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An Analysis of the Deterrent Effect of the Death Penalty in North Carolina

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AN ANALYSIS OF THE DETERRENT EFFECT OF THE DEATH PENALTY IN NORTH CAROLINA*

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The question of the deterrent effect of capital punishment for murder, and other crimes as well, has been a topic of long and heated debate in this country. On the one hand, proponents of the death penalty have argued its unique deterrent effect by (1) deterring would be killers (general deterrence), and (2) reducing recidivism among capital offenders (specific deterrence).[1] Countering these arguments, abolitionists have traditionally claimed that (1) there is no evidence that the death penalty provides a more effective deterrent to murder than alternative legal sanctions (imprisonment), and (2) the extremely low rate of recidivism among paroled capital offenders provides no support for the specific deterrence argument.[2] Of these two questions, the general deterrence argument has been the subject of greatest controversy in the professional and lay literature, and in constitutional challenges to the death penalty.[3] An empirical analysis of the general deterrent effect (hereafter deterrent effect) of the certainty of execution on homicide rates in North Carolina provides the focus of this investigation.

Unfortunately, despite the length and intensity of the deterrence debate over capital punishment, the available evidence is far from conclusive, with many important questions remaining to be addressed. Recognizing this need, the last few years have witnessed a number of death penalty investigations focusing

*By way of background, the pre-*Furman* discretionary provisions for the death penalty for murder in North Carolina were struck down by the North Carolina Supreme Court on January 18, 1973, with the remaining provisions being declared constitutional. Death penalty statutes were revised in North Carolina on April 8, 1974, but declared unconstitutional by the United States Supreme Court on July 6, 1976, Woodson v. North Carolina 428 U.S. 280(1976). On June 1, 1977 a revised statutory provision for the death penalty for murder went into effect in North Carolina.

On June 20, 1978, which is the latest date that figures are available to this writer, three persons were on death row awaiting execution in North Carolina.

**(Biography unavailable at this time)

1. General deterrence refers to the deterrent effect that the threat and application of punishment have on would be offenders. In contrast, specific deterrence refers to the effect that the actual application of punishment has on punished offenders' future criminal involvement. For a detailed discussion of the theory of general and primary deterrence *see* J. GIBBS, CRIME PUNISHMENT AND DETERRENCE (1975); J. ANDENAES, PUNISHMENT AND DETERRENCE (1974); F. ZIMPING & G. HAWKINS, DETERRENCE: THE LEGAL THREAT IN CRIME CONTROL (1973).

2. For a brief summary of the literature on recidivism of paroled capital offenders, *see* C. JAYEWARDENE, THE PENALTY OF DEATH 10-16 (1977).

3. For example, before vacating Fowler v. North Carolina, 428 U.S. 904 (1976), the United States Supreme Court received briefs and heard oral arguments in five other death penalty cases in which the deterrence question was of major issue, Roberts v. Louisiana, 428 U.S. 325 (1976); Proffitt v. Florida, 428 U.S. 242 (1976); Woodson v. North Carolina, 428 U.S. 280 (1976); Jurek v. Texas, 428 U.S. 262 (1976); Gregg v. Georgia, 428 U.S. 153 (1976). Although the Court did not provide any empirical evidence in support of its belief, it did state that for many murderers "the death penalty undoubtedly is a significant deterrent." Gregg v. Georgia, 428 U.S. 153, 185-86 (1976).

specifically upon the issue of deterrence.[4] In these studies, which have appeared in leading sociology, criminology, economics and law journals, researchers have attempted to build upon some of the important shortcomings of the early investigations by Sutherland, Sellin, Schuessler and others, and thus bring more theoretical and methodological sophistication into this important line of inquiry.[5]

Although these recent investigations have addressed a number of important matters neglected in earlier analyses, and the findings of these studies have found their way into litigation before the United States Supreme Court, they have far from settled the deterrence debate.[6] Rather, these studies have brought some researchers to totally opposite conclusions, and in fact, have raised even additional questions about the deterrent effect of the death penalty for murder.[7]

Foremost among these questions, and the issue to be examined in this investigation, is the extent (if any) that the findings and conclusions drawn from these recent studies can be generalized to North Carolina's experience with the death penalty. Because recent, and the more classic death penalty investigations, have typically either examined (1) the relationship between cross-state variation in execution rates and homicide rates for selected years, or (2) the relationship between execution rates and homicide rates longitudinally over time for nationally aggregated data, it remains quite unclear how well the results of these studies apply to individual jurisdictions, including North Carolina. That is, national trends over time in the execution rate-homicide rate relationship may, or may not, be similar to the relationship between these factors over time in North Carolina. Likewise, observed patterns of cross-state variation in executions and

4. Bailey, *Murder and the Death Penalty*, 65 J. CRIM. L.C. & P.S. 416-23 (1974) [hereinafter cited as Bailey (1974)]; Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 AM. ECON. REV. 397-417 (1975) [hereinafter cited as Ehrlich]; Bowers & Pierce, *The Illusion of Deterrence in Isaac Ehrlich's Research on Capital Punishment*, 85 YALE L. REV. 187-208 [hereinfater cited as Bowers & Pierce]; P. Passell & J. Taylor, The Deterrent Effect of Capital Punishment: Another View (Discussion Paper 74-7509, Columbia University (1975)) [hereinafter cited as Passell & Taylor]; Yunker, *Is the Death Penalty a Deterrent to Homicide? Some Time Series Evidence*, 5 J. BEHAVIORAL ECON. 45-81 (1976) [hereinafter cited as Yunker]; Forst, *The Deterrent Effect of Capital Punishment: A Cross-State Analysis of the 1960's*, 61 MINN. L. REV. (1977) [hereinafter cited as Forst]; Bailey, *Imprisonment v. the Death Penalty as a Deterrent to Murder*, 1 L. & HUMAN BEHAVIOR 239-60 (1977).

