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CAPITAL PUNISHMENT, EXECUTION PUBLICITY AND MURDER IN HOUSTON, TEXAS

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Punishment is not inflicted by a rational man for the sake of the crime that has been committed—after all one cannot undo what is past—but for the sake of the future, to prevent either the same man or, by the spectacle of his punishment, someone else, from doing wrong again.

– Plato, *Protagoras*

I. INTRODUCTION

Healthy debate persists as to the deterrent effect of capital punishment. Although an expansive and diverse body of research has accumulated that examines the effect of executions or execution publicity on murder rates, this research affords few definitive conclusions. On one hand, there is evidence that executions reduce murder levels. Empirical work by Ehrlich, Phillips, and Stack supports this view.[1] On the other hand, several studies fail to discern convincing evidence of a relationship.[2] Still others find a positive association.[3] These inconsistencies in the literature raise

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[1] Isaac Ehrlich, *The Deterrent Effect of Capital Punishment: A Question of Life and Death*, 65 AM. ECON. REV. 397 (1975); David P. Phillips, *The Deterrent Effect of Capital Punishment: New Evidence on an Old Controversy*, 86 AM. J. SOC. 139 (1980); Steven Stack, *Publicized Executions and Homicide, 1950-1980*, 52 AM. SOC. REV. 532 (1987).

[2] William C. Bailey & Ruth D. Peterson, *Murder and Capital Punishment: A Monthly Time-Series Analysis of Execution Publicity*, 54 AM. SOC. REV. 722 (1989); William C. Bailey, *Murder, Capital Punishment, and Television: Execution Publicity and Homicide Rates*, 55 AM. SOC. REV. 628 (1990) [hereinafter Bailey, *Television: Execution Publicity*]; Ruth D. Peterson & William C. Bailey, *Felony Murder and Capital Punishment: An Examination of the Deterrence Question*, 29 CRIMINOLOGY 367 (1991).

[3] John K. Cochran et al., *Deterrence or Brutalization? An Impact Assessment of Oklahoma's Return to Capital Punishment*, 32 CRIMINOLOGY 107 (1994); David R. King, *The Brutalization Effect: Execution Publicity and the Incidence of Homicide in South Carolina*, 57 SOC. FORCES 683 (1978).

methodological issues, some of which are grounded in theoretical arguments. Perhaps the most serious concern is specifying the true nature of the causal relationship between capital punishment and murder rates. Most previous studies estimated only unidirectional relationships. The question of salience, however, is whether recursive models portray the relations among the variables of interest accurately. Another issue relates to the geographical unit of analysis best suited for evincing deterrence effects. Whereas most prior studies relied on state or national level data to assess the deterrent effect of capital punishment, a high level of aggregation may not fully capture the ecological dynamics that are hypothesized to underlie deterrence theory.

We address these methodological concerns to help clarify the conflicting findings often reported in the literature. Using monthly data and a fully recursive vector ARMA statistical procedure, we examine the causal relations among execution risk, execution newspaper publicity, and incidents of murder in Houston, Texas from January 1990 to December 1994. We address three general questions. First, does the number of monthly executions decrease murder incidents? If people are rational actors who weigh the likely costs and benefits of their behavior before engaging in criminal activity as deterrence advocates suggest, an inverse relationship between execution risk and murder incidents is anticipated. Conversely, if the brutalization thesis has any merit, we expect to observe a positive relationship between execution risk and murder incidents. Second, does variation in murder incidents impact execution risk? It is plausible that high levels of murder drain the finite resources of the criminal justice system, thereby making the apprehension, prosecution, and execution of offenders less certain. It is also possible that high murder rates amplify public fear of crime, which in turn evokes a more punitive response on the part of prosecutors and judges in their handling of criminal cases. Third, if causality flows in both directions, what is the relative magnitude of the effects of execution risk on murder incidents and murder incidents on execution risk?

In addition to analyzing the relationship between execution risk and murder incidents, an effort is made to determine whether the newspaper publicity surrounding an execution affects the frequency of murder incidents. Because deterrence is a communicative theory, it seems logical to anticipate that such publicity influences murder rates. The identification of the nature and direction of the causal relations among execution risk, execution newspaper publicity, and murder incidents should help to enrich our understanding of deterrence theory.

A. BACKGROUND

The deterrent effect of capital punishment remains a topic of contentious debate. Advocates of the deterrence thesis maintain that the death penalty acts as an effective deterrent because individuals are free-will actors who rationally weigh the probable benefits and potential liabilities before engaging in criminal activities. This calculation on the part of the individual hinges on personal experience with criminal punishment, knowledge of what sanctions are imposed by law, and awareness of how punishment has been applied to apprehended offenders in the past.[4] The state's administering of capital punishment must also be swift and certain if a reduction in crime is to be actualized. Another important facet of the deterrence theory is that the threat of punishment must be communicated to the populace. The state's sanctioning of criminal offenders serves as an example to those who have not yet committed a crime, instilling in them sufficient fear to deter them from partaking in illegal activities.

Advocates of deterrence remain steadfast in their belief that the crime of murder is a product of a reasoned decision-making process on the part of an individual. A number of empirical studies give credence to this belief. Felson and Messner find that a sizable percentage of murders in our society result from an offender's desire to avoid retaliation from others or to eliminate potential witnesses.[5] Parker also reports that even alcohol-related murders are not irrationally motivated.[6] Even serial killers, usually considered among the most irrational of all offenders, appear to select their victims from either the defenseless or from those unable to depend fully on law enforcement for protection, such as prostitutes and the homeless.[7]

However, despite the plausibility of the deterrence thesis, many social scientists are still unconvinced that capital punishment deters people from committing murder. The threat of the death penalty, especially when the likelihood of execution is extremely small, is not seen as having the same motivating power as the offender's desires at the moment of the crime. Most murderers, for example, are thought to lack single-minded intent.[8] The death or survival of a victim in a homicidal attack is believed to be

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[4] The publicity surrounding an execution may also serve an educative, moralizing, and normative validation function. *See* JACK P. GIBBS, CRIME, PUNISHMENT, AND DETERRENCE (1975).

[5] Richard B. Felson & Steven F. Messner, *To Kill or Not to Kill? Lethal Outcomes in Injurious Attacks*, 34 CRIMINOLOGY 519 (1996).

[6] ROBERT NASH PARKER, ALCOHOL AND HOMICIDE (1995).

[7] ERIC W. HICKEY, SERIAL MURDERERS AND THEIR VICTIMS (1991).

[8] ROBERT M. BOHM, DEATHQUEST: AN INTRODUCTION TO THE THEORY AND PRACTICE OF CAPITAL PUNISHMENT IN THE UNITED STATES (1999).

largely a matter of chance, and that chance depends to a degree on the lethality of the weapon used to inflict the injury. Studies also show that most murderers have little or no prior criminal records[9] and that murderers released from prison recidivate at lower rates than other felony offenders.[10]

Some also argue that executions escalate violence levels in society by devaluing human life and by legitimizing lethal violence. Two main variants of this argument have been adduced in the literature. One focuses on the desensitizing aspects associated with repeated exposure to violence, while the other centers on the modeling of violent behavior. First, according to Bandura,[11] repeated exposure to either direct or indirect violence has a desensitizing effect on individuals. Bandura's claim is consistent with experimental studies showing that frequent exposure to violence not only results in a gradual blunting of emotional responses to subsequent displays of aggression[12] but also reduces the speed and willingness of an individual to intervene in the violent disputes of others.[13]

A second perspective maintains that individuals learn aggressive behavior by observing the aggressive behavior of others. For example, research has found that homicides increase markedly shortly after championship prize fights given widespread media coverage of the events.[14] Additionally, the publicity surrounding suicides has been found to be associated with subsequent rises in suicide rates.[15] The clear implication of these studies is that heavy exposure to publicity surrounding executions may desensitize people or may provide them with violent models to imitate, and in turn, raise the probability of violent behavior, including murder.

