
Discussion of Durlauf, Navarro and Rivers
“Notes on the Econometric Analysis of Crime”

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Steve's ~~Advice~~ Complaints

1. Estimation: Start with well-specified choice models
 - Understanding the aggregation of micro-behavior into macro aggregates can guide functional form choices
 - *Ad hoc functional forms*
 - Well-specified models highlight important controls
 - *Policy variables are often correlated (and too often omitted)*

2. Interpretation: Policy analysis requires well-specified social welfare functions
 - Requires explicit of counterfactual policy experiments
 - *Counterfactuals rarely well-specified*
 - Statistical significance is not policy significance
 - *Statistical significance is the usually reported*
 - *Cost-benefit relevant magnitudes rarely reported*
 - Probability distributions matter, not just mean effects
 - *Model uncertainty is usually ignored*
 - *Model uncertainty may be large*

What is Missing?

My Complaints

0. Poorly-defined policy counterfactuals
1. Incredible instrumental variables
2. Overstatements of precision
3. Publication bias understates model uncertainty

Complaint #0: Counterfactual Policy Analysis

- What is the relevant counterfactual policy in death penalty analysis?
 1. Abolish the death penalty
 - Test of the “deterrence” hypothesis
 2. Re-allocate all death penalty resources to other criminal justice areas
 - Cost-benefit analysis
 3. Re-allocate “some” proportion of death penalty resources to alternative criminal justice projects and “the rest” to competing state priorities
 - The variation we have.

Complaint #1: Incredible Instrumental Variables

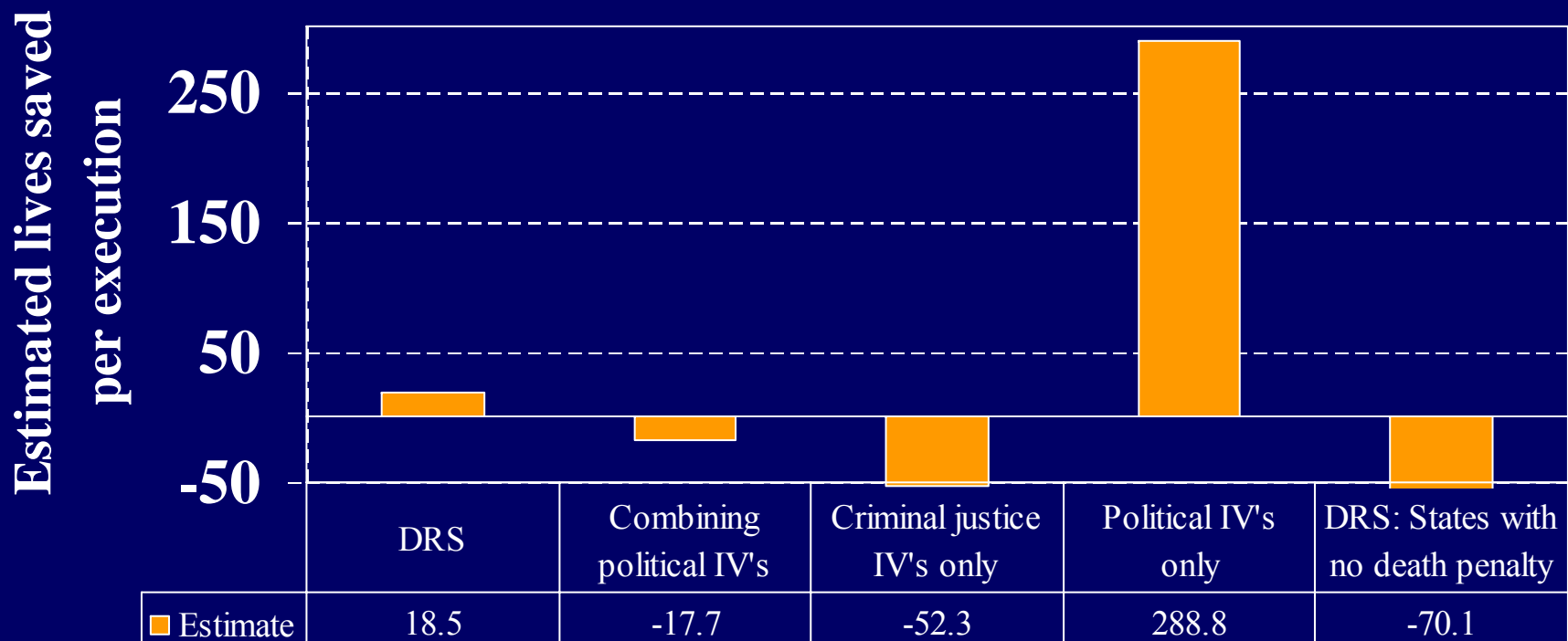
- Identification requires “experiments” in execution policy that do not otherwise affect crime
 - DRS suggest “experiments” in execution from:
 - » State-level police payrolls
 - » State judicial spending
 - » Prison admissions
 - » Partisanship: % of state voting for a Republican Prez (6 variables)
 - Further:
 - » Variables are state aggregates, not per capita
 - » Nominal, rather than real expenditure variables

