

Deterrence Reconsidered:
A Theoretical and Empirical Case Against the Death Penalty
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On October 17, 2000 – during the third presidential debate at Washington University in St. Louis, Missouri – both candidates were asked about their views on the death penalty and its deterrent effect on homicide. The question seemed an apt one, as viewers might have expected some difference of opinion on capital punishment. George W. Bush, then governor of Texas, had signed more than one hundred and fifty death warrants in five years. Al Gore, on the other hand, had no first-hand experience with the death penalty and was, on many issues, far to the left of his opponent’s “compassionate conservatism.” The brief exchange, however, made clear that the candidates had no disagreement on whether executions had a positive impact:

Mr. Lehrer: Do both of you believe the death penalty actually deters crime?
Governor?

Gov. Bush: I do. It’s the only reason to be for it. Let me finish, sir. I don’t think you should support the death penalty to seek revenge. I don’t think that’s right. I think the reason to support the death penalty is because it saves other people’s lives.

Vice President Gore: I think it is a deterrent. I know that’s a controversial view, but I do believe it’s a deterrent.¹

This is certainly a far cry from Michael Dukakis’ statement in the second 1988 presidential debate, when he challenged the deterrence hypothesis in response to the hypothetical rape and murder of his wife.² In fact, it echoes George H. W. Bush’s response to Dukakis. But what is most interesting to note is that twelve years later, Gore

¹ The Commission on Presidential Debates website: <http://www.debates.org/pages/trans2000c.html>

² “I think you know that I’ve opposed the death penalty during all of my life. I don’t see any evidence that it’s a deterrent, and I think there are better and more effective ways to deal with violent crime. We’ve done so in my own state. And it’s one of the reasons why we have had the biggest drop in crime of any industrial state in America; why we have the lowest murder rate of any industrial state in America” (*Ibid.*, <http://www.debates.org/pages/trans88b.html>).

points out that his position is a controversial one and Bush goes so far as to argue that *the* reason to support the death penalty is because it deters homicide.

Despite the agreement between Bush and Gore in 2000, the debate about whether or not the death penalty deters potential murderers has a long and contentious past. For much of its history, capital punishment's deterrent effect was simply assumed; recently, though, several economists have utilized sophisticated econometrics to demonstrate that executions, or the risk of executions, deter a significant number of homicides (Dezhbakhsh, Rubin, and Shepherd 2003; Mocan and Gittings 2003; Shepherd 2004; Zimmerman 2004; Shepherd 2005). Since the reintroduction of the death penalty in the United States in the late 1970s, however, a number of social scientists – including political scientists, economists, criminologists, and sociologists – have cast some doubt on the deterrence hypothesis (Berk 2005; Donohue and Wolfers 2005). At the same time, the Supreme Court has set new limits on the types of people who remain eligible for execution in the United States and several state governments have either considered or imposed moratoria on executions in light of procedural issues or growing unease at the number of innocents found on death row. In this context, Cass R. Sunstein and Adrian Vermuele (2005b) argue in a controversial new paper that the death penalty is actually morally required because each execution deters eighteen murders. In this paper, we take issue with Sunstein and Vermuele's argument on both theoretical and statistical grounds.

We make three main points. First, the deterrence puzzle is a notoriously difficult one to piece together in part because it is not entirely clear how to get an accurate count of deterred murderers. Where are the would-be murderers who will admit that their desire to kill is held in check by the threat of execution? In fact, some survey evidence suggests

that most criminals either do not think they will be caught or do not even know the punishment associated with the crime. For the deterrence argument to hold, it would need to be obvious that the punishment for murder is execution; that is simply not the case, even in states that use the death penalty most frequently. Using survey data, we contend that the ‘rational criminal’ assumption necessary for deterrence to work is largely a myth.

Second, both intra-national and inter-national simple statistics suggest the death penalty is not an effective deterrent. A survey by the *New York Times* found that “[d]uring the last 20 years, the homicide rate in states with the death penalty has been 48% - 101% higher than in states without the death penalty” (Bonner and Fessenden 2000, A1). Similarly, the United Nations *Survey of Crime Trends* (2000) demonstrates that the United States has a (dramatically) higher murder rate than any West European country without the death penalty, evidence that runs counter to Sunstein and Vermeule’s contention that “in a legal regime without capital punishment, far more people die [from murder]” (Sunstein and Vermeule 2005b, 13). Further, as recent critics ably demonstrate (Berk 2005; Donohue and Wolfers 2005), the statistical results that underpin Sunstein and Vermeule’s argument, and therefore the case for the death penalty as an effective deterrent, are fragile and inconsistent given slightly different statistical specifications. Extending these critics’ work, we propose a research design to utilize multi-level or hierarchical models to test the Dezhbakhsh, Rubin, and Shepherd (Dezhbakhsh, Rubin, and Shepherd 2003) results for fragility and extend the analysis to other advanced industrial democracies. In so doing, we will further demonstrate that executions, or the risk of executions, are not effective deterrents to future murders, *ceteris paribus*.