B. PRIOR RESEARCH

Despite considerable support for the deterrence theory at both the macro and micro levels of analysis,[16] empirical evidence for the expectation

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[9] ROBERT J. SPITZER, THE POLITICS OF GUN CONTROL (1995).

[10] Gennaro F. Vito & Deborah G. Wilson, *Back from the Dead: Tracking the Progress of Kentucky's Furman-Commuted Death Row Population*, 5 JUST. Q. 101 (1988).

[11] ALBERT BANDURA, AGGRESSION: A SOCIAL LEARNING ANALYSIS (1973).

[12] Margaret Hanratty Thomas et al., *Desensitization to Portrayals of Real-life Aggression as a Function of Exposure to Television Violence*, 35 J. PERSONALITY & SOC. PSYCHOL. 450 (1977).

[13] Ronald S. Drabman & Margaret Hanratty Thomas, *Does Media Violence Increase Children's Tolerance of Real-life Aggression?*, 10 DEVELOPMENTAL PSYCHOL. 418 (1974).

[14] David P. Phillips, *The Impact of Mass Media Violence on U.S. Homicides*, 48 AM. SOC. REV. 560 (1983).

[15] Kenneth A. Bollen & David P. Phillips, *Imitative Suicides: A National Study of the Effects of Television News Stories*, 47 AM. SOC. REV. 802 (1982).

[16] CHARLES R. TITTLE, SANCTIONS AND SOCIAL DEVIANCE: THE QUESTION OF

that capital punishment reduces murder rates in society has not been compelling. It is beyond the scope of this paper to comment on all previous research in detail. However, prior studies have enough commonality that a general discussion of several examples is sufficient.[17]

Ehrlich examined national execution and homicide data for various periods between 1933 and 1969 and found a significant negative relationship between execution rates and homicide rates after controlling for a variety of factors.[18] His analysis led him to conclude that an additional execution per year over the period in question resulted, on average, in seven or eight fewer murders. Phillips examined the deterrent effect of twenty-two highly publicized executions in London, England from 1858 to 1921.[19] He found a thirty-five percent decline in the average number of homicides during the two weeks immediately following each execution. However, this deterrent effect was short-lived because the number of homicides returned to baseline levels during the third, fourth, and fifth weeks following the executions. Stack used data for the United States from 1950 to 1980 to examine the deterrent effect of newspaper coverage devoted to executions.[20] He classified executions recorded in *Facts on File* and *The New York Times* as receiving high levels of newspaper publicity. Executions appearing in *The New York Times* but not in *Facts on File* were coded as receiving moderate media attention. Executions not covered in either source were classified as low-publicity cases. Stack observed a reduction in homicide rates for months with highly publicized executions. In contrast, there was little association between executions receiving moderate or low publicity and homicide rates. Over the entire period of observation, Stack estimated that an average of thirty people were saved for every execution carried out by the state.

Bailey investigated the relationship between monthly murder rates and national evening news coverage devoted to executions from 1976 to 1987.[21] He employed the amount of news coverage dedicated to each execution, as well as the type of news coverage. Type of news coverage encompassed qualitative factors such as whether the executed offender maintained his or her innocence and whether the offender was executed for killing a child.

DETERRENCE (1980).

[17] For a more detailed and comprehensive review of the literature, see Steven Stack, *Publicized Executions and the Incidence of Homicide: Methodological Sources of Inconsistent Findings*, *in* HANDBOOK OF CRIMINAL JUSTICE ADMINISTRATION 355 (M. A. DuPont-Morales et al. eds., 2001).

[18] *See* Ehrlich, *supra* note 1.

[19] *See* Phillips, *supra* note 1.

[20] *See* Stack, *supra* note 1.

[21] *See* Bailey, *Television: Execution Publicity*, *supra* note 2.

Bailey observed only a chance association between the number of monthly executions and homicide rates. The type of news coverage also failed to play a salient role in determining monthly homicide rates. Grogger analyzed daily homicide data drawn from death certificates for California during the 1960s.[22] He disaggregated the homicide data by the victim's race and gender. His analysis of the data showed little support for the deterrence argument.

King investigated the effect of twenty publicized executions in South Carolina that occurred between 1951-1962.[23] Contrary to the deterrence thesis, he found that there was an overall increase of 1.2 homicides following an execution. Cochran et al. also found support for the brutalization thesis.[24] Using an interrupted time-series design, he and his associates attempted to discern the impact of the execution of Charles Coleman, who was the first person executed in Oklahoma following a twenty-five-year moratorium of executions in the state. They found an increase in stranger homicides following the Coleman execution. Cochran et al. concluded that, "[b]ecause social ties and hence social controls possibly are much weaker among strangers, such affronts, particularly if they follow an execution, could result in somebody's [sic] being killed."[25]

C. METHODOLOGICAL PROBLEMS WITH PRIOR RESEARCH

Although considerable effort has been devoted to evaluating the deterrent effect of capital punishment, most analyses are plagued with methodological problems. Research on the deterrent effect of capital punishment has "suffered from a lack of high quality data, and to a somewhat lesser extent from the use of weak or inappropriate statistical techniques to analyze what data do exist."[26] One problem relates to a general failure among social scientists to account for the possibility that the linkage between execution risk and murder rates is reciprocal.[27] There are convincing theoretical expectations for such a causal relationship. For example, it is proffered that organizational efficiency is related to

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[22] Jeffery Grogger, *The Deterrent Effect of Capital Punishment: An Analysis of Daily Homicide Counts*, 85 J. AM. STAT. ASS'N 295 (1990).

[23] *See* King, *supra* note 3.

[24] *See* Cochran et al., *supra* note 3.

[25] *Id.* at 110.

[26] *See* Grogger, *supra* note 22, at 295.

[27] THE NAT'L RESEARCH COUNCIL, NAT'L ACAD. OF SCI., DETERRENCE AND INCAPACITATION: ESTIMATING THE EFFECTS OF CRIMINAL SANCTIONS ON CRIME RATES (Alfred Blumstein et al. eds., 1978).

workload.[28] Adherents to this view maintain that because criminal justice resources tend to be relatively inelastic, at least in the short term, a rise in murder rates may actually lower the probability of an execution following the commission of a murder. As Hoenack and Weiler write, "increases in murders augment workloads in the criminal justice system which, in the absence of additional resources, result in lower levels of the measured rates of apprehension of suspects, conviction of apprehended suspects, and execution of convicted criminals."[29] The potential for finding an overload effect is particularly relevant to death penalty research because most states with capital punishment statutes allow condemned defendants to appeal their cases *directly* to the highest appellate court immediately following their conviction. These appellate courts are also required to review habeas corpus appeals from individuals already on death row who are awaiting sentencing. It seems entirely plausible that these direct appeals overwhelm the court's ability to expedite habeas corpus applications in capital cases, thereby decreasing the likelihood of execution.

Figure 1 shows some evidence for this assertion. This figure displays the number of executions by the number of murder and non-negligent homicides that occurred in the United States from 1977 to 2001. A visual examination of the graphic shows that during years when the number of murders is relatively low, executions are most likely to occur.

On the other hand, public choice theory argues that high murder rates increase public fear, which in turn makes prosecutors more likely to seek the death penalty and judges less apt to reverse a death penalty judgment.[30] As Coyne and Entzeroth note, "[t]he death penalty and politics . . . are inseparable," particularly because "the vast majority of judges who preside over capital cases must answer to the electorate . . . ."[31] Given the plausibility of these explanations, a compelling theoretical rationale exists for expecting that murder levels, at least to some degree, influence the risk of execution.

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[28] Michael Geerken & Walter R. Gove, *Deterrence, Overload and Incapacitation: An Empirical Evaluation*, 56 SOC. FORCES 424 (1977).

