A Power-Law of Death

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A Pareto-Distribution

- Across geographic units, executions are distributed as Pareto noted that wealth is distributed: A small number of the units have a large percentage of the executions.
- Pareto suggested a model by which the “rich get richer” – a proportionate growth model.
- Why do some jurisdictions never or rarely impose the death penalty while others do so more by several orders of magnitude?

Plan of Talk

- An informal discussion of proportionate-growth models
- Background on the death penalty
- Core of the presentation: geographic distribution of executions
- My goal: to get your help in explaining an interesting empirical puzzle, one with substantive importance for equal justice

Proportionate Growth with a Random Start

- Assume a random start, and different units begin with different sizes (or histories)
- Subsequent growth is proportionate to size.
  - Think: web sites with more prominence continue to get more links to them, increasing their prominence
  - Big companies may grow faster than smaller ones, leveraging their advantages in scale
  - The rich get richer

How might this apply to the development of a "local legal culture"?

Six actors in the US system

- Prosecutor
- Defense (Public Defender's Office, funded by state)
- Juries
- Judges
- State appellate courts
- US circuit courts
- (US Supreme court as well, but affects all actors equally)

Assume no executions so far in your jurisdiction

- Next heinous murder occurs
- Probably not the most heinous in local history
  - Therefore does not merit more severe punishment
- Prosecutor has no confidence that:
  - He has the staff experience to do it
  - Defense attorneys cannot fight successfully
  - Juries will go for it
  - Judges will allow it
  - Appellate courts will sanction it

Assume some previous executions

- Next heinous murder occurs
- It may well be more heinous than some previous case which led to execution
- Prosecutor has confidence that:
  - He has the staff experience to do it (and maybe a younger lawyer who needs a promotion)
  - Juries will go for it
  - Public Defender is under-funded and ill-equipped
  - Judges will allow it (and keep the Defender weak)
  - Appellate courts will sanction it

Local norms developing independently

- Baseline factors:
  - Former slave states
  - High minority population
- But why Houston and not, say, New Orleans?
- Random start, then self-reinforcement
- If we can show this it excludes “equal justice” as a factor, which could be unconstitutional

Empirical Expectations

- Time elapsed between executions then decline with each successful case
- Executions per year should be predicted by number of previous executions, more than by number of murders or the crime rate
- Patterns should not be predictable based on simple geography or slave-state status
- Should hold at all levels of scale
- Pattern should move from relatively random (murders) to relatively extreme as we move through the stages of the process: capital charges brought, sentences, executions
- Outliers should always be present but may not always be the same in different historical periods