Third, although Sunstein and Vermuele contend that “[t]he particular numbers do not much matter” (2005b, 2), their argument that the government is morally obligated to execute murderers hinges on the deterrent effect. They are arguing, then, that some murders are being prevented – whether or not that number is eighteen – and so we must continue to execute killers. Does their argument hold, though, if the number of deterred murders shrinks to ten? Or to five? Or only one? Their answer to each of these questions seems to be affirmative “because the numbers do not much matter.” The problem, though, is that the numbers *do* matter when it comes to deterrence, as the numbers are meant to tell us whether or not there is any deterrent value. It is a very short jump from the position they are advocating – that any number of deterred murders justifies capital punishment – and the argument that we ought to use the death penalty *in case* some murderers are deterred. And it is yet another logical leap to a 1984 style autocracy that prevents more crime through constant public monitoring. The slippery slope of this line of reasoning, that they acknowledge but then quickly cast aside, is real and potentially severe for a democratic polity.

The Theoretical Case: The Rational Criminal

Thirty years ago, the Supreme Court lifted its temporary ban on the death penalty in its *Gregg v. Georgia* decision, suggesting the system – found wanting in 1972 – was no longer cruel and unusual because of capricious, arbitrary, and unfair application.³ More than one thousand American citizens have been shot, hanged, gassed, electrocuted, and poisoned in that time, to punish them for committing murder and also to serve as an example to would-be murderers. There is a great deal of debate about whether capital

³ Cf. *Furman v. Georgia*, 408 U.S. 238 (June 29, 1972) and *Gregg v. Georgia* 428 U.S. 123 (July 2, 1976).

punishment is a fair or ethical response to murder, but we will avoid any discussion of that question in this paper. What follows is instead a consideration of the lesson that the death penalty presents to society. In particular, we argue in this section that using the threat of occasional execution to deter murderers is unlikely to work.

The concept of deterrence is built upon the assumption that criminals are rational actors; if we regarded criminals as irrational, we would immediately give up on the possibility of influencing their decisions and, following George W. Bush's comments in 2000, on the death penalty as well. But how rational are murderers, the particular subset of criminals that society is most interested in affecting? The answer is not so clear. For almost the entirety of the modern death penalty era, for example, states have executed the mentally retarded; the Supreme Court ruled unconstitutional the execution of persons with an IQ of 70 or below only in 2005. The mentally ill, however, are still not exempt. This is not to say that either the mentally retarded or mentally ill do not know the difference between right and wrong, but it should be clear that the prospects for deterring these persons are not particularly good. Nor should this be read as suggesting that the majority of the death row population is mentally retarded or mentally ill, though many people would likely suggest that there is something quite clearly different about those who commit murder and those who do not. While there is undoubtedly a difference of mindset between the inmate who murders his girlfriend's husband and most other people, it seems obvious that even he is procedurally rational. It is not simply the case that most people are more risk-averse than the murderer, it is that murder is part of a menu of choices for one and not for most others. There is considerable debate, to be sure, about

how much weight we should ascribe to biology and how much to circumstance,⁴ but the fact remains that I am not in the least deterred from committing murder by the possible consequences of doing so; I do not even begin to consider the crime, which means that the penalty is of no personal concern. We need to focus, then, on the question of deterring those for whom murder is already on the menu of available choices.

The inmates on death rows across the country are a fairly uniform bunch. They are poor, they are male, and roughly half of them reside in only four states, California, Texas, Florida, and Pennsylvania.⁵ They are often addicted to drugs or alcohol; they are the losers in our society, on the bottom rung of the ladder. Many of them – and, indeed, convicted felons in general – view the world and their place in it quite differently from the way those who hold to the idea of deterrence would expect. As Howard Zehr argues, “If success comes, it is associated more with luck than hard work. If they are arrested for an offense, it has more to do with luck than something they did. Whether or not they do have the power to make real choices, many do not *believe* that they do” (Zehr 2005, 54). The implications of this sort of thinking are serious, for deterrence necessitates a belief that we choose what we will do in any given situation. Zehr continues: “Every day these young people saw innocent people being arrested. Every day they saw people who were guilty going free. In their mind, there was little relationship between offense and punishment. Rather, they saw punishment like rain. Some days it rains, some days it doesn’t” (2005, 54). If offenders believe they lack agency, then the threat of punishment

⁴ There is undoubtedly a subset of this larger group of murderers for whom even death is not going to be a deterrent, but these sociopaths are happily few and far between. There is also a growing number of people who use the death penalty as a method of committing suicide; this group is obviously not deterred by capital punishment and, in fact, may kill others *in order to be executed*.

⁵ There are 3373 inmates on death row in the United States (as of January 1, 2006); four states account for 1677 of them. For a complete list, see the Death Penalty Information Center website: <http://www.deathpenaltyinfo.org/article.php?scid=9&did=188>

will not influence their actions because the link between crime and punishment is broken, or at least attenuated, in their minds.