An Instrument for All Occasions?

- The instruments used by Dezbakhsh, Rubin and Shepherd have been used in other papers:
 - Lott and Mustard (1997) ⇒ Explain concealed gun laws
 - Rubin and Dezbakhsh (2003) ⇒ Explain concealed gun laws
 - Shepherd (2002a) ⇒ Explain Truth-in-sentencing legislation
 - Shepherd (2002b) ⇒ Explain California’s three strikes laws
 - Shepherd (2004) ⇒ Explain Sentencing guidelines
- In each case, the authors assume:
 - Instrumental variables cause changes in specific deterrence variables
 - But have *no other effects on crime*.
 - ...and hence generate useful “as if” experiments in a particular endogenous variable (and not others!)

“Overidentification” Tests

Estimates of Lives Saved per Execution: Alternative “Experiments”



Alternative IV Specifications

Assessing the Reduced-Form

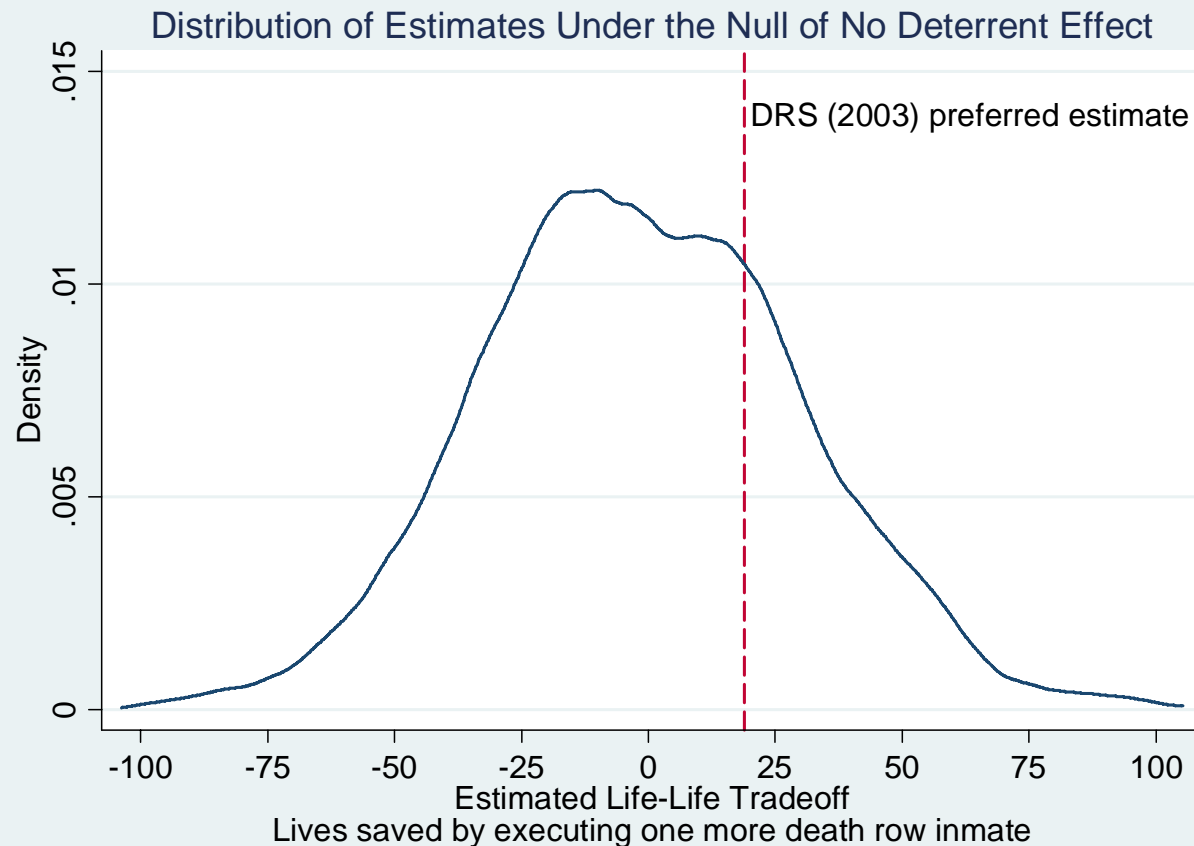
	Dependent variable			Net Effect on Homicide Rate ^(a)
	Probability of Arrest	Probability of Death Sentence Given Arrest	Probability of Execution Given Death Sentence	
	(1)	(2)	(3)	
Police Spending	0.03 (0.023)	-0.002 ^{***} (0.000)	-0.05 ^{***} (0.004)	0.08
Judicial Spending	-0.22 ^{***} (0.034)	0.01 ^{***} (0.001)	-0.04 ^{***} (0.006)	0.58
Prison Admission	0.01 ^{***} (0.002)	-0.0001 ^{***} (0.000)	0.004 ^{***} (0.000)	-0.04
