Discrimination in Capital Sentencing

An Investigation of Discretionary Bias in the Imposition of the Death Penalty in the United States

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Abstract

This study examines the probability that an individual receives the death penalty for murder in the United States in 1998. The intention is to investigate the presence of arbitrariness and discrimination in capital sentencing subsequent to the supposed reforms of the pre-Furman capital statutes. The author hypothesizes that race, gender, education, and the location of the murder are relevant factors in determining the likelihood of receiving the death penalty. Specifically, non-blacks, men, and poorly educated people convicted of murder are expected to be more likely to receive a death sentence. A preliminary statistical overview suggests that these hypotheses are born out in the data. The findings from a more thorough regression analysis support these hypotheses and show that non-blacks are approximately 1.5 times more likely than blacks to incur the death penalty for murder. Additionally, a convicted murderer with a ninth grade education is 1.7 times more likely than a high school graduate to receive a death sentence. Therefore, this study suggests that discrimination is present in capital sentencing based upon a convicted murderer’s race and level of education, among other factors.
## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
<td>4</td>
</tr>
<tr>
<td>II. Literature Review</td>
<td>6</td>
</tr>
<tr>
<td>III. Data Sources</td>
<td>10</td>
</tr>
<tr>
<td>IV. Capital Punishment in the United States, 1998</td>
<td>13</td>
</tr>
<tr>
<td>V. Hypotheses</td>
<td>22</td>
</tr>
<tr>
<td>VI. Methodology</td>
<td>24</td>
</tr>
<tr>
<td>A. Selection of Regression Model</td>
<td>24</td>
</tr>
<tr>
<td>B. The Regression Model</td>
<td>25</td>
</tr>
<tr>
<td>VII. Results</td>
<td>30</td>
</tr>
<tr>
<td>VIII. Conclusion</td>
<td>38</td>
</tr>
<tr>
<td>IX. Tables</td>
<td>41</td>
</tr>
<tr>
<td>X. Appendices</td>
<td>51</td>
</tr>
<tr>
<td>XI. References</td>
<td>60</td>
</tr>
</tbody>
</table>
I. Introduction

The sentencing of persons to death has been charged as a capricious process that is imbued with arbitrariness. Many individuals and organizations contend that the institution of the death penalty is inherently corrupted by discrimination. The result of these contentions came to a dramatic conclusion in the case of Furman v. Georgia in 1972. In this paramount case the U.S. Supreme Court decided to invalidate all death penalty statutes on the grounds that existing capital punishment laws were arbitrary\(^1\) and discriminatory\(^2\) and therefore unconstitutional.

Merely four years following the decision in Furman v. Georgia (408 U.S. 238 [1972]) the U.S. Supreme Court overturned its ruling in Gregg v. Georgia (428 U.S. 153 [1976]). The reversal of the Furman decision resulted in the reinstitution of many death penalty statutes, “on the ground that they promised to eliminate the arbitrariness and the discrimination that had troubled the Court in 1972” (Gross&Mauro, 1989, p. xi). In the years following the Gregg decision many studies investigated the impact of judicial reforms on capital sentencing. The outcome of these studies was a “series of legal cases, culminating in 1987 in the Supreme Court’s decision in McCleskey v. Kemp (107 S.Ct. 1756 [1987])” (Gross&Mauro, p. xii). In this case a black man named Warren McClesky sought to overturn his death sentence on the grounds that the race of his victim was a significant factor in his procurement of the death penalty (Jackson, 1996). However, while “the Court acknowledged that the correlation of the victim’s race and the imposition of the death penalty was ‘statistically significant in the system as a whole’

\(^1\) “meaning that there were no adequate legitimate distinctions between cases that received death sentences and those that did not” (Gross&Mauro, 1989, p. xi)

\(^2\) “(meaning that death sentences were imposed in part on the basis of impermissible distinctions)” (Gross&Mauro, p. xi)
(McClesky v. Kemp, 481 U.S. 279), it denied McClesky’s petition saying that the burden is on the defendant to prove his individual sentence was based on his victim’s race” (Smolowe, 1991, cited in Jackson, 1996, p. 104).

The Supreme Court’s decision in *McClesky v. Kemp*, given the findings of empirical studies following *Gregg*, has precipitated the necessity to determine whether discrimination and arbitrariness have indeed been removed from the capital sentencing process. The majority of recent research has determined that since the post-*Furman* reforms offender characteristics are no longer important predictors of receiving the death penalty. Instead, they point to victim characteristics as well as the joint impact of the demographics of both the offender and the victim. When these studies do find an independent effect of an offender’s race they discover that whites are more likely to incur a death sentence than blacks (Bowers, 1983).

Therefore, this study returns to an investigation of the prevalence of discrimination, based on offender characteristics, in capital sentencing since the *McClesky* decision. Specifically, the purpose is to estimate the probability that an individual receives the death penalty for murder based on demographics of the offender, state, and county in which an individual is convicted. This probability is calculated as a function both of extra-legal factors, such as gender, age, race, and the location of the crime, and of legal factors, such as the nature of the murder and the offender’s prior criminal history. The general findings are that non-blacks, men, and poorly educated people convicted of murder are more likely to receive a death sentence for murder. Moreover, whether a person faces a judge or a jury in the sentencing process and the number of counts of murder are statistically relevant factors in capital sentencing.
Specifically, non-blacks are approximately 1.5 times more likely than blacks to incur the death penalty for murder. Additionally, a convicted murderer with a ninth grade education is 1.7 times more likely than a high school graduate to receive a death sentence. Therefore, this study suggests that discrimination is present in capital sentencing based upon a convicted murderer’s race and level of education. Furthermore, a person who is convicted of murder in a state where a judge imparts capital punishment decisions is roughly 7 times more likely to be death sentenced than in a state where a jury is employed. Lastly, this study demonstrates that the number of counts of murder is a legally relevant factor in the decision to impart a death sentence. Specifically, a person with two counts of murder is 2.5 times more likely than a person with only one count for murder to receive the death penalty. In initial results the effect of being male is found to be significant. Males are found to be over 3 times more likely than females to receive a death sentence. However, this result is does not hold after the inclusion of state and county demographic variables.

II. Literature Review

Both pre and post-Furman research “has shown consistent evidence of differential application of the death penalty by race of offender and race of victim” (Paternoster, 1983, p. 7). When the race of the offender is examined independent of the race of the victim there is often little racial disparity in capital sentencing. In fact, when a racial difference is discovered due to the race of the offender it typically favors black defendants (Bowers, 1983). But when the combined effect of the race of the offender and the race of the victim is considered there is strong evidence of discrimination against blacks who kill whites. This general pattern of racial profiling in capital sentencing was
demonstrated in an overwhelming majority of the studies examined. Paternoster’s study finds that in South Carolina between 1977 and 1981 black offenders who kill white victims “are over 40 times more likely to have the death penalty requested than black killers of blacks” (Paternoster, p. 7). This is especially troubling considering that he also finds that whites who kill blacks are only 1.6 times more likely “to have the death penalty sought than white killers of whites” (Paternoster, p. 7). Another study conducted by William J. Bowers (1983) presents similar findings in Florida during the years 1973-1977. Bowers finds that defendants who kill white victims are more likely to receive the death penalty than killers of blacks. He further notes that the racial combination of black killer and white victim is a strong predictor of the imposition of the death penalty (Bowers).