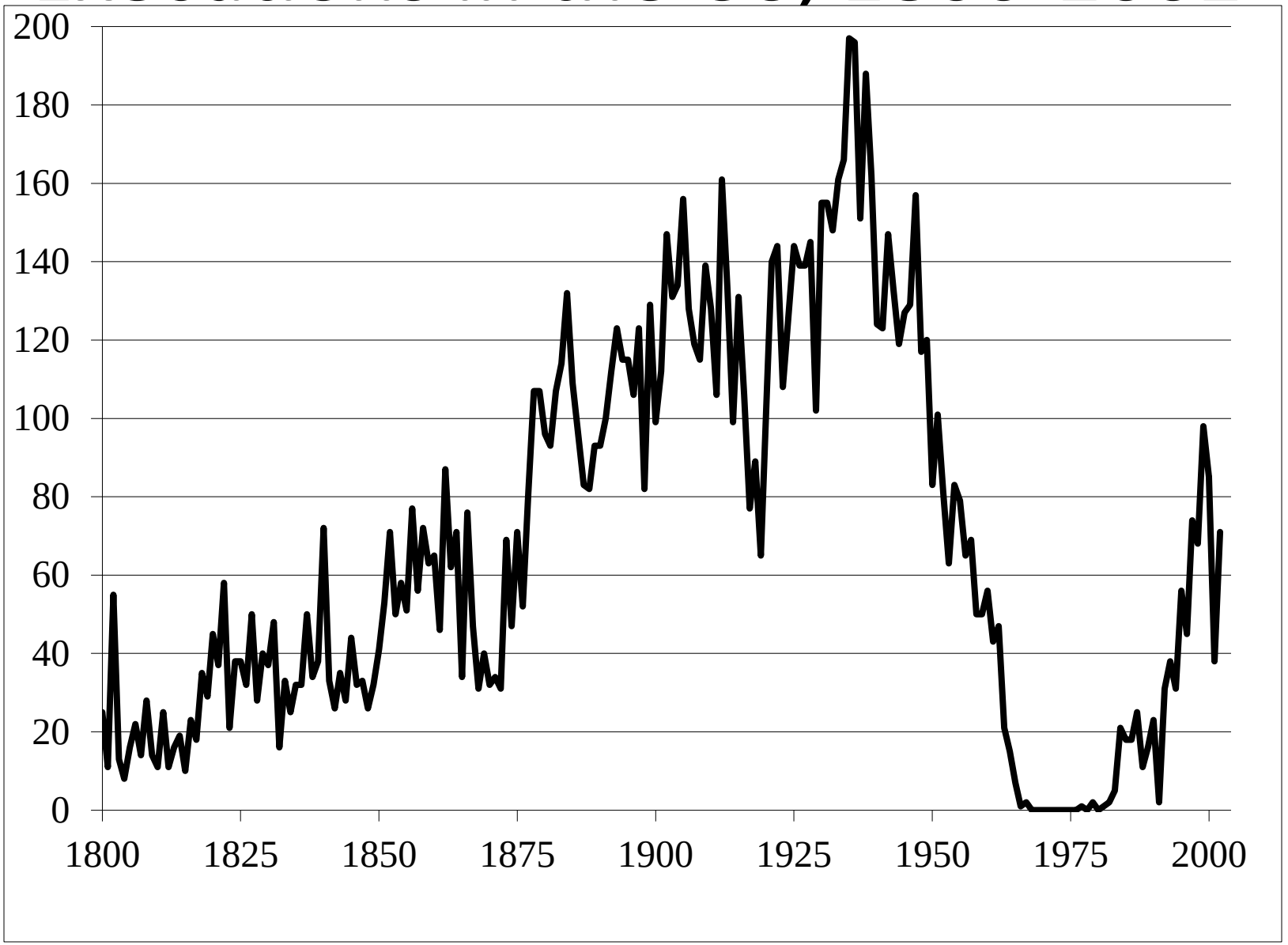
Some background facts

- 1972: State laws ruled unconstitutional
- 1976: 37 new state laws pass constitutional review by Supreme Court
- 1977: Gary Gilmore, a volunteer, shot by firing squad in Utah
- NJ, NM, IL recently have become first states in US history to VOTE to abolish.
- Current trends all toward reduction
- Inflection: late 1990s