1976 * Republican Vote Share (Ford)	-0.66 ^{**} (0.311)	0.03 (0.083)	0.49 ^{***} (0.053)	0.08
1980 * Republican Vote Share (Reagan I)	0.16 (0.202)	0.004 (0.004)	0.02 (0.036)	-0.45
1984 * Republican Vote Share (Reagan II)	-0.64 ^{***} (0.196)	0.04 ^{***} (0.004)	0.29 ^{***} (0.035)	0.54
1988 * Republican Vote Share (Bush I)	-0.25 (0.216)	0.06 ^{***} (0.004)	-0.03 (0.038)	0.41
1992 * Republican Vote Share (Bush II)	-0.04 (0.215)	0.05 ^{***} (0.004)	0.14 ^{***} (0.039)	-0.45
1996 * Republican Vote Share (Dole)	-0.82 ^{***} (0.212)	0.01 ^{**} (0.004)	0.96 ^{***} (0.040)	-0.77
N	48,070	51,143	57,637	
	Second Stage			
Coefficients	-2.27 ^{***} (0.50)	-3.62 (14.53)	-2.71 ^{***} (0.62)	

Rubin's Response

- Donohue and Wolfers claim: These instrumental variables are not possibly “exogenous” shocks to execution policy
 - Fail test of overidentification
- Rubin's response: “Most of our instrumental variables have been used in numerous empirical papers because previous researchers believed (often based on empirical testing) that the instruments were as uncorrelated with crime rates as one was likely to find.”
 - *Economists' Voice*, April 2006 [[Detail](#)]

Complaint #2: Overstatements of Precision

- DRS treat county-year observations as independent
 - Variation in execution policy (IV's) at state level only
 - Autocorrelation in homicide and execution policy



