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DETERRENCE AND THE CELERITY OF THE DEATH PENALTY: A NEGLECTED QUESTION IN DETERRENCE RESEARCH

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Deterrence and the Celerity of the Death Penalty:

A Neglected Question in Deterrence Research

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ABSTRACT

This paper examines a neglected, but theoretically important question in deterrence literature; namely, the deterrent effect of the celerity of the death penalty on homicide rates. Although in recent years we have witnessed a number of investigations of deterrence and the certainty of exectuion, the celerity of executions has not received empirical attention. As a result, we can only speculate about the merit of the deterrence hypothesis in regard to the celerity of executions, and how the findings of previous investigations of deterrence and the certainty of the death penalty might have been biased due to celerity being ignored.

Here, the deterrent effect of the certainty and celerity of the death penalty (and the certainty and severity of imprisonment) on homicide rates is examined cross-sectionally for states. Multiple measures of execution and homicide are considered, along with various sociodemographic variables, in investigating the possible spuriousness of the sanction-offense rate relationship. Analysis consistently fails to provide support for the deterrence argument for the effect of the certainty and celerity of executions on homicide rates. Rather, our results fall well within the pattern of negative findings of over five decades of deterrence and death penalty research.

Deterrence and the Celerity of the Death Penalty: A Neglected Question in Deterrence Research

In response to the growing recognition of the serious limitations of the early studies of the deterrent effect of the death penalty by Kirkpatrick (1925), Bye (1919), Sutherland (1925), Vold (1932), Schuessler (1952), Sellin (1959, 1967), and others, a number of empirical investigations on this important question have been published in the last few years. (Bailey, 1974, 1975, 1977; Ehrlich, 1975; Passell and Taylor, 1975; Bowers and Pierce, 1975; Yunker, 1976; Forst, 1977; Black and Orsagh, 1978). Although these recent studies have addressed some important neglected questions, and have played a prominent role in a number of recent death penalty cases brought before the United States Supreme Court, they have far from settled the deterrence controversy.[1] Rather, recent death penalty investigations have brought some investigators to diametrically opposed conclusions, and have raised even additional theoretical and methodological questions about the deterrent effect of the death penalty (Gibbs, 1977). One of these questions, and the issue examined in this investigation, concerns the extent to which the results of these recent studies might be biased due to neglect of a presumed theoretically important dimension of the death penalty; namely, the deterrent effect of the <u>celerity</u> of executions.

Dating back to the early Classical School of Criminology writings of Beccaria (1809) and Bentham (1843), proponents of deterrence have argued that in order for legal sanctions to be effective deterrents to

crime, they must be (1) severe enough to outweigh the potential pleasures to be gained from crime, (2) administered with great certainty, (3) administered swiftly (celerity), and (4) administered publicly in order to best inform would be offenders of the consequences of crime. The presumed importance of the celerity of punishment is illustrated in the following statement by Beccaria:

> An immediate punishment is more useful; because the smaller the interval of time between the punishment and the crime, the stronger and more lasting will be the association of the two ideas of "crime" and punishment; so that they may be considered, one as the cause, and the other as the unavoidable and necessary effect.... Delaying the punishment serves only to separate these two ideas, and thus affects the minds of the spectators rather as being a terrible sight than the necessary consequences of a crime, the horror of which should contribute to heighten the idea of punishment. [pp. 75-76; emphasis added]

Similarly, in a more recent discussion of the role of punishment--including capital punishment--in the criminal justice system, Jeffery (1965) also emphasizes the importance of the celerity and certainty of legal sanctions as deterrents to crime. In accounting for the negative evidence for the death penalty he argues:

> The uncertainty of capital punishment is one major factor in the system. Another factor is the time element. A consequence [the death penalty] must be applied immediately if it is to be effective.... The lesson to be learned from capital punishment is not that punishment does not deter, but that the improper and sloppy use of punishment does not deter or rehabilitate. [p. 299; emphasis in the original].

Unfortunately, because death penalty investigators have uniformly failed to consider the celerity of executions, we can only speculate about the deterrent effectiveness of this dimension of punishment. In addition, if the celerity of the death penalty is an important deterrent to murder, then ignoring this factor may have resulted in biased findings in previous investigations of the deterrent effect of the severity

(imprisonment versus execution) and certainty (execution rates) of the death penalty. As Black and Orsagh (1978) point out, by their (and others') failure to include the celerity of punishment in their deterrence model, results for the sanction variables, including the certainty of execution, may be biased against confirming the neoclassical hypothesis; that is, parameter estimates for the sanction and other variables included in a model will be biased if some important variable(s) is excluded from the model.[2]

Here, too, I can only speculate about the deterrent effect of the celerity of execution on murder, and how ignoring this factor may have led to biased results in previous investigations. It may well be that proponents of deterrence are correct about the value of the celerity of punishment, for as Geerken and Gove (1975, p. 500) argue, "the greater the speed with which punishment occurs (the brevity of the reaction time), the greater the effectiveness of the deterrence system." On the other hand, the celerity of the death penalty may have little-to-no deterrent value for murder:

> Surely it is difficult to see how, in the case of general deterrence, a short time interval between an offense and the punishment of an alleged offender increases the deterrent impact on others. Thus on reading that someone has been executed for first-degree rape, why would the reader be deterred more (assuming any impact at all) if the alleged rape took place a year ago rather than two years ago? [Gibbs, 1977, p. 289]

In addition, Gibbs (1975, p. 9) further argues that for the same reasons, "why would he or she [the would-be offender] be deterred more if the crime took place six weeks rather than one year previously?" Although highly skeptical, Gibbs does concede, however, that the celerity hypothesis does warrant systematic empirical investigation.[3]

1. THE PRESENT INVESTIGATION

The research reported here is both a partial replication and an extension of a number of recent death penalty investigations. Consistent with most studies, I examine the deterrence hypothesis of a significant inverse relationship between states' homicide rates and (1) the certainty of execution for homicide, (2) the certainty of imprisonment for homicide, and (3) the severity of imprisonment for homicide. In addition, I also examine the deterrence hypothesis of (4) a significant positive relationship between the celerity of the death penalty--the elapsed time between the sentencing and execution of convicted murderers--and homicide rates; that is, the greater the elapsed time between sentencing and execution of convicted murderers, the higher the homicide rate.

Analysis is confined here to states that provide the death penalty for murder because it makes no theoretical sense to talk about the deterrent effect of the celerity of executions in abolitionist jurisdictions. Further, by limiting the analysis to only those states that provide for both types of sanctions for murder, it will be possible to examine the relative deterrent effect of both imprisonment and the death penalty. In addition, by incorporating the celerity of execution variable into the analysis, it will be possible to examine the question raised by Black and Orsagh (1978) about how the exclusion of this deterrence variable might have biased the results of previous investigations.

Also similar to previous investigations, a number of sociodemographic factors are considered in the analysis to control for the possible spuriousness of the sanction-offense rate relationship. For reasons discussed later, analysis is confined to a cross-state examination of

the deterrence question for 1960. Before presenting more detail on the methodology of the study and the findings, some of the more important recent death penalty and deterrence investigations are reviewed.