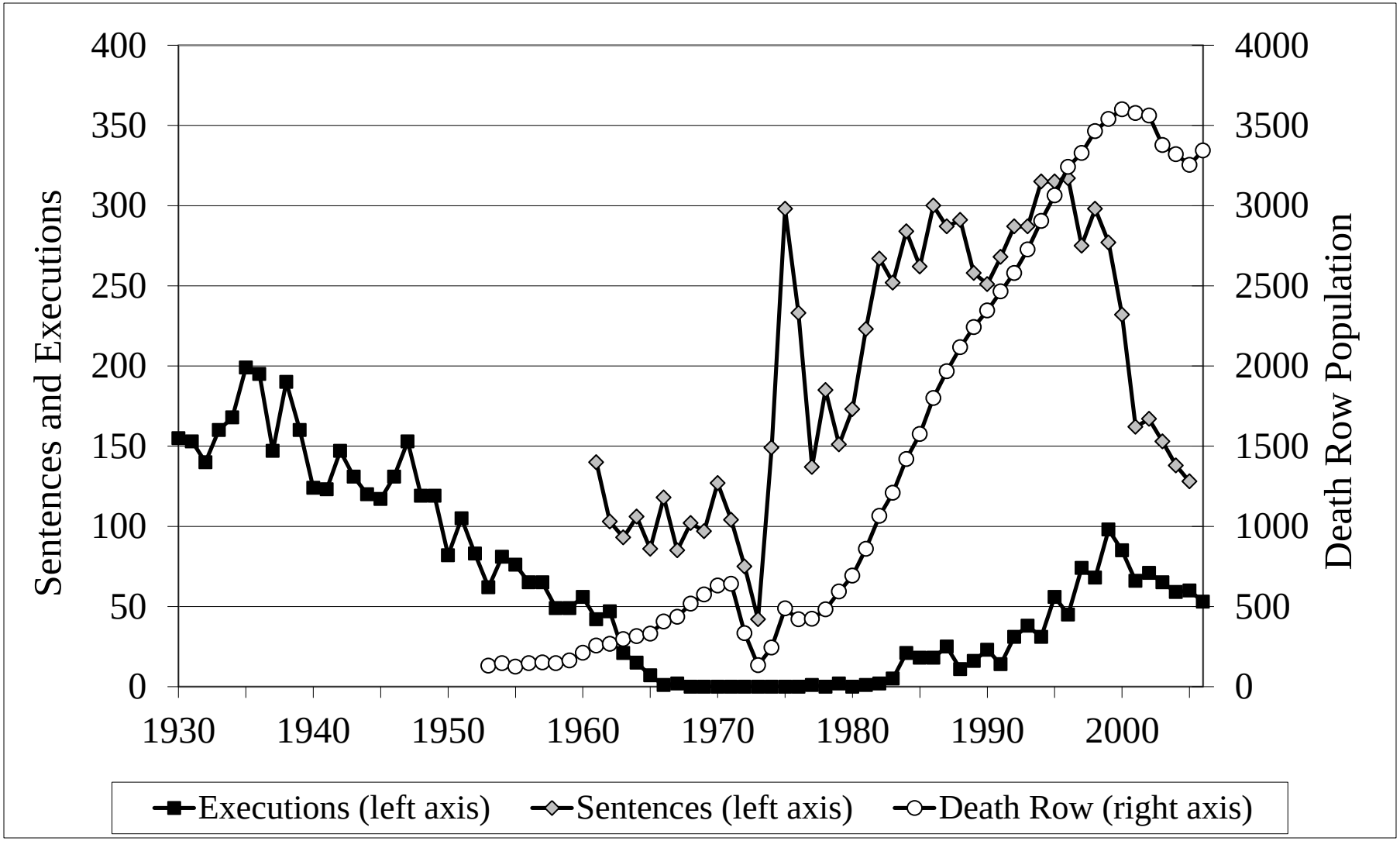
More facts

- Since 1976, about 20,000 homicides per year, or 720,000 homicides
- Same period: 1,239 executions
- Homicides > executions: ~1.7 in 1,000
- Homicides > death sentences: ~ 1 in 100
- Death sentences > executions: 20 percent
- Other outcomes: 65 percent reversed on appeal, others die in prison, are commuted. About 5 percent are EXONERATED (freed).