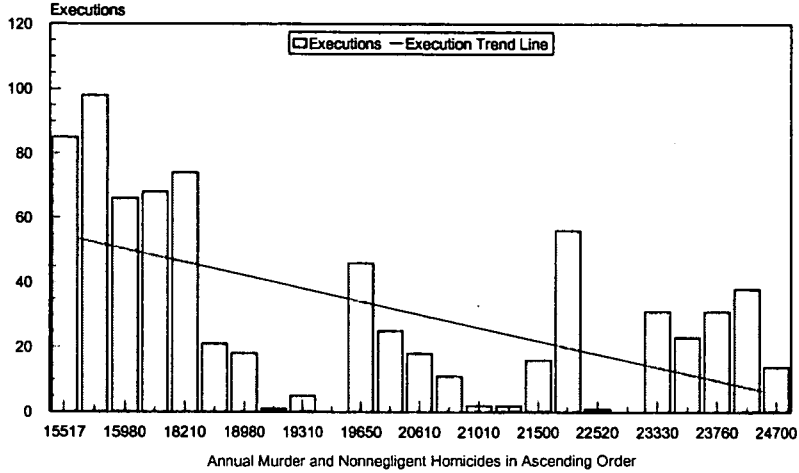
[29] Stephen A. Hoenack & William C. Weiler, *A Structural Model of Murder Behavior and the Criminal Justice System*, 70 AM. ECON. REV. 327, 328 (1980).

[30] Stephen B. Bright & Patrick J. Keenan, *Judges and the Politics of Death: Deciding Between the Bill of Rights and the Next Election in Capital Cases*, 75 B.U. L. REV. 759 (1995).

[31] Randall Coyne & Lyn Entzeroth, *Report Regarding Implementation of the American Bar Association's Recommendations and Resolutions Concerning the Death Penalty and Calling for a Moratorium on Executions*, 4 GEO. J. ON FIGHTING POVERTY 3, 13 (1996).

Figure 1

Executions by Murder and Nonnegligent Homicides in the United States 1977 - 2001



Note: The murder and nonnegligent homicides that occurred as a result of the events of September 11, 2001 are not included.

Sources: FBI, Uniform Crime Reports, prepared by the National Archive of Criminal Justice Data; BJS, Capital Punishment, 2001.

Differences in causal mechanisms aside, these predictions provide a more complex view of the relationship between execution risk and murder rates than deterrence theory predicts. Even so, the vast majority of studies conducted to date restrict their attention to recursive models that allow for an execution-murder effect, but that preclude the prospect of murder levels also influencing execution risk. This problem is by no means picayune. Specification error of this type not only misrepresents the relationships directly involved but also biases the coefficients that are being estimated. This specification problem alone has hindered attempts to estimate the execution-murder linkage in previous empirical work.

However, while most studies have ignored the possibility of reciprocal effects between executions and murder rates, some investigators have been mindful of potential causality problems. Two basic research strategies have been employed to model possible simultaneous effects. The first approach relies on two-stage least squares regression to differentiate the potential effect of execution risk on murder and murder on execution risk.[32] However, the identification assumptions made in these studies are somewhat questionable. The major problem relates to the selection of instruments that are necessary to identify each nonrecursive relationship.

[32] *See* Ehrlich, *supra* note 1; Hoenack & Weiler, *supra* note 29.

Two-stage least squares estimates are dependent on the instruments selected and there is often an array of nearly equally plausible candidates. Unfortunately, neither research nor theory provides much guidance regarding the selection criteria that researchers should employ.

The second approach allows the data to aid in the determination of the appropriate lag structure between execution risk and murder rates. Many researchers have used statistical procedures such as ordinary least squares regression, panel regression, or ARIMA to assess the deterrent effect of capital punishment. But, these statistical procedures do not allow for the estimation of feedback relationships. They are predicated solely on the assumption that temporal sequencing provides a sufficient basis for making inferences about causal order. Even if we were to accept the theoretical rationale of a delayed effect of execution risk on murder levels, the lagging of a variable does not necessarily eliminate the problem of simultaneity bias.[33] Because many previous analyses only tested for lagged execution risk effects, it is questionable whether findings generated from these types of studies represent the true nature of the relationship between capital punishment and murder rates.

Another methodological shortcoming pertains to the geographical unit of analysis generally used in research. Despite some recent exceptions,[34] most prior analyses relied on state or national level data to access the deterrent effect of capital punishment. While these studies have made important contributions to the literature, a high level of aggregation may not fully capture the ecological dynamics that are hypothesized to underlie deterrence theory. It seems logical to assume that potential criminal actors, if influenced at all, respond to the threat of punishment within small ecological units such as cities since these units tend to be more homogeneous in reference to punishment risk.[35]

It is also important to recognize that for executions to effectuate a reduction in murder rates, the public must be conscious of each execution. The dissemination of information regarding changes in execution risk is also likely to be enhanced by the properties of small ecological units. Many investigations that assessed the effect of execution publicity on murder rates relied on national-level media outlets such as *The New York Times*, *Facts*

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[33] Glenn Firebaugh & Frank D. Beck, *Does Economic Growth Benefit the Masses? Growth, Dependence, and Welfare in the Third World*, 59 AM. SOC. REV. 631 (1994).

[34] William C. Bailey, *Disaggregation in Deterrence and Death Penalty Research: The Case of Murder in Chicago*, 74 J. CRIM. L. & CRIMINOLOGY 827 (1984); *see also* Phillips, *supra* note 1.

[35] David F. Greenberg et al., *Aggregation Bias in Deterrence Research: An Empirical Analysis*, 18 J. RES. CRIME & DELINQ. 128 (1981).

on File, or on national television news broadcasts to measure execution publicity. Yet, only a small fraction of executions garner national media attention. For example, Stack found that *Facts on File* reported less than five execution news stories between the years of 1948-1960, despite the occurrence of more than fifty executions per year during this time period.[36] Additionally, Peterson and Bailey reported that only twenty-five of ninety-three executions transpiring between 1976-1987 in the U.S. received any national evening news media exposure.[37] In contrast, most news coverage of executions tends to be concentrated locally. From 1990 to 1994, for example, fifty-two individuals were executed in Texas. The *Houston Chronicle*, a widely read local newspaper in the city of Houston, referenced all fifty-two executions on one or more occasions.

Moreover, the readership of a local newspaper such as the *Houston Chronicle* is proportionally greater than the readership of a national paper such as *The New York Times*. In 1999, *The New York Times* had a readership of approximately 1.6 million people nationally. In contrast, the *Houston Chronicle* had a readership of about 740,000 people. Thus, while about forty percent of the population in Houston might become aware of an execution by reading the *Houston Chronicle*, less than one percent of the population nationally may become aware of an execution by reading *The New York Times*. In sum, because local news editors and news broadcasters devote higher proportions of their coverage to executions that occur locally, a much higher percentage of the local population, including potential murderers, are going to be made aware of an execution. As Stack writes, "[g]iven the relative lack of national publicity for most executions, the use of local or state data might reduce measurement errors."[38]

It is also important to note that individuals fashion their perceptions of punishment risk not only on the basis of media outlets, but also through their friends, coworkers, and neighbors. Person-to-person communication tends to be the primary source of information for most people rather than newspapers, radio, or television.[39] Additionally, these friendship networks are likely to be circumscribed by small geographical boundaries.[40] In sum, then, valid tests of the deterrent effect of capital punishment necessitate a

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[36] Steven Stack, *Execution Publicity and Homicide in South Carolina: A Research Note*, 31 SOC. Q. 599, 608 n.1 (1990).

[37] *See* Peterson & Bailey, *supra* note 2, at 374.

[38] *See* Stack, *supra* note 36, at 600.

[39] Melvin L. DeFleur & Mary M. Cronin, *Completeness and Accuracy of Recall in the Diffusion of the News from a Newspaper vs. a Television Source*, 61 SOC. INQUIRY 148, 149 (1991).

[40] CLAUDE S. FISCHER, TO DWELL AMONG FRIENDS: PERSONAL NETWORKS IN TOWN AND CITY (1982).

unit of analysis that is small enough to accurately reflect the tenets of deterrence theory. Units sufficiently small so that information regarding changes in punishment risk can be disseminated easily among the populace, at least in terms of geographical proximity, are preferred.