2. REVIEW OF THE LITERATURE

Beginning in the mid-1970s a handful of multivariate analyses of deterrence and the death penalty began to appear in leading criminology, economics, and law journals. In Ehrlich's (1975) research, which has received considerable attention and publicity, the relationship between certainty of execution and the homicide rate was examined longitudinally for the period 1933 to 1969; simultaneously, a number of sociodemographic and law enforcement factors were introduced into the analysis as control variables. Using nationally aggregated data, Ehrlich's analysis led him to the conclusion that "an additional execution per year over the period in question may have resulted, on average, in seven to eight fewer murders [p. 414]."

Ehrlich's findings, which are in striking contrast to those of earlier investigations, have been challenged on a number of grounds. First, in examining the effect of executions, Ehrlich failed to differentiate between retentionist and abolitionist jurisdictions in estimating annual probabilities of execution, which, of course, is quite misleading since the probability of execution in abolitionist states is zero. Second, the validity of Ehrlich's findings rests upon the assumption that the form of the relationship between executions and homicides is the same over the period 1933 to 1969. The independent examinations of this question

for varying periods between 1933 and 1969 led both Bowers and Pierce (1975) and Passell and Taylor (1975) to reject the assumption of temporal homogeneity. Third, in examining the years 1933 to 1969, Ehrlich aggregated his execution, homicide, and control variables on a national level, thus ignoring the variation in these factors from state to state. Such a procedure obviously does not take into consideration the substantial variation in the levels of homicide (in both types of states) and execution practices (in retentionist jurisdictions) from state to state. Because of these and numerous other difficulties, Passell and Taylor)p. 12) conclude that Ehrlich's research has to be viewed with extreme skepticism, and that "it is prudent neither to accept nor reject the hypothesis that capital punishment deters murder."

In another recent investigation, Yunker (1976) further examined the execution-offense rate relationship by (1) utilizing an alternative measure of the certainty of execution--the actual number of executions per year for varying periods from 1933 to 1972, (2) considering only annual unemployment rates as a control variable, and (3) considering a zero and three-year time lag between executions and homicide rates. His research, like Ehrlich's, provides support for the deterrence hypothesis. For the period 1960 to 1972 (the execution-homicide rate relationship is positive, or low-negative, for more extended time periods), he reports a highly significant inverse relationship between executions and homicide rates for the three-year lag model, and concludes that "one execution will deter 156 murders [p. 65]." In contrast, nonlagged execution rates and homicide rates were not found to be significantly related.

Unfortunately, Yunker's research suffers from the same objections as those raised regarding Ehrlich's study: (1) he aggregates his execution, homicide, and unemployment data on a national level; and (2) he fails to differentiate between abolitionist and retentionist jursidictions. In addition, he chooses to ignore his less conclusive findings for the period 1933 to 1959. Accordingly, and at best, Yunker's findings may only reflect a limited and atypical period of our national experience with the death penalty.

In a third investigation, Forst (1977) examined changes in execution rates and homicide rates from 1960 to 1970 cross-sectionally for states. As in most other studies, sociodemographic and imprisonment variables were considered as control variables. Exploring a number of execution-homicide rate models, Forst consistently reports a nonsignificant relationship between changes in executions and homicides. He did find, however, changes in the certainty of imprisonment for homicide from 1960 (41.3%) to 1970 (34.6%) to be significantly related to changes in homicide rates (+53%) between these years. Forst concludes that this factor, along with the increased affluence during the 1960s, is the major contributor to the increase in homicide during the decade.

In two final studies of note, Bailey (1977) and Black and Orsagh (1978) examined the relationship between the certainty of execution and homicide rates for 1950 and 1960 cross-sectionally for states. Although the methodologies differ somewhat in the two investigations, both explored a number of models of the execution-offense rate relationship.

For neither 1950 nor 1960 do either of these studies provide support for the deterrence argument. On the contrary, both Bailey and Black and

Orsagh find execution rates and homicide rates to be positively related. In contrast, the findings for the severity and certainty of imprisonment are much less consistent in each investigation, with the coefficients varying in sign, size, and level of significance for different years, and models of the sanction-offense rate relationship. Although the mixed findings for the imprisonment variables are somewhat difficult to interpret, both Bailey and Black and Orsagh conclude that they find no evidence consistent with the deterrence argument for the death penalty.

In sum, the above research fails to provide an altogether consistent pattern of findings. With the exception of the studies by Ehrlich (1975) and Yunker (1976), both cross-state and longitudinal analyses have typically failed to provide support for the hypothesis of a substantial inverse relationship between the certainty of execution and homicide rates. Most typically, these two variables have been found to be either positively, or only slightly negatively associated. In addition, because of the difficulties with the Ehrlich and Yunker studies, their contrary findings have to be viewed with extreme caution. As Bailey (1977) and Black and Orsagh (1978) point out, until the celerity of the death penalty is considered as a possible deterrent to murder, the negative findings resulting from recent death penalty investigations have to be viewed with at least some degree of caution.

3. METHODS AND PROCEDURES

The deterrent effect of the certainty and celerity of execution, and the certainty and severity of imprisonment on state homicide rates

is examined here to provide a more comprehensive analysis of the deterrence question. Multiple measures of the certainty of the death penalty and homicide rates are investigated and a variety of sociodemographic control variables are considered in the analysis as control variables.

Homicide Rate

In the absence of theoretically appropriate figures for first degree murder, F.B.I. figures for murder and nonnegligent manslaughter are used as an indicator of capital homicide rates. Because this homicide offense category includes all felonious homicides, and is thus more inclusive than first degree murder, it must be assumed that the ratio of capital to total criminal homicides is constant from state to state, so that F.B.I. figures provide a reasonably good indicator of offenses punishable by death.[4]

Unfortunately, despite the widespread use of F.B.I. figures in death penalty investigations, the possible bias resulting from this practice remains unknown, for no one has succeeded in accurately counting the capital offenses hidden in these data (Sellin, 1959; Bedau, 1967, pp. 56-74; Gibbs, 1975). The bias resulting from the use of these police data may not be substantial, however, for Bailey (1974, 1975, 1976) reports very similar findings for the certainty of execution when F.B.I. figures and prison admission figures for first-degree murder were used as indicators of capital homicide rates.[5] In addition, it can be argued that the deterrence doctrine also suggests that the death penalty may have a deterrent effect for other forms of criminal homicide. As Caldwell (1965, pp. 425-426) points out, the fact that society so condemns murder that it demands the life of the offender "helps to engender attitudes of dislike,

contempt, disgust, and even horror of these acts, and thus contributes to the development of personal forces hostile to crime." In fact, the subtle, unconscious effect of the law and punishment, as opposed to the cool, conscious calculation of punishment, was believed by Beccaria (1809) and Bentham (1823) to provide the major mechanism of deterrence.

Certainty of Execution

Three related measures of the certainty of execution are considered. First, execution rates were computed by dividing (1) the number of executions for homicide during the year by (2) the number of reported criminal homicides during the year. This procedure resulted in an execution rate value for each state that could theoretically range from zero to unity. The rationale for this execution measure is based upon the assumption that the general public, including would-be killers, is more affected (deterred) by its impression of current levels of homicide and executions than by (1) the current level of homicides and the possible future levels of executions, and/or (2) previous levels of homicide and the current level of executions.

Second, if the public is sensitive to the typical delay of at least one year between the commission of murder and execution, then it also makes sense to take a time lag factor into account. To explore this possibility, a second execution rate measure was constructed by dividing (1) the number of executions for homicide during the year (year t) by (2) the number of reported homicides for the previous year (year t-1). Such a one-year time lag factor has also been used in previous death penalty investigations (Forst, 1977; Bailey, 1977).

