% of all crime income. In each case there is clear-cut evidence of risk premiums, implying that the crime income-risk profile is upward sloping.

The yearly crime income results also lend support to the criminal deterrence hypothesis. The spirit of the results is very similar to the monthly findings, with crime risk premiums averaging \$815 or 54% of total crime income. The crime risk share is somewhat less for the yearly crime income since the respondents who committed crimes in the past month engage in criminal activity on a more intensive basis. Both in terms of the levels of crime income per unit time and the number of crimes committed, those who engaged in criminal activity during the past month have stronger criminal inclinations than those who only committed crimes at some point in the past year. The risks posed by committing any particular crime category consequently may be a bit larger to the extent that the CHANCE and other variables do not fully reflect the greater intensity of criminal activity of the monthly crime participants.

The constructed crime risk results imply crime risk premiums on the order of 54%–64% of all crime income. These results represent much

stronger effects than do the risk premiums for the health and safety risks of jobs, which average 6%.¹³ The dominant role played by crime risk premiums is not inconsistent with the strong empirical results concerning the effect of criminal enforcement on participation in crime. In addition, criminal activity requires a much lower commitment of time than a full-time job so that the risk premium will be a larger component of the income. The annual crime risk premium is of roughly the same order of magnitude as job risk compensation, which averages \$900 for blue-collar workers.

Nevertheless, there is widespread belief that the risks of being apprehended and sent to prison are low, and, if sent to prison, this outcome is much less severe than being killed on the job. If the risks of crime were smaller than those posed by hazardous jobs, risky criminal pursuits would clearly dominate risky jobs as a potential income source. Using information from the Washington, D.C., area for the crime categories most similar to those analyzed here, I estimate that each crime committed has a probability of .087 of leading to arrest and an unconditional probability of .014 of being convicted and serving time in jail.¹⁴ Although these estimates exclude crimes such as numbers, which are seldom reported, they are at least suggestive of the kinds of risks associated with property crimes. In contrast, the average risk of a reported nonfatal job injury is about 1/30 per year, and the average risk of a fatality is about 1/10,000 annually. The risk of prison appears to lie between these two risks in terms of both its severity and the probability involved.

The crime risk premium levels consequently are not inconsistent with available evidence regarding how individuals make decisions among other risky opportunities to earn income. In each case, activities posing additional risk will command compensating differentials. Legitimate and illegitimate activities both have upward-sloping income-risk profiles. The primary distinguishing characteristic of illegitimate activities is that the risk premiums have an additional policy implication in that they imply that enhanced criminal enforcement will raise the risks to crime, thus diminishing its attractiveness.

V. Conclusion

When compared with other risky income-generating pursuits, crime is clearly one of the most hazardous income sources. Most workers facing occupational health and safety risks received risk premiums that

¹³ This estimate, which is based on the findings in Viscusi (1979), is comparable to the results in other risk premium studies. Also see Smith (1976, 1979).

¹⁴ The crime categories I used were reporting rate (burglary, larceny, and auto theft), conditional arrest rate (robbery, burglary, larceny, and auto theft), and conditional rates of serving time in jail (robbery, burglary, larceny, auto theft, narcotics, and others). Differences in data availability and reliability generated differences in the crime categories used.

are under 10% of their earned income. In contrast, the risk premiums for criminal activities constitute between one-half and two-thirds of all crime income.

Although the risks posed by the criminal enforcement system are notoriously low, the absolute magnitude of the probability of imprisonment for most crimes committed by the sample is over 100 times as large as the risk of death faced by the typical blue-collar worker and about one-half of the average risk of a nonfatal job injury. The nonrisk compensation for criminal behavior is not great since, for many crimes such as muggings and car theft, the forgone leisure time is not a major component of the criminal activity. A person's decision to engage in such crimes will be governed largely by the risk the crime poses and the financial returns it offers. Consequently, there is an important qualitative difference between legitimate and illegitimate income-generating activities in terms of both the level of the risk and the nature of the time allocation.

The empirical evidence on the premiums for criminal risks is strong and quite robust. The results presented here indicate that there is a positive relation between crime income levels and crime risks. This relation was quite stable for both monthly and yearly crime activity data. Changes in the specification of the risk variable (perceived vs. constructed risks) and in the particular risk measure (ARREST, CONVICT, and PRISON) did not greatly alter either the significance of the link or the magnitude of the implied risk premium.

The positive risk-rewards linkage provides an alternative test in support of the criminal deterrence hypothesis. Unlike most studies in the literature, it avoids the intrinsic problem associated with using aggregative data on crime rates and criminal enforcement levels. The NBER sample also offers the additional advantage of making possible a joint analysis of the risks and rewards of crime, thus providing a more comprehensive test of criminal deterrence. The results bolster the findings of other studies supporting the empirical importance of criminal deterrence.

In terms of the conceptual foundations of the crime decision, there should be little reason to disagree that risky crimes should command wage premiums or that crime should be responsive to criminal sanctions. Much of the controversy over deterrence issues presumably has arisen because of the magnitude of the effects and their implications for criminal justice policy. The inherent shortcomings of the data typically used have created sufficient ambiguities to foster a prolonged debate over the empirical effect of criminal enforcement measures. The findings here suggest that the threat of criminal sanctions does not simply pass the usual tests of statistical significance but is a dominant determinant of crime income.

The strength of these results does not imply that economic opportunities do not influence the criminal behavior of this sample. In a companion paper (see Viscusi 1986) I found that legitimate job prospects also affected criminal behavior. Whether crime-related policies should focus on increased criminal enforcement or improved economic opportunities depends not only on the extent of these policies' present influence on criminal behavior but also on the cost of manipulating these policy variables. A decision to tilt the policy mix in favor of more stringent criminal enforcement hinges largely on the marginal productivity of such expenditures. How much, for example, will an increase in the police budget alter the risk of apprehension, thus deterring additional crimes? Although my data do not enable me to make any judgments on the enforcement cost-crime risk linkage, the subsequent relation between criminal behavior and criminal enforcement risks is very powerful.

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