The Death Penalty: No Evidence for Deterrence

JOHN J. DONOHUE AND JUSTIN WOLFERS

Despite continuing controversy, executions continue apace in the United States. Late last year, we witnessed the 1000th U.S. execution since the Supreme Court reinstated capital punishment in 1977. The United States trails only China, Iran, and Vietnam in the number of executions according to Amnesty International.

The debate over the death penalty has hung on several major issues. Here, we'll concentrate on one: Does it act as a deterrent?

The claim that it does, is for many people the main reason to support it. George W. Bush stated in the 2000 Presidential debates, "I think the reason to support the death penalty is because it saves other people's lives," and further that "It's the only reason to be for it." By contrast, earlier that year, Attorney General Janet Reno stated, "I have inquired for most of my adult life about studies that might show that the death penalty is a deterrent, and I have not seen any research that would substantiate that point."

Gary Becker and Richard Posner have recently taken George Bush's side, but our own comprehensive evaluation of the econometric evidence supports Janet Reno.

John J. Donohue is a professor at Yale Law School and a Research Associate at the National Bureau of Economic Research. Justin Wolfers is a professor at the Wharton School of Business and a Research Affiliate at the National Bureau of Economic Research.

The academic case for the death penalty

Over the last few years, a number of highly technical papers have purported to show that the death penalty is indeed a deterrent. Cass Sunstein and Adrian Vermeule initially argued, based on studies like these, that "capital punishment is morally required" given the "significant body of recent evidence that capital punishment may well have a deterrent effect, possibly a quite powerful one." In a reply paper subsequent to our review of the evidence, they have adopted a more agnostic tone, however, stating that "[w]e do not know whether deterrence has been shown… Nor do we conclude that the evidence of deterrence has reached some threshold of reliability that permits or requires government action."

More recently, in the *Economists' Voice*, Posner and Becker have adopted the position vacated by Sunstein and Vermeule. Posner claims that "the recent evidence concerning the

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deterrent effect of capital punishment provides strong support for resisting the abolition movement." Becker adds, "I support the use of capital punishment for persons convicted of murder because, and only because, I believe it deters murders."

The empirical research relied on by both Becker and Posner, however, is a skewed sample of available evidence: early research by Isaac Ehrlich, and more recent research by Hashem Dezhbakhsh, Paul Rubin, and Joanna Shepherd.

As we show in a recent Stanford Law Review article and describe below, when one considers all the evidence the empirical support for the proposition that the death penalty deters is *at best* weak and inconclusive.

The flawed statistical evidence in support of deterrence from executions

Isaac Ehrlich's 1975 *American Economic Review* paper analyzed U.S. time series data on homicides and execution from 1933-1969, finding that each execution yielded 8 fewer homicides. This result was somewhat puzzling in light of the fact that an 80 percent drop in the execution rate from the late 1930s until 1960 had been accompanied by falling murder rates. A subsequent re-analysis by Peter Passell and John Taylor showed that Ehrlich's estimates were entirely driven by attributing a sharp jump in murders from 1963-69 to the post-1962 drop in executions.

But the mid-1960s decline in homicide occurred across all states—including those that had never had the death penalty. Moreover, Ehrlich's own model showed no correlation between executions and murder if one simply lopped off the last seven years of his data.

No wonder, then, that a National Academy panel savaged Ehrlich's analysis. Its modern-day impact beyond the University of Chicago campus is extremely limited.

But Posner does cite one recent study (by Dezhbakhsh, Rubin, and Shepherd, hereafter DRS) that finds that each execution saves on balance 18 lives. As we show in our recently published piece in the Stanford Law Review, however, these estimates are simply not credible.

An immediate problem is that DRS do not actually run the regression that they claim to run. The regression they claim to run actually yields the *opposite* result: each execution is associated with 18 *more* executions! (The different results turn on how they measure the key variable defined as "the percent Republican vote in the most recent Presidential election"). We do not suggest, though, that this specific result should be seriously entertained either, as the paper is far more fundamentally flawed.

Like Ehrlich's early work, the DRS study mis-uses a sophisticated econometric technique—instrumental variables estimation. Statistically, the cleanest way to estimate the effect of the death penalty would be to run an (unethical and impossible) experiment, executing convicts more vigorously in randomly selected states, and then comparing the changes in homicide rates across states. DRS attempt to create econometrically a quasi-experiment by identifying a set of variables, "instruments," that might cause changes in the execution rate but not otherwise affect the homicide rate.