Phyllis Crocker (2001) examines a different element of capital sentencing but arrives at similar conclusions regarding the importance of race. Her study examines the presence of gendered racism in the application of the death penalty in Ohio, Florida, Colorado, and Oregon. She finds that people who commit rape-murder are disproportionately overrepresented on death row. She further notes that, “the victims of men convicted of rape-murder on death row are primarily, if not exclusively, white women” (Crocker, p. 7). This suggests that in specific cases of rape-murder discrimination exists based on the race of female victims. Although this study focuses only on cases of rape-murder, it arrives at the same conclusion as more general studies regarding the existence of discrimination in determining capital sentences. Further studies conducted by Ekland-Olson (1988) in Texas, Vito and Keil (1988) in Kentucky, Gorton and Boies (1999) in Pennsylvania, McAdams (1998) in pooled data on eight
states, and Zimring, Eigen, and O’Malley (1975) in Philadelphia, also find evidence of racial disparities in the probability of receiving a death sentence. All of these studies find that the race of the victim is the most important extra-legal factor that decides who is sentenced to death. They specifically find that killers of white victims are more likely to arrive on death row, especially if they are black.

Another widely developed notion in capital sentencing research is that the location of the crime is important in determining who receives the death penalty. Both Bowers (1983) and Paternoster (1983) ascertain that in Florida and South Carolina, respectively, the death penalty is not arbitrated equally across the state. Bowers finds that “courts in the northern region are far more likely to impose a death sentence” (Bowers, p. 15). Similarly, Paternoster determines that the death penalty is much more likely to be distributed in rural than urban areas in South Carolina. He further investigates the effect of geographic location while accounting for racial differences in capital murders. He finds that the geographic area has an effect on capital sentencing independent of the race of the victim. When the location of the crime and racial composition of the victim and offender are considered simultaneously the findings are even more troubling. Specifically, “a black offender who kills a white victim in a rural area of the state has an eleven times greater risk of having the death penalty requested than a black who kills a black in an urban area” (Paternoster, p. 20).

While race of victim and location of crime are the most widely studied factors in capital sentencing, many of the reviewed studies control for other relevant characteristics that prove significant. For example, Sheldon Ekland-Olson’s (1988) study includes the relationship between the victim and offender. In accordance with Paternoster’s (1983)
research Ekland-Olson found that murders involving strangers are overrepresented on death row while offenders who killed acquaintances are underrepresented (Ekland-Olson). This study also demonstrates that the age of the victim is more important than the age of the offender in death penalty cases (Ekland-Olson). Another victim-based characteristic that pertains to the institution of the death penalty is gender. Elizabeth Rapaport (1991) refers to a study performed by Gross and Mauro (1989) which finds that “murderers of women are more likely to be death sentenced than murderers of men” (cited in Rapaport, p. 379). Lastly, Bowers (1983) establishes the need to investigate the effect of whether a judge or a jury makes decisions regarding the imposition of the death penalty. Bowers’ claims that, “judges … are the products of the cultures and communities from which they come. In many places, state and local judges, … are elected and thus accountable to the public” (Bowers, p. 3).

The literature on capital sentencing has determined, among other variables, that race is an important consideration in the imposition of the death penalty. This strongly suggests that racial discrimination is prevalent in the decision to impart a death sentence for murder. Other extra-legal factors that have been found to be important in capital sentencing are the location of the crime, the relationship between the victim and the offender, and gender. These findings provide the impetus for this study. However, this study examines the impact of offender characteristics on the likelihood of receiving the death penalty for murder independent of victim characteristics in contrast to the majority of recent works that study victim-based characteristics. This is the result of limitations in the available data, which are discussed in the following section.
III. Data Sources

The process of reviewing prior literature and exploring the current views of many individuals and organizations, regarding the prevalence of discrimination in the institution of the death penalty, has initiated this investigation of capital punishment. The intention of this project is to examine the likelihood of receiving the death penalty by race, gender, income, and education level. In order to explore the impact of these variables in capital sentencing one must simultaneously examine legally relevant factors that occasion the penalty of death. Therefore, an exhaustive investigation of potentially influential factors must be conducted in order to separate the impact of legally relevant factors from those that should not be considered in the judicial process. The prior research that is referenced in the literature review section has provided a comprehensive catalogue of the possible variables that result in a person’s arrival on death row.

Identifying a comprehensive data source has proved to be the most challenging aspect of this research endeavor. There are many data sources that contain legally relevant variables as well as extra-legal variables important to the determination of discrimination in capital sentencing. However, many of these data sets do not include all of the necessary information required for this statistical analysis. For example, *Capital Punishment in the United States* (Snell, 1999), a data collection sponsored by the U.S. Department of Justice Bureau of Justice Statistics, only includes information on prisoners serving death sentences. Because this data does not include individuals who committed capital crimes but who did not receive the death penalty it does not allow for an investigation into the capital sentencing process. Other data sets, such as the FBI’s
Supplementary Homicide Reports, do not include information regarding the sentence imposed on the offender.

The most exhaustive data source available, which contains variables regarding the nature of the crime and the sentence that was imposed is the National Corrections Reporting Program (NCRP) (U.S. Dept. of Justice, 2001). The Bureau of Justice Statistics, a research investigation arm of the United States Department of Justice, compiled this data. The data collection is available for most years between 1983 and 1998 via the Inter-university Consortium for Political and Social Research (ICPSR) website\(^3\). The choice to use the 1998 data set arose out of the desire to apply the investigation of discrimination to the most recent cases. The data includes information on prison admissions records for all people in the United States who were admitted to prison during the 1998 calendar year. The data file distinguishes both the state and county in which individuals were incarcerated. The variables include incarceration history, current criminal offenses, and the type of sentence mandated. Demographic information on murder offenders includes the year of birth, sex, age, race, Hispanic origin, and educational attainment. For a comprehensive list and description of all of the variables included in the NCRP data set refer to Appendix A.

The use of the NCRP data set poses some obvious limitations on the ability to investigate discrimination in the capital sentencing process. The main component that is missing is information on the victim. There are no variables which describe the victims race, gender, age, income or otherwise. This is important given the results of prior research, which have demonstrated that victim characteristics, particularly the race of the victim, are very relevant in determining who receives the death penalty. However, this is
a problem that cannot be remedied with the available data sets. Another limitation is that the data does not provide information regarding the aggravated nature of the crime. It only contains the most serious crime committed, such as murder, without specifying whether there was burglary, rape, or another aggravating element to the murder. Therefore, it becomes difficult to determine which crimes are eligible to be tried as capital offenses. This is because most states require a certain number of aggravating circumstances alongside the murder in order for the offense to be capital. There is also no data on the weapon used, whether the defendant had a court appointed attorney or an elected prosecutor, or the strength of the prosecution’s case. While these facts are important to the statistical analysis of determining the impact of discrimination in death sentencing their absence does not preclude a thorough investigation into the nature of the death penalty.

In order to study the impact of such factors as the racial composition and distribution of people by age and education levels of the county in which the criminal was imprisoned the use of the 1990 Census was employed. The fact that many of the data files for the 2000 Census were not completed at the time of this writing excluded its use in this project. Therefore, the 1990 Census data was the best approximation of county demographics in 1998. The 1990 Census STF3C data file (U.S. Dept. of Commerce, 1993) was employed for the purpose of this study since it included all relevant variables at the county level. This data set is available for public downloading from the ICPSR website. For a complete list and description of census variables used for this study see Appendix A.

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3 The ICPSR website can be accessed at http://www.icpsr.umich.edu
Lastly, the aforementioned Bureau of Justice Statistics report *Capital Punishment 1998* (Snell, 1999) was used to obtain state level information regarding the method of execution, minimum age to receive the death penalty, and whether a state has life without parole. These three data sources encompass the statistical information used in this study to determine the prevalence of discrimination and arbitrariness in capital sentencing. See Appendix C for a complete discussion of the technical aspects regarding the coding of variables in the data files and information pertaining to the construction of the final data set.