5. Sutherland, *Murder and the Death Penalty*, 51 J. AM. INST. CRIM. L. & C. 522-29 (1925) [hereinafter cited as Sutherland]; T. SELLIN, THE DEATH PENALTY (1959) [hereinafter cited as T. SELLIN]; Schuessler, *The Deterrent Effect of the Death Penalty*, 284 ANNALS 54-63 (1952) [hereinafter cited as Schuessler].

6. As noted, the United States Supreme Court received briefs and heard oral arguments in five recent death penalty cases in which the deterrence argument was a major focus. Roberts v. Louisiana, 428 U.S. 325 (1976); Proffitt v. Florida, 428 U.S. 242 (1976); Jurek v. Texas, 428 U.S. 262 (1976); Gregg v. Georgia, 428 U.S. 153 (1976); Woodson v. North Carolina, 428 U.S. 280 (1970). In addition, in the amicus curiae brief submitted by the Solicitor General of the United States in Fowler v. North Carolina, 428 U.S. 904 (1976) statistical evidence was presented supporting the hypothesis that capital punishment deters murder.

7. For a review of recent death penalty studies and deterrence questions in need of examination, *see* Gibbs, *A Critique of the Scientific Literature on Capital Punishment and Deterrence*, 6 J. BEHAVIORAL ECON. 243-68 (1977).

homicides during the years examined may, or may not, be similar to the relationship between changes in execution rates and offense rates in North Carolina. In short, until the deterrence hypothesis is examined separately for North Carolina, we can only speculate about this matter.

Before examining this question further and the methodology of the present investigation, the findings of the earlier and more recent death penalty investigations will be briefly reviewed.

REVIEW OF THE LITERATURE

Early Studies

The investigations upon which most social scientists have traditionally drawn a negative conclusion about the deterrent effect of capital punishment have been primarily of two sorts; (1) longitudinal studies of states' homicide rates before and after the abolition and/or restoration of the death penalty, and (2) cross-state analyses of yearly homicide rates for retentionist and abolition states. Contrary to the deterrence hypothesis, these studies have typically shown: (1) homicide rates to be higher, and not lower, in death penalty jurisdictions; and (2) no significant change in the level of homicides that can be attributed to abolition or restoration of capital punishment.[8]

In addition, at least two cross-state examinations of the relationship between the certainty of execution and homicide rates in retentionists states have failed to show a significant inverse relationship between these two factors as the deterrence argument would predict. To the contrary, for the period 1937 to 1941 examined by Schuessler, only a very slight negative association ($r = -.26$, $r^2 = .067$) was found between average execution rates and average homicide rates for 41 death penalty jurisdictions.[9] Likewise, in a replication of Schuessler's study for the five year period preceding 1967 and 1968, Bailey also found only a very slight negative correlation between execution rates in retentionist states and rates of first degree murder ($r = -.137$, 1967; $r = -.194$, 1968) and rates of murder and non-negligent manslaughter ($r = -.166$, 1967; $r = -.039$, 1968).[10] As with most of the earlier investigations, these findings lead both Schuessler and Bailey to conclude that the evidence does not provide support for the claim that the death penalty—certainty of execution—provides an effective deterrent to murder.

Recent Investigations

Beginning with a recent paper by Ehrlich which appeared in a leading economics journal, there have been a handful of rather complex multivariate analyses of the death penalty in the last few years. Turning first to Ehrlich's research, which has received considerable attention and publicity, the certainty of execution-homicide rate relationship was examined for the period 1933 to

8. Sutherland, *supra* note 5; T. SELLIN, *supra* note 5; Schuessler, *supra* note 5.
9. Schuessler, *supra* note 5.
10. Bailey (1974), *supra* note 4.

1969, while simultaneously introducing a number of sociodemographic and law enforcement factors into the analysis as control variables.[11]

Of greatest concern here are his findings for the certainty of execution variable. Ehrlich's analysis leads him to conclude that "an additional execution per year over the period in question may have resulted, on average, in seven to eight fewer murders.[12] Or, put differently, he reports that his research indicates a trade-off of seven to eight fewer murders for each execution performed during the above years.

While these findings are in striking contrast to the results of previous investigations, Ehrlich's research has not gone unchallenged, and continues to be a source of debate more than two years since its publication. Because it is beyond the scope of the present investigation to thoroughly critique Ehrlich's study, we shall confine our comments to only its most important limitations. First, in examining the effect of executions, Ehrlich fails to differentiate between death penalty and abolition jurisdictions in estimating annual probabilities of execution. This, of course, is terribly misleading for the probability of execution in abolition states is zero.

Second, the validity of Ehrlich's statistical model rests upon the assumption that the form of the relationship between his presumed causal (executions) and affect variable (homicides) is the same over the period 1933 to 1969. Both Bowers and Pierce and Passell and Taylor's independent examinations of this question for varying periods between 1933 and 1969 led them to reject the assumption of temporal homogeneity.[13] In fact, their replication of the Ehrlich study for various periods between 1933 and 1969 consistently revealed a positive association between executions and homicide, and not a negative association as Ehrlich reports.