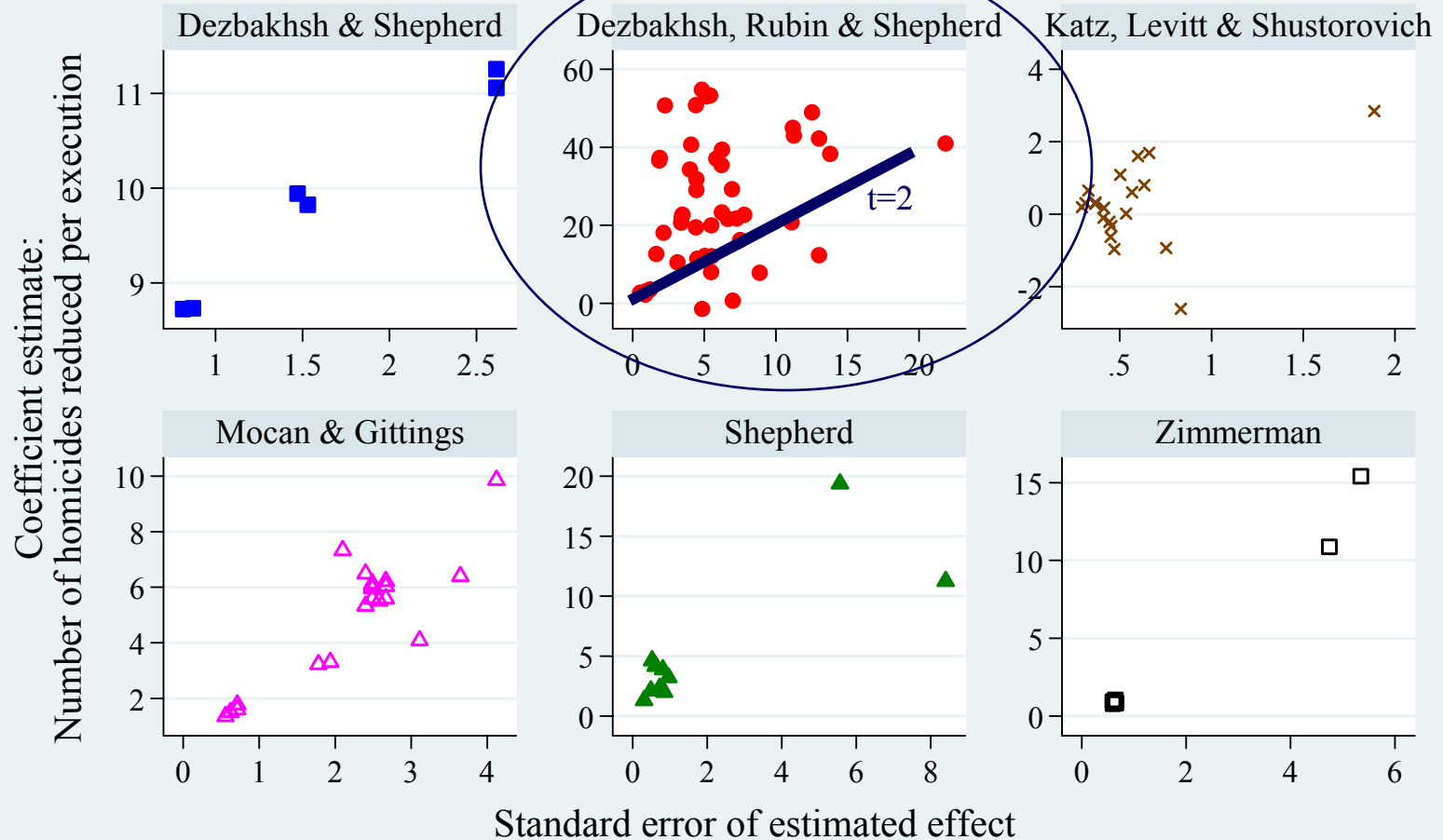
□ *Realistic estimates of parameter uncertainty make Durlauf et al's estimates of model uncertainty less striking*