**IV. Capital Punishment in the United States, 1998**

This section provides an overview of capital punishment statistics by demographic categories such as race, gender, location, and education. The information regarding the universe of inmates on death row was gathered from the Bureau of Justice Statistics report *Capital Punishment 1998* (Snell, 1999). Meanwhile, the *National Corrections Reporting Program* (U.S. Dept. of Justice, 2001) provides the statistics pertaining to the sample of people sentenced to death represented in the data set for this project. See the section entitled Data Sources as well as Appendix C for a more detailed description of the data sets and their construction. The information in the data set is compared to the nationwide universe of death row cases provided by the Bureau of Justice Statistics report (Snell, 1999).

In 1998 thirty-eight states and the federal prison system authorized the death penalty. These jurisdictions combined sentenced 285 individuals to death. Nearly half (42%) of these people were sentenced to death in four states. Texas admitted the most prisoners to death row (39), California admitted 31, while Florida and Alabama each
admitted 25. The most frequently employed method of execution was lethal injection (34 states). Electrocution (11 states) was the next most common form of execution, followed by lethal gas (5 states), hanging (3 states), and firing squad (3 states). Of the 38 states with capital statutes seventeen authorized more than one form of execution. The federal government prescribes two methods of execution for death row inmates. A person can either be executed by lethal injection or by “the method of the state in which the conviction took place”(Snell, 1998, p. 4). Eight states did not specify a minimum age for the imposition of the death penalty. Sixteen states held the minimum age between 14 and 17 while fourteen states and the federal system maintained a minimum age of 18. See Appendix B for a presentation of state characteristics of the death penalty.

The NCRP data set provides information on 7,747 individuals who were convicted of murder in 1998. Of these, 197 received the death sentence, which is 88 less than the population of people who were sentenced to death in 1998. Therefore, the data contains 30.9% fewer observations than the actual number of death row cases. However, for the most part the sample of 197 people exhibits the same or similar characteristics as the population of death row inmates, thereby substantiating the use of the data set.

Of the 285 prisoners admitted to death row in 1998, “142 were white men, 129 were black men, 3 were American Indian men, 2 were Asian men … 3 were white women, 3 were black women … 36 were Hispanic men and 2 were Hispanic women” (Snell, 1998, p. 9). Of the 197 prisoners in the sample who were sentenced to death in 1998, 90 were white men, 85 were black men, 1 was an American Indian male, there were no Asian men, 4 were white women, 1 was a black woman, 10 were Hispanic men, and 1 was a Hispanic woman. See Table 1 for a comparison between the sample and
universe of people on death row in 1998. The percentage of people by race, gender, and education in the sample are very similar to those reported in the population figures. However, there are a few notable differences⁴. The most obvious differences between the data sample and the population of death row inmates are in the numbers of Hispanics and poorly educated people. There is a substantially smaller proportion of Hispanic males in the sample than in the population. Also, there are far fewer poorly educated people in the sample. Despite these differences the parallels between the data set and the population of death row inmates support the validity of the sample as a reliable source of data. The following sections present characteristics relating only to the data sample of people who committed murder in 1998. The entire sample contains information on 7747 individuals, of which 197 (2.54%) were sentenced to death. Table 1 presents the demographic characteristics of prisoners under the sentence of death while Table 2 conveys information pertaining to the demographic characteristics of convicted murderers.

**Gender**

All but two of the observations in the data sample contain information pertaining to gender. The sample consists of 7253 males (93.6%) and 492 females (6.4%). Looking only at people who received the death penalty (197 observations), 97.0% are male and 3.0% are female. Therefore, it appears that males are slightly more likely to receive the death penalty for murder than women. In fact, 2.6% of males in the sample received the death penalty for murder while the same is true of only 1.2% of females.

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⁴ The NCRP data set contains information on four white women who were sentenced to death in 1998, but the BJS report (Snell, 1999) records only three death sentences for women that year. This and other discrepancies are explained by the fact that the NCRP data sample contains information on individuals who were sentenced to death, whereas the BJS statistics (Snell, 1999) include only those who were actually on death row at the time of the survey.
Race

Race was reported for 6893 individuals; 41.6% were white and 57.1% were black while only 1.2% were American Indian or Asian. Of the 181 people for which race was reported and who were sentenced to death, 51.9% were white and 46.3% were black. There was only one American Indian who was sentenced to death of 37 who were convicted of murder. Meanwhile, no Asian out of 51 murder offenders was sentenced to death. Therefore, it seems that whites are disproportionately given the death sentence for murder compared to blacks. The proportions of whites and blacks that received a death sentence for murder are 3.3% and 2.2%, respectively. These findings suggest that whites may be more likely to receive a death sentence for murder than blacks and people of other races. This accords with a prior study performed by Bowers (1983) in which he finds that blacks are less likely than whites to face the possibility of a death sentence.

Furthermore, since there is a higher proportion of white females in the data set than black females this finding is especially revealing given the evidence that men may be more likely than women to incur a death sentence for murder. In fact, 3.4% of white-males were sentenced to death while only 1.6% of white-females received a death sentence. Meanwhile, 2.3% of black-males were sentenced to death for murder while the same is true for just 0.5% of black-females.

Hispanic Origin

Information regarding Hispanic origin is provided for 5550 of the people in the sample, of which 21.5% are Hispanic. Merely 0.9% of Hispanics were imparted with a death sentence for murder compared to 3.3% of non-Hispanics. This suggests that people who are not of Hispanic origin are more likely to receive a capital punishment for murder
than those who are Hispanic. However, 97.8% of Hispanics in the sample are white, 97.5% are male, and 38.3% have less than a high school education. Therefore, since whites, males, and poorly educated individuals are expected to receive the death penalty in higher proportions than non-whites, females, and well-educated people the apparent effect of being Hispanic could be the result of these other characteristics.

Examining the interaction of gender and Hispanic origin reveals that 0.9% of Hispanic males and 3.4% of non-Hispanic males were given death sentences. However, the same pattern does not hold when examining the impact of being female on Hispanic origin in death sentencing. The death penalty for murder was conferred on 3.3% of Hispanic females and 1.8% of non-Hispanic females. It appears that the effect of being Hispanic on capital sentencing is not fully explained by considering the offender’s gender. However, as previously noted, the impact of education in determining which individuals are sentenced to death for murder is a potentially relevant independent variable that remains to be investigated.

*Education*

Of the 3873 observations for which education was reported 19.4% had less than an 8th grade education and 44.4% had completed some level of high school, but did not graduate. Meanwhile, 28.6% had their highest degree of education being a high school diploma or GED and nearly 7.5% received some level of college education. Among the individuals for whom educational information was available 2.5% of those with at least a high school education received a death sentence. Also, 2.3% of people with less than a complete high school education were sentenced to death for murder. Both of these proportions are very close to the overall percentage (2.54%) of murder offenders who
received a death sentence. This seems to suggest that education is not relevant in
determining which individuals are sentenced to death for murder. However, when
education levels are divided more narrowly a disparity becomes apparent.

A much larger percentage of people with less than an 8th grade education (4.2%) were given the penalty of death for murder. However, only 1.9% of convicted murderers who had completed at least some level of high school at the time of sentencing, 2.5% of those who had graduated from high school or received a GED, and 2.4% of those who had received at least some level of college education received the same sentence. This could suggest that people who are less-educated are more likely to receive the death penalty. However, the impact of race, age, and gender must be examined in conjunction with education in order to determine which factors are most important in explaining the probability of being sentenced to death for murder. For example, since people of color are generally less educated than whites in this sample the findings based on education could be attributable to racial differences rather than solely educational attainment.