A third execution rate measure was also computed by dividing (1) the average number of executions for a three-year consecutive period ((yr. t-1 + yr. t + yr. t+1)/3) by (2) the number of reported homicides for year t. This operationalization has some potential advantages over the above indexes (Forst, 1977). First, if the public has only a vague notion of the level of executions during any particular year, then it makes more sense to compute execution rates by comparing the level of homicides during year t with the level of executions for that year, and the year that precedes (t-1) and follows (t+1) that year. Second, due to the relatively small number of executions that occured during 1960, measurement error and sampling variability can be reduced by considering the mean number of executions for a three-year period (1959-1961).

Celerity of Execution

In examining the deterrent effect of the celerity of the death penalty for murder, ideally one would like to consider the time intervals both between the commission of murder and executions, and between sentencing and executions. Unfortunately, published data for either of these measures are simply not available. Thanks to the assistance of the National Prisoners Statistics Branch of the Bureau of the Census, however, I was able to secure unpublished data for the median elapsed time in months between the sentence of death and execution of convicted murderers from 1956 to 1960.[6] As explained by the Bureau, these unpublished data have been collected each year since 1956, but the Bureau has been unable to locate these figures for most states since 1960.[7] As a result, my

celerity data are confined to only a five-year period. Unfortunately, figures are not available from the Bureau of the Census for the elapsed time between the commission of murder and executions.

Celerity figures for each individual year and for the five-year period are presented in Table 1. As can be seen, the median elapsed time for all states combined varies only slightly from year to year. In contrast, median figures vary substantially for states each year, and for the five-year period. For a number of states for individual years, and for some states for all five years (n = 9), median figures could not be computed since there were no executions for murder during these years.

The figures reported in Table 1 were initially utilized to compute two measures of celerity: the average median elapsed time between sentence of death and execution between (1) 1956 and 1960, and (2) 1958 and 1960. Both measures of celerity were considered on the assumption that the public's impression of the delay between sentencing and execution is more a result of sentencing and execution practices over the past few years than during any one year. Initial analysis revealed, however, a rather substantial association between these two average measures of celerity ($r = .707$), and a very similar association between median celerity figures lagged by one year (1959) and average elapsed time figures from 1956 to 1960 ($r = .900$), and from 1958 to 1960 ($r = .907$). In addition, the results of the analysis (to be presented later) were virtually identical regardless of which measure of celerity was selected. As a result, and to extend the degrees of freedom in the analysis, we choose to utilize median figures for the five-year period 1956 to 1960 ($n = 31$) rather than the period 1958 to 1960 ($n = 25$).

Table 1

Median Elapsed Time Between Sentence of Death and Execution of Convicted Murderers

State	Year of Execution					
	1956	1957	1958	1959	1960	1956-1960[a]
Alabama	--	13.6 mo	--	11.6 mo	16.8 mo	14.0 mo
Arizona	--	22.2	46.6	17.6	20.7	26.8
Arkansas	--	--	--	11.4	18.0	14.7
California[b]	19.4	13.8	51.7	16.2	13.1	22.8
Colorado	18.4	7.9	--	--	67.4	31.2
Connecticut	--	--	--	57.4	34.7	46.1
Florida	24.5	29.6	36.4	24.7	19.4	26.9
Georgia[c]	11.9	10.3	14.7	9.0	2.0	9.6
Idaho	--	10.4	--	--	--	10.4
Illinois	--	--	36.9	--	--	36.9
Indiana	--	--	--	--	--	--
Iowa	--	--	--	--	--	--
Kansas	--	--	--	--	--	--
Kentucky	18.2	--	--	--	--	18.2
Louisiana	23.3	24.0	12.3	--	--	19.9
Maryland	--	11.3	--	12.2	--	11.8
Massachusetts	--	--	--	--	--	--
Mississippi	7.8	24.1	29.9	--	--	20.6
Missouri	--	19.1	--	--	--	19.1
Nebraska	--	--	--	12.6	--	12.6
Nevada	--	--	--	--	22.0	22.0
New Hampshire	--	--	--	--	--	--
New Jersey	29.1	--	--	--	--	29.1
New Mexico	16.4	--	--	--	20.5	18.5
New York	10.8	21.4	19.2	18.2	14.4	16.8
North Carolina	23.7	--	11.5	--	--	17.6
Ohio[b]	13.2	6.8	12.1	21.7	22.3	15.2
Oklahoma	14.6	16.6	--	--	15.4	15.5
Oregon	--	--	--	--	--	--
Pennsylvania	14.1	--	--	28.1	--	21.1
South Carolina	11.1	21.8	--	--	--	16.5
South Dakota	--	--	--	--	--	--
Tennessee	--	10.6	--	--	--	10.6
Texas	3.3	6.6	8.0	2.4	2.9	4.6
Utah	78.7	--	16.9	--	27.4	41.0
Vermont	--	--	--	--	--	--
Virginia	--	2.0	2.1	5.4	15.1	6.2
Washington	28.7	28.2	--	--	1.2	19.4
West Virginia	3.8	--	7.3	20.0	--	10.4
Wyoming	--	--	--	--	--	--
All states	14.0	13.5	15.3	13.6	15.4	14.4

Source: Data provided by Bureau of the Census, Demographic Survey Division, National Prisoner Statistics Branch.

[a]The arithmetic mean of the median figures from 1956 to 1960 are reported in this column.

[b]The median time lapsed is computed on the basis of the time between date first received into prison and execution. In California the number of days between sentencing and delivery to prison was small, seldom more than a weekend. For Ohio the delay was also quite brief, generally 1 to 5 days. Accordingly, for these two states these short delays should have relatively little impact on the monthly median figures.

[c]Georgia officials indicate that in some cases the sentencing date was reported and in some cases the date received at prison was reported in computing median figures. The median time lapse figures for this state are thus understated to some unknown degree.

Certainty and Severity of Imprisonment

Measures of the certainty and severity of imprisonment for homicide were considered in the analysis as control variables. Using homicide and imprisonment figures published by the Federal Bureaus of Investigation (1961) and Prisons (1960), estimates of the certainty of imprisonment for 1960 were computed for each state by dividing (1) the number of convicted murderers imprisoned during the year by (2) the number of reported murders during the year. This procedure resulted in a certainty value for each jurisdiction that can theoretically range from zero to unity. Unfortunately, because the required imprisonment data are only available for one year (1960) during the period where celerity data are available, analysis is confined to 1960.

The measure of the severity of imprisonment for homicide used here is the median length of prison sentence served by convicted murderers who were released from prison in 1960. These median data were also secured from figures issued by the Federal Bureau of Prisons (1960), and are also only available for one year (1960) during the 1956 to 1960 period.

For the 40 death penalty states examined in this analysis (see Table 1), estimates of the certainty of imprisonment could be computed for all but one jurisdiction (New Jersey) for 1960, and for all but three states (New Jersey, Idaho, Wyoming) for the severity of imprisonment. A certainty estimate could not be computed for New Jersey due to New Jersey officials' failure to report the number of convicted murderers imprisoned in 1960; similarly, New Jersey also failed to report length of imprisonment figures for 1960. Severity estimates were not possible

for Idaho and Wyoming due to there being no convicted murderers released from prison during the year.