A third criticism involves the inclusion of offenders in homicide data who are not eligible to receive the death penalty because of their age. Most previous analyses used homicide data drawn from the Federal Bureau of Investigation's (FBI) Supplemental Homicide Reports (SHR). The use of this data is problematic in at least two respects. First, because data are submitted by law enforcement agencies to the FBI at early stages of murder investigations, offender characteristic information such as age is frequently missing.[41] Age is important because it determines whether an offender is eligible to receive the death penalty.[42] Even more troublesome for national level studies is that age eligibility for the death penalty varies by state.

In addition, the SHR only contain information relating to the date of the victim's death. This is problematic because some victim deaths result from injuries inflicted days, weeks, or even months after the homicidal attack occurred.[43] To illustrate, if a victim receives a gunshot wound during a robbery in January but he survives in the hospital until February, the SHR records the date of the homicide as occurring in February rather than in January. In any analysis of the deterrent effect of capital punishment it seems advisable for researchers to use the date that the fatal attack occurred rather than the date that the victim died since these two dates might be different.

II. DATA AND METHODS

The purpose of this study is to shed additional light on the debate regarding the deterrent effect of capital punishment, correcting for many of the methodological problems encountered in earlier studies. We contribute to the extant literature by using monthly data and a fully recursive vector ARMA statistical procedure to examine the relations among execution risk, newspaper execution publicity, and murder incidents in Houston, Texas. Our study period is from 1990 to 1994. The type of data and the analytic

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[41] Fred C. Pampel & Kirk R. Williams, *Intimacy and Homicide: Compensating for Missing Data in the SHR*, 38 CRIMINOLOGY 661, 662 (2000).

[42] Juveniles currently account for a large percentage of the murders committed in the United States. About twelve percent of all individuals arrested for murder are under the age of eighteen. *See* FEDERAL BUREAU OF INVESTIGATION, U.S. DEP'T OF JUSTICE, CRIME IN THE UNITED STATES 1998 (1999), *available at* http://www.fbi.gov/ucr/Cius_98/98crime/98cius01.pdf.

[43] Donald D. Trunkey, *Trauma*, 249 SCI. AM. 28 (1983).

strategy used in this study have obvious methodological advantages over previous research in this area. First, although no research design guarantees correct inferences, the vector ARMA statistical procedure affords us the opportunity to assess contemporaneous and lagged relationships and to directly test for feedback effects. The ability to estimate such a model is important because, as previously discussed, there is strong reason to speculate that the relationship between execution risk and murder is reciprocal.

Second, we use city as our geographic unit of analysis because it is an aggregation large enough to allow for a sufficient range of variation in murder incidents, but at the same time small enough to be relatively homogenous in regard to punishment risk. The city of Houston also provides an important venue for this study because proponents of deterrence have long argued that the death penalty must be administered in a swift, certain, and frequent manner to effectuate a reduction in murder.[44] Harris County, which includes Houston, is responsible for more death sentences and executions than any other county in America.[45] Executions also occur in Texas with greater certainty than in most other death penalty states. Between 1973 and 1995, fifteen percent of the death sentences were carried out in Texas.[46] This figure was the fifth highest in the U.S. during this time period. Texas also ranked fourth nationally in the number of executions per homicide and fifth in the number of death sentences per homicide.

A. MURDER INCIDENTS

Our analysis is concerned with murder incidents, as opposed to the murder rate or the raw number of murders.[47] Murder is defined as the willful (non-negligent) killing of one human being by another. Excluded from the murder incident variable are negligent manslaughters, accidental homicides, justifiable homicides and executions carried out by the state. Although the murder rate and the raw number of murders have been employed in the past by researchers, their construction ignores the fact that a deterrent effect is only anticipated for the first murder in a murder incident. If an individual can receive the death penalty for killing a single person in a murder incident, there is no logical reason to expect that an

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[44] ERNEST VAN DEN HAAG & JOHN CONRAD, THE DEATH PENALTY: A DEBATE (1983).

[45] Tamar Lewin, *Who Decides Who Will Die? Even Within States It Varies*, N.Y. TIMES, Feb. 23, 1995, at A1.

[46] JAMES S. LIEBMAN ET AL., A BROKEN SYSTEM: ERROR RATES IN CAPITAL CASES, 1973-1995 (2000).

[47] *See* Bailey & Peterson, *supra* note 2.

offender will be deterred from killing additional individuals in the same incident. We also excluded all murders where the identified offender was sixteen or younger because murderers under the age of seventeen cannot be sentenced to death in Texas. Our murder incident variable also represents the date that the fatal attack occurred and not the date that the victim died. The Houston Police Department furnished the data on murder incidents. These data are useful for our purposes because they were updated routinely by the Houston Police Department.[48]

It is argued by some social scientists that the appropriate dependent variable in a study of the deterrent effect of capital punishment should be those homicides legally defined as capital murders. This line of reasoning hinges on the assumption that deterrence requires a conscious and deliberate weighing of risks on the part of the offender. However, it is debatable as to whether the deterrent effects of the death penalty are limited solely to homicides legally defined as punishable by death. The cognitive link in potential offenders' minds may be between the ultimate legal sanction, death, and the act of homicide rather than any particular arbitrary legal subtype of homicide. As Kleck points out, "there is no reason to limit the hypothesized effect of deterrence variables to premeditated homicides only since preventative effects of legal sanctions do not necessarily depend on any deliberate, conscious consideration of potential punishments by potential offenders."[49] We assume, like most previous researchers that the ratio of first-degree murder to murder in general is constant, so that the latter furnishes a reasonably good indicator of capital offenses.[50]

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[48] Unfortunately, the Houston Police Department discontinued collecting these data at the end of 1994.

[49] Gary Kleck, *Capital Punishment, Gun Ownership, and Homicide*, 84 AM. J. SOC. 882, 888 n.5 (1979).

[50] *See* Bailey, *Television: Execution Publicity*, *supra* note 2; Bailey & Peterson, *supra* note 2; Stack, *supra* note 1. Although the concept of capital murder is considered "ambiguous" because the entire criminal justice process determines whether a capital crime has been committed, *see* Stephen A. Hoenack et al., *The Deterrent Effect of Capital Punishment: A Question of Identification*, 4 POL'Y ANALYSIS 491, 506 (1978), a few researchers have attempted to identify capital murders on the basis of homicide circumstance information contained in the Supplemental Homicide Reports. *See* Bailey & Peterson, *supra* note 2. However, as previously discussed, homicide circumstance information is frequently missing in the Supplemental Homicide Reports. As a consequence, researchers have assumed that homicides with missing circumstance information are actually felony murders. Felony murders are considered capital crimes in most states. However, this arbitrary classification of missing circumstance information reportedly produces a distorted image of lethal violence and introduces an unknown degree of bias in a statistical analysis. *See* Pampel & Williams, *supra* note 41, at 662.

B. EXECUTION RISK

We employ frequency of execution as our measure of execution risk because it is more likely that a potential offender is sensitive to the relative frequency of execution rather than to the marginal probability of execution. The state of Texas carried out fifty-two executions during the study period. Many previous studies measured execution risk as a ratio (i.e., the number of executions divided by the number of murders reported to police). The use of this measure assumes that peoples' perceptions of the certainty of capital punishment derive from a calculation of the number of murders relative to the number of executions. However, the frequency of execution is considered a more theoretically appropriate measure for testing the deterrence thesis because most people do not have accurate knowledge regarding the actual amount of criminal activity in their neighborhoods.[51] Rather, most people only perceive the level of murder in their community in very broad terms. This is especially true in large communities where murders tend to be more commonplace. If the public is misinformed about the actual number of murders in their community, then a ratio measure of execution risk may not reflect the public's true perception of the deterrent effect of capital punishment.