Slightly under a half (43.9%) of whites had at least a high school degree while only 33.6% of blacks, 34.8% of American Indians, and 25.0% of Asians had comparable schooling. 6.6% of blacks with less than an 9th grade education were sentenced to death for murder, as compared to 4.1% of whites with the same education. Meanwhile, only 1.3% of blacks with at least a high school education received a death sentence compared to 4.0% of whites. Therefore, it appears that blacks are more likely than whites to receive the death penalty at lower education levels but that the opposite is true at higher education levels. However, some of this can be explained by the fact that 13.9% of blacks, 10.8% of American Indians, and 13.7% of Asians in the sample were below
twenty years old, as compared to only 10.7% of whites. Furthermore, gender differences may account for these proportions since women in the sample tend to have slightly higher education levels than men. Nearly half (46.6%) of women had either graduated from high school or spent some time in college while only 35.3% of men had an equivalent education. Surprisingly, 2.8% of females with at least a high school education were sentenced to death for murder compared to 2.5% of males. At lower education levels this disparity works in the opposite direction. Specifically, 4.5% of males with less than a ninth grade education received a death sentence while this is true for none of the 45 women at this education level.

**Age**

The age at admission to prison was provided for 6962 of the people who were convicted of murder and for all of those who were admitted under sentence of death. A preliminary investigation of the impact of age suggests that people in their early adult years are more likely to be imparted with a death sentence than individuals who are either in their teens or are much older. Specifically, 1.3% of convicted murderers who were less than 20 years old received the death penalty. However, 3.1% of individuals between 20 and 29 as well as 3.7% of those between 30 and 39 were death sentenced. Yet, a fewer percentage of people over the age of 50 (2.9%) received the same judgment for murder. Once again, however, these results must be examined in relation to other factors such as gender, race, and education.

The proportion of blacks between the ages of 20 and 40 (70.8%) is greater than that of whites (65.8%). Since earlier findings have suggested that blacks may be less
likely than whites to receive a death sentence for murder the statistics pertaining to the impact of age on capital sentencing appear to be even more significant. The proportion of whites that are below 20 years of age who received a death sentence for murder is 1.8%. For whites who are between 20 and 40 years old the proportion is 4.2% while for those over 50 years old it is 3.7%. The associated proportions of blacks by each of these three age categories are 1.4%, 2.7%, and 2.5%, respectively. In other words, within each age category there is a smaller proportion of blacks than whites that are sentenced to death. However, since 68.8% of males in the sample are between the age of 20 and 40 the impact of age could be affected by the high concentration of males in this age group.

Criminal History

There is information regarding prior jail time for 4829 people admitted to prison in 1998 for murder and for 7032 whose prior prison history is known. Among the people for which prior jail time is reported, 86.9% have previously spent time in jail. 11.1% of those who were convicted of murder and had never previously spent time in jail were sentenced to death. However, only 1.4% of individuals with between 1 and 99 months of prior time spent in jail received the death penalty. Therefore, it appears as if people with no previous jail record are treated more harshly in capital sentencing. However, when longer jail sentences are examined this observation is disputed. This is because the proportion of death sentenced individuals increases to 4.2% for those who have spent over 200 months in jail prior to their current sentence for murder.

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5 Jail is a containment facility for individuals who are awaiting trial or who are serving short sentences for minor crimes. Prison is a facility for individuals who are serving lengthy sentences for more serious crimes.
Meanwhile, of those for which prior prison time is reported, only 20.3% of murder offenders have previously spent time in prison. The percentage of people who received a death sentence and had no prior prison history is 3.2%. In the case of prison time the disparity between the proportion of people who incurred a death sentence, when looking at longer prison histories, works in the opposite direction than for time spent in jail. Specifically, 1.6% of persons who previously spent between 1 and 99 months in prison and only 0.9% of those who previously spent over 200 months in prison were sentenced to death. Despite the apparent differences in prior time spent in jail and prison there appears to be a general trend that implies that people who commit murder as their first criminal offense are treated more severely in the decision to implement the death penalty.

**Number of Counts of murder**

We would expect that people who are charged with multiple counts of murder receive harsher sentences and incur the death penalty with higher probability than those charged with a single count. This notion is supported by a preliminary investigation of the data. The proportion of convicted murderers who had only one count of murder and who received the death penalty is 3.1%. This proportion rises to 8.3% for those who had two counts of murder and to 12.5% for those who had three counts of murder. Meanwhile, only 16 murder offenders were charged with four or more counts of murder. Within this category 5 people (31.3%) were sentenced to death. These proportions are calculated only for people for whom murder was the most serious offense for which they were admitted to prison in 1998. The same analysis cannot be conducted for people who were convicted of murder as a second or third offense due to the small number of
observations in these categories. These findings indicate that people who commit more serious crimes are punished to a greater extent than those who commit less serious crimes. This certainly supports intuition and more importantly provides preliminary evidence that legally relevant issues, such as the criminal history of a murder offender, are a determining factor in implementing capital punishment.

V. Hypotheses

Based upon prior research on the capital sentencing process as well as the summary statistics provided in the previous section I expect to find that the probability of receiving the death penalty varies depending on a number of factors such as race, gender, location and education level. Therefore, the general hypothesis of this research project is that these extra-legal factors impact the likelihood of receiving the death penalty upon conviction of murder. Specifically, I hypothesize that blacks, American Indians, and Asians are more likely to receive a capital sentence than whites. Furthermore, I expect that being Hispanic increases the probability of a death sentence. Also, males are conjectured to be more likely than females, and poorly educated people more likely than well-educated people, to incur a death sentence. Other individual characteristics that are expected to increase the probability of being sentenced to death for a capital crime are being young, having a lengthy prior criminal history, and being charged with multiple counts of murder.

Further hypotheses regarding the likelihood of the imposition of a death sentence are made for characteristics of the state in which the prisoner is convicted. Although the effect of state characteristics has not been previously investigated, I hypothesize that persons convicted of murder in states that do not have the option of life without parole or
that employ lethal injection or lethal gas as methods of execution are more likely to incur a death sentence. Intuitively, one would expect that states that do not offer life without parole are more likely to sentence murderers to death rather than allow them the possibility for parole. Also, states with more humane methods of execution, such as lethal injection and lethal gas, would be more likely to impart death sentences than states that employ electrocution, hanging, or death by firing squad. It is also possible, however, that states with more humane methods of execution are themselves generally more humane and so execute less frequently. Lastly, whether a judge or jury determines the death penalty has an unknown impact on the estimated probability of a death sentence. Based on the intuition of Bowers (1983) it is hypothesized that a person who faces a judge is more likely to be sent to death row than a person who is tried by a jury.

The last consideration is the effect of county demographics on the probability of a death sentence for murder. Variables are included on the racial composition as well as on the age, gender, and educational attainment of persons within each county. The variables represent the proportion of each demographic within each county. It is difficult to hypothesize about the independent impact of these county demographics on the probability of a death sentence since there are no prior studies that examine these influences. Therefore, it is possible to make conjectures based on county-level information that operate in both directions. For example, it is logical to argue that the impact of having a high proportion of females in a population results in a greater likelihood of the death penalty. This is based on the idea that women are less likely than men to impart a death sentence on a murderer. This would suggest that a convicted murderer in a county with a greater percentage of women would be less likely to receive
the death penalty. However, it is also possible that in such a county death sentences are more common out of a desire to protect the largely female population. Therefore, the independent effect of the gender composition of a county on the probability of receiving a death sentence for murder is uncertain. Likewise, the significance of the other county demographic variables in the sentencing of murderers to death, such as the proportion of people by race, age, and education level is uncertain. Consequently, one objective of this study is to examine the impact of these county-level demographics on the implementation of the death penalty.

VI. Methodology

A. Selection of Regression Model

There are three options for the regression model since the dependent variable is binary. These three options are the linear probability, logit, and probit models. The linear probability model is the most appealing in terms of ease of interpretation. However, the ordinary least squares (OLS) estimators of the linear probability model are not minimum variance (Preston, 2001). This is because the error terms in the linear probability model are heteroskedastic (Preston). Therefore, either the logit or probit regression models must be employed.

