



The Park Place Economist

Volume 19 | Issue 1

Article 10

2011

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Recommended Citation

Law, Adam '11 (2011) "The Deterrent Effect of Capital Punishment," *The Park Place Economist*: Vol. 19

Available at: <http://digitalcommons.iwu.edu/parkplace/vol19/iss1/10>

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The Deterrent Effect of Capital Punishment

Abstract

This project will attempt to determine whether or not capital punishment, in the manner which it is currently used here in the United States, does in fact have a significant deterrent effect on the murder rates across the country. My hypothesis is that such a deterrent effect does exist and that, as the likelihood of being executed increases that deterrent effect will become stronger.

The Deterrent Effect of Capital Punishment

Adam Law

I. Introduction

The United States' continued use of capital punishment has been a source of debate for years. According to Amnesty International, the United States is one of only 58 nations that still actively employ capital punishment. Last year 52 people were executed in the United States, the fifth most worldwide, fewer than only China, Iran, Iraq, and Saudi Arabia (www.amnesty.org). The use of capital punishment in the United States was temporarily suspended from 1972 to 1976, as a result of the Supreme Court's decision in the case *Furman v. Georgia*, where it was ruled to be a "cruel and unusual punishment" in certain cases and thus unconstitutional. However, since its reinstatement, 1,233 people have been executed, with the most recent being the November 4th execution of an Alabama man for the murder of his pregnant teenage daughter's boyfriend, and 3,256 currently sit on death row (Death Penalty Information Center). All but one of those 3,256 currently on death row are there for murder, the exception being a Georgia man sentenced to death for kidnapping with bodily injury. Currently 37 states and the federal government still have statutes permitting capital punishment.

Regardless of the moral and ethical issues surrounding the continued use of capital punishment here in the United States, issues which I will, by and large, attempt to avoid in this paper, a determination needs to be made as to whether or not capital punishment is serving its intended purpose, namely deterring people from committing certain capital punishment eligible crimes. If no significant deterrent effect exists it would appear to make more sense to instead move to a system which would make lifetime incarceration the maximum penalty instead of the death penalty. Making such a switch would save California, with 697 people on death row, over 100 million dollars a year, according to a report by the Commission on the Fair Administration of Justice, released in 2008 (www.ccfaj.org). The disparity in costs between the two options is due in part to the complicated nature of capital punishment eligible cases. Each capital punishment eligible trial is actually two trials; one to determine guilt or innocence and a second trial if the defendant is found guilty to determine whether or not the death penalty should be given. Additionally there are numerous, automatic appeals which must be undertaken as well which cause the trials to last much longer than non-capital punishment cases (www.deathpenalty.org). With the current state of the economy, across the United States and in California in particular, savings in the hundreds of millions are hard to ignore.

While there are several crimes other than murder which can result in the death penalty, the last person to be executed for any crime other than murder in the United States was a man executed for robbery in Alabama in 1964. For that reason, I have chosen to only look at the effect of capital punishment on murder rates and exclude the case of the Georgia man on death row for kidnapping with bodily harm.

This project will attempt to determine whether or not capital punishment, in the manner which it is currently used here in the United States, does in fact have a significant deterrent effect on the murder rates across the country. My hypothesis is that such a deterrent effect does exist and that, as the likelihood of being executed increases that deterrent effect will become stronger.

II. Theory and Literature Review

My paper will employ Gary Becker's "Rational Choice Theory" which states that every person, criminals included, undertakes a cost-benefit analysis before engaging in any action (Becker 1968). As it relates to crime, he theorizes that criminals weigh the expected personal benefits that are perceived to come from committing a crime against the possible costs that may come their way if they are apprehended for committing that crime. In the specific case of murder, a potential murderer would have to weigh the personal benefits of things like revenge or monetary gain against the disutility of the shame of being convicted, the legal expenses, lost potential earnings, prison time, and early death which could occur if apprehended. Obviously, at a certain point, committing a crime would not pay at the margin so the challenge for society, according to Becker, is to figure out the most efficient manner of increasing the costs of committing said crime to that point. Proponents of capital punishment claim that it accomplishes exactly that. Economic studies on the subject as a whole unfortunately have been unable to reach a consensus on the existence of the purported deterrent effect.