C. EXECUTION NEWSPAPER PUBLICITY

On theoretical grounds it seems reasonable to assume that the deterrent effect of capital punishment is dependent on the amount of publicity given to an execution. The more citizens become aware of an execution, the greater the likelihood of a deterrent effect. We measure the amount of media attention devoted to executions as the level of print coverage contained in the *Houston Chronicle*.[52] The *Houston Chronicle* is the newspaper of record for Houston and has the largest circulation of any daily newspaper in the city. It is postulated that an execution story covered by

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[51] *See* VAN DEN HAAG & CONRAD, *supra* note 44.

[52] Although newspaper execution publicity is widely used by researchers and newspapers are considered "well suited for the study of city or state areas," *see* Bollen & Phillips, *supra* note 15, at 803, some maintain that television news broadcasts are a better measure of execution publicity because they are a major source of news for many Americans. *See* Bailey, *Television: Execution Publicity*, *supra* note 2. We feel that this position is overstated for two reasons. First, investigations regarding recall patterns from different news mediums have generally shown print media to be superior to television in terms of message retention. *See* DeFleur & Cronin, *supra* note 39, at 164. Second, and more importantly, very few executions receive coverage on national evening news television broadcasts. *See* Bailey & Peterson, *supra* note 2. We did consider using local television news broadcasts, but there is no index or abstract available to measure the amount of news coverage devoted to executions during the 1990-1994 time period.

the *Houston Chronicle* received wide publicity and that executions not covered by the newspaper garnered little or no publicity. Archives of the *Houston Chronicle* are available online.

We measure newspaper execution coverage as the product of the monthly number of newspaper execution stories multiplied by the number of newspaper execution story lines per month. Our first measure is the monthly count of execution stories appearing in the *Houston Chronicle*. Between January 1990 and December 1994, the *Houston Chronicle* published 237 stories relating to executions in Texas. Our coding scheme pertains only to execution publicity. Publicity regarding other aspects of capital cases such as appeals of capital convictions or stays of execution is not considered in the analysis. Our second publicity measure is the total number of execution story lines published per month. We employ this measure because some stories relating to executions are much longer in length than other execution stories. The average number of execution story lines per month is 36.48. The means, standard deviations, sums, and definitions for the variables used in this study are reported in Table 1. These variables are also depicted graphically over the time period of the study in Figures 2 and 3.

Table 1

Descriptive Statistics and Definitions for the Variables, 1990-1994

Variable	Mean	S.D.	Sum	Definition
Murder Incidents	36.55	9.06	2193	Number of monthly murder and non-negligent manslaughter incidents committed in Houston.
Executions	.87	.96	52	Number of death row inmates executed monthly in Texas.
Execution stories	3.95	4.65	237	Number of monthly execution stories reported in the Houston Chronicle.
Execution story length	36.48	46.81	2189	Number of monthly execution story lines reported in the Houston Chronicle.
Execution publicity	341.45	775.04	20,487	Number of execution stories multiplied by execution story length.

Figure 2

Statewide Executions and Murder Incidents in Houston, Texas
January 1990 - December 1994

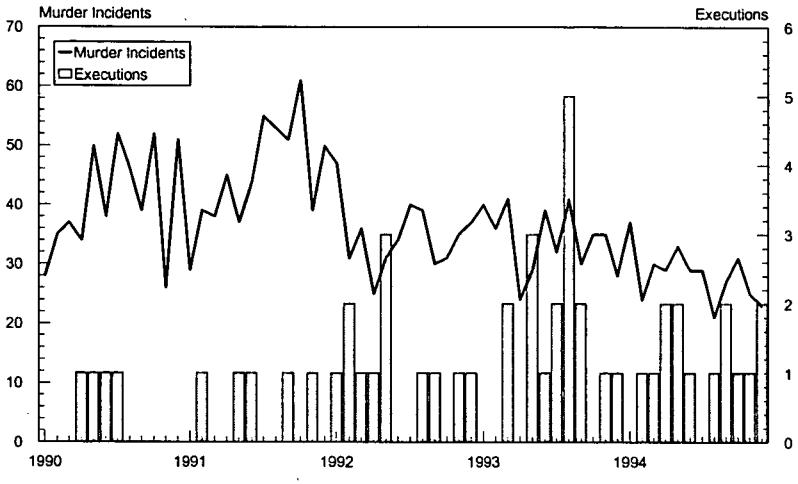
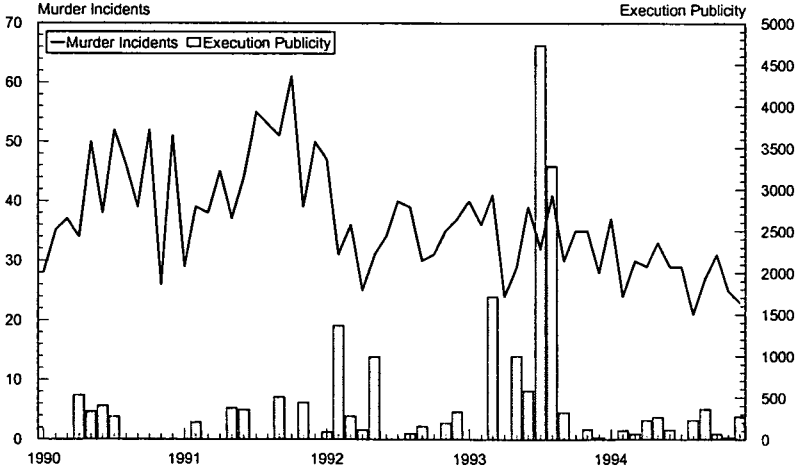


Figure 3

Execution Publicity and Murder Incidents in Houston, Texas
January 1990 - December 1994



Note: The publicity levels shown for July and August 1993 were exceedingly high because two brothers were executed in July (Danny and Curtis Harris), and five executions occured in August.

D. METHOD OF ANALYSIS

We used vector ARMA to estimate the relations among execution risk, execution newspaper publicity and murder incidents. Although primarily employed by statisticians and economists, vector ARMA has been employed by a few sociologists to examine trends in school victimization[53] and to investigate the relationship between alcohol treatment and cirrhosis mortality.[54] Vector ARMA is a fully recursive statistical procedure, which allows us to test for contemporaneous, lagged, and feedback relationships among two or more variables. A vector ARMA model can be conceived of as a set of reduced-form equations associated with a simultaneous system of linear structural equations. The vector ARMA statistical procedure is unique in that it does not necessitate an a priori specification of the direction of causality or the lag structure among the variables of interest. Formally, the vector ARMA model is described as: $\phi(B)Z_t = \theta(B)\varepsilon_t$, where ϕ is a matrix of autoregressive parameters, θ is a matrix of moving-average parameters, Z_t is a stationary vector of time series containing n observations, and ε_t is a vector of random shocks which are independently, identically, and normally distributed with a zero mean and stable variance.

The vector ARMA approach is a relatively straightforward extension of the univariate and bivariate Box-Jenkins analytic methodology in that it uses an interative modeling procedure to determine model specification. That is, each time series is treated as vector or group of series for which a common noise model is identified, estimated, and evaluated through various diagnostic tests. Once a common noise model is specified, specific hypotheses concerning the relationships among the series can be specified with the common knowledge that common trends, seasonal patterns, and other spurious components which exist across the vector of series have been controlled for. The methodology for constructing a vector ARMA model consists of three stages: (1) tentative model specification, where sample cross-correlation and partial cross-correlation matrices are used to specify the order of the vector ARMA process; (2) estimation, where efficient parameter estimates are obtained by maximizing the likelihood function; and (3) diagnostic checking, where model deficiencies are identified by a cross-correlation analysis of the residual series. The residual cross-correlation matrices should represent a random white-noise process, as determined by chi-square statistics.

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[53] *See* Robert Nash Parker et al., *Trends in Victimization in Schools and Elsewhere, 1974-1981*, 7 J. QUANTITATIVE CRIMINOLOGY 3 (1991).

[54] *See* Harold D. Holder & Robert Nash Parker, *Effect of Alcoholism Treatment on Cirrhosis Mortality: A 20-year Multivariate Time Series Analysis*, 87 BRIT. J. ADDICTION 1263 (1992).

