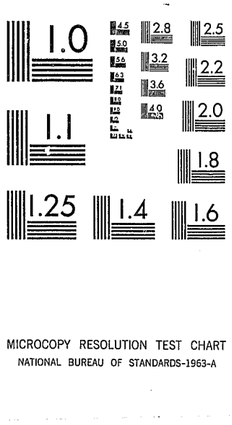
If you have issues viewing or accessing this file contact us at NCJRS.gov.

National Criminal Justice Reference Service

ncjrs

This microfiche was produced from documents received for inclusion in the NCJRS data base. Since NCJRS cannot exercise control over the physical condition of the documents submitted, the individual frame quality will vary. The resolution chart on this frame may be used to evaluate the document quality.



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

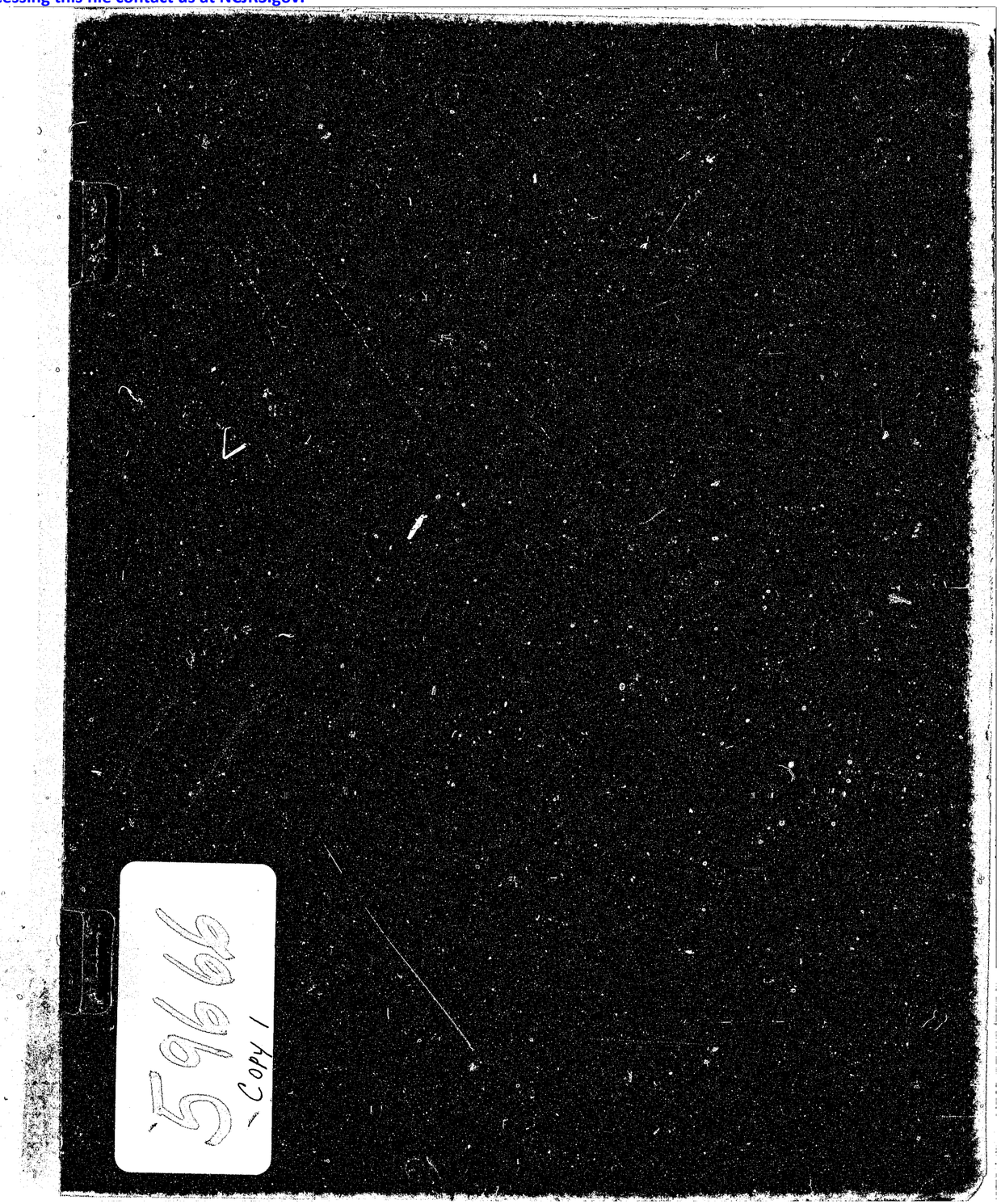
Microfilming procedures used to create this fiche comply with the standards set forth in 41CFR 101-11.504.