It might be the case, then, that the particular group of people the death penalty is meant to deter simply *will not* be deterred. But perhaps there is another group, this time of potential offenders, who feel that they have choices to make and that there are consequences for actions stemming from these choices. Perhaps there are a lot of people in this group who are deterred every day by the specter of the death penalty because it is clear to them that the choice leading them to murder will lead also to the execution chamber. That is a fairly straightforward story, but one that is most likely incorrect. The typical rational agent is not deterred by the death penalty because he has every reason to believe that he will not be executed, even if he commits murder. The death penalty is not, of course, the sole – or even the most frequent – punishment for homicide in the United States. Richard Dieter, Executive Director of the Death Penalty Information Center estimates that there are approximately fifteen thousand homicides annually and approximately one hundred fifty annual capital sentences.⁶ One percent of murderers, then, are sentenced to death. These numbers fluctuate a bit, certainly, but the greatest number of capital sentences in any year since 1991 was 317 in both 1995 and 1996. If we assume that there are fewer homicides and more capital sentences – say 10,000 and 500, respectively – then we arrive at the conclusion that five percent of all homicides end in a death sentence. A rational agent who is considering homicide would conclude that he is very unlikely to be convicted and sentenced to death in this country.

As Isaac Ehrlich admits, the results supporting the deterrence hypothesis depend “on the presumption that offenders respond to incentives” (Ehrlich 1975b, 415). In

⁶ Cf. Death Penalty Information Center website: <http://www.deathpenaltyinfo.org>

weighing the costs and benefits of homicide, then, potential murderers incorporate the death penalty into their calculation and this higher punishment deters at least some of them.⁷ This model depends on several conditions. Criminals or potential criminals must have some understanding of the probability they will be apprehended and convicted, along with an idea of the likely punishment (Anderson 2000, 6). The rarity of executions and long lags between crime, sentencing, and executions make these probabilities fairly small. Levitt concludes that “a rational criminal should not be deterred by the threat of execution” precisely because executions are so rare and time horizons are short (2004, 175). Exacerbating this concern is the tendency of people to not identify with people on death row or with people in bad situations generally (Bowers and Pierce 1980, 455). An attitude of “It couldn’t happen to me” would also limit the effectiveness of a deterrent signal.

Further, they must have a mindset capable of rational decision-making. Beyond intoxication, which would cloud rational behavior, capital murders are different from others. As Bowers and Pierce note, it is often extreme brutality or cruelty which distinguish murders that warrant the death penalty (1980, 454). People who commit these sorts of crimes are not likely to “fit the model of the calculating killer” (Bowers and Pierce 1980, 454).

Nevertheless, this is an empirical question, albeit a tricky one, and it is critical to evaluate the causal inference made by the deterrence hypothesis proponents. In a survey of inmates at a Kentucky prison, David Anderson attempts to evaluate the conditions

⁷ Or, as Bowers and Pierce write, “deterrence theory assumes that potential offenders exercise rational judgment in deciding whether or not to kill and that they are predictably sensitive to the actual range of variation in certainty and severity of legal punishment for murder at the time of the decision to act” (1980, 454).

necessary for the rational criminal model (2000). In this study, he finds that most criminals are “impervious to harsher punishments, either because they perceive no risk of apprehension and conviction, or because they have no knowledge of the likely punishments for their contemplated crimes” (Anderson 2000). In fact, for perpetrators of deadly crime, only 16% thought it very or somewhat likely they would be caught. 30% thought it was unlikely or that they would not be caught at all. A remarkable 54% did not think about it at all. Similarly, 14% of inmates for deadly crime either had no idea what the punishment would be or were incorrect in their assumption. Another 54% did not think about the punishment at all. Almost 90% of the inmates were totally incognizant of one or both factors (Anderson 2000, Table 1). Though this study is of a relatively small sample in only one prison, it is suggestive that the basic underlying conditions necessary for the deterrence hypothesis to work are simply not present.

These results are suggestive and, if consistent with other studies, are indicative that the deterrence hypothesis is misguided. Along this line of research, we will pursue several questions. First, we will analyze survey data in the general population. Understanding who among the general population knows the punishments for capital crimes and the likelihood of execution will be a significant step forward. Second, we will attempt to extend prison inmate survey to explore inmates’ prior expectations of sentencing rules, execution probabilities, and the extent of intoxication during criminal acts. If these results support the Anderson (2000) findings, they would be damaging to the deterrent proponents. If most criminals are not aware of the punishment, they are unlikely to be aware of changes and are unlikely to be deterred. Thus, the public policy prescription inherent in Sunstein and Vermeule’s paper is misguided.

The Empirical Case: Testing the Deterrence Hypothesis

For Sunstein and Vermeule, the statistical evidence showing that capital punishment has a deterrent effect is the foundation for their theoretical argument (2005a, 706). Though they claim the “particular numbers do not much matter” (Sunstein and Vermeule 2005b, 3), they emphasize the results of a prominent recent study that suggests each execution deters eighteen murders (Dezhbakhsh, Rubin, and Shepherd 2003). Again, though they acknowledge at least some doubt as to the ‘truth’ of the deterrence results, they utilize the numbers throughout to strengthen their case and for rhetorical flourish:

Most striking is the sheer size of the opportunity cost of foregone capital punishment. Stipulate that for every foregone execution (conducted under procedural safeguards), the cost is, on average, some eighteen arbitrary and irreversible murders—as some of the evidence in Part 1 suggests. Suppose, for example, that five hundred additional death row inmates were executed in the next year. Unless the marginal deterrent benefit of each additional execution diminishes rapidly, the result would be to save thousands of innocent people—in all probability, far more people than were killed in the terrorist attacks of September 11, 2001 (Sunstein and Vermeule 2005b, 26-27).