To estimate our models, we employed the MTS software package from Automatic Forecasting Systems.[55] The identification routine in MTS computes and plots sample autocorrelation matrices and a partial lag correlation matrix. These matrices enable us to identify the appropriate AR and MA orders. In a vector ARMA (p, q) model, p is the number of autoregressive parameters, and q is the number of moving-average parameters. Once the model is identified, the MTS program uses a moment estimation routine (conditional least squares) to estimate the maximum-likelihood parameters.[56] If the estimated model fits well, the residual autocorrelations for the model will be small and weakly related.[57]

The relations among the variables of interest are assessed in the following manner. First, if the matrices for $\phi(B)$ and $\theta(B)$ are lower triangular, it suggests that the variables in the model are not related causally in the sense of Granger.[58] Second, if the matrices for $\phi(B)$ and $\theta(B)$ are block triangular, it indicates the existence of a unidirectional relationship. Finally, if an off-diagonal value in the error correlation matrix (Σ) is statistically significant, it indicates a contemporaneous relationship between two variables at the zero-lag.

III. RESULTS

Table 2 reports the maximum-likelihood estimates for a vector ARMA (2, 0) model. The residuals for this specification satisfy all the diagnostic requirements recommended by Tiao and Box to ensure model adequacy.[59] Several interesting findings emerge from a visual inspection of this table. First, although deterrence theory posits that execution risk is an important factor in reducing murder levels, our findings undermine this assumption. We find no empirical evidence that frequency of execution influences murder incidents in the negative direction $\hat{\phi}_1$ (1, 2) = 0. Additionally, and contrary to predictions derived from the brutalization thesis, this insignificant coefficient fails to lend credence to the importance of executions as a factor in escalating murder incidents. Table 2 shows that the most salient predictor of current murder incident levels is past levels

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[55] MTS USER'S GUIDE (Version 2, Nov. 1987) (on file with author).

[56] *See* Henrik Spliid, *A Fast Estimation Method for the Vector Autoregressive Moving Average Model with Exogenous Variables*, 78 J. AM. STAT. ASS'N 843 (1983).

[57] *See* G. C. Tiao & G. E. P. Box, *Modeling Multiple Time Series with Applications*, 76 J. AM. STAT. ASS'N 802 (1981).

[58] *See* C. W. J. Granger, *Investigating Causal Relations by Econometric Models and Cross-Spectral Methods*, 37 ECONOMETRICA 424 (1969).

[59] *See* Tiao & Box, *supra* note 57. We also estimated differenced models, but the undifferenced models produced more parsimonious results.

$\hat{\phi}_2(1, 1) = .570$. An examination of the error correlation matrix (Σ) reveals no evidence of a contemporaneous association between execution risk and murder incidents.

Table 2

*Vector Arma Estimates of the Relationship Between Murder Incidents and Executions, 1990-1994**

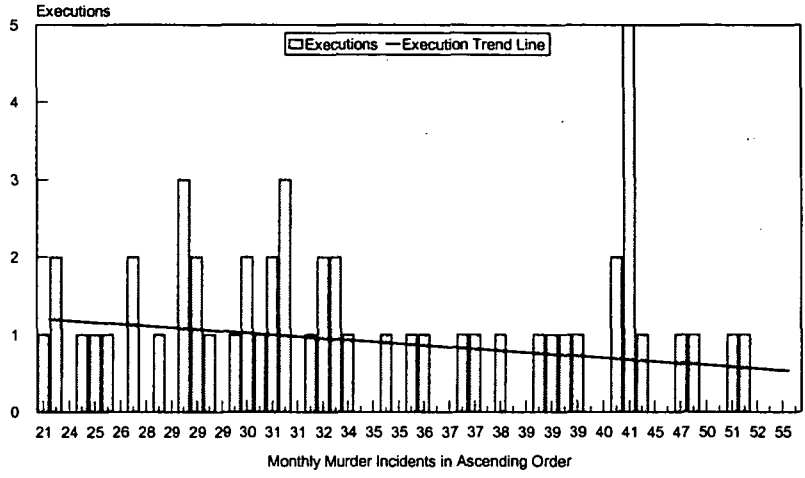
	$\hat{\phi}_1$		$\hat{\phi}_2$		$\Sigma \times 10$	
	Murders	**Executions**	**Murders**	**Executions**	**Murders**	**Executions**
Murders			.570		53.761	
			(5.32)			
Executions	-.030				-1.296	.842
	(-2.22)					

**t* score in parentheses. The results are presented in matrix form. The significant coefficient in the (2, 1) position indicates that murder incidents influence executions at lag-1. If the coefficient in the (1, 2) position had been statistically significant, it would indicate that executions affect murder incidents at lag-1. If the coefficients in the (2, 1) position and the (1, 2) were both significant, it would indicate that there was feedback between executions and murder incidents at lag-1. Because vector ARMA uses an iterative process to derive parameter estimates, only the significant coefficients are reported in the final model.

Of particular salience is the negative and statistically significant delayed and sustained effect of murder incidents on execution risk $\hat{\phi}_1$ (2, 1) = -.030, which is reported in Table 2. As the number of murder incidents in Houston rises, the number of executions in Texas decreases substantially the following month and to a lesser extent each month thereafter. This finding furnishes support for the overload hypothesis. To facilitate further interpretation of this relationship, we constructed a chart that depicts the monthly number of executions in Texas by the monthly number of murder incidents in Houston for the five-year period. Figure 4 is intuitively appealing because it portrays the operation of the causal mechanisms associated with the overload thesis. During months when the number of murder incidents in Houston was relatively low, the number of executions carried out by the state was at its highest level. It is not that surprising that monthly murder incidents in Houston are driving executions at the state level when one considers that approximately forty-eight percent of the offenders executed in Texas during the observation period were sentenced to death in Houston.

Figure 4

Statewide Executions by Murder Incidents in Houston, Texas
January 1990 - December 1994



We turn next to the question of execution publicity effects since the vector ARMA results displayed in Table 2 are by themselves insufficient to falsify the deterrence thesis. It may be that the publicity surrounding an execution, rather than the execution itself, is salient in predicting changes in the number of monthly murder incidents. We estimated a model measuring execution publicity as the product of the monthly number of newspaper execution stories multiplied by the number of newspaper execution story lines per month. We excluded the execution risk variable from this model because it was highly correlated with the execution publicity measure ($r = .659$). This high correlation is interesting because previous studies reported extremely small correlations between execution publicity and execution risk nationally. Our finding of a high correlation between execution risk and the execution newspaper publicity measure suggests strongly in favor of using data from local rather than from national sources when attempting to measure execution publicity.

The results presented in Table 3 indicate that execution publicity is unrelated to the frequency of murder incidents. Murder incidents also fail to have a direct influence on newspaper publicity. The most salient predictors of current levels of execution publicity and murder incidents are past levels of these variables. Although some research has found that newspaper publicity is important for understanding variations in murder levels, our analysis undermines this assumption. The residual correlations

at the zero-lag between the newspaper publicity measure and murder incidents are also not of substantive importance.[60]

Table 3

*Vector Arma Estimates of the Relationship Between Murder Incidents and Execution Publicity, 1990-1994**

	$\hat{\phi}_1$		$\hat{\phi}_2$		$\Sigma \times 10$	
	Murders	Publicity	Murders	Publicity	Murders	Publicity
Murders			.570		53.761	
			(5.32)			
Publicity		.406			-.364	.516
		(3.41)				

* t score in parentheses.

A. SUPPLEMENTAL ANALYSIS

We conducted several supplemental analyses to ensure that our original findings remained robust across different specifications. First, when a ratio measure was used to measure execution risk, the powerful negative effect of murder incidents on execution risk remained robust. Second, when the frequency of front-page news stories was used as our measure of execution newspaper publicity, results remained unchanged. Third, when we employed murder frequency rather than murder incidents as our variable of theoretical interest, the vector ARMA results were nearly identical to those generated in our original analysis. Fourth, following the practice of other investigators, we coded executions and newspaper coverage that occurred after the twenty-third of the month as taking place the following month. This delay represents the time needed for information about changes in the risk of execution to be disseminated throughout the population. The results remained virtually the same as those produced using the unaltered coding scheme in the original analysis.