Points of view or opinions stated in this document are those of the author(s) and do not represent the official position or policies of the U. S. Department of Justice.

National Institute of Justice
United States Department of Justice
Washington, D.C. 20531

DATE FILMED

6/11/81



A NOTE ON USING DATA FOR INDIVIDUAL OFFENDERS IN ECONOMIC STUDIES OF THE CRIMINAL JUSTICE SYSTEM

by

F.C. Nold

Technical Report ESCD-3-76
October 1976

Prepared under Grant Number 75-NI-99-0123 from the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice.

Points of view or opinions stated in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.

59666

CENTER FOR THE ECONOMETRIC STUDIES OF CRIME AND THE CRIMINAL JUSTICE SYSTEM

Hoover Institution

Stanford University

NCJRS

JUL 23 1979

ACQUISITIONS

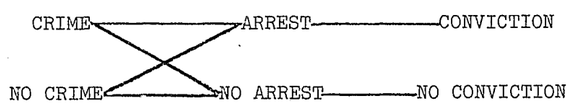
A Note on Using Data on Individual Offenders in Econometric Studies of the Criminal Justice System

1. Introduction

There has been much discussion recently about the adequacies of existing empirical work on aggregate data dealing with crime rate determination. The critics have argued effectively that in this work the problems of simultaneity, aggregation and deficient data are all present in their most virulent forms.[1] Analysis of data on individual offenders avoids most of these criticisms, substituting other difficulties in their places. This note is designed to enumerate the major potential uses of individual data. The most difficult question, the measurement of general deterrence, is given the most attention and is treated in the next section. The third section presents some related uses of data on individuals, while the last section offers some conclusions.

2. Exploring General Deterrence with Data on Individuals

There are two problems common to most analyses of decisions involving criminal activity. The first is the non-random character of the retrospective choice-based samples obtained by collecting records of arrested or convicted individuals. The second is the dependence upon past experience of the choices open to an individual and his evaluation of the relative merit of these opportunities. The first problem, that a person must be at least arrested to become part of a retrospective sample, has two facets. The process can best be described with the help of two overlayed tree diagrams.



Apparently, the only way to obtain information on no crime/arrest and crime/no arrest would be through self-reported behavior. This method of data collection has obvious and irremediable shortcomings, not the least of which are the limited ability of any individual to recall past activities and the incentives for him to obscure previous criminal activity. Yet, the information available only through self-report is critical because of the possibility that the probabilities of moving out along the branches are interrelated. For example, a person who chooses to commit a crime may have both a higher conditional probability of

being arrested and yet a lower conditional probability of conviction due to some personal characteristics. In addition, those same characteristics might affect the probability that the crime was selected in the first place.

Regardless of whether data is collected from the criminal justice system (CJS) by sampling those individuals arrested or convicted, the non-randomness of selection will contaminate the sample to the extent that inconsistent estimates of the effects of determinants of individual behavior result. However, using the data on self-reported behavior and making an assumption about the functional form of the conditional probabilities, we can estimate models relating individual characteristics and the characteristics of the crime selected to the conditional probability of arrest and conviction. We are now in a position to use the sample collected from the criminal justice system records, augmented with additional information, to study the decision in which we are interested, namely P (Crime | personal characteristics, choice set). For example, assuming a sample of convicted individuals is taken, we have:

$$P(\text{CONVICTION, ARREST, CRIME, CHARACTERISTICS}) =$$
$$P(\text{CONV} \mid \text{AR, CR, CH}) \cdot$$
$$P(\text{AR} \mid \text{CR, CH}) \cdot$$
$$P(\text{CR} \mid \text{CH})\ P(\text{CH})$$

A second facet is that we do not get a random sample of those individuals who commit a crime. The density function conditional on the mode of sampling must reflect this fact, adding another layer of complication.[2] The probability of any individual observation can be written:

$$P(CR|CONV, AR, CH) = \frac{P(CONV, AR, CR, CH)}{D}$$

$$\text{where } D = \int P(CONV|AR, CR, CH)\ P(AR|CR, CH)\ P(CR|CH)\ P(CH)dP(CR)$$