Both the logit and probit models estimate the regression equation using a maximum likelihood procedure (Preston, 2001). The two regression models differ in their basic assumption regarding the distribution of the equation $Z_i = B_1 + B_2X_i$. The logit model assumes that the above equation follows a logistic distribution while the probit model assumes a normal distribution (Preston).
Despite the different underlying assumptions between the logit and probit models they are very comparable. “Therefore, the choice between the two is one of (mathematical) convenience and ready availability of computer programs. On this score, the logit model is generally used in preference to the probit”(Gujarati, 1995, p. 567-568). Furthermore, the probit model “is conceptually more difficult to interpret and historically more difficult to estimate [while] translating parameter estimates to changes in probability are also more difficult”(Preston, 2001, p. 6). Therefore, this study applies the logit model.

B. The Regression Model

This study is centered around ten logit regressions, each of which will be introduced in this section. These ten regressions are performed under the constraint that the individual was convicted of murder in one of the 34 states that had the death penalty in 1998. A second constraint on half of these regressions is that murder was the most serious offense for which the person was incarcerated in 1998. This further constraint is necessary in order to examine the effect of the number of counts of murder on the probability of receiving a death sentence. Therefore, there are five sets of regressions that are separated into two main categories. The first regression in each set of two regressions incorporates the universe of individuals convicted of murder in states that employ the death penalty. The second regression retains all of the variables of the prior regression but restricts the observations to those for whom murder was the most serious offense that they committed in 1998. This is done in order to examine the effect of the number of counts of murder, which is only available for those persons for whom murder was the most serious offense. The length of the sentence imparted determines the
severity of the offense. In other words, murder is the most serious offense for an individual if it results in the longest sentence of any offense for which they were convicted.

The first set of regressions that is performed includes the most basic demographic variables relating to the criminal offender. These variables are age at admission to prison (Age), gender (Sex), education level (Education), race (Black)\(^6\), Hispanic origin (Hispanic), and prior time spent in prison (Prison). These variables are regressed, using the logit model, against a dummy variable that represents whether a person received the death penalty (Death). However, when race and Hispanic origin are simultaneously considered a person who is not of Hispanic origin perfectly predicts not receiving a death penalty for murder. Therefore, the variable Hispanic is dropped from each of the regressions and cannot be considered in examining the likelihood of the death penalty.

The first regression performed is then of the following form:

\[
\text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + e_i
\]

The second regression incorporates the variables of the first but includes an additional variable on the number of counts of murder (Counts). The regression is then:

\[
\text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Counts}_i + e_i
\]

\(^6\) The regression only includes a dummy variable for whether a person is black for two main reasons. First, Asians could not be included in the regression because no Asian was sentenced to death in the data sample. As a result, being Asian perfectly predicts not receiving a death sentence. Secondly, if Asians were omitted along with whites, then the base racial category would be people who are either Asian or white. It does not make intuitive sense for two racial categories to be the basis of comparison. Therefore, only blacks are included in the regression, thereby making the omitted group non-blacks.
The next set of regressions examine the impact of several state characteristics in determining the probability of receiving the death penalty for murder. Two of the additional variables that are added to those of the first regression are dummy variables for the method of execution (Electrocution) and whether a judge or jury decides the sentence for murder (Jury). Only a dummy variable for electrocution is included due to the low number of observations for individuals who are sentenced to death under laws that prescribe the use of lethal gas, hanging, or a firing squad. The final variable that is considered in this set of regressions is the minimum age that is required to receive the death penalty (Min Age). Therefore, regression three is:

\[
\text{Regression 3: } \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \\
\beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \epsilon_i
\]

Again, the fourth regression contains the same variables of the third regression, but considers the impact of the number of counts of murder (Counts) on whether a person is death sentenced. The fourth regression is of the form:

\[
\text{Regression 4: } \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \\
\beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{Counts}_i + \epsilon_i
\]

It is further important to consider the influence of the state in which a person is tried for murder to determine their probability of a death sentence. The distribution of death row inmates is concentrated in a small number of states. Therefore, this set of regressions attempts to ascertain whether these states employ the death penalty for murder with greater probability than the states that have fewer death row inmates after controlling for the number of convicted murderers within a state. The regressions
therefore include dummy variables for each of the states with capital statutes. Many of these states were dropped from the regressions due to the low number of observations or collinearity. The states that remain are Arkansas, Georgia, Illinois, Kentucky, Mississippi, Missouri, Nevada, North Carolina, and Virginia. Regression five examines the effect of the state in which the murder was committed independent of the number of offenses for murder while the sixth regression includes this factor. The fifth and sixth regressions are then:

(Regression 5) \[ \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{Arkansas}_i + \beta_{10} \text{Georgia}_i + \beta_{11} \text{Illinois}_i + \beta_{12} \text{Kentucky}_i + \beta_{13} \text{Mississippi}_i + \beta_{14} \text{Missouri}_i + \beta_{15} \text{Nevada}_i + \beta_{16} \text{North Carolina}_i + \beta_{17} \text{Virginia}_i + e_i \]

(Regression 6) \[ \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Jury}_i + \beta_7 \text{MinAge}_i + \beta_8 \text{Kentucky}_i + \beta_9 \text{Missouri}_i + \beta_{10} \text{Nevada}_i + \beta_{11} \text{North Carolina}_i + \beta_{12} \text{Virginia}_i + \beta_{13} \text{Counts}_i + e_i \]

A few of the states (Arkansas, Georgia, Illinois, Mississippi) from regression five are dropped in regression six, as well as the method of execution dummy variable (Electrocution). This is the result of the inclusion of the number of counts of murder in regression six.

The seventh and eighth regressions examine the effect of county demographics on the likelihood of a death sentence for murder independent of the state in which a person is convicted. The main prisoner demographic variables from the first set of regressions are included to examine the impact of the county variables on these individual characteristics in death sentencing. The county variables that are examined are the percentage of people by gender, race, education, and age. The variables for the percentage of males, non-
Hispanics, people with less than a 9th grade education, and those below age 10 were omitted to form a base group of comparison. To be consistent with earlier regressions the eighth regression investigates the influence of the number of counts of murder while regression seven omits this factor. Regression seven is of the following structure:

(Regression 7) \[ \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{PrctFemale}_i + \beta_{10} \text{PrctBlack}_i + \beta_{11} \text{PrctAmIndian}_i + \beta_{12} \text{PrctAsian}_i + \beta_{13} \text{PrctOther}_i + \beta_{14} \text{PrctHispanic}_i + \beta_{15} \text{PrctEd9-12}_i + \beta_{16} \text{PrctEdHs}_i + \beta_{17} \text{PrctEdCollege}_i + \beta_{18} \text{PrctEdDeg}_i + \beta_{19} \text{PrctAge10-20}_i + \beta_{20} \text{PrctAge21-39}_i + \beta_{21} \text{PrctAge40-59}_i + \beta_{22} \text{PrctAge60-79}_i + \beta_{23} \text{PrctAge80+}_i + e_i \]

After including the number of counts of murder in regression eight all of the variables from regression seven were retained. Therefore, the only difference between the seventh and eighth regressions is the variable for the number of counts of murder (Counts). Regression eight is then:

(Regression 8) \[ \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{PrctFemale}_i + \beta_{10} \text{PrctBlack}_i + \beta_{11} \text{PrctAmIndian}_i + \beta_{12} \text{PrctAsian}_i + \beta_{13} \text{PrctOther}_i + \beta_{14} \text{PrctHispanic}_i + \beta_{15} \text{PrctEd9-12}_i + \beta_{16} \text{PrctEdHs}_i + \beta_{17} \text{PrctEdCollege}_i + \beta_{18} \text{PrctEdDeg}_i + \beta_{19} \text{PrctAge10-20}_i + \beta_{20} \text{PrctAge21-39}_i + \beta_{21} \text{PrctAge40-59}_i + \beta_{22} \text{PrctAge60-79}_i + \beta_{23} \text{PrctAge80+}_i + \beta_{24} \text{Counts}_i + e_i \]