Complaint #3: Publication Bias

Understates Model Uncertainty

Reporting Bias: Estimated Effects of Executions on Homicide

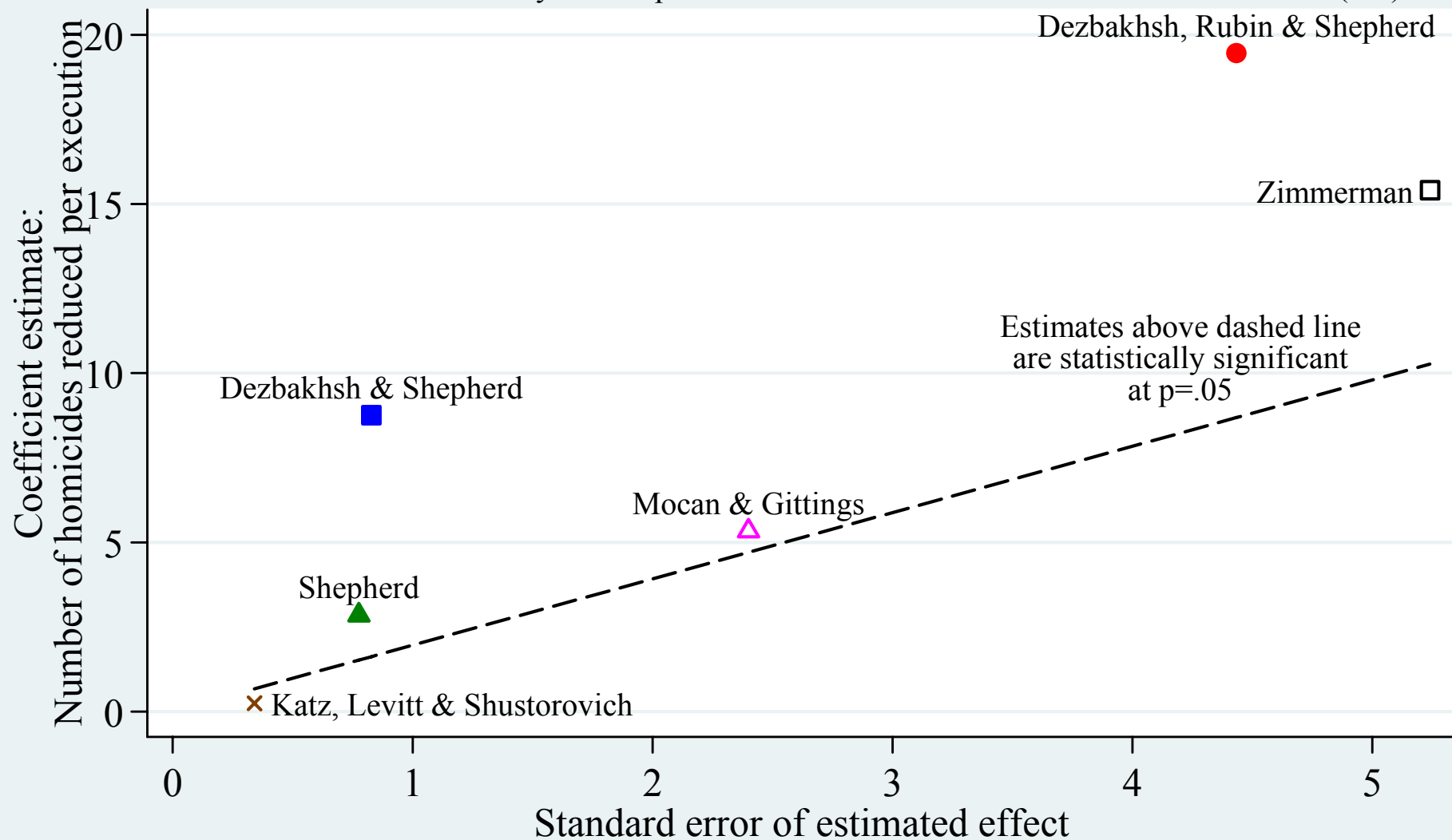
H0: No reporting bias implies that estimated effects should be unrelated to the standard error
 H1: Results are more likely to be reported if the effect is at least twice the standard error ($t > 2$)



Coefficients converted into homicides reduced for the average executing state in 1996

Reporting Bias: Estimated Effects of Executions on Homicide

H0: No reporting bias implies that estimated effects should be unrelated to the standard error
H1: Results are more likely to be reported if the effect is at least twice the standard error ($t > 2$)



Coefficients converted into homicides reduced for the average executing state in 1996.
The central estimate from each study is shown.

What Problem Does Model Averaging Solve?