This inability to reach a consensus is interesting to note as often it is only minute changes in the overall models which create drastically different results. Some papers have even found the presence of what they call a "Brutalization" effect, whereby each execution actually raises the overall murder rate. According to this theory, by executing an individual society sends the message that it is acceptable to kill under certain circumstances. Those who tout this theory point to the increase in homicides that often follow an execution in the area where

the individual was put to death (Bowers and Pierce 1980). Many other contrasting works have been done by Dezhbakhsh, Rubin, and Shepherd however, who have consistently found that a significant deterrent effect does exist, and conversely, Donohue and Wolfers who have consistently found no deterrent effect (Dezhbakhsh, Rubin, and Shepherd 2003 and 2006 and Donohue and Wolfers 2005 and 2006).

One such 2003 work by Dezhbakhsh, Rubin, and Shepherd looked at county-level data from 3,054 counties over the period 1977 through 1996 in order to determine if such a deterrent effect exists. At the time of its publication it was widely considered to be the most detailed and comprehensive data set ever compiled to test the deterrent effect of capital punishment in this country. Their model estimated the murder rate as a function of three main deterrence variables and numerous other control variables to account for the differences between counties. Their deterrence variables were: the probability of being arrested for committing a murder, the probability of receiving a death sentence conditional on being arrested, and the probability of being executed conditional on receiving a death sentence. Additionally, their control variables included demographic variables to account for population subsamples which were deemed likely to contribute to higher levels of crime as well as income variables with the same goal in mind. These variables included: the population proportion of 10-19 year olds and 20-29 year olds, the percentage of African Americans, percentages of non-African American minorities, population density, male population share, real per capita income, real per capita income maintenance payments, and real per capita unemployment insurance payments. Lastly, they included the percentage of National Rifle Association membership in an attempt to measure the ease of access to firearms and a measure of partisan influence determined by the percentage of the population who voted Republican in the most recent elections. The inclusion of all of these variables was an attempt to account for the varying opportunity costs for crime across the data set, a necessary determination to make under Becker's theory.

They then estimated 55 slightly different models, using two stage least squares, double-log and semi-log functions, producing several different results, though the estimate they put their most faith in, their "most conservative estimate" is that each execution saves on average the lives of 18 potential victims, with a standard deviation of 10 (Dezhbakhsh, Rubin, and Shepherd 2003).

These three men built on that paper in a 2006 work which looked at panel data from all fifty states during the period of 1960-2000, choosing to include the four year moratorium on the death penalty. Using many of the same variables they estimated 84 distinct regression models, finding once again that a significant deterrent effect was present and additionally noting that murder rates increased substantially during the 1972-1976 moratorium (Dezhbakhsh, Rubin, and Shepherd 2006).

Two of the main opponents of capital punishment, Donohue and Wolfers, argue in a 2005 work that often researchers involved in the capital punishment debate manipulate their data until they reach their desired conclusion. They argue that while the underlying argument for the deterrent effect of capital

punishment, "raise the price of murder for criminals, and you will get less of it", makes sense, individuals given death sentences are so rarely executed that it may in fact be having the opposite effect (Donohue and Wolfers 2005). Remarkably they note that at the time of their study, "the execution rate on death row is only twice the death rate from accidents and violence among all American men" (Donohue and Wolfers 2005).

In this work they look at several major studies looking at the deterrent effect of capital punishment, the most notable being Dezhbakhsh, Rubin, and Shepherd's study using 1960-2000 data, and manipulate a few variables to show how easily the opposite conclusion can be reached. In the case of Dezhbakhsh, Rubin, and Shepherd's work they run the same regressions but define the likelihood of execution in three different ways: executions per 100,000 residents, executions per 1,000 prisoners, and executions per homicide. They find that each execution saves 7.4, -0.1, and 5.0 lives respectively (Donohue and Wolfers 2005).

Following Becker's "Rational Choice Theory" I will attempt to measure whether or not certain key deterrence variables do in fact increase the cost of committing a murder. If his theory holds true increasing the costs of committing a murder should result in a decreased likelihood of murder. The studies which I reviewed point to several specific variables which appear to be linked to determining both the cost and prevalence of murder and thus I will include many of the same variables in my study.