Third, in examining the years 1933 to 1969, Ehrlich aggregated his execution, homicide and control variables on a *national level,* thus ignoring the tremendous variation in these factors from state to state. In other words, the unit of analysis in his investigation is all states combined rather than each state for the above period. Such a procedure, again, fails to differentiate between abolition and death penalty states. More importantly, it 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, nor does Ehrlich take into consideration variation from state to state on his control variables, which further renders his analysis highly suspect.

Fourth, and finally, because Ehrlich uses nationally aggregated data in his analysis, it remains totally unclear to what extent, if any, his findings can be generalized to individual jurisdictions for the 1933 to 1969 period. Unfortunately, he fails to even speculate about this matter.

11. Ehrlich, *supra* note 4.
12. Ehrlich, *supra* note 4, at 414.
13. Bowers & Pierce, *supra* note 4; Passell & Taylor, *supra* note 4.

In sum, while Ehrlich should be commended for attempting to bring more sophistication into death penalty investigations, on the basis of his research, Passell and Taylor conclude that "it is prudent neither to accept nor reject the hypothesis that capital punishment deters murder".[14] Moreover, it must be emphasized that at least two independent replications of Ehrlich's research have shown nationally aggregated execution rates and homicide rates to be positively, and not negatively, associated.

In another recent investigation, Yunker has 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 solely annual unemployment rates as a control variable, and (3) considering a zero and three-year time lag model between executions and homicide rate in testing the deterrence hypothesis.[15]

Yunker's research, like Ehrlich's (but unlike Passell and Taylor's, and Bowers and Pierce's), provides support for the deterrence hypothesis. For the period 1960 to 1972, the only years where Yunker concludes that the execution-homicide rate relationship can be properly examined (the execution regression coefficients are positive, or low-negative, for more extended time periods), he reports for the three-year time lag model a highly significant inverse relationship between execution rates and homicide rates, and concludes that "one execution will deter 156 murders".[16] In contrast, non-lagged execution rates and homicide rates were not found to be significantly related.

Unfortunately, Yunker's research suffers from the same objectives raised above about Ehrlich's study; (1) he aggregates his execution, homicide and unemployment data on a national, and not a state level, and (2) he fails to differentiate between abolition and retentionist jurisdictions. In addition, he chooses to ignore his less conclusive findings for the period 1933 to 1959 where executions were at a more substantial level than for the years 1960 to 1972 where levels of execution were reduced. Accordingly, and at best, Yunker's reported findings may only reflect a limited and atypical period of our national experience with the death penalty.

In a final investigation of interest, Forst examined cross-sectionally for states the effect of changes in execution rates on homicide rates for the years 1960 to 1970.[17] As in the earlier studies by Ehrlich, Passell and Taylor, and Bowers and Pierce, selected sociodemographic and imprisonment variables were introduced into the analysis as control variables.

Exploring a number of models of the execution rate-homicide rate relationship, Forst consistently found a nonsignificant relationship between changes in the level of executions and homicide rates. He did find, however, changes in the levels of imprisonment for homicide from 1960 (41.3%) to 1970 (34.6%) to be significantly related to changes in states' homicide rates (+53%) between these

14. Passell & Taylor, *supra* note 4, at 12.
15. Yunker, *supra* note 4.
16. Yunker, *supra* note 4, at 65.
17. Forst, *supra* note 4.

years. This factor, along with the increased affluence during the 1960's, Forst concludes to be the major contributor to the increase in homicide during the decade.

SUMMARY OF THE EVIDENCE

The research reported above, which represents some of the most significant capital punishment investigations, fails to provide an all together consistent pattern of findings on the deterrent effect of the death penalty for murder. With the exception of the recent studies by Ehrlich and Yunker, both cross-state and longitudinal analyses have typically failed to provide support for the hypothesis of a substantial inverse relationship between the certainty of the death penalty (execution rates) and homicide rates. Most typically, these two variables have been found to be either positively associated, or only slightly negatively associated. In addition, because of the difficulties noted above with the Ehrlich and Yunker studies, their contrary findings have to be viewed with extreme caution.

Despite the importance of these studies in contributing to a better understanding of the deterrent effect of the death penalty, the methodology employed in these investigations makes it extremely difficult to generalize their findings to individual jurisdictions in this country. For example, and as noted above, while cross-sectional analyses of states for selected years have failed to show variation in execution rates and homicide rates to be substantially inversely related, these investigations do not address the relationship between variation (changes) in execution rates and homicide related over time within individual jurisdictions. Similarly, while longitudinal studies of nationally aggregated data for execution rates and homicide rates for various time periods have also generally failed to provide support for the deterrence argument, it is uncertain whether national patterns may be generalized to individual states' experiences with the death penalty.

THE PRESENT INVESTIGATION

To avoid the difficulties discussed above and to better understand the deterrent effect of the death penalty in North Carolina, we examine here the hypothesis of a significant inverse relationship between the certainty of execution and homicide rates in North Carolina for the years 1910 to 1962.[18] Five sociodemographic factors associated with homicide rates are introduced in the analysis as control variables in considering the execution rate-homicide rate relationship. By considering the sociodemographic variables, it will be possible to both (1) control for their effect on changes in homicide rates during the above period, and thus better isolate the effect of the death penalty on homicide, and (2) compare the relative effect of these factors versus executions on changes in

18. The period 1910 to 1962 was selected for examination because (1) executions did not begin under state authority until 1910, with accurate execution figures for most earlier years not being available, and (2) the last execution for murder in North Carolina occurred in 1961.

homicide rates. A description of the execution rate, homicide rate, sociodemographic variables, and method of analysis follows below.