With this backdrop, they conclude: “If the current evidence is even roughly correct... then a refusal to impose capital punishment will effectively condemn numerous innocent people to death” (Sunstein and Vermeule 2005a, 706). In the following pages, we review the extant literature on the deterrent effect of the death penalty and show that their confidence in the statistical results is misplaced, leaving their theoretical case without its empirical foundation.

Somewhat unusual for academic debates, the debate over the deterrent effect of the death penalty has serious and far-reaching political implications. In the short moratorium on the death penalty in the 1970s with *Furman*, its reinstatement after *Gregg*, and recent court and congressional activities, academic research proved influential. This

realization makes understanding the robustness of the results supporting the death penalty deterrence argument a critical concern for the academic debate and, more significantly, public policy. In Table 1, we summarize the deterrence studies discussed below.

Table 1. Selected Studies of the Deterrent Effect of the Death Penalty

Study	Unit of Analysis	Period	Result
Sellin, 1959	Matched state comparison	1920-1962	No deterrent
Ehrlich, 1975b	US (aggregate)	1933-1969	7-8 fewer murders per execution (C.I. 0-24)
Bowers and Pierce, 1980	New York state	1907-1963	2 more homicides per month after an execution
Mocan and Gittings, 2003	State-level	1977-1997	5 fewer homicides per execution
Katz, Levitt, Shustorovich, 2003	State-level	1950-1990	No systematic evidence of a deterrent (+3.1 to -5.6)
Dezhbakhsh, Rubin, and Shepherd, 2003	County-level	1977-1996	18 fewer homicides per execution
Shepherd, 2004	State-level	1977-1999	3 fewer murders per execution
Zimmerman, 2004	State-level	1978-1997	14 fewer murders per execution
Shepherd, 2005	County-level	1977-1996	-21 states have brutalization effect -6 states have deterrent effect -23 states have no effect -Overall, 4.5 fewer murders per execution
Donohue and Wolfers, 2005	Canada vs. US	1950-2003	No deterrent

Using matched state comparisons, Thorsten Sellin argued that executions did not deter additional murders (1959). Basically, he matched two states, alike in most ways pertinent to homicide rates except for death penalty, and analyzed the homicide rates. Using data from 1920-1962, he found little evidence that executions affected the murder rate. Baldus and Cole (1975) replicated his research, lending further confidence to the results. And in *Furman v. Georgia* in 1972, Justice Marshall gave particular credence to these results, which “demonstrate that there is no correlation between the murder rate and the presence or absence of the capital sanction,” and concluded that “the deterrent effect of capital punishment rested on ‘logical hypotheses devoid of evidentiary support’”

(qtd. in Editors' Introduction 1975, 165). These findings contributed to the *Furman* decision that the death penalty was unconstitutional.

In the following years, the debate over the deterrent effect of the death penalty raged in the courts and the academic journals. In a series of articles, Ehrlich (Ehrlich 1975a, 1975b) utilized econometric models to test whether probabilities of execution served as a deterrent effect in the period from 1933-1969. He concludes that each execution deters 7 or 8 additional homicides (Ehrlich 1975b, 414). But even Ehrlich admits his analysis is not definitive proof of a deterrent effect: “The results may be biased by the absence of data on the severity of alternative punishments for murder, by the use of national rather than state statistics, and by other imperfections” (1975b, 416). And subsequent studies further clouded any possible conclusions as scholars criticized Ehrlich’s data sources for both the dependent (homicide rate) and independent variables (arrest, conviction, and execution risk), the length of the time series, and the functional form of the regressions. In particular, changing the end point of the time series by as few as seven years or the functional form from logarithmic to natural values invalidates the results, or at least shows them to be inconsistent and less than robust (Bowers and Pierce 1975).⁸ Ehrlich’s (Ehrlich 1975a) response to this criticism, defending his results and attacking his critics for their misinterpretations and misapplications of his work, could have only muddied the waters even more for those legal scholars with less statistically-inclined training. Nevertheless, in *Fowler v. North Carolina* in 1974, the Solicitor

⁸ In other work, Bowers and Pierce (Bowers and Pierce 1980) go beyond just trying to replicate and discredit Ehrlich’s findings and present evidence that the death penalty actually *increases* the number of homicides by one or two in the short term. Contrary to what Bush and Gore contended in 2000, in the month or two after an execution, executions brutalize rather than deter potential murderers: “The lesson of the execution, then, may be to devalue life by the example of human sacrifice” (Bowers and Pierce 1980, 456).