Fifth, because our data set from the Houston Police Department was limited to a five-year period, we estimated an ARMA equation between murder incidents in Houston and statewide executions for a longer ten-year

[60] In addition, we ran separate models for each of the execution publicity variables. Results are virtually identical: both execution stories and execution story length are inconsequential in determining homicide incident levels. In addition, the frequency of murder incidents has no effect on the number of execution stories and execution story lines published per month in the *Houston Chronicle*. There are also no significant residual correlations between either of the newspaper publicity variables and murder incidents at the zero-lag.

period (1990 to 1999) using the SHR. Although there are a number of problems with the SHR, we still felt it necessary to compare our results using the data from the Houston Police Department with the data drawn from the SHR. The results generated from this analysis, which are reported in Table 4, are virtually identical to those reported in Table 2. That is, an increase in the frequency of murder incidents decreases the number of executions. No contemporaneous relationship is observed between statewide executions and murder incidents in Houston.

Table 4

*Vector Arma Estimates of the Relationship Between Murder Incidents (Supplemental Homicide Reports) and Executions, 1990-1994**

$\hat{\phi}_1$

	Murders	Executions
Murders	.372	
	(4.59)	
Executions		.401
		(4.68)

$\hat{\phi}_2$

	Murders	Executions
Murders	.500	
	(6.16)	
Executions	-.240	
	(-2.08)	

$\Sigma \times 10$

	Murders	Executions
Murders	.417	
Executions	-.076	2.011

**t* score in parentheses.

Sixth, we extended the time period of our measure of execution newspaper publicity from 1990 to 1999 and estimated an ARMA equation between execution publicity and murder incidents in Houston. Again, the results of this analysis, as reported in Table 5, are nearly identical to the results displayed in Table 3. We evince no substantive lagged or contemporaneous relationship between execution newspaper publicity and murder levels.

Table 5

*Vector Arma Estimates of the Relationship Between Murder Incidents (Supplemental Homicide Reports) and Execution Publicity, 1990-1994**

$\hat{\phi}_1$

	Murders	Publicity
Murders	.372	
	(4.67)	
Publicity		

$\hat{\phi}_2$

	Murders	Publicity
Murders	.500	
	(6.27)	
Publicity		

$\Sigma \times 10$

	Murders	Publicity
Murders	.423	
Publicity	-.007	.031

**t* score in parentheses.

Finally and similar to many previous studies, we used the SHR to estimate an ARMA equation between felony murder incidents in Houston and statewide executions. We define felony murders as the monthly number of felony and suspected felony murder incidents. We also included murder incidents in this measure where the circumstances were unknown. Although this measure has a number of shortcomings, we still wanted to compare our results using total murder incidents with those obtained employing only felony murder incidents. As can be seen in Table 6, we observe no lagged or contemporaneous relationship between felony murder incidents and executions. These findings are consistent with prior research using felony murders derived from the SHR.

Table 6

*Vector Arma Estimates of the Relationship Between Felony Murder Incidents (Supplemental Homicide Reports) and Executions, 1990-1994**

	$\hat{\phi}_1$		$\hat{\phi}_2$		$\Sigma \times 10$	
	Murders	**Executions**	**Murders**	**Executions**	**Murders**	**Executions**
Murders	.435		.224		11.331	
	(4.91)		(2.53)			
Executions		.451			-.170	2.064
		(5.51)				

* *t* score in parentheses. Felony murder incidents is defined as the monthly number of felony and suspected felony murder incidents committed in Houston. Also includes murder incidents where the circumstances are unknown.

Our failure to evince a relationship may be explained to some degree by the limited variation in felony murder incidents (mean = 10.96, s.d. = 4.40) as compared to the total number of murder incidents recorded during the same time period (mean = 28.42, s.d. = 11.90). These figures suggest that there probably is not a sufficient amount of variation in the felony murder incident variable to expect even modest effects to emerge in the ARMA analysis.

IV. SUMMARY AND CONCLUSION

We probed the relations among execution risk, newspaper execution publicity, and murder incidents. The data used in our primary analyses encompassed the period from January 1990 to December 1994. We organized our analysis in terms of several competing theories with respect to the relationship between capital punishment and murder levels: (1) the deterrence thesis; (2) the brutalization thesis; (3) the overload thesis; and (4) public choice theory. The first two of these theories debate the direction of

the effect between execution risk and murder incidence. The deterrence thesis predicts that executions attenuate murder rates, whereas the brutalization thesis argues that executions escalate violence levels in society. The overload thesis proffers that the certainty of execution declines as murder levels rise because of finite criminal justice resources. Finally, public choice theory asserts that high murder rates increase executions because of public pressure to get tough on crime.

Assuming a recursive causal structure, most research has simply regressed murder rates on executions and interpreted any relationship as validating either the deterrence or brutalization thesis. We feel that this practice is theoretically unjustifiable. There is every reason to believe that execution risk affects murder incidence as well as being affected by it. Because of the difficulty in estimating reciprocal effects, we employed a fully recursive vector ARMA statistical procedure that enabled an estimation of instantaneous, lagged and feedback effects simultaneously. The study of the deterrence effects of capital punishment has also been impeded by difficulties in acquiring murder data at the city level. When researchers have investigated the effect of executions on murder rates for states or for the nation as a whole, they have neglected to allow for the transmission of information relating to punishment risk by local media outlets and by word-of-mouth, and thus failed to capture the ecological dynamics that are hypothesized to underlie deterrence theory.

Findings from the vector ARMA analyses fail to lend credence to the theoretical importance of execution risk and execution newspaper publicity as factors in determining murder levels. Specifically, we discern no credible evidence that frequency of execution produces a consequential decrease in the number of murder incidents in Houston during the period under investigation. Regardless of the model specified, our analyses show that both frequency of execution and the newspaper publicity surrounding an execution have no discernible effect on changes in murder incidents over time. Additionally, our findings contravene the assertion that executions devalue human life and legitimize lethal violence since there is no indication that executions amplify the frequency of murder incidents.

The only persistent finding of the present study is that there is a negative and delayed effect of murder incidents on execution risk. We are fully aware that the time period from the occurrence of a homicide to the execution of an offender is much longer than one month. Our position is that there already exists a large group of individuals in the system who are eligible to receive the death penalty. This pool of death eligible offenders is affected by an increase in murder incidents in such a way so as to slow the prosecution process and thus ultimately decrease the frequency of

execution. It is also important for readers to understand that in an autoregressive ARMA process, such as reported in Tables 2 and 4, the impact of murder incidents on executions occurs over the entire period of observation and not only for just one month. However, although murder incidents impact executions over the entire period of study, its effect diminishes exponentially over time. That is, the effect of murder incidents on executions is strongest at lag 1, weaker at lag 2, still weaker at lag 3, and so forth. Basically, what our ARMA analyses are showing is that murder incidents have a "ripple" type effect that ultimately reduces the frequency of execution.

In gauging the validity of our findings we are encouraged by research that shows how the dramatic rise in the number of death sentences in recent years has attenuated the certainty of execution. In their comprehensive study of capital cases nationwide from 1973 to 1995, Liebman et al. found that "political pressure tends to *impel* judges—or to create an environment in which prosecutors and jurors are impelled—to *impose* death sentences, but then tends to *interfere* with the state's capacity to carry out the death sentences that are imposed."[61]

However, while the evidence presented here supports the notion that an increase in murder incidents engenders a reduction in execution frequency, it does not provide an explanation for that effect. We speculate that the elaborate appeals process established for capital cases is impeding the criminal justice system's ability to carry out executions in an efficient and timely manner. Two specific explanations warrant consideration. First, we maintain that the direct appeal of capital cases is overwhelming Texas's ability to expedite habeas corpus petitions, thereby decreasing the frequency of execution. An interesting and unique feature of capital cases is that in all states with a death penalty statute (except South Carolina) a death sentence is appealed automatically to the state's court of last resort, which is usually the state supreme court. In the state of Texas this court is called the Court of Criminal Appeals. The review of a direct appeal is mandatory and it bypasses any intermediate court of appeals.[62] Direct appeals of capital cases only pertain to legal and constitutional errors that may have transpired during the trial itself such as a ruling made by judge during the trial.