Certainty of Execution

To construct a measure of the certainty of the death penalty, figures were required on the number of executions for homicide in North Carolina for each year. In previous investigations, execution figures have typically been obtained from the Federal Bureau of Prison's *National Prisoner Statistics* series. It was not possible to use these data here, however, for execution figures are only available from this source from 1930. As a result, we have chosen to construct our certainty measure with alternative execution data compiled by Teeters and Zibulka.[19] The Teeters-Zibulka Inventory provides a detailed summary of executions for homicide in North Carolina for the period 1885 to 1963.

Similar to many previous investigations, certainty of the death penalty (execution rates) was operationally defined as (1) the total number of executions for homicide for each year divided by (2) the total number of reported homicides each year. This procedure resulted in an execution rate value for each year that can theoretically range from zero (0) to unity (1.0). A value of zero would indicate that there were no executions for homicide in the state during the year, while a value of one would indicate an equal number of homicides and executions during the year.[20]

Homicide Rates

While generally only one type of homicide—murder in the first degree—is punishable by death, deterrence investigators have typically operationalized this offense as either: (1) homicide, and made use of figures from *Vital Health Statistics;* or (2) murder and non-negligent manslaughter making use of statistics from the *Uniform Crime Reports.* This practice has been necessitated by the fact that there are no alternative statistics available on capital homicides in this country (or in North Carolina). As a result of this practice, investigators have had to assume, whether they use police or public health figures, that the proportion of first degree murders remains constant so that these more inclusive homicide data provide a reasonably good indicator of capital offenses. While Bailey's findings for 1967 and 1968, showing a similar relationship between states' execution practices and rates of first degree murder, and F.B.I. figures for homicide, would appear to support this assumption, its validity remains unknown for other years.[21]

19. N. TEETERS & C. ZIBULKA, EXECUTIONS UNDER STATE AUTHORITY: JANUARY 20, 1864-AUGUST 10, 1967 (1968), *Reprinted in* W. BOWERS, EXECUTIONS IN AMERICA at 200-401 (1974).

20. Although it would have been of interest here to also examine the conditional probability of execution (given arrest and/or conviction for murder) as a measure of the certainty of the death penalty, such an analysis could not be conducted due to the necessary arrest and conviction data not being available for many of the years considered here.

21. Bailey (1974), *supra* note 4.

In the absence of theoretically appropriate data on first degree murder, homicide figures were secured for North Carolina from the F.B.I. *Uniform Crime Reports* for the years 1933-62 and *Vital health Statistics* for the period 1910-1932. Although the homicide offense category used by the F.B.I. more closely corresponds to first degree murder than that used by the U.S. Public Health Service, reasonably complete F.B.I. figures are only available from the year 1933.[22] As a result, to extend our analysis to two prior decades, public health service figures had to be used as an index of capital homicides for this period.

Sociodemographic Variables

To extend the analysis beyond a simple bivariate examination of the relationship between executions and homicide, five sociodemographic factors associated with homicide were introduced into the analysis as control variables: (1) percent urban population; (2) percent nonwhite population; (3) percent unemployment; (4) percent male population; (5) percent population 20-40 years of age. Data for these variables came from census figures.[23]

While it was our hope to examine the multivariate relationship between executions, the sociodemographic factors, and homicide for each year 1910-1962, this was not possible. Unfortunately, relatively complete control data was available only for the six census years, 1910, 1920 . . . 1960. Rather than restricting our analysis to only these years, however, we chose to also examine the two year periods immediately preceding and immediately following each census year, and to use the respective census figures as the best available estimate for the control variables for these pre-census and post-census periods. To illustrate, census figures for 1920 were used as estimates of the control variables in examining the execution-offense rate relationship for 1918, 1919, 1920, 1921, and 1922. This procedure was followed for each of the six pre-census and post-census periods (with the exception of the pre-census years of 1908 and 1909 where accurate execution and homicide data were not available), thus yielding a total of 28 years where the execution-homicide relationship could be examined longitudinally for the state. In the absence of a sound theoretical rationale, we chose not to interpolate figures for the control variables for the remaining inter-census years.

22. The F.B.I. category of murder and non-negligent manslaughter includes all willful felonious homicides, as distinguished from deaths caused by negligence. The Public Health Service includes in its homicide category all deaths resulting from an injury purposely inflicted by another person, with intent to kill not being required to classify a death as a homicide.

23. Socioeconomic and demographic data were secured from the following U.S. Department of Commerce, Bureau of the Census Publications: (1) ABSTRACT OF THE THIRTEENTH CENSUS OF THE UNITED STATES 1910 (1914); (2) ABSTRACT OF THE FOURTEENTH CENSUS OF THE UNITED STATES: 1920 (1923); (3) ABSTRACT OF THE FIFTEENTH CENSUS OF THE UNITED STATES: 1930 (1933); (4) SIXTEENTH CENSUS OF THE UNITED STATES: 1940 (1943); (5) CENSUS OF THE POPULATION: 1950 (1953); (6) HISTORICAL STATISTICS OF THE UNITED STATES (1960), and (7) CENSUS OF THE POPULATION: 1960 (1964).

Method of Analysis

To examine the deterrence hypothesis, the execution, sociodemographic and homicide variables were fit into a series of multiple regression analyses, with three models of the certainty of execution-homicide rate relationship being examined. To test the possible immediate deterrent effect of capital punishment on homicide, the relationship between the execution and offense rate variables was first examined within the same year. This model rests 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 more distant past levels of execution.

Second, to further explore this matter, the execution-offense rate relationship was examined by building in a one-year time lag between execution rates (year t-1) and homicide rates (year t). To illustrate, executions for 1909 were compared to homicides for 1910, and so forth through the years, with executions for 1961 ultimately being compared with homicides for 1962.