III. Empirical Model and Data

For the most part my empirical model will follow the work done by Dezhbakhsh, Rubin, and Shepherd, however, for ease I will attempt to use Ordinary Least Squares (OLS) where they use two, and at times even three, stage least square regression techniques. For the purpose of this paper I will be looking at state-level cross sectional data from 2007 and 2008, the most recent two year period from which all the necessary data are available. I have chosen to use cross sectional data as numerous studies have detailed the benefits of using cross sectional data rather than time-series data. The deterrent effect of each execution should only affect the state in which the execution is carried out in and cross sectional studies allow for this effect to be correctly measured. I will not be excluding either Texas or California as has been done in some studies which considered them as outliers. Texas has often been excluded due to the relatively high number of executions they perform and California has been excluded as they have a relatively high number of people on death row but rarely execute anyone. I will however, include a dummy variable, 2008, to account for changes between the two years which might otherwise go unrepresented. The variables I will be using along with their expected signs are listed in Table 1.

The main variables I am interested in are listed as "Deterrent Variables" in the table. If there is in fact a significant deterrent effect that comes from capital punishment as the probability of each of those factors increases there should be a corresponding decrease in the murder rate. This follows logically from Becker's theory in all three cases as rational people want to avoid being arrested, given a death sentence, and eventually being executed. As it becomes more likely for each of those events to happen the "cost" of committing

a murder should rise until it reaches the point where criminal no longer find it in their best interests to commit a murder. If this level has been reached, these factors should be having a significant effect on reducing murder rates. As a result it seems logical to expect that each of those variables will have a negative coefficient. The other socioeconomic control variables more than likely do affect the annual murder rates but their inclusion is only intended to account for differences between states. States with higher levels of unemployment should naturally have higher rates of murder and other violent crimes as their opportunity costs of committing such acts are much lower for individuals without steady employment. The last variable, the number of law enforcement officials per capita, could even be grouped with the deterrence variables since as the number of law enforcement officials increases potential criminals would logically be less likely to commit murders; thus I expect it will have a negative coefficient. However, I have chosen not to include it as such as I believe it influences the murder rate by increasing the cost of committing a murder in a different manner than in measured by the likelihood of being arrested for a murder.

Both the state by state murder rates and the corresponding arrest rates are from the Federal Bureau of Investigation's Uniform Crime Reports (FBI's UCR hereafter); yearly breakdowns of all crimes committed within the United States. This data set is not ideal for my study but it is the best and most complete I have been able to find. The number of deaths which were officially categorized as murders at year end for each state is reported in that year's corresponding UCR. The obvious flaw with this measure is that not all deaths are correctly reported and there is the possibility for under or over reporting of numbers based on later revisions which I am unable to account for. The official measure I will be using for homicide arrests in a given state is reported in the arrest subcategory "Murders and nonnegligent manslaughter". The obvious issues with this measure are that multiple people can be arrested for one murder and that they are not necessarily arrested in the same year the murder is committed (www.fbi.gov).

Conviction data are not available, as the Bureau of Justice Statistics no longer collects such data. However, as appears to be the generally accepted alternative, I will be using sentencing data which is readily available. The data for the number of Americans given death sentences and eventually executed comes from the Department of Justice's Bureau of Justice Statistics' annual "Capital Punishment Statistics Tables" (<http://bjs.ojp.usdoj.gov/>). These reports include state-by-state information on the movement of prisoners into and out of death row annually. To account for changes from state to state I am also including the state-level unemployment rates and the law enforcement officials per capita. Those two control variables are provided by the United States Census Bureau (www.census.gov).

It is important to note here that the likelihood of each deterrent variable occurring is measured independently along the way. While not completely representative I am calculating the likelihood of being arrested as the number of homicide arrests in each year over the number of murders in that same period and the other two in a similar manner. While it is indeed very likely that the individuals getting arrested committed their crimes

in past years this appears to be the only way of measuring what I need to cover my time period.

The most obvious shortcoming of this study is the relatively few number of years from which I will be using data from. Unlike in most studies, I am unable to follow an individual from the time he/she commits a murder, is arrested, sentenced, and ultimately executed. The average stay of an inmate on death row, not counting the time that passes during their trial, is over twelve years, making it impossible to follow individual cases in this study. As a result of this, the results are not wholly representative, something which can only be remedied by lengthening the time period from which data are collected.