The fourth and final set of regressions are the most comprehensive in that they combine the factors of the first three sets of regressions. Therefore, individual prisoner demographic variables are combined with state and county variables. With the inclusion of all three sets of variables the dummy variables for Arkansas and Georgia, which were included in regression five, were dropped. The ninth regression becomes:

(Regression 9) \[ \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{Illinois}_i + \beta_{10} \text{Kentucky}_i + \beta_{11} \text{Mississippi}_i + \beta_{12} \text{Missouri}_i + \beta_{13} \text{Nevada}_i + \beta_{14} \text{NorthCarolina}_i + \beta_{15} \text{Virginia}_i + \beta_{16} \text{PrctFemale}_i + \text{Illinois}_i + \beta_{18} \text{PrctEd9-12}_i + \beta_{19} \text{PrctEdHs}_i + \beta_{20} \text{PrctEdCollege}_i + \beta_{21} \text{PrctEdDeg}_i + \beta_{22} \text{PrctAge10-20}_i + \beta_{23} \text{PrctAge21-39}_i + \beta_{24} \text{PrctAge40-59}_i + \beta_{25} \text{PrctAge60-79}_i + \beta_{26} \text{PrctAge80+}_i + \beta_{27} \text{Counts}_i + e_i \]
\[ \beta_{17} \text{PctBlack}_i + \beta_{18} \text{PctAmIndian}_i + \beta_{19} \text{PctAsian}_i + \beta_{20} \text{PctOther}_i + \beta_{21} \text{PctHispanic}_i + \beta_{22} \text{PctEd9-12}_i + \beta_{23} \text{PctEdHS}_i + \beta_{24} \text{PctEdCollege}_i + \beta_{25} \text{PctEdDeg}_i + \beta_{26} \text{PctAge10-20}_i + \beta_{27} \text{PctAge21-39}_i + \beta_{28} \text{PctAge40-59}_i + \beta_{29} \text{PctAge60-79}_i + \beta_{30} \text{PctAge80+}_i + \epsilon_i \]

In the tenth regression, after the number of counts of murder is included, some further states were omitted, namely Illinois and Mississippi. Therefore, regression ten is:

(Regression 10) \( \text{Death}_i = \beta_0 + \beta_1 \text{Age}_i + \beta_2 \text{Sex}_i + \beta_3 \text{Education}_i + \beta_4 \text{Black}_i + \beta_5 \text{Prison}_i + \beta_6 \text{Electrocution}_i + \beta_7 \text{Jury}_i + \beta_8 \text{MinAge}_i + \beta_9 \text{Illinois}_i + \beta_{10} \text{Kentucky}_i + \beta_{11} \text{Mississippi}_i + \beta_{12} \text{Missouri}_i + \beta_{13} \text{Nevada}_i + \beta_{14} \text{North Carolina}_i + \beta_{15} \text{Virginia}_i + \beta_{16} \text{PctFemale}_i + \beta_{17} \text{PctBlack}_i + \beta_{18} \text{PctAmIndian}_i + \beta_{19} \text{PctAsian}_i + \beta_{20} \text{PctOther}_i + \beta_{21} \text{PctHispanic}_i + \beta_{22} \text{PctEd9-12}_i + \beta_{23} \text{PctEdHS}_i + \beta_{24} \text{PctEdCollege}_i + \beta_{25} \text{PctEdDeg}_i + \beta_{26} \text{PctAge10-20}_i + \beta_{27} \text{PctAge21-39}_i + \beta_{28} \text{PctAge40-59}_i + \beta_{29} \text{PctAge60-79}_i + \beta_{30} \text{PctAge80+}_i + \epsilon_i \)

These ten regressions comprise the basis for this study. In the next section each of these regressions will be analyzed as to the ability of the included variables to predict the probability that a convicted murderer will receive the death penalty.

**VII. Results**

Prior to a discussion of the results it is important to understand how the coefficients are interpreted using a logit regression model. In order to interpret the coefficients one must multiply \( p_i(1-p_i) \) by the coefficient, where \( p_i \) is the overall probability that a person receives the death penalty in the sample, which is .0254. The resulting value is the percentage point change in the probability of receiving a death sentence associated with a one-unit increase in the coefficient being examined for a person who committed murder, holding all other variables in the regression constant. The coefficient on the variable Sex in the first regression will be used as a numerical example. Multiplying the coefficient of Sex (-.831) by \( p_i(1-p_i) \) results in the value -2.27.
Since Sex is a dummy variable that takes on the value of 0 for males and 1 for females a one-unit increase in the variable is associated with being female. Therefore, being female decreases the probability of receiving a death sentence for murder by 2.27 percentage points, holding age, race, education, and prior time spent in prison constant. For each of the regressions only those coefficients which are statistically significant at the 10% level or better are interpreted. However, not every coefficient will be discussed in this section. For a complete presentation of the values of all of the coefficients, their interpretation, and significance level in the regressions see Table 3. Furthermore, the probability of being sentenced to death for murder based on different factors is presented in Table 4.

Regressions 1

This most basic regression illustrates that blacks and people with a higher education are less likely to receive the death penalty for murder than non-blacks and people with lower education levels, respectively. In the first regression the impact of having an extra level of education is associated with a 0.40 percentage point decrease in the probability of receiving the death penalty for murder. Likewise, being black is associated with a 1.24 percentage point decrease in the probability of a death sentence. It is then possible, using STATA\textsuperscript{7}, to calculate the predicted probability of a death sentence for murder based on these different characteristics. A black person has a 0.0249 probability of facing a death sentence for murder as compared to a non-black person who has a probability of 0.0387. Therefore, non-blacks are 1.6 times more likely than blacks to receive the death penalty. This remains true even when education is simultaneously considered. A black person with a college degree has a 0.0147 probability of a death

\textsuperscript{7} STATA is a statistical analysis package under copyright of the STATA Corporation, 1984-2001.
sentence while a non-black person with the same education has a 0.0230 probability. These findings are only significant when controlling for age, gender, education, race, and prior time spent in prison of a convicted murderer.

Regression 2

When the number of counts of murder is included alongside of the variables in the first regression equation the effect of race loses its significance. However, gender becomes an important factor along with education, and the number of counts of murder. A person with a high school education is 1.5 times more likely than a person who has a college degree to incur a death sentence. This is very similar to the finding in the absence of the number of counts of murder, in which a person with a high school education is 1.3 times more likely than a person with a college degree to receive the death penalty. Furthermore, a male is 3.4 times more likely than a female and a person with two counts of murder is 2.5 times more likely than a person with only one count for murder to receive a death sentence. The predicted probability that a male receives the death penalty is 0.0288 while for females it is 0.0084. The significant difference in probabilities based on gender prevails even when education is simultaneously examined.

When gender and the number of counts of murder are studied together the impact of being male on the likelihood of being sentenced to death decreases with more counts of murder. For example, a male with one count for murder is 3.4 times more likely than a female to receive the death penalty. This is the same differential found when gender is examined independently or alongside of education. However, a male with four counts of murder is only 2.2 times more likely than a female with four counts of murder to incur a
death sentence. This number drops to 1.1 when the individual has eight counts of murder. When examining the predicted probability of a death sentence based upon the number of counts of murder it is obvious that a positive correlation exists. Specifically, a person with only one count for murder has a 0.0236 probability of a death sentence as compared to a person with three counts (0.1362 probability) and a person with eight counts (0.9447 probability). Since the impact of the number of counts of murder is so influential in determining the probability of a death sentence the remaining results will rely only on those regressions which account for this factor. Therefore, the findings of regressions three, five, seven, and nine will not be discussed in these results. However, Table 3 presents the results of these regressions.