General turned to Isaac Ehrlich's statistical work to convince the court that the death penalty did in fact have a deterrent effect (Baldus and Cole 1975). And in *Gregg v. Georgia*, the Supreme Court found that, for at least some potential murderers, "the death penalty undoubtedly is a significant deterrent" (qtd. in Shepherd 2005, 204). The pendulum had swung toward believing the deterrence hypothesis in the Courts if not the academy.

Fast-forward thirty years and several economists, using new data and more sophisticated techniques, seek to claim victory for Ehrlich, or at least his conclusions (Dezhbakhsh, Rubin, and Shepherd 2003; Mocan and Gittings 2003; Shepherd 2004; Zimmerman 2004; Shepherd 2005). For Sunstein and Vermeule (2005a), a study by a team of Emory University scholars, Hashem Dezhbakhsh, Paul Rubin, and Joanna Shepherd (2003), provides the empirical foundation for their argument. Using county-level panel data and a system of simultaneous equations for the period from 1977-1996, they find that each execution results in *eighteen* fewer murders, on average. In their study, they preempt several criticisms--including functional form, a control for gun-ownership, and aggregation problems--that plagued Ehrlich, by doing multiple robustness tests (Dezhbakhsh, Rubin, and Shepherd 2003).

Using state-level data from 1977 to 1997, Mocan and Gittings (2003) also find a significant deterrent effect, with each execution deterring five homicides. Also using state-level data but focusing on instrumental variables, Paul Zimmerman (2004) finds an even stronger deterrent effect in the period from 1978 to 1997, with each execution deterring fourteen murders. Shifting the focus to specific types of murders, Joanna Shepherd uses monthly data aggregated at the state-level from 1977 to 1999 to test which

kinds of murders are deterred by executions. As we discuss above, rational choice models of criminal behavior require a set of conditions to be met before deterrence would logically work. One of these conditions is the mindset or rationale of the criminal. Presumably, crimes of passion do not allow time for contemplating potential punishments.⁹ Yet, Shepherd (2004) remarkably finds that executions deter these types of homicides as well.

Despite these universalistic-sounding results, critics of the deterrence hypothesis exist. Though herself a co-author or author of several studies supporting the deterrence hypothesis, Joanna Shepherd argues that most studies suffer from an aggregation problem and miss a crucial aspect of the deterrence debate (2005). In other words, most studies present their results in terms of national averages and ignore the variation among states.

The death penalty is not a universal deterrent. As she notes, her results are striking:

Consider the twenty-seven states where at least one execution occurred during the sample period. Executions deter murder in only six states. Capital punishment, however, actually *increases* murder in thirteen states, more than twice as many as experience deterrence. In eight states, capital punishment has no effect on the murder rate. That is, executions have a deterrent effect in only twenty-two percent of states. In contrast, executions induce additional murders in forty-eight percent of states. In seventy-eight percent of states, executions do not deter murder (Shepherd 2005, 205).

The critical difference between those states where executions deter and the rest is the number of executions. Only states that execute more than nine people a year achieve any deterrent effect at all. In the rest of the states, the brutalization effect outweighs or at least cancels out the deterrent effect (Shepherd 2005, 206). For example, Utah is a state where executions brutalize, which would not surprise death penalty opponents who criticize the

⁹ Shepherd disagrees with this assumption. She claims that “even an offender who does not premeditate a murder, like a crime-of-passion murder has an instant to weight the expected costs and benefits of committing that murder” (Shepherd 2004, 292). But the empirical questions surrounding the conditions necessary for the deterrence hypothesis remain under-tested, as discussed above.

state's use of the firing squad. The aggregation bias affects other studies of deterrence because it appears that executions always deter, when in fact, Shepherd shows that executions merely deter in those states where the probability of execution is significantly higher than the national average.

Katz, Levitt, and Shustorovich extend the criticism further. First, they point out that the standard deviation for the homicide rate is so high, it is hard to extract meaningful signals about the effects of the death penalty because so few executions occur, even in Texas, which has the highest execution rate in the United States (Katz, Levitt, and Shustorovich 2003, 319). Second, they also criticize the rational criminal model underpinning the deterrence hypothesis. In addition to the influence of drugs and alcohol, which would limit the cost-benefit calculation necessary for deterrence to work, the long lag between sentencing and execution would severely test the time horizons of potential murderers (Katz, Levitt, and Shustorovich 2003, 319-320).¹⁰ Finally, they find little evidence to support the deterrence hypothesis vis-à-vis the death penalty, with results “extremely sensitive to the choice of controls and invariably estimated with little precision” (Katz, Levitt, and Shustorovich 2003, 319). In fact, they find that prison conditions are more likely to deter potential criminals than capital punishment (Katz, Levitt, and Shustorovich 2003, 321).

The studies and counter-studies show that research on the deterrence hypothesis is unclear, at best. But recent replication studies of the major research supporting deterrence

¹⁰ Further, as Katz, Levitt, and Shustorovich note: “the execution rate on death row is only twice the death rate from accidents and violence among all American men, and is only slightly greater than the rate of accidental and violent death for black males between the ages of 15 and 34. Among the sub-sample of individuals engaged in illegal activities, the death rates are likely to be much higher” (2003, 319-320).

show that we should be even more skeptical of any possible deterrent effect of the death penalty.¹¹ In Table 2, we present a summary of these studies.