Recent research suggests that the direct appeal of capital cases is acting as a "bottleneck" in the overall prosecution of capital cases.[63] Nationally, twenty-one percent of capital sentences imposed between 1973

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[61] *See* LIEBMAN ET AL., *supra* note 46, at 103.

[62] BUREAU OF JUSTICE STATISTICS, U.S. DEP'T OF JUSTICE, CAPITAL PUNISHMENT 2001 (2002), *available at* http://www.ojp.usdoj.gov/bjs/pub/pdf/cp01.pdf.

[63] *See* LIEBMAN ET AL., *supra* note 46, at 43.

and 1995—about five years worth of death sentences—were awaiting direct appeal in 1995. In three of the nation's most prolific capital sentencing states, Texas, Pennsylvania and California, the 1995 log-jam of cases awaiting state direct appeal encompassed twenty-seven percent, twenty-seven percent and forty-seven percent of the state's post-1972 cases, respectively. It is believed that these direct appeals are placing a significant burden on state supreme courts to the exclusion of other cases. For example, Acker and Lanier report that the direct appeal of capital cases represents a "crushing load" to the California Supreme Court, and that their volume is jeopardizing the court's ability to perform other necessary functions.[64] Ueleman also maintains that direct appeals are consuming so much of the California Supreme Court's time that it "is no longer functioning as an architect of California case law. It has become chiefly a death penalty review court."[65] It is estimated that the Supreme Courts in California and Florida spend nearly half of their time reviewing death penalty appeals.[66]

However, while it is readily acknowledged that direct appeals are slowing the prosecution of capital cases, one has to wonder how direct appellate review, which occurs relatively early in the prosecution process, translates into fewer executions being carried out in Texas and other states. The evidence presented here, which is based on a more sophisticated analysis than used in previous studies, suggests that the frequency of homicide has a rather immediate impact on executions. The question that remains unanswered is why such a quick effect? The most reasonable answer to this question is that the increased workload engendered by direct appeals is impeding state supreme courts ability to review the vast number of habeas corpus petitions that they receive each year. Habeas corpus appeals are different than direct appeals in that the individual making the appeal is already on death row awaiting execution. Habeas corpus appeals also afford defense lawyers the opportunity to broach issues from outside the trial record, such as allegations of incompetent counsel, suppression of evidence, and larger constitutional issues. Similar to direct appeals, habeas corpus petitions are extremely complex and typically require state supreme courts to review an enormous amount of case related material.

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[64] James R. Acker & Charles S. Lanier, *Statutory Measures for More Effective Appellate Review of Capital Cases*, 31 CRIM. L. BULL. 211, 233 (1995).

[65] Gerald F. Uelmen, *Lucas Court: First Year Report*, CAL. LAW. MAG., June 1988, at 30-31.

[66] Richard C. Dieter, *Millions Misspent: What Politicians Don't Say About the High Costs of the Death Penalty*, *in* THE DEATH PENALTY OF AMERICA 401 (Hugo Adam Budeau ed., 1997).

It is also important to recognize that not only are state supreme courts reviewing both types of appeals simultaneously, but in Texas, as in most other states, direct appeals are mandatory and thus given priority over all other discretionary cases including habeas corpus petitions. It seems likely that the concurrent review of direct and habeas corpus appeals, coupled with the preferential treatment shown to direct appeals, inevitably results in the slowing of executions by lengthening the review time of habeas corpus appeals. Evidence suggests that the amount of time state supreme courts are spending in reviewing habeas corpus appeals has increased dramatically in recent years. From 1990 to 1999, the number of writs of habeas corpus pending in the Texas Court of Criminal Appeals increased by more than 170 percent.[67] Approximately seventy percent of these writs were filed by inmates on death row. In sum, it seems highly likely that the direct appeal of capital cases is overwhelming the ability of the state supreme courts to expedite habeas corpus petitions in capital cases, thereby decreasing the likelihood of execution.

Another plausible explanation for the observed negative relationship between homicide and frequency of execution relates to prosecutor workload. We proffer that the pressure to prosecute new capital cases, which naturally results from an increase in the number of homicides, reduces the state's ability to retry and re-sentence death row inmates who had their cases overturned in direct and habeas corpus appeals. Nationally, the overall rate of serious error in capital cases is approximately sixty-eight percent while in the state of Texas it is about fifty-two percent. High error rates in capital cases further slows the system because a finding of serious error results in vacating the conviction or sentence and the remanding of the case to the trial court for additional proceedings or retrial. As a result of retrial or resentencing, a death sentence could be re-imposed and hence the appellate process begins once again. This elaborate appellate process is burdensome for prosecutors who are expected not only to prosecute new capital cases, but also to aid in the preparation of oral arguments at state and federal appellate review proceedings on capital cases that they prosecuted previously. The burden of handling the initial prosecution of capital cases while simultaneously dealing with the retrial or re-sentencing of death row inmates who had their cases overturned is further compounded by the typically small number of death eligible prosecutors. In the state of Texas, for example, only the Chief Prosecutor of the District Court is assigned to handle capital cases that fall within his or her court's jurisdiction. Chief prosecutors are assisted by their division chiefs and other senior

[67] OFFICE OF COURT ADMINISTRATION, 2000 TEXAS JUDICIAL SYSTEM ANNUAL REPORT (2000).

prosecutors. Thus, notwithstanding changes in homicide levels or error rates in capital cases, the number of prosecutors eligible to handle capital cases remains relatively constant over time, at least in the short term.

However, certain caveats must be taken into consideration. First, the findings reported here must be replicated with other data sets before they can be accepted without question. The more frequently such research is conducted, the greater confidence we can place in the generalizability of our findings to different times and places. The underlying causal mechanisms for the observed impact of murder incidents on execution risk must also be dealt with more systematically in future research. More detailed information on case processing will allow a more accurate appraisal as to whether the direct appeal of capital cases is reducing the risk of execution. Such research will also help provide further evidence bearing on our interpretation of the murder-execution linkage.

There will also remain a question as to whether the evidence presented here suffices to sufficiently discredit the deterrence thesis. One possible limit on the generality of our findings concerns the delineation of the geographical unit of study. We argued that the city is the most appropriate unit of analysis for testing the deterrence effects of capital punishment. The city is an aggregation small enough to be homogenous in reference to punishment risk, but at the same time still large enough to allow for a sufficient range of variation in murder incident levels. Even so, this position requires further empirical verification because it is possible that even more homogenous geographical units of analysis such as neighborhoods may be necessary to evince deterrence effects.

It is also conceivable that our inability to discern evidence supporting the deterrence thesis may be attributable to our reliance on monthly data. One could make a reasonable argument that murder data should be calibrated into finer temporal intervals in order to evince a deterrence effect.[68] The influence of the size of time units on causal relationships in deterrence studies such as ours is a question that requires further investigation.

In an effort to react to public pressure to get tough on crime, policymakers have typically sought to increase the severity of criminal penalties. The use of the death penalty plays a salient role in this endeavor. From 1973 to 1999 the number of offenders sentenced to death rose by more than 600 percent.[69] This paper provides bad news for this trend. It appears that one unintended consequence of death penalty mania has been

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[68] *See* David P. Phillips & J. Hensley, *When Violence is Rewarded or Punished: The Impact of Mass Media Stories on Homicide*, 34 J. COMM. 101 (1984).

[69] *See* LIEBMAN ET AL., *supra* note 46.

to attenuate the certainty of punishment. The most promising direction for future research on capital punishment is to pursue the possibility of a different causal structure than that assumed by either the deterrence thesis or the brutalization thesis—that high levels of murder decrease the certainty of execution.