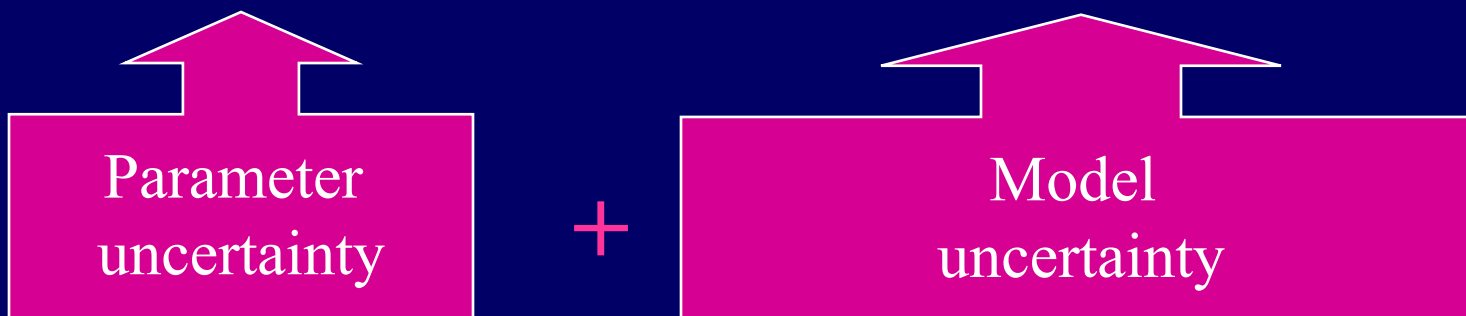
- “Optimal” crime forecast

$$E(\rho_{l,t+1} | D_t, M) = \sum_{m \in M} E(\rho_{l,t+1} | D_t, m) P(m | D_t)$$

- Realistic measure of forecast uncertainty

$$\text{Var}(\rho_{l,t+1} | D_t, M) =$$

$$\sum_{m \in M} \text{Var}(\rho_{l,t+1} | D_t, m) P(m | D_t) + \sum_{m \in M} \left(E(\rho_{l,t+1} | D_t, M) - E(\rho_{l,t+1} | D_t, m) \right)^2 P(m | D_t).$$



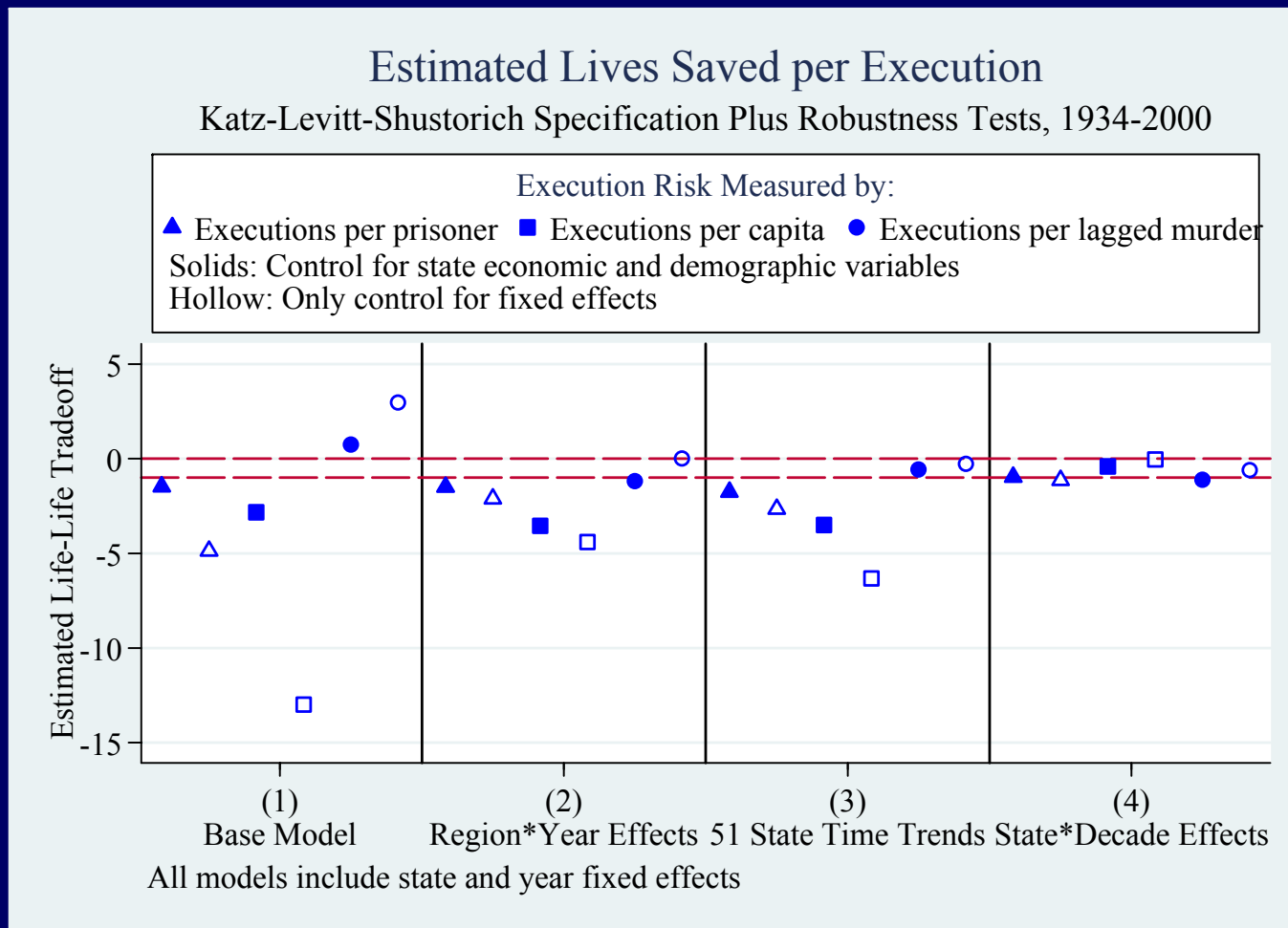
→ We get a reasonable measure of our ignorance