Third, a two-stage analysis procedure was utilized to examine the additional possibility that homicide rates may influence the level of use of the death penalty (execution rates). Homicide rates for the previous year (t-1) were first regresed against execution rates for each year (t), and then the residual variation in execution rates for each year (t) was regressed against homicide rates for that year (t), controlling for the sociodemographic variables.

In considering each of the three models of the execution rate-homicide rate relationship, two homicide measures are utilized. First, as with most longitudinal studies, homicide rates for each of the individual years are used as a measure of the dependent variable. By using this measure, we will thus be able to better compare our findings with those of previous studies. Second, average homicide rates for two-year periods [(years t + t+1)/2] are used as an additional measure of the dependent variable.[24] This type of homicide measure has also been used in some previous death penalty investigations, and has two advantages over the former measure: (1) it adds greater stability to the homicide index by reducing the effect of measurement error; and, (2) it permits a better examination of the immediate (year t) as well as the possible delayed (year t + 1) deterrent effect of executions on homicide.

Table 1 reports, by year, values for each of the execution rate and homicide rate measures used in the analysis.

24. To illustrate, with this homicide measure, execution rates for 1910 are compared with mean homicide rates for 1910 and 1911, and so forth, ending with execution rates for 1962 being compared with mean homicide rates for 1962 and 1963.

TABLE 1

NORTH CAROLINA EXECUTION RATES AND HOMICIDE RATES, BY YEAR

Year	Execution Rt. (year t)	Execution Rt. (year t-1)	Homicide Rt. (year t)	Ave. Homicide Rt. [yrt+t+1/2]
1910	0.0	0.0	2.7	1.9
1911	13.1	0.0	2.7	2.9
1912	2.7	13.1	3.2	3.4
1918	2.1	1.7	7.4	8.0
1919	0.9	2.1	8.6	9.2
1920	1.2	0.9	9.7	9.1
1921	3.1	1.2	8.5	8.7
1922	0.4	3.1	9.0	13.3
1928	1.3	1.8	9.9	10.2
1929	0.6	1.3	10.5	10.8
1930	2.0	0.6	11.0	10.8
1931	1.8	2.0	10.6	11.3
1932	2.0	1.8	12.1	17.7
1938	1.5	1.2	19.6	19.2
1939	0.0	1.5	18.8	20.2
1940	1.7	0.0	21.5	20.2
1941	1.3	1.7	18.8	17.9
1942	0.8	1.3	16.9	14.9
1948	1.1	2.8	16.5	15.2
1949	1.6	1.1	13.9	13.6
1950	0.6	1.6	13.2	11.8
1951	0.5	0.6	10.4	10.8
1952	0.2	0.5	11.2	11.3
1958	0.0	0.0	9.4	9.2
1959	0.0	0.0	8.9	9.5
1960	0.0	0.0	10.1	9.4
1961	0.0	0.0	8.7	8.1
1962	0.0	0.0	7.5	7.7
Average	1.4	1.5	11.1	11.3

Execution rates are rounded to one place to the right of the decimal, and may be interpreted as percentages (for example, for 1913, 13.1 = 13.1%). Homicide rates per 100,000 population are also rounded one place to the right of the decimal.

FINDINGS

Table 2 reports the results of the analysis where execution rates and homicide rates are examined within the same years (top half of the table), and where execution rates for each year are compared with mean homicide rates [(year t + t+1)/2] for two-year periods (lower half of the table).

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TABLE 2

RELATIONSHIP BETWEEN NORTH CAROLINA EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC VARIABLES AND HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B Coeff.	Beta Coeff.	St. Error	F. Value
Pct. Male Pop.	-.041	3760.3720	2.1535	274.1573	188.132c
Pct. Age 20-40 yrs.	-.112	-60.1557	-.6814	9.2450	42.339c
Pct. Nonwhite Pop.	-.320	-11.3703	-.0756	13.1011	.753
Pct. Unemployed	.367	6.8496	.9169	.5148	177.057c
Pct. Urban Pop.	.333	112.3467	1.7905	8.9822	156.444c
Execution Rate	-.289	.0933	.0458	.1403	.442
Constant = -1892.492					
R^2 = .932c					

Mean Homicide Rate Results

Pct. Male Pop.	.030	3523.7810	2.0915	423.3713	69.275c
Pct. Age 20-40 yrs.	-.061	-57.9294	-.6801	14.2767	16.464c
Pct. Nonwhite Pop.	-.253	-8.0246	-.0553	20.2315	.157
Pct. Unemployed	.335	6.1773	.8570	.7949	60.387c
Pct. Urban Pop.	.254	98.9015	1.6337	13.8708	50.840c
Execution Rate	-.291	-.0434	-.0221	.2166	.040
Constant = -1769.762					
R^2 = .826c					

a = $P<.05$; b = $P<.01$; c = $P<.001$

As noted above, consistent with the deterrence hypotheses, we would expect a significant inverse relationship between the certainty of execution (execution rates) and homicide rates. This expectation is not born out in either analysis. When execution rates and homicide rates are examined within the same year, the execution coefficients are positive (B = .0933, beta = .0458), and not negative as hypothesized.[25] In contrast, but also at odds with the deterrence hypothesis, when execution rates and mean homicide rates are considered, the execution coefficient is negative (B = .0434, beta = 0.0221), but very slight and not statistically significant. for this later analysis, the size of the negative execution coefficient would indicate a one percent increase in the certainty of the death penalty to be only associated with about a four-one hundredth of a person reduction in the homicide rate.