The full problem is imposing, both computationally and from the point of view of data requirements. The complication in the estimation problem comes in the evaluation of the denominator. We need information about the probability of conviction given arrest, crime, and personal characteristics. Such information exists for specific geographic areas in various forms. For example, OBTS files contain information on personal characteristics and ultimate disposition, but few specifics about the crime; PROMIS files contain all three types of information but are not as yet collected in many geographic areas; self-report data could, but often does not, cover all three types of information. The perceived probability of conviction given arrest, crime, and personal characteristics also appears as an independent explanatory variable describing the choice of crime

given personal characteristics. The probability estimated at this stage could be used as a surrogate for the perceived probability. Estimates of the probability of arrest given crime and personal characteristics probably have to be based on self-reported information. RAND's data would provide some information about the crime but not of sufficient extent to allow for appraisal of subtle differences in risk amongst crimes which are quantitatively different but of the same generic type, such as burglary. The lack of precise information is not crucial because the solvability of a case depends to a large degree on random events which may be relatively independent of the gross characteristics of a crime or crime type and offender characteristics. Thus, the omission of these influences at this stage would probably not introduce serious biases in estimation of other coefficients. The perceived probability of arrest also enters in the decision for selection of a crime. Again, we can use the value produced at this stage as a measure of the perceived probability of arrest.

Analysis of the determinants of the next conditional probability, which deals with the choice to commit a crime given personal characteristics, gives insight into the relative effectiveness of different types of deterrence and the relationship between legal opportunities and criminal activity. Data requirements at this stage are extensive and best met by samples like those of convicted criminals collected here at the Center for the

Econometric Study of Crime augmented by social security data. Other data have part of the information but lack completeness. For example, RAND's data on habitual offenders includes only individuals convicted on multiple offenses and provides a life history but little detail about specific crimes. On the other hand, the post-release data on individuals released from North Carolina prisons, collected by Anne Witte, lacks extensive longitudinal data. The last density, P(CH), can be constructed by pooling information from a number of different sources. The variables for which a joint density must be constructed are those considered to be determinants of any of the conditional probabilities. These range from purely demographic aspects of a population, such as age, sex, and race, to economic variables like wage, work history, and education, as well as descriptions of contact with the criminal justice system such as prior arrests, convictions, crimes committed, and incarcerations. Sources of data necessarily include the census, national prison statistics, and information from parole and probation files. Each of the steps outlined above is of interest in itself. Revealing the likely determinants of conviction would be of help to prosecutors and would be an interesting economic analysis, since a prosecutor and defendant jointly make a decision about how far to carry a case. This decision in turn is effected by and affects the probability of conviction. The objective function ascribed to the prosecutor has been explored by Landes, Lachman and others, and can be extended to include somewhat

broader goals. The process viewed from the point of view of the defendant has received less attention. This is also a potentially fertile viewpoint, since risk management problems similar to those encountered in choices amongst legal and illegal activities are encountered in this decision as well. The determinants of arrest probabilities are also of interest. Conjecture about the risk associated with criminal activity abound, but little systematic exploration of the actual levels and the variation of those levels across individuals exists. Of special interest is determination of how previous encounters with the criminal justice system, especially incarceration, affect arrest probabilities. The last component of (1) is the denominator, the most useful part of the research from a policy point of view. A moment's reflection will reveal that the denominator can be used to generate supply functions of arrested and convicted individuals produced by the criminal justice system, given a population and levels of policy variables, such as sentences. Also, computation of the integral

$$\int P(CR|CH)dF(CH)$$

will yield the expected number of crimes committed, given the population and characteristics of the criminal justice system. This is what is commonly referred to as the supply function of crimes. However, it has a number of advantages over the more traditionally estimated supply of criminal activity functions.

"For example, it has been argued that young adults are insensitive to penalties and so there may exist a relationship between the composition of the population and deterrent (sentence ends on page 8)

effects. Deterrence refers to how the probability that a person will commit a crime is affected by the probabilities of arrest and conviction, and the sentences likely to be imposed if convicted. The magnitude of these effects is known when $P(CR|CH)$ has been determined. Incapacitation refers to how removal of some types of individuals from the population at large will alter crime rates. To argue for an incapacitation effect, one must first conclude that $P(CR|CH)$ depends on past known criminal activity. Then, the impact of incapacitation of certain people would be to change $dF(CH)$, and the net effect could be deduced by recomputing the integral given above and comparing the derived crime rates.

In addition, a common supposition is that the recent increases in crime are due largely to changes in the mix of demographic characteristics in the population. An increased percentage of male individuals in the 15- to 25-year age bracket, so the argument goes, leads to increased crime rates per thousand of population because of the high crime rates of that specific group. Of course, the notion being advanced is that there is a serious aggregation problem across demographic groups. This difficulty is inadequately treated in aggregate studies by entering control variables which try to account for differing demographic mixes. The approach outlined above clearly takes explicit account of these factors through the population density

function of characteristics.