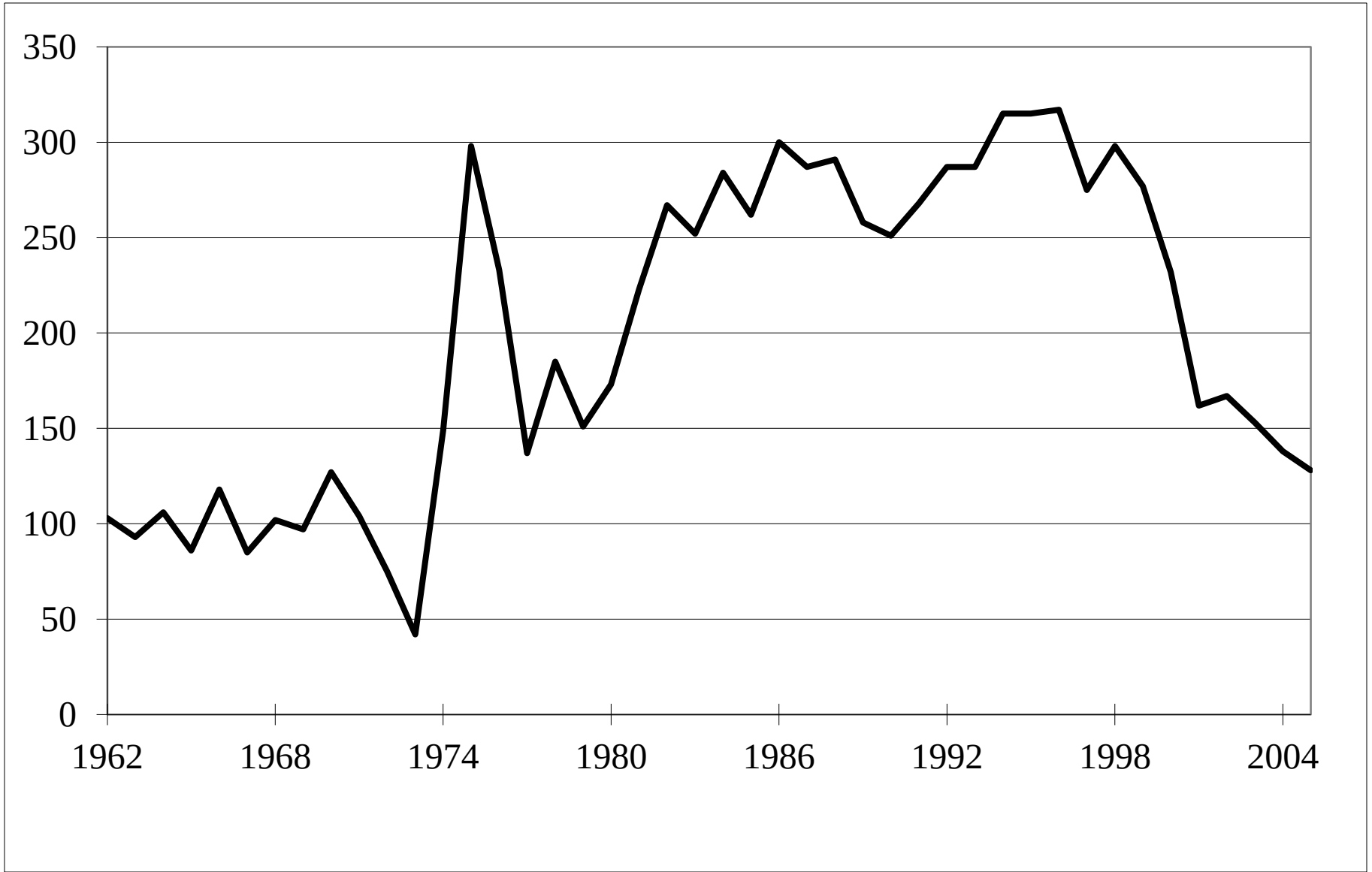
Executions in the US, 1800-2002