Table 2. Replications and Sensitivity Testing of Deterrence Studies

Study	Unit of Analysis	Period	Result	Replication
Berk, 2005	State-level	1977-1997	No deterrent	Mocan and Gittings, 2003
Donohue and Wolfers, 2005	Matched state comparison	1960-2000	No deterrent	Sellin, 1959
	State-level	1934-2000	No systematic evidence of a deterrent	Katz, Levitt, Shustorovich, 2003
	State-level	1977-1997	No systematic evidence of a deterrent	Mocan and Gittings, 2003
	County-level	1977-1996	No systematic evidence of a deterrent	Dezhbakhsh, Rubin, and Shepherd, 2003
	State-level	1978-1997	No systematic evidence of a deterrent	Zimmerman, 2004

In a 2005 *Journal of Empirical Legal Studies* article, Richard Berk takes issue with the deterrence literature, focusing on Mocan and Gittings' work (Mocan and Gittings 2003). Berk focuses on several problems with their research, many of which are applicable to the majority of studies that find a deterrent effect. First, he shows that the key explanatory variable is heavily skewed toward zero. The mean is 0.35, which implies an execution per state every three years, but the standard deviation is 1.35. Almost 90% of the cases have zero executions. This heavily skewed explanatory variable might "dominate the results" (Berk 2005, 305). This problem is exacerbated further if the data is disaggregated to the county or monthly-level, as several leading studies do (Dezhbakhsh, Rubin, and Shepherd 2003; Shepherd 2005).

¹¹ Sunstein and Vermeule's conclusion that there is a consensus on the death penalty as a deterrent stems from a selection bias in the reporting and publishing of death penalty studies. A significant bias against null findings exists in most journals. Thus, research that showed the death penalty had no effect on the homicide rate could have suffered from a file drawer problem, where scholars simply shelve papers with null findings because they expect rejection. Once the major articles showing a deterrent effect surfaced, the responses are surfacing as well (Donohue and Wolfers 2005, 837).

A second and related concern is the extremely wide confidence intervals precisely in those areas with little data, or where many executions occur. The wide confidence intervals beyond five executions show that the real relationship between executions and the homicide rate could be negative, positive, or even flat (Berk 2005, 310). Of more concern for the deterrence hypothesis, in the region with the largest mass of data, or five executions or less, the relationship is in fact positive (Berk 2005, 311-312). This result is consistent with Shepherd's work (2005), though she argues for a threshold effect while Berk contends that the data are simply too few from which to infer anything about the relationship. Donohue and Wolfers (2005, 811) and Katz, Levitt, and Shustorovich (2003, 321-322) also argue that there simply is not enough data to draw conclusions about the deterrent effect of the death penalty.

Third, Berk considers outliers, such as Texas. With Texas included, the data suggest a deterrent effect, albeit with a very wide confidence interval. But if Texas is excluded, the homicide rate and executions are unrelated (Berk 2005, 323-324; Donohue and Wolfers 2005, 815). Dropping potentially dominant cases to test for robustness is a fairly standard test, along the lines of a jackknife robustness test, to ensure the results are not artifacts of a few observations. Because this is not a natural or even quasi-experiment, drawing conclusions about the rest of the American states from just the Texas observations is questionable.

While Berk only analyzes Mocan and Gittings' work, Donohue and Wolfers (2005) offer a dramatic example of replication in the social sciences. They reanalyze the results of several leading studies, as Table 2 shows, with the original or recreated data for robustness and sensitivity. Considering the breadth of statistical techniques and the

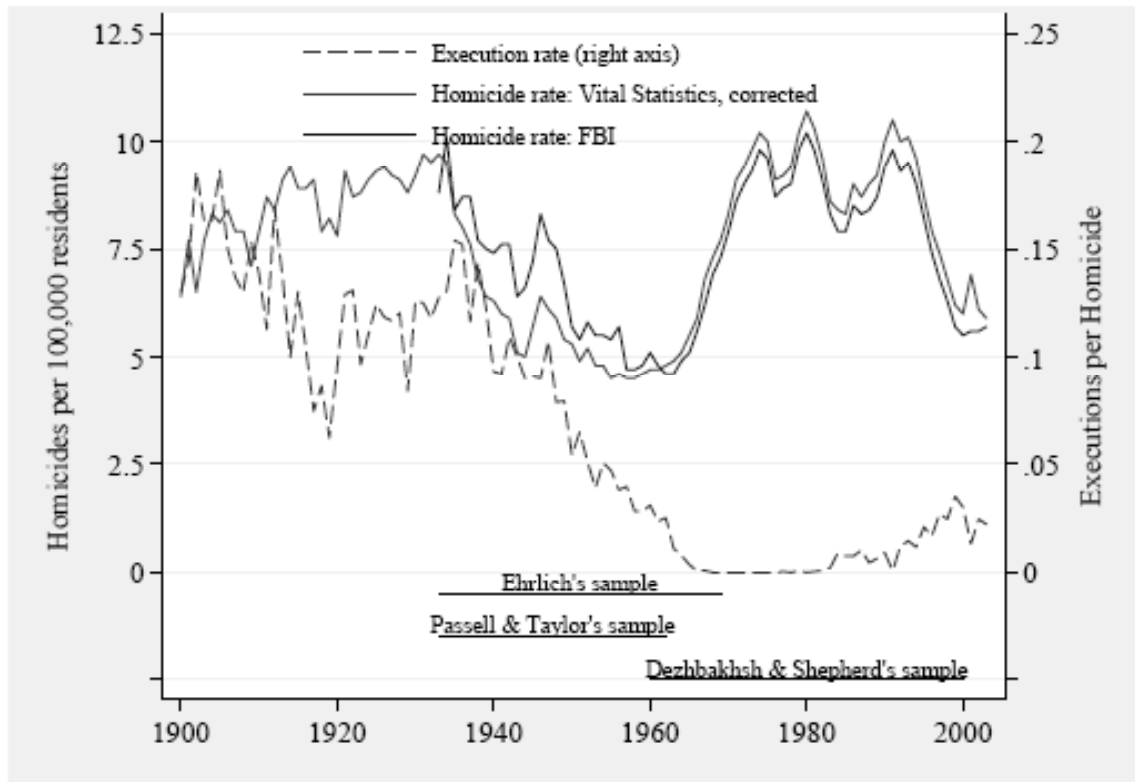
variety of datasets used, the replication and extension research is commendable. More importantly, it is convincing on several points.