Unfortunately, small mis-specifications in this technique can yield extremely misleading results. Instrumental variables estimation requires a valid instrument. However the

instruments that DRS use are not valid, and it stretches plausibility to believe that they generate quasi-experiments in capital punishment policy, rather than simply reflecting changes in crime markets or social trends.

Their instruments are: 1) the statewide aggregate number of prison admissions; 2) total statewide aggregate police payrolls; 3) judicial expenditures (albeit not adjusted for inflation or state size) and 4) the statewide percent Republican vote in the most recent Presidential election. To be valid, they would have to influence executions *and there would have to be no other link between these variables and the homicide rate*.

This is not the case. For example, DRS tell us that Republicans tend to be tougher on crime. If true, that would imply that not only does the percent Republican vote correspond with executions (as DRS posit) but it is likely also related to other get-tough measures that might cause crime to fall (say, tougher sentencing laws or more vigilant policing.)

Indeed, all three authors of the DRS study have used these very same instruments in assessing the impact of other anti-crime measures, *indicating that their own work is premised on the belief that there are other pathways from these instruments to the crime rate*. If these alternative pathways are important then their estimates of the deterrent effects of capital punishment will be severely overstated.

We show that with the most minor tweaking of the DRS instruments, one can get estimates ranging from 429 lives saved per execution to 86 lives lost. These numbers are outside the bounds of credibility. With 1000 executions over the last 25 years, if we had saved 429,000 lives (against an actual murder toll of roughly 500,000 over that period), the impact of the death penalty would leap out of the data. Murders would have plummeted in death penalty states compared to non-death penalty states, or in the United States, compared with non-executing Canada.

In fact, when we make precisely these comparisons, the murder rates across treatment and control states seem to follow virtually identical paths.

A further important problem with the DRS study is that they analyze county-level panel data, but make no adjustment for either the correlation across counties within a state[1], or the correlation of the relevant variables through time. Following standard adjustments (clustering the standard errors by state to take account of these correlations) yields vastly higher standard errors, and a confidence interval around their preferred point estimate that extends from 119 lives saved per execution to 82 lives lost! We are prepared to believe that this interval captures the true effect of each execution, but this provides little guidance to policymakers.

Why price theory doesn't fill the gaps in the statistical evidence

Other studies also claim to draw strong conclusions from noisy data. But they are also rife with coding errors and overstatements of statistical significance, or are not robust to small changes in sample, functional form, or control variables. The problem is simply that execution rates have varied too little over the last 30 years to admit any robust inference from data collected over this period.

Becker thus rightly admits that "the evidence is decidedly mixed", and that "the

weight of the positive evidence should not be overstated," and hence founds his presumption in favor of deterrence on a belief "that most people have a powerful fear of death." Thus, Becker suggests that price theory can fill in where empirical evidence is lacking: capital punishment is akin to a rise in the price of murder and hence might be expected to lessen the number of murders.

But if the price rises, by how much? Is capital punishment a poor bargain, from a consequentialist's viewpoint? After all, the cost of capital trials often run into several millions of dollars.

That can only be determined empirically, and the issue is complex: one needs to evaluate both how much the "price" rises when capital punishment is used instead of other punishments, and the marginal response of potential murderers to this increase.

The penalty for committing a capital murder (if one is caught) is already extraordinarily high—being locked in a cage for the rest of one's life without possibility of parole. So what is the marginal deterrence of an infrequently administered additional sanction of death, many years later? Indeed, executions are so rare and appeals so lengthy that it is not even clear that being sentenced to death reduces the life expectancy of a criminal (especially given the high risks of death on the street). For instance, in 2004 there were 16,137 homicides, and only 125 death sentences were handed out; of the 3,314 prisoners on death row, only 59 were executed.

Finally, other factors (some of which Becker and Posner mention) may weaken or even entirely undercut any deterrent effect. For instance, state-sanctioned executions may lower the social sanctions regarding taking the lives of others, thereby *reducing* the price of murder.