The insignificance of executions as a determinent of homicide is also further reflected by the beta results. For both analyses, comparison of the size of the standardized beta coefficients shows certainty of execution to be the least adequate predictor of homicides of the variables considered. Ranking first as a predictor of homicide rates is percent male population, then followed in their relative order of importance by percent urban population, percent unemployment, percent 20-40 years of age, percent nonwhite population, and finally, execution rates. With the exception of the execution and nonwhite population variables, each of the sociodemographic factors proves to be very significantly related to both homicide rates.[26]

Table 3 reports the results of the analysis when a one-year time lag factor is considered in examining the relationship between execution rates and homicide rates. This analysis is simply a replication of that reported above in Table 2, but with the substitution of a new execution variable.

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25. Unstandardized regression coefficients (B values) may be interpreted as the effect of (1) a unit change in the independent variable, on (2) the number of units of change in the dependent variable. When unstandardized (B) regression coefficients are standardized (Beta coefficients), the standardized coefficients for different independent variables can be compared to determine the relative effect of each independent variable on the dependent variable. For example, if the beta coefficients for variables X_1 and S_2 are .500 and .250, respectively, the former variable can be interpreted as having twice the effect per unit change compared to the former variable on the dependent variable.

26. For the regression equations examined here at 6 and 21 degrees of freedom, the significant values of the F statistic are: (1) $F \geq 2.57$, $P < .05$; (2) $F \geq 4.20$, $P < .01$; and (3) $F \geq 5.88$, $P < .001$.

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TABLE 3

RELATIONSHIP BETWEEN NORTH CAROLINA EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC VARIABLES AND HOMICIDE RATES, WITH A ONE-YEAR TIME LAG BETWEEN EXECUTION AND HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B. Coeff.	Beta Coeff.	St. Error	F. Value
Pct. Male Pop.	-.041	3743.3490	2.1438	270.1076	192.064c
Pct. Age 20-40 yrs.	-.112	-60.1673	-.6815	9.1789	42.967c
Pct. Nonwhite Pop.	-.320	-12.0448	-.0801	13.0634	.850
Pct. Unemployed	.367	6.8479	.9166	.5097	180.498c
Pct. Urban Pop.	.333	111.5347	1.7776	8.3697	177.581c
Execution Rate	-.193	.1059	.0518	.1289	.675

Constant = -1883.638
R^2 = .933c

Mean Homicide Rate Results

Pct. Male Pop.	.030	3543.4500	2.1032	417.8154	71.926c
Pct. Age 20-40 yrs.	-.061	-57.1474	-.6709	14.1984	16.200c
Pct. Nonwhite Pop.	-.253	-8.7134	-.0601	20.2070	.186
Pct. Unemployed	.335	6.2442	.8663	.7884	62.722c
Pct. Urban Pop.	.254	101.4778	1.6763	12.9467	61.436c
Execution Rate	-.160	.0886	.0450	.1993	.198

Constant = -1780.776
R^2 = .828c

a = P .05; b = P .01; c = P .001

Here too, no support is found for the deterrence hypothesis. In both analyses execution rates and homicide rates are positively associated, although the coefficients are very slight (B = .1059, B = .0886), and indicate only a very slight trade-off between these two variables. In contrast, with the exception of the nonwhite population factor, each of the sociodemographic variables is significantly associated with both homicide rate measures, with the rank order of the beta coefficients being the same as found in Table 2.

These findings, as with the earlier analysis, indicate that changes in North Carolina's homicide rates are not a function of changes in the certainty of the death penalty. Rather, rates of homicide would appear to be a result of the changing sociodemographic characteristics of the state for the period examined here (1910-1962).

In the analysis to this point we have solely considered the argument that execution rates influence homicide rates (deterrence). Equally plausible, however, is the hypothesis that levels of homicide also influence levels of execution, and that ignoring this possible reciprocal relationship has biased the analyses. As noted above, to test this possibility a two-stage analysis was conducted where, (1) homicide rates for year t-1 were first regressed against execution rates for year t, and (2) the resulting residual execution rates for year t were then regressed against both (a) homicide rates for yeat t, and (b) mean homicide rates for two-year periods [(year t + t + 1)/2], again controlling for the sociodemographic variables. Results are reported in Table 4.

TABLE 4

RELATIONSHIP BETWEEN NORTH CAROLINA RESIDUAL EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC VARIABLES AND HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B. Coeff.	Beta Coeff.	St. Error	F. Value
Pct. Male Pop.	-.041	3758.9130	2.1527	271.7232	191.369c
Pct. Age 20-40 yrs.	-.112	-60.0627	-.6803	9.1956	42.663c
Pct. Nonwhite Pop.	-.320	-11.4621	-.0762	13.0382	.773
Pct. Unemployed	.367	6.8602	.9183	.5122	179.408c
Pct. Urban Pop.	.333	112.2748	1.7894	8.6553	168.269c
Execution Rate	-.245	.3548	.0523	.4388	.654
Constant = 1891.648					
R^2 = .933c					

Mean Homicide Rate Results

Pct. Male Pop.	.030	3519.4010	2.0889	420.8515	69.993c
Pct. Age 20-40 yrs.	-.061	-58.1170	-.6823	14.2424	16.651c
Pct. Nonwhite Pop.	-.253	-7.9433	-.0547	20.1938	.155
Pct. Unemployed	.335	6.1593	.8545	.7933	60.288c
Pct. Urban Pop.	.254	98.4353	1.6260	13.4055	53.918c
Execution Rate	-.274	-.2382	-.0364	.6797	.123
Constant = -1767.417					
R^2 = .827c					

As before, this analysis also fails to provide support for the deterrence argument. When homicide rates for each year are used as a measure of the dependent variable, the execution rate coefficient is positive (B = .3548, beta = .0523) and not statistically significant. When mean homicide rates are used as a measure of the dependent variable, the execution coefficient is negative (B = -.2382, beta = -.0364) as hypothesized, but slight in magnitude and not statistically significant. Here the size of the B coefficient for executions would suggest a one percent increase in execution rates to only be associated with about a two-tenths of a person reduction in the number of homicides per 100,000 population.