Sociodemographic Control Variables

To examine the possible spuriousness of the relationship between sanctions and offense rates, a number of socioeconomic and demographic factors were considered as control variables: (1) population; (2) population density; (3) percentage urban population; (4) percentage nonwhite population; (5) percentage male population; (6) percentage population 20-40 years of age; (7) median education; (8) median family income; (9) percentage unemployment; and (10) a binary Southerness variable, where southern states = 1 and nonsouthern = 0. These control factors were selected on the basis of their use or the use of similar variables in previous investigations.[8]

Due to the substantial association among some of the control variables (multicollinearity), all of the sociodemographic factors could not be considered in the final model. To eliminate redundant and superfluous variables, a series of regression analyses were conducted where homicide rates were regressed against the four sanction variables and various combinations of the sociodemographic variables. This procedure resulted in the selection of four control variables to include in the final model: (1) percentage nonwhite population; (2) percentage urban population; (3) percentage population 20-40 years of age; and (3) median family income.

To further check that an important factor among the remaining six sociodemographic variables had not been mistakenly excluded, each, one at a time, was also combined along with the four sanction and four selected

control variables and included in a series of regressions. This procedure consistently failed to add significantly to the size of the multiple R^2 value, with the regression coefficients for the executions and imprisonment variables being altered only slightly and insignificantly.[9]

Method of Analysis

The general model examined here is

$$HR = f(EXRT, EXCEL, CERT, SEV, AGE, INC, NW, URB).$$

This model represents the hypothesis that homicide rates (HR) are influenced by execution rates (EXRT), the celerity of execution (EXCEL), the certainty of imprisonment (CERT), the length of prison sentence (SEV), and the social and demographic characteristics of age (AGE), median family income (INC), nonwhite population (NW), and urban population (URB).

A series of ordinary least squares regressions were performed to examine the hypotheses of (1) a significant inverse relationship between state homicide rates and the certainty of executions, and the certainty and severity of imprisonment, and (2) a positive relationship between delays in executions and homicide rates. First, to test for the possible immediate deterrent effect of the certainty of the death penalty, execution and homicide rates were examined within the same year (1960). Second, to explore a possible lag effect, a one-year lagged execution rate variable was considered. Third, to further explore the deterrence hypothesis, a three-year mean execution rate measure was brought into the analysis. Finally, to explore the immediate as well as the possible delayed deterrent effect of executions and imprisonment, two homicide

rate measures were considered: (1) homicide rates for 1960; and (2) mean homicide rates for 1960 and 1961. (Both homicide measures are considered when each execution rate is examined.)

The Simultaneity of the Sanction-Offense Rate Relationship

The above sanction-offense rate model rests upon the assumption that the causal relationship between sanctions and offense rates is unidimensional; sanctions influence homicide rates. It is plausible, however, that the level of homicides also influences the level of sanctions for homicide. If sanctions do influence homicide rates, but homicide rates also influence sanction levels, then our model of deterrence will yield biased results for the sanction variables.

To provide a test of this question, homicide rates for year t-1 (1959) and the four sociodemographic variables included in our model were regressed against the sanction variables. Like some previous investigators (Black and Orsagh, 1978), I assume a one-year lag in how levels of homicide (1959) might influence sanction levels. Results of this analysis fail to show sanction levels to be responsive to homicide rates. To illustrate, only a very slight trade-off is observed between 1959 homicide rates and 1960 execution rates (B = .015), and one-year lagged execution rates (B = .001) and three-year mean execution rates (B = .001). Similarly, the trade-off between changes in homicide rates and the certainty (B = -.001) and severity (B = -.001) of imprisonment is also very slight.[10] These results lead to the conclusion that these findings presented later in this paper are not seriously biased due to the simultaneity of the sanction-offense rate relationship.

4. FINDINGS

Table 2 reports the results of the analysis when the sanction variables and homicide rates are examined for 1960 (upper panel of the table), and when mean homicide rates for 1960 and 1961 are used as a measure of the dependent variable (lower panel of the table).
For both measures of homicide, the analysis reveals a very consistent pattern. When offense rates for 1960 are considered, the partial regression (B) coefficients fall in the predicted negative direction for the certainty (-2.181) and severity (-.010) of imprisonment, but not for the certainty of executions (.305). In addition, the celerity coefficient is negative (-.057), whereas the deterrence argument would suggest a positive association between the length of the interval between the sentencing and execution of murderers and homicide rates. None of the sanction coefficients are statistically significant.

When mean homicide rates are examined, the unstandardized coefficients are negative for the certainty (-2.162) and severity (-.010) of imprisonment, and for the celerity of the death penalty (-.040), but positive for execution rates (.275). Further inspection of Table 2 also shows the sizes of the respective B coefficients to be very comparable for the sanction variables in the yearly and mean homicide rate analysis.

These findings provide no support for the deterrence hypothesis as it applies to the certainty and celerity of the death penalty. Similarly, the nonsignificant findings for the certainty and severity of imprisonment are also inconsistent with the deterrence argument.

Table 2

Relationship Between Celerity of Execution, Execution Rates, Certainty And Severity of Imprisonment, Selected Sociodemographic Variables, and Homicide Rates

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.225	14.658	.143	9.966	2.163
Mdn. income	-.619	-.001	-.209	.001	.836
% nonwhite pop.	.851	22.220	.651	5.281	17.704***
% urban pop.	-.276	4.481	.183	4.482	1.000
Cert. of prison	.030	-2.181	-.114	1.873	1.355
Sev. of prison	-.594	-.010	-.185	.007	2.087
Celerity of exec.	-.401	-.057	-.151	.052	1.207
Certainty of exec.	-.031	.305	.129	.244	1.564
Constant = 3.153					
R^2 = .828***					
Adj. R^2 = .759***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.182	9.153	.095	9.122	1.007
Mdn. income	-.645	-.001	-.266	.001	1.415
% nonwhite pop.	.859	20.014	.628	4.834	17.144***
% urban pop.	-.292	4.153	.182	4.102	1.025
Cert. of prison	.021	-2.162	-.121	1.715	1.590
Sev. of prison	-.592	-.010	-.205	.006	2.677
Celerity of exec.	-.395	-.040	-.114	.047	.716
Certainty of exec.	-.028	.275	.125	.223	1.522
Constant = 5.016					
R^2 = .835***					
Adj. R^2 = .769***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socio-economic and demographic data from U.S. Department of Commerce, 1964.

***P < .001

Table 3 presents the results of the analysis when a one-year lagged execution rate measure is considered. The 1960 homicide rate analysis yields negative B coefficients for the certainty (-2.329) and severity (-.010) of imprisonment, and for the celerity of executions (-.064). Similarly, the coefficients are negative in the mean homicide rate analysis for the certainty (-2.283) and severity (-.010) of imprisonment, and the celerity of the death penalty (-.046). As before, neither the imprisonment nor the celerity coefficients are statistically significant.

In contrast, but consistent with Table 2, lagged execution rates are positively associated with both 1960 homicides (B = .259) and mean homicide rates (B = .227). Accordingly, we again find no evidence that homicide rates are responsive to the use of the death penalty.

To further explore the deterrence question, three-year mean execution rates are introduced into the analysis. Results are reported in Table 4. For each measure of homicide, the coefficients are consistently negative for both imprisonment variables and the celerity of the death penalty. In contrast, execution rates and both measures of homicide are positively related, although the coefficients are again not statistically significant.