*Regression 4*

After performing this regression the significant variables were Education, Electrocution, Jury, Min Age, and Counts. The effect of gender and race were not found to be significant after the addition of several variables relating to the structure of the death penalty. For a complete discussion of the variables that are present in this regression see the Regression Model section. The sign on each of these significant variables is negative, with the exception of Counts. Therefore, a person with a higher level of education is less likely to be sent to death row. This is also true of people who face trial by jury, are convicted of murder in states that employ electrocution as the method of execution, or are sentenced in states that prescribe an older minimum age to receive the death penalty. As before, the effect of being charged with more counts of murder increases the probability of a death sentence.
A further finding is that a person who is tried for murder by a judge is 6.8 times more likely to be sentenced to death than a person who is tried by a jury. The predicted probability that a person is sentenced to death in a state that determines death sentences by jury is 0.0106, as compared to a probability of 0.0719 in a state where a judge presides. Also, someone who is convicted of murder in a state that employs a method of execution other than electrocution (0.0457 predicted probability) is 6.9 times more likely than an individual convicted in a state with electrocution (0.0066 predicted probability). Lastly, a person who is found guilty of murder in a state with a minimum age of 14 (0.1145) is 4.6 times more likely to receive a death sentence than someone in a state where the minimum age is 16 (0.0249). They are also 22.9 times more likely than in a state with a minimum age of 18 (0.0050).

Regression 6

The variables Education, Black, Jury, Nevada, and Counts are all significant in this regression. The coefficients on Education, Black, and Jury are negative while those for Nevada and Counts are positive. In this regression it is not possible to calculate the predicted probability of a death sentence using STATA due to missing values that result with the inclusion of state dummy variables. However, it is still possible to present the impact that each variable has on the probability of being sentenced to death.

An increase in the education of a person by one level is associated with a decrease in the probability of receiving the death penalty by 0.52 percentage points. Similarly, the effect of being black is to decrease this probability by 1.87 percentage points whereas being tried by a jury leads to a 5.64 percentage point decrease in the likelihood of a death sentence. Both the effect of race and the adjudicator in death penalty cases are more
The variables Nevada and Counts have a positive impact on the prediction of a death sentence. Specifically, a person who commits murder in Nevada is faced with a 5.86 percentage point increase in the chance of a death sentence over a person who is convicted in another state. This is the largest change in terms of percentage points of any variable in this regression, which suggests that Nevada institutes the death penalty with much higher probability than any other state. The effect of an additional count for murder is to increase the probability of a death sentence by 2.42 percentage points, holding all else constant. Unlike the coefficients on Black and Jury the coefficient on Counts is smaller than in previous regressions after the addition of state dummy variables. Therefore, while the impact of the number of counts of murder is still a very strong predictor of whether a person receives the death penalty it is weaker after considering the influence of the state in which a person is convicted.

**Regression 8**

In the presence of county demographic variables, but without state dummy variables, the significant variables are Education, Black, Electrocution, Jury, Min Age, PctBlack, and Counts. The coefficients on Counts and Education are very similar to those of previous regressions, especially the fourth regression. Therefore, in the presence of county demographic variables the impact of race and the number of counts of murder remain largely unchanged. Meanwhile, the coefficients on Black, Electrocution, Jury, and Min Age are all more strongly negative than in previous regressions. This translates into a greater disparity between people who are of different categories within each
variable. However, the predicted probabilities of murder for each of these categories are lower. For example, from regression one it was determined that non-blacks convicted of murder have a 0.0387 probability of receiving the death penalty. Meanwhile, black people have a predicted probability of 0.0249. Regression eight determines that the respective predicted probabilities are 0.0159 and 0.0087. However, while these predicted probabilities are lower the difference between these values is greater than in the first regression.

According to the first regression a non-black person is 1.6 times more likely to receive the death penalty than a black person. In regression eight this value increases to 1.8. This relationship also holds for the variables Electrocution, Jury, and Min Age in determining the predicted probabilities of receiving a death sentence for murder. Therefore, people convicted in states that employ electrocution as a method of execution are 12.6 times more likely than those convicted in states that implement other methods to incur a death sentence. Furthermore, convicted murderers in states with trial by judge for capital crimes are 10.1 times more likely to receive the death penalty than those convicted in states with trial by jury. Lastly, a person who is found guilty of murder in a state with a minimum age of 14 is 5.3 times more likely to receive a death sentence than someone in a state where the minimum age is 16. They are also 29.3 times more likely than in a state with a minimum age of 18.

The one variable in this regression that is not statistically significant in any prior regression is PctBlack, which has a positive coefficient. The interpretation of this coefficient is that a one percent increase in the percentage of black people in a county is associated with a 5.09 percentage point increase in the probability of a death sentence for
murder. However, no other county demographic variable is found to be significant in
determining the likelihood of incurring the death penalty.

Regression 10

For the same reasons presented in the results for regression six the predicted probabilities of a death sentence cannot be calculated with the inclusion of state dummy variables. However, the percentage change in the probability of a death sentence can be discussed. This regression includes all of the pre-determined relevant variables that are possible in this study. Variables that relate to prisoner, state, and county demographics are included. The only coefficients that are significant, however, are on the variables Education, Black, Jury, Nevada, PctOther and Counts. Again, the effects of education, whether a state employs trial by jury, and the number of counts of murder is similar to those found in earlier regressions. However, the impact of the variables Black and Nevada are stronger than previously demonstrated.

The percentage decrease in the probability of a death sentence for murder associated with being black is 1.96, which is slightly greater than the value determined in regressions six and eight. Likewise, being convicted of murder in Nevada results in a 9.71 percentage point decrease, as compared to the value of 5.86 from regression six. As in the previous regressions that account for the number of counts of murder the most important factors in predicting a death sentence are race, education, whether a person is convicted in a state with trial by jury, and the number of counts of murder.
VIII. Conclusions

Based on the ten regressions that were performed in this study it has been determined that the most appropriate model includes the number of counts of murder, as this is a strong predictor of the probability of receiving the death penalty for murder. Within this framework the other factors that are most relevant and significant are the race and education of the person, and whether they are convicted in a state that determines death sentences by judge or jury. With the exception of Nevada, the state in which a person is convicted of murder does not seem to influence the probability that a person receives a death sentence. Furthermore, coefficients on only two county demographic variables were statistically significant in these regressions. As a result, the composition of people by age, race, gender, or education within a county is generally not found to be an important factor in determining the likelihood of the imposition of the death penalty for murder. It should be further noted that the majority of the coefficients remained largely unchanged throughout the regressions, despite the inclusion of state and county variables. This further substantiates the finding that these factors are not as important as individual characteristics of murder offenders in the decision to sentence a person to death. However, this does not undermine the findings of Bowers (1983) and Paternoster (1983), which demonstrate that the location of the crime is influential in the decision to impart a death sentence. This is because Bowers and Paternoster study the location of the crime within the states of Florida and South Carolina, respectively, while this study examines the impact of the location across states. One of the variables that is an important factor prior to the inclusion of state and county demographic variables is gender. Initially the impact of being male was to significantly increase the probability of
a death sentence for murder. Males were found to be 3.4 times more likely than females to be sentenced to death. However, this effect was not found to be significant after the inclusion of state and county demographics. This difference is also seen when the race of the convicted murderer is considered. Therefore, the impact of gender is not as important as that of race, education, whether a judge or a jury decides the death sentence, and the number of counts of murder, which remain significant throughout all of the regressions.