Which Models to Average?

- Durlauf et al: We should take a posterior weighted average of “coherent models”
- But in reality:
 - Published models are a selected subset
 - » Averaging pro-deterrence studies will yield pro-deterrence averages
 - Some IV studies are not credible
 - » GIGO: “Garbage in, Garbage out”
 - Data cannot speak very precisely
 - » Properly estimated, parameter uncertainty is huge
 - » Model uncertainty also large
 - ◆ But this depends on the range of “coherent” models
- What’s missing?
 - Researcher judgment

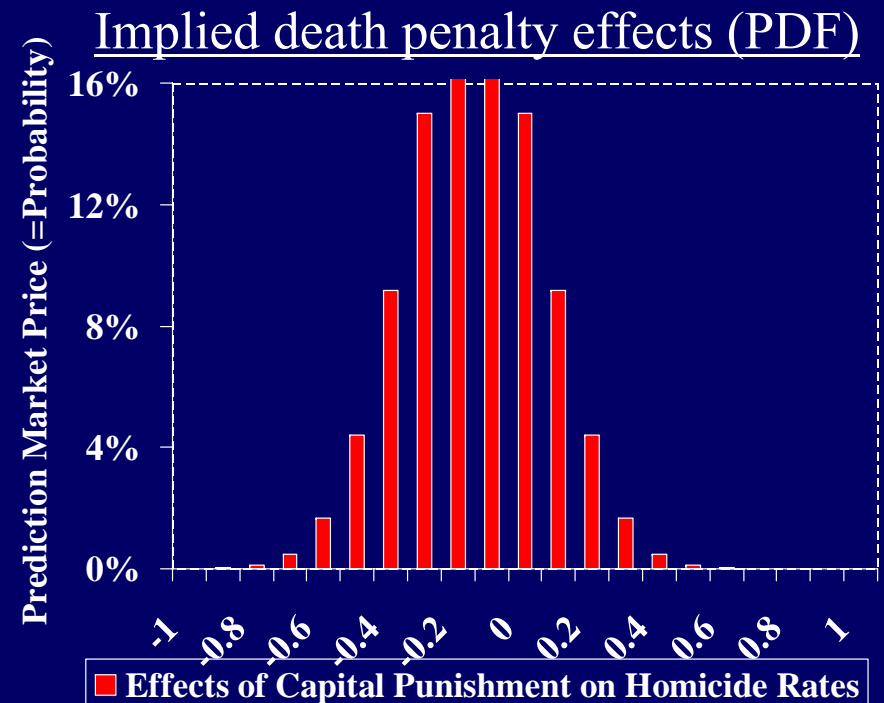
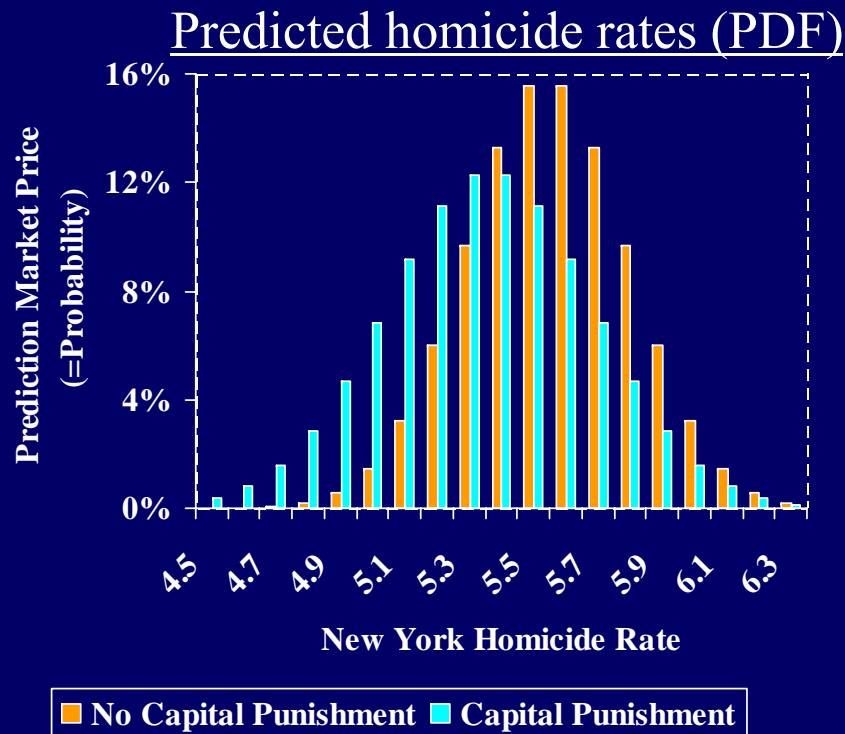
Katz, Levitt, Shustorovich: State Panel Data

$Homicide\ rate_{s,t} = \beta Execution\ rate_{s,t} + State\ effects_s + Year\ effects_t$
 + Controls: prisoners per crime, prisoners per capita, prison death rates, real per capita income, %black, %age 02-24, %age 25-44, %urban
 [+ region*year effects, state*time effects, or state*decade effects]



Model Averaging: A Market-Based Alternative

- Run a prediction market:
 - What will the New York homicide rate be in 2008?
 - » If the Supreme Court allows executions to resume?
 - » If executions are still deemed unconstitutional?



Model Averaging: A Practical Alternative

Survey 100 clever social scientists.

❖ Sample begins:

1934 1950 1972 1977 1984 2000

❖ Aggregation

National time series State cross-section State-year panel
 State-month panel county-year panel OECD country-year panel

❖ Independent variable:

#executions executions per death sentence_{t-6} executions per murder
 executions per murder_{t-1} executions per prisoner executions per capita

❖ Control variables:

Age structure Racial composition Incarceration rate Prison conditions
 Police Arrest rate Death sentences per homicide_{t-7} Non-homicide crime rates
 State effects Year effects State*year trends State*decade effects Region*year effects

❖ Estimation:

OLS WLS GLS Median regression IV Matching (on what?)

❖ Instruments

Supreme court decisions State supreme court decisions Legislative changes
 Police payrolls Prison admissions Judicial spending % voting Republican
 Botched executions Ratio of Black-white homicide rates

❖ Weight you put on this model?

5% 10% 20% 25% 50% 100%