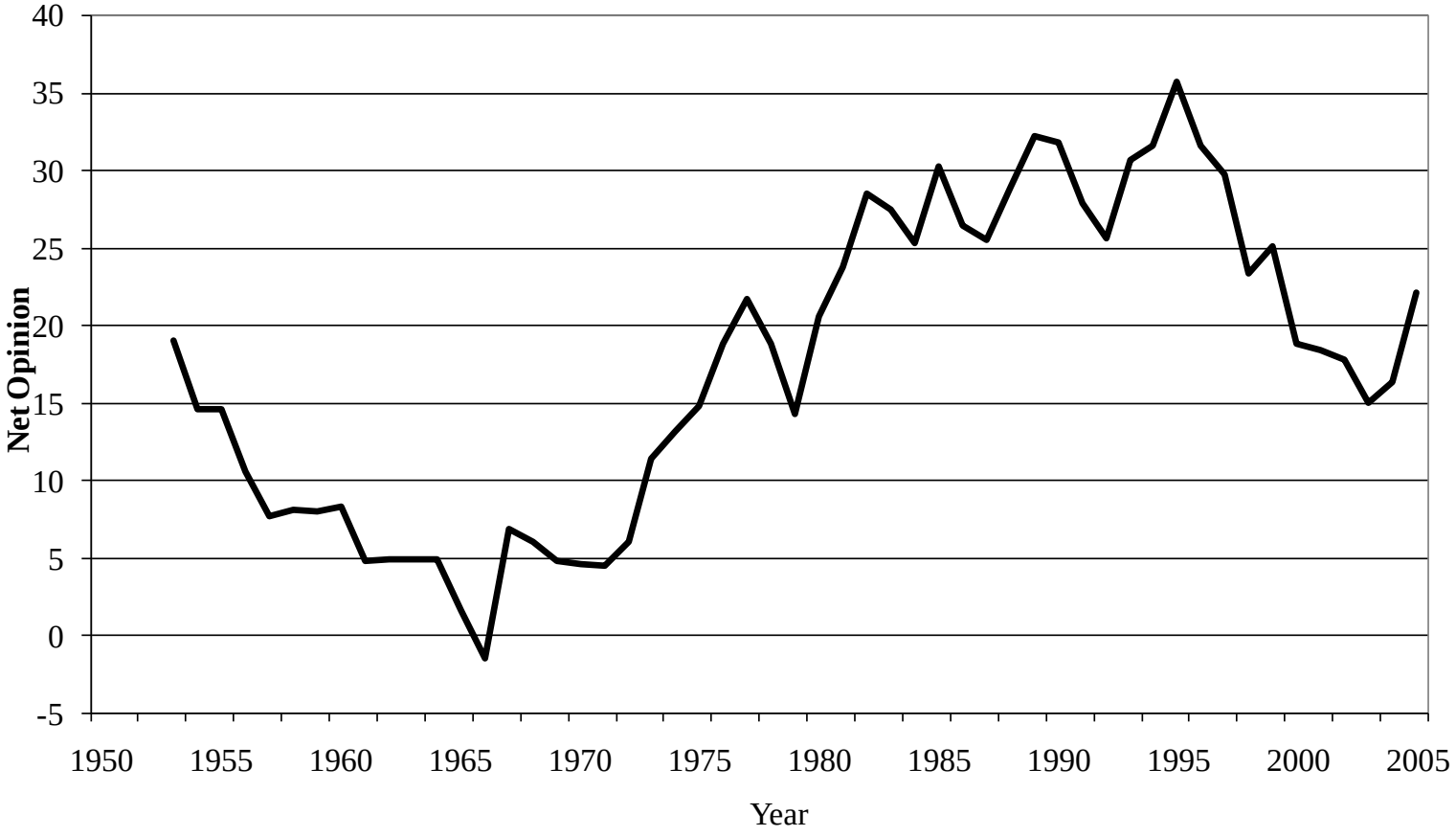
Death Sentences, Executions, and the Size of Death Row, 1930-2006