One word of caution is warranted lest the enthusiasm for a supply function unencumbered by aggregation and identification problems be untempered. One certainly can escape these two estimation problems when using data on individuals. However, when these individuals are reaggregated to form a market supply function, then we must recognize that we only have half the aggregate picture. The information missing is the response by potential victims, both individually and collectively, to perceived hazards. We can talk about moving along a market supply curve, but we have no way of knowing whether the implied policy and deterrence levels correspond to a new market equilibrium. A moment's thought about modeling this side of the market will reveal its importance. Concentration on the public provision of security masks a substantial part of the deterrence provided by society. Precautions taken by individuals, such as avoiding certain areas or limiting use of public transportation, do respond to changes in crime rates. Such individual actions undoubtedly contribute to deterrence yet are not easily measured.

3. Other Related Uses of Data on Individual Offenders

As mentioned in section 2, the analysis outlined in the preceding section requires a number of subsidiary studies which are of interest in themselves. Most prominent among these are: The

analysis of the ultimate disposition of a case which generally involves the process of plea bargaining with data coming from OBTS, PROMIS and the Alameda County Prosecutor's Office, and analysis of the process of arrest using data on self-reported behavior and focusing on how present and past contact with various parts of the criminal justice system, characteristics of the crime and other individual characteristics interact.

In addition, several other potentially attractive studies can be supported by the same data base. One such study would use the data on individuals collected by the Center for Econometric Study of Crime, victimization surveys, OBTS and prosecuting agencies along with census tract data from the Los Angeles Policy Department and the Bureau of Census to model the determinants of selection of site for a specific criminal activity like burglary. This study would be an embellished version of work done in the study of general deterrence. Rather than aggregate into generic crime types, we would restrict our attention to site specific crimes and form reasonably homogeneous target area out of Los Angeles County. Los Angeles Police, census and victimization data would be used in constructing the homogeneous areas and in providing measures of deterrence levels and attractiveness as targets for those areas. Individual behavior would be modeled as selection of a crime in an area based on returns and hazards associated with that area. The data on the prosecutorial process would be useful because the hazards assigned to a given area

would probably vary across individual offenders.

The Social Security Administration has agreed to provide us with earning histories of individual offenders subject to our meeting their confidentiality regulations. This provides us with an opportunity to mate criminal histories with the income streams earned in employment covered by the Social Security Administration. Hence, we can see how contact with the criminal justice system alters a large part of an individual offender's legal opportunities. This income data, supplemented with information about an individual's expenditures and criminal activity, might also be used to construct an index of allocation of effort to illegal income generating activities.[3] Our ability to construct this index depends entirely on the availability of accurate expenditure information. However, granting that availability, we can appraise how an individual's index changes with contact with the criminal justice system and with legal opportunities.

4. Conclusion

The analysis outlined in section 2 is ambitious. But the discussion in that section and in section 3 indicates the intrinsic usefulness of each of the subsidiary parts of the analysis of general deterrence and the existence of potentially fruitful projects using the same data base. It is clear, then, that the logical way to proceed is to analyze the various constituent parts of the process of crime generation and general deterrence as the requisite data is collected.

Notes

[1]See, for example, Franklin M. Fisher and Daniel Nagin, "On the Feasibility of Identifying the Crime Function in a Simultaneous Model of Crime Rates and Sanction Levels."

[2]The statistical problem which arises here has been noted by researchers in other fields. For example, see N. Mantel and W. Haensgel, "Statistical Aspects of the Analysis of Data From Retrospective Studies of Disease," Journal of the National Cancer Institute, Vol. 22, No. 4, 1959 or D. McFadden and C. Manski, "Alternative Estimators and Sample Designs for Discrete Choice Analysis," mimeo presented at the NSF-NBER Conference on Decision Rules and Uncertainty, Berkeley, June 1976. Also see C. Manski, "On the Feasibility of Inferring Deterrence Effects from Observations of Individual Criminal Behavior," mimeo presented at the National Academy of Sciences meeting at Woods Hole, June, 1976.

[3]The statistical technique used to produce such indices is called factor analysis. This method is becoming popular in empirical economic studies for constructing unobserved variables such as work effort. See Otis Dudley Duncan and Arthur S. Goldberger, "Structural Equation Models in the Social Sciences," Conference on Structural Equation Models, Madison, Wisc., 1970, sponsored by Social Science Research Council and the Social System Research Institute, University of Wisconsin.