Formally, the murder rate regression model I will be using is:

$$\text{Murders/Pop} = b_1 + b_2 \text{ Ratio of Arrests to Homicides} + b_3 \text{ Ratio of Death Sentences to Homicide Arrests} + b_4 \text{ Ratio of Executions to Death Sentences} + b_5 \text{ Unemployment} + b_6 \text{ LEPerCap} + b_7 \text{ 2008} + e.$$

Support for my hypothesis should manifest itself through strongly significant results for B2, B3, and B4, all three of which should have negative coefficients.

IV. Results

In the end I found that no significant deterrent effect exists from capital punishment in this country, at least within the constraints of my study. As depicted in Table A, only one of the three deterrent variables was ever significant, and only then in the absence of the control variables at the .1 significance level.

I ultimately ran three different regressions: one with only the deterrent variables, one with the deterrent variables and the dummy variable for 2008, and one with all of my variables. A Durbin-Watson test was run for all three regressions but none of the three showed signs of auto-correlation. The third regression which included all of my variables actually produced a fairly decent adjusted R², explaining 32.9% of the changes in murder rates per capita. In that regression the unemployment rate and the law enforcement officials per capita accounted for virtually all of the changes though. Those two variables had coefficients of 59.831 and -.020 with standard errors of 18.477 and .003 respectively. Both signs were as expected and the standard errors are small relative to the size of the coefficients. What those coefficients mean is that in Illinois in 2007, for example, the regression predicts that a .1% decrease in the unemployment rate from 5.1% to 5.0% would equate to roughly 7 less murders, with everything else held constant. Similarly, for the same state and year, were 463 more law enforcement officials hired, bringing the number of law enforcement officials up to 54,000 from 53,537, a per capita change of roughly 2 officers, the number of estimated murders would fall by 5.

The fact that the Arrests/Homicide variable was not more significant in all models came as a surprise. I expected that variable to have a fairly strong effect, even if only for the fact that murderers were being taken off the street, not accounting for a deterrent effect. However, when I took a step back and analyzed the likelihood of each deterrent event occurring the results made more sense. On average, over the course of 2007 and 2008, an individual who committed a murder, assuming

that each murder was committed by only one individual and no one was wrongly arrested, had a 71.9% chance of being arrested for their crime. Once arrested though their likelihood of receiving the death penalty fell to an astonishing average of only 1%. Furthermore, those individuals on death row during the period in question had only a 1% chance of being executed as well. Taken as a whole, this equates to a .00719% chance of being executed after committing a murder. With the likelihood of the latter two events occurring so low, finding no deterrent effect from capital punishment seems to be the logical result. I did choose to include states without the death penalty in the regressions, as the literature suggests is the norm. Due to this, those thirty-seven states were included in the data set with entries of 0 in all the death penalty related columns. Neither the federal government nor the District of Columbia were included in any manner in this study however.

There were present a few issues which may have negatively affected this project and skewed the results. The biggest issue may have been that the number of years I chose to look at proved to be simply too small. While I must admit that including more years would likely have improved this study I do not think that my decision to only use data from two years proved to be a major shortcoming. One issue which may have contributed to the lack of significance for the three deterrent variables was the manner in which the data were defined by the FBI. I was able to find state level, and even county level, data on the numbers of murders committed per year as well as the number of arrests for "murder and non-negligent manslaughter" in a specified year. However, not every murder arrest was for a murder committed in the same year. Additionally not every person given a death sentence was arrested or committed a murder in that same calendar year; the same holding true with those executed in either year. As a result of this discrepancy five states reported more homicide arrests than homicides in 2007 and eight states did so in 2008.

Taken as a whole, my results were much more consistent with the work of Donohue and Wolfers than with the work of Dezhbakhsh, Rubin, and Shepard. I found very little evidence of the existence of a deterrent effect from capital punishment, though as Donohue and Wolfers suggest I may have found drastically different results if I would have defined my variables differently or employed different regression techniques (Donohue and Wolfers 2005).