One of the main conclusions that is drawn from this study is that a person who is non-black is more likely to receive a death sentence for murder than a black person. Generally, a non-black person is 1.5 to 1.8 times more likely to face capital punishment for murder than a black person. The findings based on the race of the offender in this study accord with those of previous studies that examine the death penalty in post-
Furman years. For example, Bowers (1983) finds that when the race of the defendant is considered whites are 1.4 times more likely to have the death penalty requested than blacks. While Bowers’ study examines the probability of the death penalty being requested, not actually instituted, it still finds a disparity by race that favors black offenders.

Additionally, the impact of education is considerable on the likelihood of a death sentence. Specifically, an extra year of high school education is associated with a 0.50 percentage point decrease in the probability of a death sentence for murder. Therefore, a person who has a ninth grade education is 1.7 times more likely than a high school graduate to receive the death penalty. Analogously, a high school graduate is 1.4 times more likely than a college graduate to be death sentenced for murder.
The effect of whether a judge or a jury adjudicates in death penalty cases is also substantial. A convicted murderer who faces a judge is around 7 times more likely to receive a death sentence than someone who faces a jury. This finding supports Bowers’ (1983) notion that judges are influenced by the communities in which they serve, since they are often appointed. Therefore, it is expected that judges are more likely than juries to be held accountable to public demands for a death sentence.

Lastly, the most important factor in predicting the probability that a person is sentenced to death for murder is the number of counts of murder. A person with two counts of murder is roughly 2.5 times more likely to incur a death sentence than a person with only one count for murder. Moreover, a person with five counts of murder is sentenced to death with about a 0.50 probability while a person with eight counts of murder has a probability of over 0.90 of receiving the death penalty. These findings are reassuring since it should be the case that a person is death sentenced with a greater likelihood if they have more counts of murder. However, this is the only legally relevant factor that is examined in this study. Its strong significance throughout all of the regressions suggests that legally relevant factors are very important in death sentencing. Therefore, it is necessary that further studies attempt to incorporate more legally relevant variables relating to a murderer’s criminal history and the nature of their crime. Despite the absence of these variables the findings still strongly demonstrate discrimination in capital sentencing based on the convicted murderer’s race and education. The results further suggest that gender-based discrimination is prevalent, however, this finding is not as robust. Lastly, the study shows that death sentences are highly dependent on whether a judge or a jury adjudicates in capital cases.
Appendix C: Data Construction

The NCRP data set (U.S. Dept. of Justice, 2001) consists of three different parts, prison admissions, parole release, and prison release files. However, only the prison admissions file could be used as the result of a technical flaw with the data set. All three files contained a variable representing the case identification number. This was intended to be a unique value for each prisoner in the data set across all three files. However, after attempting to merge the three data files it was determined that the case identification number was not unique for each prisoner. Instead, a prisoner in the prison admissions data file had a different case identification number in each of the three files. Therefore, it was impossible to merge the three data files, thereby making only one of the data files useable. The prison admissions records were then selected since they contain the most relevant variables regarding capital sentencing.

The prison admissions file contained 535,517 observations on individuals who were admitted to prison in 1998. This was reduced to 9077 observations by including only people who committed murder. The choice to include only individuals who committed murder was the result of investigating the possible capital offenses for each state. In several states crimes other than murder were considered to be capital offenses. For example, in California train wrecking and treason were capital offenses in 1998 (Snell, 1999). However, a relatively small number of states maintained the capital nature of such alternative offenses and therefore only murder is considered a capital offense in this study. Another issue in determining capital offenses for each state was the consideration of aggravating circumstances. Most states require a number of aggravating circumstances alongside murder in order for the crime to be considered a capital offense.
However, the NCRP data set does not include information regarding the aggravating circumstances of the murders and hence this study considers an individual who commits any form of murder to be eligible for the death sentence. Federal laws governing the nature of capital offenses are much more varied than the state laws, but in this case murder is again considered the only capital crime.

The next stage in compiling the final data file was to remove individuals who committed murder but who were below the state’s minimum age to receive the death penalty in 1998. This process was carried out state by state since many states have different minimum age requirements for the death penalty. The minimum age ranged from 14 in Arkansas and Virginia to 18 in a number of states (Snell, 1999). There were also some variations in the minimum age within states. For example, in Mississippi the minimum age instituted by the state was 13 in 1998, however, “the effective age is 16 based on interpretation of U.S. Supreme Court decisions by the Mississippi Supreme Court” (Snell, 1999, p. 5). In such instances the effective age is considered the minimum age to be eligible for capital punishment. The Federal System also mandates that the minimum age to receive the death penalty is 18. After dropping observations for which people were below the minimum age to receive the death penalty within each state the data set was reduced by 157 observations, from 9077 to 8920 observations. The next step was to include only individuals who were convicted of murder in states that had capital statutes. Therefore, a dummy variable (Capital) was created, which has a value of one for states that employ the death penalty. When only individuals that are convicted of murder in states with capital punishment are included the data set is further reduced to 7747 observations.
Using the BJS report *Capital Punishment 1998* (Snell, 1999) a variable (Min Age) representing the minimum age to receive the death penalty was created. This variable takes on the values of 14, 16, 17, and 18 for each state with the death penalty, which corresponds to the minimum age in that state. Next, the dummy variable Life was created. This variable represents whether a state has life without parole as an alternative to the death penalty. The variable takes on a value of 0 if the state does not have life without parole and a value of 1 if the state does have life without parole. Another group of dummy variables was created in order to convey information concerning the method of execution by state. There are five methods of execution: lethal injection, electrocution, lethal gas, hanging, and firing squad. Therefore, five dummy variables (Injection, Electrocution, Gas, Hanging, and Firing) were created for each of these methods of execution. A coding of 0 represents a state that does not have the method of execution while a coding of 1 means that the state employs the method of execution. It is important to note that states can employ more than one method of execution. This is because some states offer a choice to death row inmates while others vary the method dependent on the year in which the prisoner was sentenced. The last set of dummy variables that was created from the BJS report (Snell) represent whether a judge or jury decides the death sentence. A dummy variable (Jury) was created to convey this information. A value of 0 for the variable signifies that the state employs a judge in determining a death sentence while a value of 1 means that it decides by jury. Dummy variables for the four main racial categories were also created. These variables are White, Black, AmIndian, and Asian and are coded in the usual manner.
The next step in compiling the final data set was to merge the 1990 Census data file with the 1998 prison admissions file. This was done using the variable County. Both data files contained this variable, which uniquely identifies each county in the United States. The first two digits of this variable represent the FIPS\(^8\) state code while the last 3 digits identify the county within each state. The census data file contains county level information regarding the total number of people that are in a demographic category. For example, the census data specifies the total number of people by race within each county. However, what is required is information concerning the percentage of people by race within each county. Therefore, all of the census variables were used to create new variables that convey percentages instead of total values of each of the demographic characteristics. This was done by dividing the demographic variable (e.g. males) by the sum of the demographic variables in each category (e.g. males+females). Furthermore, dummy variables for each state were created in order to allow the estimates of each of their intercepts to be different.

The intention of this study is to estimate the probability that an individual receives the death penalty for murder. Therefore, a binary dependent variable (Death) is employed. This variable takes on a value of 0 for individuals who did not receive the death penalty and a value of 1 for those who are sentenced to death. The binary dependent variable was created by re-coding the variable Maxsnt. This variable represents the maximum sentence imparted on an individual in the data set. An individual who received a death sentence for murder takes on the value of 99997 for the variable Maxsnt. Using this data the variable Death was created by assigning a value of 1.

\(^8\) FIPS are Federal Information Processing Standards issued by the National Institute of Standards and Technology. These numerical codes represent the states and counties in the United States.
for anyone who had a value of 99997 for Maxsnt and 0 for any other sentence.

Information is provided on 197 people who were sentenced to death in 1998. The remaining 7550 people were admitted to prison on a lesser sentence.
References