Also similar to the previous analyses, with the exception of the nonwhite population variable, each of the sociodemographic variables again proves to be very significantly related to both homicide rate measures. In addition, comparison of the size of the beta coefficients shows them to fall in the same rank ordering of importance as predictors of homicide, with execution rates again ranking last among these factors.

Results For A Non-Linear Analysis

While the results to this point clearly do not provide support for the deterrence hypothesis for the certainty of the death penalty, the possibility exists that; these negative findings are due to our failure to properly specify the form of the relationship between execution rates and homicide rates. In each of the above models (Tables 2-4), the form of this relationship was assumed to be linear. The possibility exists, however, that the execution rate-homicide rate relationship is actually nonlinear. Ehrlich, for example, argues this point in his time-series analysis of nationally aggregated execution and homicide data for the period 1933 to 1969.[27]

To test for the possibility of a nonlinear relationship between changes in execution rates and homicide rates, natural log transforms were performed on the homicide rate variables and the above analysis (Tables 2-4) was repeated. The same type of transformation has been used by Ehrlich and other previous death penalty investigators, and its use here will thus better allow us to compare our findings with those of earlier studies.[28] Results of this analysis are reported in Tables 5-7.

Table 5 (like Table 2) presents the findings of the analysis when no time lag factor is considered in examining the execution rate-homicide rate relationship.

27. Ehrlich, *supra* note 4.

28. Ehrlich, *supra* note 4; Bowers & Pierce, *supra* note 4; Passell & Taylor, *supra* note 4; Forst, *supra* note 4.

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TABLE 5

RELATIONSHIP BETWEEN NORTH CAROLINA EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC VARIABLES AND LOG HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B. Coeff.	Beta Coeff.	St. Error	F. Value
Pct. Male Pop.	-.117	412.2956	1.8587	53.0113	60.489c
Pct. Age 20-40 yrs.	-.079	-4.0327	-.3596	1.7876	5.089b
Pct. Nonwhite Pop.	-.361	-1.5433	-.0808	2.5332	.371
Pct. Unemployed	.175	.6470	.6817	.0995	42.248c
Pct. Urban Pop.	.486	14.9971	1.8815	1.7368	74.562c
Execution Rate	-.346	.0220	.0851	.0271	.660
Constant = -207.5175					
R^2 = .843c					

Mean Homicide Rate Results

Pct. Male Pop.	-.051	367.8179	1.8910	51.7503	50.517c
Pct. Age 20-40 yrs.	-.039	-4.0130	-.4081	1.7451	5.288b
Pct. Nonwhite Pop.	-.313	-1.1647	-.0695	2.4730	.222
Pct. Unemployed	.177	.5621	.6755	.0972	33.469c
Pct. Urban Pop.	.418	12.3468	1.7665	1.6955	53.030c
Execution Rate	-.385	-.0042	-.0186	.0265	.025
Constant = -184.3834					
R^2 .805c					

a = P<.05; b =P<.01; c =P<.001

Because these findings are very similar to those of the earlier analysis, they can be summarized very briefly. First, for both homicide rate measures, the execution coefficients, although they differ in their signs, are very slight and not statistically significant. Second, and as before, percent nonwhite population also proves not to be significantly associated with homicide rates, nonwhite population is the variable least strongly associated with homicide rates, with execution rates being least strongly associated with mean homicide rates. Third, although the findings vary slightly for the remaining sociodemographic variables, each is very significantly related to offense rates.

As shown in Table 6, a nearly identical pattern also holds when a one-year time lag is considered between executions and homicide rates.

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TABLE 6

RELATIONSHIP BETWEEN NORTH CAROLINA EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC, VARIABLES AND HOMICIDE RATES, WITH ONE-YEAR TIME LAG BETWEEN EXECUTION AND LOG HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B. Coeff.	Beta Coeff.	St. Error	F. Value
Pct. Male Pop.	-.117	408.5956	1.8420	51.6774	62.515c
Pct. Age 20-40 yrs.	-.079	-4.0141	-.3579	1.7561	5.225b
Pct. Nonwhite Pop.	-.361	-1.7302	-.0906	2.4993	.479
Pct. Unemployed	.175	.6484	.6832	.0975	44.208c
Pct. Urban Pop.	.486	14.8656	1.8650	1.6013	86.182c
Execution Rate	-.200	-.0288	.1110	.0247	1.365
Constant = -205.6147					
R^2 = .848c					

Mean Homicide Rate Results

Pct. Male Pop.	-.051	370.3730	1.9041	50.7579	53.244c
Pct. Age 20-40 yrs.	-.039	-3.8945	-.3960	1.7249	5.098b
Pct. Nonwhite Pop.	-.313	-1.2865	-.0768	2.4548	.275
Pct. Unemployed	.177	.5722	.6877	.0958	35.695c
Pct. Urban Pop.	.418	12.7175	1.8195	1.5728	65.381c
Execution Rate	-.204	.0162	.0710	.0242	.445
Constant = -185.8313					
R^2 = .809c					

a = $P < .05$; b = $P < .01$; c = $P < .001$

Again, although the signs of the coefficients differ, lagged execution rates and both homicide measures are not significantly related, with the beta results showing executions to be a very poor predictor of offense rates along with percent nonwhite population. In contrast, each of the other socioeconomic and demographic variables are very significantly related to both homicide measures.