V. Conclusions

This paper presents a rather limited look into the debate on the deterrent effect of capital punishment. My data looked at a very short time period and as a result cannot be used to comment on the existence of a deterrent effect from capital punishment over the long-term. However, similar to the argument presented by Donohue and Wolfers, it appears that since executions are so rarely carried out capital punishment carries no real deterrent effect (Donohue and Wolfers 2005). Whether or not these results support Becker's "rational choice" theory is another matter. On one hand the argument could be made that these results suggest that his theory is not applicable to murder as it is often a crime of passion and as such a murder performs no cost-benefit analysis beforehand. The relatively complete lack of significance of any of the deterrent variables could be used to support this stance. However, on the other hand most death

penalty eligible murders are pre-meditated. A person committing a crime such as that surely would weigh the prospect of being executed for committing their crime before doing so. In that instance what this study would suggest is that because of the infrequency of executions in this country, as well as the extreme length of the time from a person actually committing a murder to being executed, the cost of committing a murder has not been increased to the point whereby capital punishment has any meaningful deterrent effect. However, the high significance of the law enforcement officials per capita variable does suggest that as more police officers and law enforcement officials are present the likelihood of a murder occurring does fall. This would appear to offer support for Becker's theory as having more law enforcement officials present surely raises the cost of committing a murder as one becomes more likely to be caught before or during the act and stopped before committing a murder. This finding, while providing no support for the existence of a deterrent effect from capital punishment, does suggest that criminals and potential murderers are rational thinkers as they opt not to commit murders in areas with high concentrations of law enforcement officials.

Ultimately this project found that under the current system of capital punishment in use in the United States its existence has no real deterrent effect on the murder rate, at least in 2007 and 2008. Furthermore, the likelihood of being arrested, given a death sentence, or executed really has no effect on the murder rate whatsoever for that same time period. What is interesting to note however is that it appears that socio-economic factors such as the unemployment rate have a large effect on determining the murder rate as people who are unemployed have a lowered opportunity cost of committing such crimes.

This project could easily be expanded and improved by lengthening the time period from which data was collected or employing panel data as other studies have done. Additionally using more advanced regression techniques such as a two or three stage least squares regression technique and adding more control variables to account for the other socio-economic factors which surely impact the murder rates would likely improve the results. Furthermore, employing such techniques could help deal with some of the endogeneity that could be present.

While it would be incredibly presumptuous of me to claim that any changes in policy will, or should, come from this study, the results presented here do make the argument that we need to reevaluate the continued use of the death penalty in this country. Studies done on the supposed deterrent effect of capital punishment have been far from conclusive and thus due to the moral and ethical issues that surround the ending of another person's life it seems necessary to be 100% certain that capital punishment is having the intended effect. Until a consensus can be reached to that effect it seems prudent to once again call for a moratorium on the penalty as was done back in the 1970s or remove the penalty altogether, an option many states are opting for.

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Table 1: Variables & Expected Signs

Variable	Definition	Expected Sign
Dependant Variable		
Murder Rate/100,000 Residents		N/A
Deterrent Variables		
Ratio of Arrests to Homicides	Arrests/Homicides	-
Ratio of Death Sentences to Arrests	DS/Arrests	-
Ratio of Executions to Death Sentences	Executions/DS	-
Control Variables		
Unemployment	Average Annual % of Unemployed Workers	+
LE per Cap	# of Law Enforcement Officers per Capita	-
Dummy Variable		
2008	1 if 2008 or 0 if 2007	N/A

Table A: Regression Results

Variables	Regression 1	Regression 2	Regression 3
Constant	5.518 *** (8.735)	5.608 *** (8.431)	8.767*** (5.817)
Arrests/Homicide Ratio	-1.537* (-1.980)	-1.517* (-1.943)	-.840 (-1.271)
Death Sentences/Arrest Ratio	1.814 (.181)	2.138 (.211)	1.522 (.181)
Executions/Death Sentence Ratio	.647 (.094)	.546 (.079)	5.172 (.903)
2008	N/a	-.213 (-.450)	-.858** (-1.989)
LEPerCap	N/a	N/a	-.020*** (-6.033)
Unemployment PerCap	N/a	N/a	59.831*** (-6.033)
Adjusted R²	.011	.003	.329
Durbin Watson Statistic	2.543	2.551	2.429

* Significance at the .1 level ** Significance at the .05 level *** Significance at the .01 level