In sum, the above findings (Tables 2-4) provide no support for the deterrence argument for the certainty of the death penalty. On the contrary, homicide rates are found to be positively related with each measure of the certainty of execution. Second, both homicide rates are negatively related to the celerity of the death penalty, but the celerity coefficients are very slight (B < -.07), and are not significant. Accordingly, no support is found for the deterrence argument that delays in execution are positively related with homicide rates. Third, although

Table 3

Relationship Between Celerity of Execution, One-Year Lagged Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Homicide Rates

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.225	14.404	.140	9.901	2.116
Mdn. income	-.619	-.001	-.202	.001	.790
% nonwhite pop.	.851	22.418	.657	5.265	18.129***
% urban pop.	-.276	4.379	.179	4.458	.965
Cert. of prison	.030	-2.329	-.122	1.880	1.535
Sev. of prison	-.594	-.010	-.182	.007	2.057
Celerity of exec.	-.401	-.064	-.172	.053	1.464
Certainty of exec.	-.068	.259	.146	.192	1.809
Constant = 3.332					
R^2 = .830***					
Adj. R^2 = .762***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.182	8.913	.093	9.086	.963
Mdn. income	-.645	-.001	-.260	.001	1.360
% nonwhite pop.	.859	20.167	.632	4.832	17.422***
% urban pop.	-.292	4.066	.178	4.091	.988
Cert. of prison	.021	-2.283	-.128	1.725	1.752
Sev. of prison	-.592	-.010	-.203	.006	2.654
Celerity of exec.	-.395	-.046	-.131	.049	.890
Certainty of exec.	-.069	.227	.137	.177	1.654
Constant = 5.182					
R^2 = .836***					
Adj. R^2 = .771***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

*** $P < .001$

Table 4

Relationship Between Celerity of Execution, Three-Year Mean Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Homicide Rates

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.225	17.058	.166	9.838	3.007
Mdn. income	-.619	-.001	-.223	.001	1.016
% nonwhite pop.	.851	21.422	.628	5.093	17.692***
% urban pop.	-.276	4.728	.193	4.354	1.179
Cert. of prison	.030	-2.412	-.126	1.832	1.733
Sev. of prison	-.594	-.008	-.148	.007	1.340
Celerity of exec.	-.401	-.067	-.179	.051	1.735
Certainty of exec.	.145	.795	.176	.471	2.848
Constant = 2.524					
R^2 = .838***					
Adj. R^2 = .773***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.182	11.252	.117	9.043	1.548
Mdn. income	-.645	-.001	-.280	.001	1.657
% nonwhite pop.	.859	19.293	.605	4.681	16.984***
% urban pop.	-.292	4.373	.191	4.002	1.194
Cert. of prison	.021	-2.357	-.132	1.684	1.959
Sev. of prison	-.592	-.008	-.171	.006	1.847
Celerity of exec.	-.395	-.048	-.138	.046	1.074
Certainty of exec.	.147	.700	.166	.433	2.612
Constant = 4.470					
R^2 = .843***					
Adj. R^2 = .780***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

***P < .001

the certainty and severity of imprisonment also prove to be negatively associated with both measures of homicide, the findings for these variables are not statistically significant.

Finally, although not of primary interest in this investigation, comparison of the findings for the sanction versus the sociodemographic variables also reveals a rather consistent pattern. Regardless of the homicide or certainty of execution measure considered, the beta results consistently show percentage nonwhite population to be the best predictor of offense rates, followed by median family income. After these two variables comes severity of imprisonment, which ranks third in importance in four of the six analyses, followed by percentage urban population, which ranks fourth in four of the six analyses. These three factors are followed by the two execution variables, and lastly by age and certainty of imprisonment, which prove to be the poorest predictors of homicide. These beta results are consistent with the findings of most previous investigations that homicide rates are more responsive to sociodemographic factors (nonwhite, income, urban) than imprisonment (certainty and severity), and are not responsive to executions (certainty, celerity).

Nonlinearity of the Sanction-Offense Rate Relationship

In the above analysis the form of the relationship between the sanction and offense variables was assumed to be linear. The possibility exists, however, that the actual form of the relationship is nonlinear. To provide a test of this question, I followed the procedure used in some previous investigations of performing natural log transforms on the homicide rate variables and repeating the above analysis.

Table 5 reports the results of the nonlinear analysis when both the sanction variables and the transformed homicide rates are examined for 1960, and when transformed mean homicide rates are used as a measure of the dependent variable. This analysis reveals much similarity, but also some points of contrast to Table 2. As before, with the exception of execution rates, each of the sanction variables is negatively related with both homicide measures. Likewise, neither the certainty and severity of imprisonment nor the certainty of execution is significantly related with either measure of homicide. Importantly, however, and in contrast to what was reported in Table 2, celerity of death penalty is now found to be negatively and significantly related with yearly ($F = 4.907$, $P < .05$) homicide rates.

Table 6 reports the results of the log analysis when the one-year lagged execution rate variable is considered. Again we observe a very similar pattern of results for the sanction variables. Execution rates and both homicide rates are positively associated, and the certainty and severity of imprisonment, and the celerity of the death penalty are negatively associated with each of the dependent variables. With the exception of the celerity of execution-1960 homicide rate relationship, the sanction coefficients are not statistically significant. Less the significant results for the celerity variable in the yearly analysis, these findings closely parallel those reported in Table 3.

To round out the picture, Table 7 reports the regression results when the three-year mean execution rate measure is considered in the log analysis. As before, we observe a consistent pattern of findings for the celerity of the death penalty, but with both celerity coefficients being

Table 5

Relationship Between Celerity of Execution, Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Log Homicide Rates

Homicide Rate Results

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
% age 20-40 yrs.	.173	2.824	.117	2.762	1.045
Mdn. income	-.425	-.001	-.051	.000	.036
% nonwhite pop.	.728	4.823	.601	1.463	10.861**
% urban pop.	-.091	1.881	.327	1.242	2.294
Cert. of prison	.031	-.526	-.117	.519	1.025
Sev. of prison	-.652	-.003	-.236	.002	2.448
Celerity of exec.	-.500	-.032	-.360	.014	4.907*
Certainty of exec.	-.007	.100	.181	.068	2.206
Constant =	.413				
R^2 =	.761***				
Adj. R^2 =	.665**				

Mean Homicide Rate Results

% age 20-40 yrs.	.140	1.486	.070	2.284	.423
Mdn. income	-.505	-.001	-.100	.000	.158
% nonwhite pop.	.771	4.316	.609	1.210	12.713**
% urban pop.	-.166	1.305	.257	1.027	1.613
Cert. of prison	-.020	-.680	-.171	.429	2.509
Sev. of prison	-.649	-.003	-.254	.002	3.245
Celerity of exec.	-.461	-.023	-.302	.012	3.944
Certainty of exec.	-.021	.085	.173	.056	2.309
Constant =	1.171				
R^2 =	.791***				
Adj. R^2 =	.707***				

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

* < .05
** < .01
*** < .001

Table 6

Relationship Between Celerity of Execution, One-Year Lagged Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Log Homicide Rates