Finally, Table 7 reports the results of the analysis when residual execution rates are regressed against the transformed homicide rate variables.

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TABLE 7

RELATIONSHIP BETWEEN NORTH CAROLINA RESIDUAL EXECUTION RATES, SELECTED SOCIODEMOGRAPHIC VARIABLES AND LOG HOMICIDE RATES

Homicide Rate Results

Ind. Variable	r	B Coeff.	Beta Coeff.	St. Error	F Value
Pct. Male Pop.	-.118	407.8871	1.8388	53.5148	58.094c
Pct. Age 20-40 yrs.	-.079	-4.1265	-.3679	1.8110	5.192b
Pct. Nonwhite Pop.	-.361	-1.5340	-.0803	2.5678	.357
Pct. Unemployed	.175	.6390	.6734	.1009	40.136c
Pct. Urban Pop.	.486	14.5788	1.8291	1.7046	73.146c
Execution Rate	-.330	.0252	.0292	.0864	.085
Constant = -205.1192					
R^2 = .839c					

Mean Homicide Rate Results

Pct. Male Pop.	-.051	365.9438	1.8813	51.2294	51.026c
Pct. Age 20-40 yrs.	-.039	-4.0725	-.4141	1.7337	5.518b
Pct. Nonwhite Pop.	-.313	-1.1457	-.0684	2.4582	.217
Pct. Unemployed	.177	.5567	.6689	.0966	33.233c
Pct. Urban Pop.	.418	12.1584	1.7395	1.6318	55.515c
Execution Rate	-.370	-.0441	-.0584	.0827	.284
Constant = -183.3717					
R^2 = .808c					

a = P< 05; b =P< 01; c= P<.001

As before, this analysis also provides no support for the deterrence hypothesis. To the contrary, certainty of the death penalty is positively associated with homicide rates, and very slightly, and not significantly, related to mean homicide rates. Likewise, nonwhite population also proves not to be significantly related to both homicide variables, with the findings being highly significant for the remainig sociodemographic factors.

In sum, this analysis also leads us to the same general conclusion. Contrary to the deterrence argument, certainty of execution and homicide rates are generally independent factors, with changes in homicide rates being largely a function of the changing demographic and socioeconomic conditions and characteristics of the state during the period examined here, 1910 to 1962.

Summary and Conclusion

In this investigation we have examined a question of both obvious theoretical and practical importance, namely, the deterrent effect of the death penalty for murder. While this issue has been long debated across the country and in North Carolina, the research to date is far from conclusive. Moreover, because of the methodology typically employed in previous death penalty studies, the findings of these investigations are only suggestive at best for individual jurisdictions, including North Carolina.

As discussed above, the deterrence hypothesis of a significant inverse relationship between the certainty of execution and homicide rates has received considerable empirical attention in recent years. With few exceptions, these studies have failed to provide support for the deterrence argument. However, because this question has typically either been examined cross-sectionally for retentionist states for selected years, or longitudinally for various time periods for nationally aggregated data, the findings resulting from these studies may, or may not, well reflect individual state's experiences with capital punishment. Until the deterrence hypothesis for the certainty of execution is examined for individual jurisdictions, this matter will have to remain an important, but unanswered question.

In response to this situation, we have examined the deterrence hypothesis of a significant inverse relationship between the certainty of execution and homicide rates for the state of North Carolina for the period 1910 to 1962. Three models of the execution rate-homicide rate relationship were considered, with two measures of offense rates being examined. In addition, to control for the possible spuriousness of the findings for the certainty of execution variable, sociodemographic factors association with homicide rates were introduced into the analysis as control variables. Finally, to further explore the deterrence hypothesis, both the possible linear and nonlinear relationship between the certainty of execution and homicide rates was also considered.

For each of the execution rate-homicide rate models, for the two measures of homicide, and for both the linear and nonlinear models, analysis resulted in a very consistent pattern of findings. Contrary to the deterrence hypothesis, throughout the analysis certainty of execution was not found to be significantly inversely related to homicide rates. To the contrary, the execution coefficients were repeatedly found to be either low-positive or low-negative, and not statistically significant regardless of their sign. That is, for the years considered (1910-1962), changes in the certainty of execution and homicide rates were found to be generally unrelated factors.

In contrast, with the exception of the percent nonwhite population variable, changes in the sociodemographic characteristics and conditions of the state were found to be very significantly related to changes in homicide rates. Foremost among these variables was percent male population and percent urban population, then followed by percent unemployment and percent population 20 to 40 years of age. With the exception of insignificant results for percent nonwhite population, the significant findings for the remaining sociodemographic variables, and the insignificant findings for the certainty of execution, are consistent with the results of most previous investigations.

Although the policy implications of our findings for some of the sociodemographic factors (male population, age 20 to 40 years, urban population) are far from obvious, they are clearly suggestive for the execution and unemployment variables. For the period examined here, levels of unemployment would appear to have had a significant positive effect on levels of homicide, and levels of execution would appear to have been unrelated to homicide rates. If we assume that the observed relationship between these two factors and homicide holds equally well today, (and history probably provides us with the best means of guidance here), then there would appear to be little to no hope that the use of the death penalty can provide an effective means of deterring murder. Rather, measures aimed at improving socioeconomic conditions and other negative consequences of unemployment would appear to hold much more promise in dealing with this dimension of the crime problem in North Carolina.