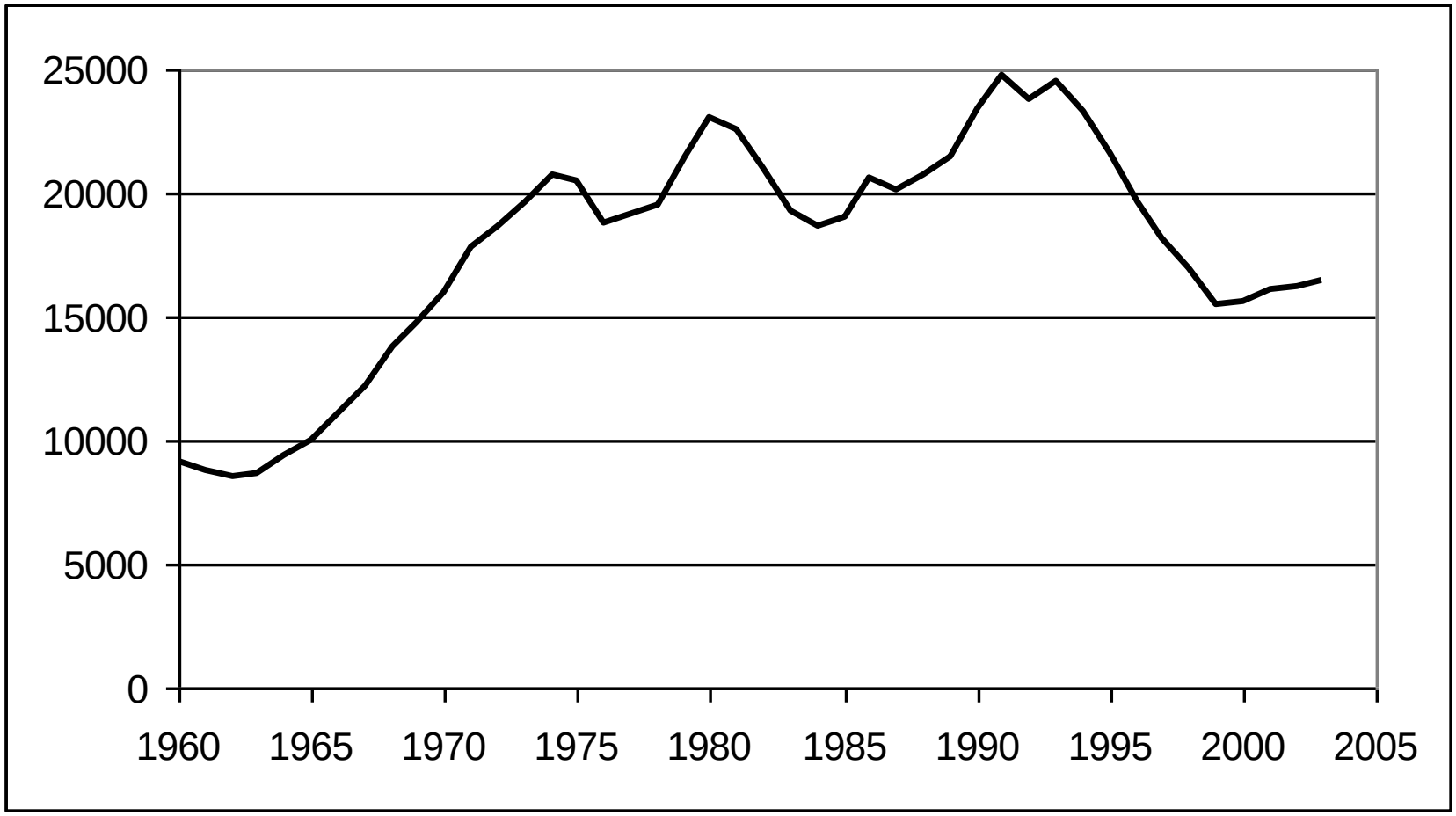
Number of Death Sentences



Net Public Opinion, 1953-2004



Homicides: decline from 24,500 in 1993 to 15,500 in 2000