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.173	2.735	.113	2.751	.988
Mdn. income	-.425	-.001	-.044	.000	.026
% nonwhite pop.	.728	4.876	.608	1.463	11.107**
% urban pop.	-.091	1.850	.322	1.239	2.231
Cert. of prison	.031	-.568	-.126	.522	1.182
Sev. of prison	-.652	-.003	-.234	.002	2.427
Celerity of exec.	-.450	-.034	-.384	.015	5.236*
Certainty of exec.	-.052	.082	.197	.053	2.344
Constant = .474					
R^2 = .762***					
Adj. R^2 = .667***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.140	1.409	.066	2.279	.382
Mdn. income	-.505	-.001	-.093	.000	.138
% nonwhite pop.	.771	4.356	.614	1.212	12.915**
% urban pop.	-.166	1.279	.252	1.026	1.554
Cert. of prison	-.020	-.713	-.179	.433	2.719
Sev. of prison	-.649	-.003	-.253	.002	3.226
Celerity of exec.	-.461	-.025	-.323	.012	4.221
Certainty of exec.	-.072	.068	.185	.044	2.367
Constant = 1.223					
R^2 = .791***					
Adj. R^2 = .708***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

* < .05
** < .01
*** < .001

Table 7

Relationship Between Celerity of Execution, Three-Year Mean Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Log Homicide Rates

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.173	3.470	.144	2.765	1.575
Mdn. income	-.425	-.001	-.073	.000	.076
% nonwhite pop.	.728	4.560	.569	1.431	10.150**
% urban pop.	-.091	1.956	.340	1.224	2.554
Cert. of prison	.031	-.573	-.127	.515	1.239
Sev. of prison	-.652	-.002	-.197	.002	1.658
Celerity of exec.	-.450	-.033	-.380	.014	5.493*
Certainty of exec.	.159	.225	.212	.132	2.876
Constant = .251					
R^2 = .768***					
Adj. R^2 = .675***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.140	2.016	.095	2.293	.773
Mdn. income	-.505	-.001	-.121	.000	.239
% nonwhite pop.	.771	4.094	.577	1.187	11.890**
% urban pop.	-.166	1.367	.269	1.015	1.813
Cert. of prison	-.020	-.717	-.180	.427	2.818
Sev. of prison	-.649	-.002	-.219	.002	2.319
Celerity of exec.	-.461	-.025	-.318	.012	4.387*
Certainty of exec.	.145	.186	.198	.110	2.584
Constant = 1.040					
R^2 = .796***					
Adj. R^2 = .714***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

* < .05
** < .01
*** < .001

negative and significant ($P < .05$). In contrast, the coefficients fall in the hypothesized negative direction for the two imprisonment variables, but they are not statistically significant. The same pattern of findings also resulted in the earlier linear analysis (Table 4). In addition, mean execution rates and both homicide rates are again positively related, which is at odds with the deterrence hypothesis.

In sum, the nonlinear analysis also provides a rather consistent pattern of findings. As before, the log analysis provides no support for the deterrence argument for either the certainty and severity of imprisonment, or the certainty and celerity of the death penalty.

An Alternative Construction of Execution Rates

The three measures of execution used up to this point in the analyses have all been based upon the ratio of the number of reported homicides to the number of executions for homicide. Ehrlich (1975) and others have argued, however, that a more appropriate measure of execution would be based upon the ratio of the number of convicted and imprisoned murderers to the number of executions of imprisoned murderers. The rationale for this measure is that the public is at least generally aware of the probability of convicted murderers being executed.

To test whether a conditional execution rate provides a more appropriate test of the deterrence hypothesis, conditional execution rates were computed for each state by dividing (1) the number of convicted murderers executed during 1960 by (2) the number of murderers imprisoned during the year. Conditional execution values were then substituted in the analysis of homicide rates (as in Table 2) and log homicide rates (as in Table 5). Results of the first analysis are presented in Table 8.

Table 8

Relationship Between Celerity of Execution, Conditional Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Homicide Rates

Ind. Variable	r	B. Coeff.	Beta Coeff.	SE	F Value
Homicide Rate Results					
% age 20-40 yrs.	.225	14.967	.146	9.517	2.473
Mdn. income	-.619	-.001	-.170	.001	.602
% nonwhite pop.	.851	22.678	.665	5.049	20.174***
% urban pop.	-.276	3.530	.144	4.314	.670
Cert. of prison	.030	-1.833	-.096	1.765	1.078
Sev. of prison	-.594	-.009	-.180	.006	2.189
Celerity of exec.	-.401	-.059	-.156	.048	1.507
Certainty of exec.	.068	.190	.181	.099	3.647
Constant = 2.727					
R^2 = .843***					
Adj. R^2 = .780***					
Mean Homicide Rate Results					
% age 20-40 yrs.	.182	9.371	.098	8.827	1.127
Mdn. income	-.645	-.001	-.233	.001	1.145
% nonwhite pop.	.859	20.347	.638	4.683	18.880***
% urban pop.	-.292	3.362	.147	4.001	.706
Cert. of prison	.021	-1.847	-.103	1.637	1.272
Sev. of prison	-.592	-.010	-.202	.006	2.812
Celerity of exec.	-.395	-.040	-.114	.044	.817
Certainty of exec.	.060	.160	.163	.092	2.987
Constant = 4.680					
R^2 = .846***					
Adj. R^2 = .784***					

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

* < .05
** < .01
*** < .001

We see a very similar pattern of findings for the sanction variables as revealed earlier in Table 2. For both measures of homicide, the coefficients are negative for the certainty and severity of imprisonment, and the celerity of execution, but not for the certainty of the death penalty. In addition, none of the sanction coefficients are statistically significant.

Table 9 presents the same analysis, but with log homicide rates substituted into the conditional execution rate analysis. As before (Table 5), the signs, but not levels of significance, for the sanction variables closely parallel the earlier findings. The coefficients are negative for the certainty and severity of imprisonment and the celerity variable, but only statistically significant for the latter variable. Also similar to the earlier findings (Table 8),the certainty of execution-offense rate coefficients are positive, but statistically significant ($P < .05$) in this analysis.

Although not shown here, the same pattern of mixed results for the certainty and celerity of executions found in Tables 8 and 9 also results when the same linear and nonlinear analysis is performed using conditional execution rate measures that are similar to the nonconditional one-year lagged (Tables 3 and 6), and the three-year mean (Tables 4 and 7), execution rate measures used in the earlier analysis.[11] Because the results using these two conditional execution rate measures so closely parallel the respective findings shown in Tables 8 and 9, they can be summarized very briefly. First, conditional execution rates and log homicide rates (but not homicide rates in their original form) are positively and significantly related. Second, regardless of the homicide

Table 9

Relationship Between Celerity of Execution, Conditional Execution Rates, Certainty and Severity of Imprisonment, Selected Sociodemographic Variables, and Log Homicide Rates

Homicide Rate Results

Ind. Variable	r	B Coeff.	Beta Coeff.	SE	F Value
% age 20-40 yrs.	.173	2.901	.120	2.636	1.211
Mdn. income	-.425	-.000	-.004	.000	.000
% nonwhite pop.	.728	4.942	.616	1.398	12.491**
% urban pop.	-.091	1.595	.277	1.195	1.782
Cert. of prison	.031	-.410	-.091	4489	.705
Sev. of prison	-.652	-.003	-.232	.002	2.633
Celerity of exec.	-.500	-.032	-.360	.013	5.735*
Certainty of exec.	.111	.058	.234	.027	4.387*