First, they make two fairly straightforward statistical arguments against the previous studies. As cross-section time-series analysis, they undoubtedly suffer from problems associated with these types of analysis, such as autocorrelation and clustering. Dezhbakhsh, Rubin and Shepherd do not correct for autocorrelation, which overestimates the precision of the results and underestimates the standard errors (Donohue and Wolfers 2005, 833). In addition, they disaggregate to the county-level but many of the explanatory variables are measured at the state-level, which suggests that these observations are not independently distributed, as assumed in regression analysis (Donohue and Wolfers 2005, 834). After correcting for these two problems, the coefficient remains the same, for an effect of 18 fewer murders, but the standard errors are dramatically higher, increasing from 7.1 to 51.3. With these corrections, each execution could either cause 82 more murders or deter 119, a margin sufficiently wide to demonstrate that the variable has no discernable effect (Donohue and Wolfers 2005, 835).¹²

Second, the time series start and end points severely affect the results. Figure 1, borrowed from Donohue and Wolfers (2005, 797), shows that the various conflicting results may simply be a result of selecting on the time series.

¹² Similar corrections to correct for clustering within states over time eliminated the deterrent effect in Zimmerman's data (Donohue and Wolfers 2005, 835).

Figure 1. Homicides and Execution in the United States



Ehrlich's data, for instance, relied heavily on the years from 1963-1969 to prove a deterrent effect. During these years, the execution rate dropped while the homicide rate increased. Dezhbakhsh, Rubin, and Shepherd's findings, on the other hand, depend on the late 1990s to prove the deterrent hypothesis. Certainly, it is possible that the death penalty is a more effective deterrent in the late 1990s than previously, but, as Donohue and Wolfers note, this is unlikely considering the longer lags between sentencing and execution and the less graphic and brutal methods of execution (2005, 798). Taking a longer view, it is not surprising to see so much uncertainty in this research project. Depending on the start and end points selected, the homicide and execution rates are either positively or negatively correlated or not related at all.

In the end, Donohue and Wolfers (2005) demonstrate that the existing findings that support the deterrence hypothesis are extremely fragile and sensitive to even slight

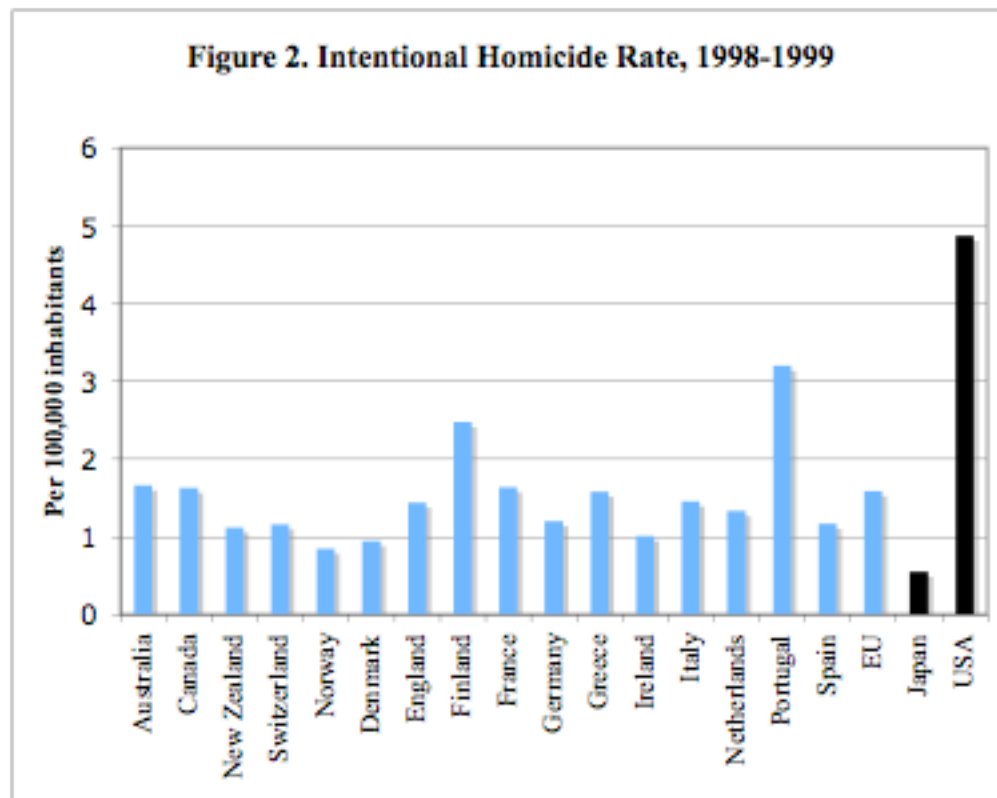
re-specifications to the regression models. These re-specifications include different control variables, time series, and functional forms. With these models as support, they conclude not that the death penalty deters or not, but that there is simply ‘profound uncertainty’ about the relationship (Donohue and Wolfers 2005, 794).