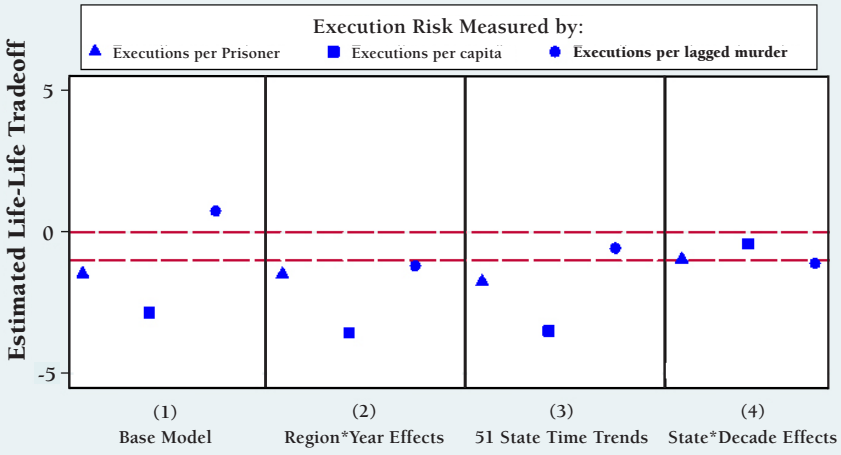
Model dependence in estimating the deterrent effect of executions

Posner omits to mention a key paper by Lawrence Katz, Steven Levitt and Ellen Shustorovich's (hereafter, KLS), which appeared in the same issue as DRS. KLS analyzed annual state homicide execution data from 1950-1990, publishing four models with a full set of controls. These models yielded the following alternatives estimates of net lives saved per execution: 0.6, 0.4, -0.8, and -0.5 (with the negative numbers suggesting net lives *lost* per execution).

We have updated KLS' data to include a longer time period, extending it to cover 1934-2000. Reliance on the death penalty was far greater 70 years ago than it has been in the past two decades and this greater variation is necessary to obtain reasonably precise estimates. The resulting four estimates for the longer data period: -1.5, -1.5, -1.7, -1.0, now uniformly suggesting no benefit from executions (an estimate of -1 implies that no murders were deterred and one life was lost by virtue of the execution). These results are shown in Figure 1 as the solid triangles.

We also tried two further specifications, coding the execution variable as executions per capita (shown as squares), and executions per (lagged) homicide (shown with circles). In other respects, we followed the KLS specifications and include a rich set of controls, including the (non-execution) prison death rate, prisoners per crime (lagged once), prisoners per capita (lagged once), real income per capita, the proportion of the state population that is black,

Figure 1
Estimated Lives Saved per Execution
Katz-Levitt-Shustorich Plus Robustness Tests, 1934-2000



All models include state and year fixed effects and control for state economic and demographic variables

living in urban areas, aged 0-24 and 25-44 and state and year fixed effects. In each case, we converted the estimated coefficients into the implied number of lives saved per execution.

Across each of these quite reasonable specifications, we find considerable variation in the estimated relationship between execution and murder rates. Our reading of these results suggests (weakly) that the preponderance of the evidence supports the view that increases in executions are associated with *increases* in lives lost, although further permutations of the full array of plausible models would be needed before strong conclusions could be reached.

One reason to believe that the KLS methodology yields unbiased estimates is that the focus of their paper is not on the deterrence effect: for them, capital punishment is only a control variable. Why is this better? Because it makes it less likely that they would be tempted to tailor their specification to generate a particular result concerning the impact of the death penalty. Our re-analysis of the existing literature suggested a tendency of many authors to only report results that were favorable to a particular political position.

Our guess is that estimating more models will only reinforce the lack of robustness of any particular finding, confirming the high degree of model-dependence in the estimated effects of the death penalty. Moreover, we should emphasize that these regressions merely highlight an association between executions and homicides, and the direction of the causal arrow remains an open question.

The bottom line

The view that the death penalty deters is still the product of belief, not evidence. The reason for this is simple: over the past half century the U.S. has not experimented enough with capital punishment policy to permit strong conclusions. Even complex econometrics cannot sidestep this basic fact. The data are simply too noisy, and the conclusions from any study are too fragile. On balance, the evidence suggests that the death penalty may increase the murder rate although it remains possible that the death penalty may decrease it. If capital punishment does decrease the murder rate, any decrease is likely small. In light of this evidence, is it wise to spend millions on a process with no demonstrated

value that creates at least some risk of executing innocents when other proven crime-fighting measures exist? Even consequentialists ought to balk.

Letters commenting on this piece or others may be submitted at http://www.bepress.com/cgi/submit.cgi?context=ev

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[1] Recall that DRS are trying to estimate the effect of executions on county murder rates, while they only have data on executions by *state*, which is less than ideal.