Constant = .292
R^2 = .782***
Adj. R^2 = .695***

Mean Homicide Rate Results

% age 20-40 yrs.	.140	1.548	.073	2.181	.504
Mdn. income	-.505	-.000	-.056	.000	.054
% nonwhite pop.	.771	4.413	.622	1.157	14.552**
% urban pop.	-.166	1.065	.210	.988	1.162
Cert. of prison	-.020	-.582	-.147	.404	2.075
Sev. of prison	-.649	-.003	-.251	.001	3.513
Celerity of exec.	-.461	-.023	-.300	.011	4.576*
Certainty of exec.	.097	.048	.222	.023	4.486*

Constant = 1.071
R^2 = .809***
Adj. R^2 = .733***

Sources: Homicide rate figures from F.B.I., 1961; celerity of execution figures from Bureau of the Census, Demographic Survey Division, National Prisoners Statistics Branch; certainty and severity of imprisonment figures from Federal Bureau of Prisons, 1960. Execution rates were computed on the basis of homicide and execution figures that came respectively from F.B.I., 1961, and Federal Bureau of Prisons, 1967. Socioeconomic and demographic data from U.S. Department of Commerce, 1964.

* < .05
** < .01
*** < .001

measure utilized, and the type of conditional execution measure considered, certainty and severity of imprisonment are not found to be significantly related to offense rates. Third, celerity of execution does not prove to be significantly related to either measure of homicide in their original form, but is positively and significantly related to log homicide rates regardless of which conditional execution measure is considered. The consistent negative sign of the celerity coefficients is opposite that predicted by the deterrence hypothesis.

The Use of Weighted Regressions

In two recent death penalty investigations an argument has been made for the use of weighted regressions in testing the deterrence hypothesis (Forst, 1977; Black and Orsagh, 1978). Forst, for example, claims that because the variance in the dependent variable--homicide rate--is often larger for more populated states, the problem of heteroscedasticity results in biased estimates of standard errors, and in biased tests of significance. Likewise, Black and Orsagh argue that in a cross-sectional analysis one might a priori expect heteroscedastic disturbances to result in the variance of the residuals of the regression equations, and these residuals to be inversely related with population size. Neither Forst, nor Black and Orsagh, however, find that heteroscedasticity provides difficulties in their analyses, with the latter investigators, for example, only reporting a slight inverse relationship ($r = -.03$) between population size and the size of the residuals.

To determine whether the same negative conclusion can be drawn about heteroscedasticity with my data and deterrence model, residuals

were computed for each of the combinations of the execution and homicide rate variables. These residuals were then correlated with state population size, with the results being very similar to those reported by Black and Orsagh (1978). As in their analysis, the resulting coefficients were found to be low-negative, and not significantly different from zero. Accordingly, I conclude that heteroscedasticity does not provide a difficulty for my findings.

5. SUMMARY AND CONCLUSION

In the research reported here we have examined a neglected, but theoretically important question in the deterrence literature: the deterrent effect of the celerity of executions on homicide rates. Although both the early founders of the Classical School of Criminology (Beccaria, 1809; Bentham, 1823) and more recent investigators of the deterrence doctrine (Jeffery, 1965; Geerken and Gove, 1975) have emphasized the importance of the celerity of punishment as a deterrent to crime, this question has been ignored by death penalty investigators.

To explore this question, measures of the celerity and the certainty of the death penalty, and the certainty and severity of imprisonment were incorporated into a multivariate analysis of state homicide rates for 1960. To make the analysis as comparable as possible to previous investigations, multiple measures of execution and homicide were considered, along with a variety of sociodemographic control variables. In addition, both the possible linear and nonlinear forms of the sanction-offense rate relationship were examined. Briefly, this analysis revealed first of all

that although severity of imprisonment was consistently found to be inversely related with homicide rates, the severity coefficients are very low ($B < -.005$), and are not statistically significant.

Second, for the certainty of imprisonment, the findings are also negative. This variable too proves to be inversely related to homicide rates throughout the analysis, but the certainty-offense rate results were not found to be statistically significant. In addition, the general lack of support for the deterrence argument for the certainty of imprisonment is reflected by the size of the respective beta coefficients for the certainty and severity of imprisonment. Throughout the analysis, the standardized coefficients are larger for the latter variable. This finding is consistent with the results of two previous death penalty investigations that have focused upon 1960 (Bailey, 1977; Black and Orsagh, 1978).

Third, also consistent with the findings of most previous investigations, no support is found for the deterrence hypothesis on the certainty of the death penalty. Regardless of the measures of execution and homicide considered, and the assumed functional form (linear, nonlinear) of the sanction-homicide rate relationship, certainty of the death penalty consistently proved to be positively related with offense rates. Moreover, for each of the conditional execution rate measures, the certainty of execution coefficients was found to be statistically significant, which is also consistent with reports by some previous investigators (Forst, 1977; Black and Orsagh, 1978).

Fourth, and at odds with the deterrence hypothesis, the length of the time interval between the sentencing and execution of convicted murderers

(celerity of execution) was found to be negatively associated with state homicide rates, regardless of (1) the execution rate measure considered, (2) the measure of homicide considered, and (3) the functional form of the sanction-offense rate relationship considered. States with longer time intervals between sentencing and execution tend to have lower homicide rates.

The findings of this investigation provide a rather consistent response to the two questions that were the major impetus for this study: (1) What is the deterrent effect of the celerity of the death penalty on homicide rates; and (2) have the findings of previous investigations been affected, and possibly biased, by a failure to consider the celerity of the death penalty? To both of these questions the answer is negative. I find no support for the deterrence argument for celerity of the death penalty, nor any evidence that the negative findings reported by most investigators for the certainty of executions are due to their failure to also consider the celerity of executions.

Before ending this disucssion, some possible explanations for the negative findings for the two death penalty variables must be examined. First, although the present investigation and previous studies have typically failed to show a significant inverse relationship between the certainty of the death penalty and homicide rates, it might be argued that this negative finding is a result of the "low" level of executions for murder for the time periods considered (Jeffery, 1965).

Although early and recent proponents of deterrence are far from specific about how certain sanctions--including the death penalty--must be in order to become an effective deterrent to crime, Black and Orsagh (1978) conclude that the low level of executions for murder in this country

may possibly be responsible for theirs, and others', negative findings for the certainty of executions. For example, for 1960 they estimate that less than 2% of convicted first-degree murderers were put to death.

Although I take issue with Black and Orsagh's 2% estimate because they base it upon the ratio of executions for murder to total criminal homicides (not first-degree murders), the fact remains that a sizable number of capital murderers are not executed. If we assume, as Wolfgang and Ferracuti (1967, p. 273), Sutherland and Cressey (1970, p. 347), and others have, that not more than 5 to 10% of all criminal homicides are first-degree murders, then the 2% figure suggested by Black and Orsagh for 1960 substantially underestimates execution rates for capital homicides. If execution rates are estimated on the basis of the argument that from 90 to 95% of criminal homicides are not capital offenses (first degree murders), then a more realistic estimate of the certainty of the death penalty for murder in 1960 ranges from (1) a minimum of 20%, if we assume that 1.0 in 10 criminal homicides are first-degree murders, to (2) a maximum of 40%, if we assume that 0.5 in 10 criminal homicides are first-degree murders.[12]

Although these are only rough estimates of actual execution rates for first-degree murder, they do illustrate that the certainty of the death penalty for capital homicide was much higher in 1960 than some have assumed. Moreover, in light of these more realistic estimates of execution rates, my negative findings for the certainty of the death penalty would suggest that returning to the 1960 level of executions holds little if any promise of effectively deterring murder. I must agree with Black and Orsagh (1978), however, that this analysis could not

address the question of the deterrent effectiveness of the certainty of the death penalty if execution rates were raised to substantially higher levels.