Yet another fact that is striking about the deterrence literature is the sheer volume of statistical models. For example, Dezhbakhsh, Rubin, and Shepherd admitted they ran 55 models (2003, 373), while Shepherd ran 56 regressions (2004, 314). And these are just the reported regression models. As recent methodological papers argue (Beck, King, and Zeng 2004; de Marchi, Gelpi, and Grynaviski 2004), over-fitting is a serious concern for social scientists. Running hundreds of models on a dataset, as individual researchers or as a community, stretches the data to its limits and quickly reduces available degrees of freedom. Certainly, the advice of Beck, King, and Zeng (2004) and de Marchi, Gelpi, and Grynaviski (2004) to withhold a portion of the dataset as a replication set would be most applicable on this research subject. This research strategy would allow the researcher to test the final model against new data to evaluate whether the model is accurate or simply curve-fitting

Though Donohue and Wolfers (2005) do a thorough job replicating and re-analyzing prior studies, we intend to extend this research in several ways in future versions of this paper. First, the nature of the data used in most of this analysis begs for multi-level or hierarchical models. Explanatory variables at the county, state and national level affect the county-level homicide rates. Certainly, it is plausible that county-level homicide rates are affected by clustering problems at the state or national-level. By using hierarchical modeling, we can disentangle the effects of the explanatory variables on the

dependent variable as well as the effects of the explanatory variables at different levels on each other.

In addition, we will extend the analysis to investigate the effects of the death penalty on homicide rates internationally. Sunstein and Vermeule make a bold claim that has clear researchable observable implications: “The principal difference, on the empirical assumptions we are making, is that in a legal regime without capital punishment, far more people die, and those people are innocent of any wrongdoing” (2005b, 13). On the surface, this claim seems implausible if one looks at a sample of advanced industrial democracies. In Figure 2, we show the average homicide rates in 1998 and 1999 in several advanced industrial countries, with Japan and the United States the only current users of the death penalty.



In every advanced industrial nation, the homicide rate is significantly lower than the United States. In fact, except for Portugal, the homicide rate is at most half the American rate. Japan's extremely low homicide rate and continued use of the death penalty demonstrate that it is not just the death penalty that drives the American homicide rate, but it does cast some doubt on Sunstein and Vermeule's strong assertion.

Further, over time, there is substantial variation among advanced industrial democracies as to their death penalty policies. This new venue would allow for further testing of the deterrence hypothesis with less fear of over-fitting the well-trodden ground of the United States. Donohue and Wolfers' simple comparison of the United States and Canada suggests this extension would be a fruitful line of research.

Discussion

In this paper, we confront the conclusions of Sunstein and Vermeule's recent work on the death penalty. Their theoretical argument that a just society should support the death penalty because it saves lives (by deterring murders) relies on a weak foundation, namely the claim that the death penalty deters murders. First, we argue that the deterrence hypothesis relies on a rational criminal model that simply does not hold up under theoretical or empirical scrutiny. In future iterations of this paper, we intend to pursue this question further.

Second, we show that the empirical results of a deterrent effect, which Sunstein and Vermeule highlight, are fragile and extremely sensitive to minor re-specifications. There are simply not enough data to support the deterrence hypothesis. These fragile and overly sensitive results are not convincing to anyone undecided. Rather, the statistical

data supporting the death penalty as deterrent are only convincing if you have a “strong enough prior belief” (Donohue and Wolfers 2005, 844). Because of the weakness of the deterrence hypothesis, vis-à-vis the rational criminal model, we are not surprised by the fragility of these results.

Yet, these are not idle academic questions. Social science research on the effects of the death penalty on homicide rates has affected public policy in the Courts, in Congress, and in the public. For this reason, we argue that it is imperative to fully understand the deterrence hypothesis before making policy prescriptions about the death penalty.

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