My second concern about my findings focuses upon the adequacy of the celerity measure used in this investigation. As discussed earlier, I have only been able to focus upon the time interval between the sentencing and execution of convicted murderers. Despite consistent negative findings for the celerity of executions, it might be argued that these results are due to a failure to consider the more theoretically appropriate time period between the offense behavior and execution.

Unfortunately, I can only speculate about the merit of this objection to my celerity measure, for there are simply no nationwide data for 1960 (or any other year) on the time interval between the commission of murder and the execution of convicted murderers. If on the one hand, the average length of time between the commission of murder and the sentencing of capital offenders was relatively uniform (a constant) from state to state in 1960, then this measure of celerity would not be expected to yield biased results; that is, the average time period between (1) the murder and execution, and (2) sentencing and execution, would be highly correlated. If on the other hand, the average time interval varied substantially from state to state in 1960 between murders and the sentencing of convicted murderers, then this analysis would result in <u>somewhat</u> biased findings. (The term somewhat is used here because the delay in execution after sentencing is obviously one important contributor to the interval between the commission of murder and execution.)

In short, it is impossible to know to what extent (if any) these findings on the celerity of the death penalty are biased due to this possible difficulty. What is clear from the analysis, however, is that I find no support for the deterrence hypothesis when one important source of the delay in the execution of convicted murderers is considered.

In conclusion, the findings of this study fall well within the pattern of results of the vast majority of previous investigations. No support whatsoever is found for the argument that the certainty, or celerity, of the death penalty provides an effective deterrent to murder. Although I have identified some possible limitations of this investigation, the consistency of my findings with those of earlier studies cannot be ignored. Nor can it be ignored that not a single reputable study has yet to demonstrate the death penalty to be a more effective deterrent to murder than alternative legal sanctions (Passell and Taylor, 1975; Passell, 1975; Bowers and Pierce, 1975; Baldus and Cole, 1975; Peck, 1976; Zeisel, 1976). For these reasons, and because of the seriousness of the issue, I feel obliged to agree with most previous investigators. The evidence clearly suggests that the role of the death penalty in our criminal justice system, at least for murder, will have to be justified on grounds other than its effectiveness as a deterrent.

NOTES

[1]It is of interest to note that in the Furman v. Georgia decision of 1972 Chief Justice Burger of the United States Supreme Court complained about the lack of clear cut empirical evidence of a recent vintage on the deterrent effect of the death penalty for murder, and the urgent need for studies on this important question. Before vacating Fowler v. North Carolina (1976), the Supreme Court received briefs and heard oral arguments in five other death penalty cases in which the findings of a number of post-Furman deterrence investigations were of major concern: Roberts v. Louisiana (1976); Proffitt v. Florida (1976); Woodson v. North Carolina (1976); Jurek v. Texas (1976); Gregg v. Georgia (1976). Although the Court did not provide any empirical evidence in support of its belief, it did conclude that for many murders "the death penalty undoubtedly is a significant deterrent" [Gregg v. Georgia, 1976, pp. 185-186].

[2]Black and Orsagh (1978) also make the same argument for the possible bias of their results for the death penalty variable due to their (1) possibly excluding some important nonsanction variable(s) from their model, (2) ignoring the possible deterrent effect of informal sanctions, and (3) use of a log-linear functional form in the analysis.

[3]Both Gibbs (1975, 1977) and Andenaes (1974) take issue with persons like Jeffrey (1965) and Geerken and Gove (1975) who base their claims of the deterrent effectiveness of the celerity of legal sanctions upon the findings of psychological laboratory research. As Andenaes (p. 188) argues, analogies drawn from such experimental research to general deterrence

are very seriously flawed due to the important "differences between the life situation and the experimental setting." To illustrate, whereas laboratory research has been almost exclusively concerned with the effects of actual punishment upon experimental subjects, the important question for general deterrence is the effect of the threat of punishment upon would-be offenders. In addition, Gibbs (1975) further questions the possible contribution of laboratory research findings to a better understanding of "special deterrence" due to the dissimilarity between the laboratory experiment (the setting, and the types of subjects and sanctions typically examined) and factors of importance to the theory of special deterrence.

[4]Although first degree murder typically includes the elements of premeditation and malice aforethought, the homicide offense category used by the F.B.I. (1961) is much more inclusive; their category for murder and nonnegligent manslaughter includes all willful felonious homicides as distinguished from deaths caused by negligence.

[5]To illustrate, the bivariate correlations between state execution rates for the five-year periods leading up to 1967 and 1968 and (1) first-degree murder rates for these years (1967, $r = -.137$; 1968, $r = -.194$), and (2) F.B.I. homicide rates for these years (1967, $r = -.166$; 1968, $r = -.194$) are very comparable (Bailey, 1974, 1975). Likewise, when both measures of homicide are considered along with a number of sociodemographic control variables in a series of multiple regression analyses, the partial coefficients for the execution rate variable are also very similar for both homicide measures (Bailey, 1976).

[6]I would also like to express my appreciation to Matthew G. Yeager, Chief Criminologist of the House Subcommittee on Crime, and to the House Subcommittee for their kind assistance in doing much of the leg-work that made it possible for me to secure the celerity of execution data from the Bureau of the Census.

[7]I have, however, been promised additional celerity figures for the years after 1960 when these data are located.

[8]I must emphasize that no explicit theory of homicide is reflected in the sociodemographic variables chosen for incorporation into the analysis. (Unfortunately, no adequate theory of variation in homicide rates can be found in the criminology literature.) Rather, selection was based upon previous homicide investigations that have shown such variables to be associated with variation in offense rates. By including these factors in the analysis, I will thus be able to better compare my findings with those of previous studies.

[9]It is also of interest to note that regardless of the additional sociodemographic variables considered (individually, or in combination), percentage nonwhite population continues to be very significantly ($P < .001$) related with homicide rates, and provides the best predictor of the dependent variable.

[10]Due to the time period considered with the celerity of execution variable (1956-1960), this factor was not included in our analysis of the effect of homicide rates for the previous year (1959) on sanction levels for the next year (1960).

[11]One-year lagged conditional execution rates were computed by dividing (1) the number of executions for murder in 1961 by (2) the number of convicted murderers imprisoned in 1960. The three-year mean conditional execution rate measure was computed by dividing (1) the average yearly number of executions for the period 1959-1961 by (2) the number of convicted murderers imprisoned in 1960. Results of the analysis using these two additional conditional execution rate measures are available upon request.

[12]To illustrate how these percentage figures were derived, assume that in 1960 there was a ratio of (1) two executions for murder, per (2) 100 criminal homicides. Comparison of these figures (2/100) would yield the 2% execution rate suggested by Black and Orsagh (1978). If, however, only 10% of criminal homicides are first-degree murders (100 x 10% = 10), then the execution rate would be 2/10, or 20%. Similarly, if only 5% of total criminal homicides are first-degree murders (100 x 5% = 5), then the execution rate would be 2/5, or 40%.

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