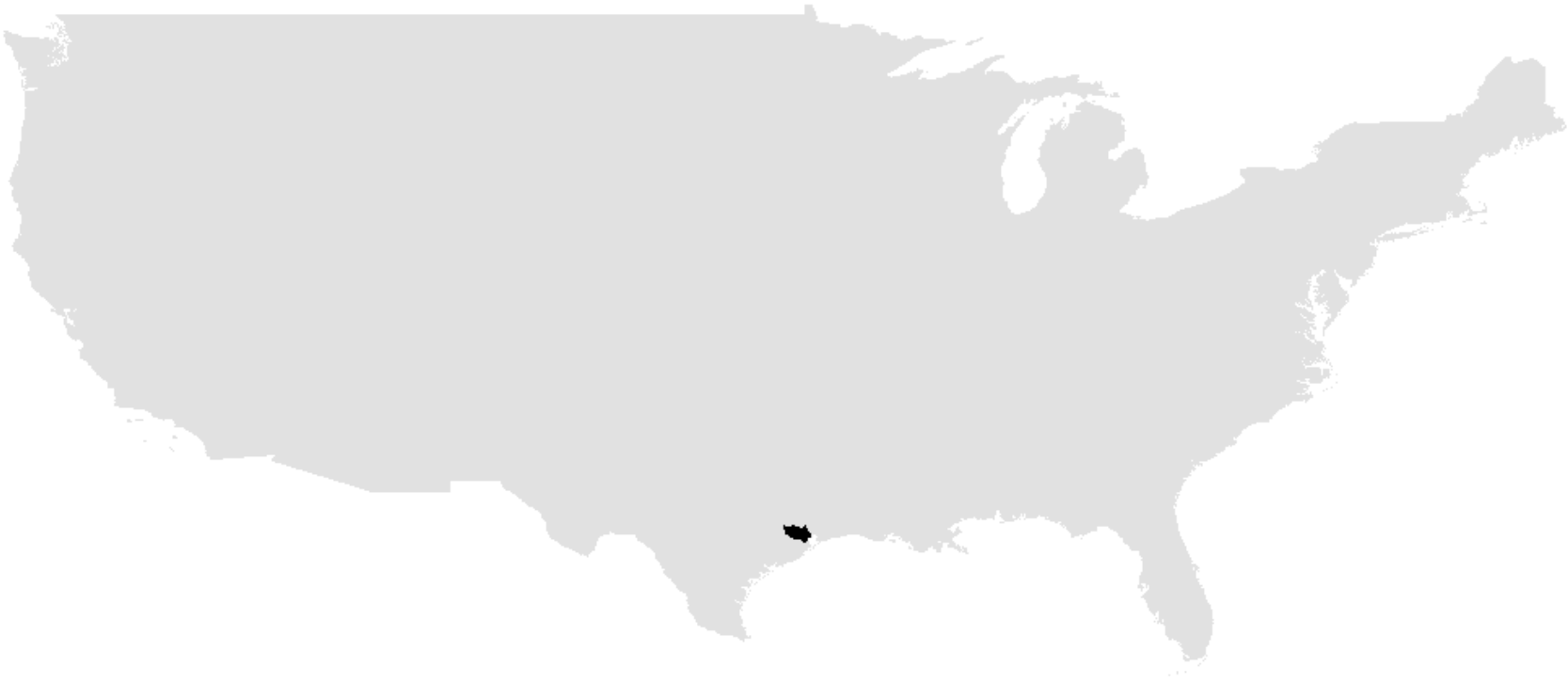


NB: France, UK, approx 400 per year

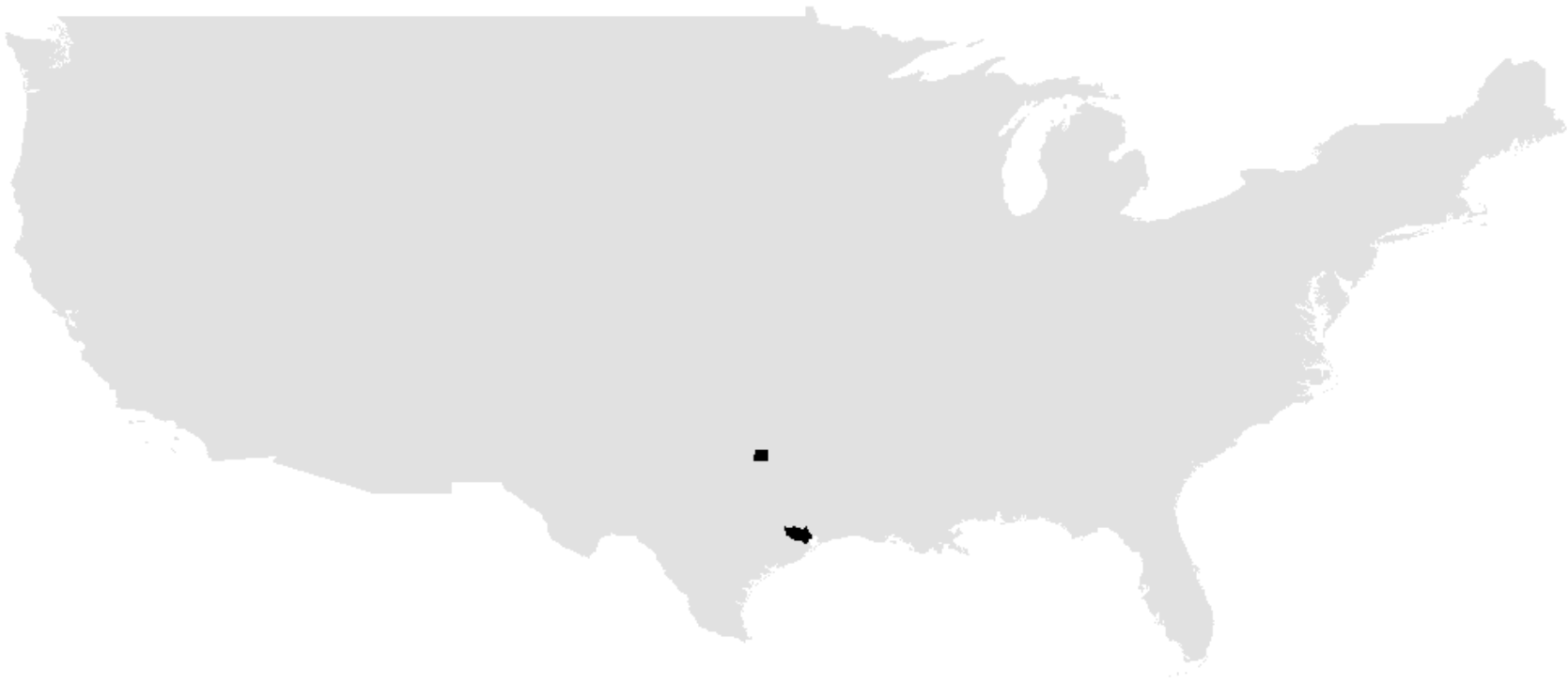
OK, finally to the point

- Some maps
- Some data
- Some ideas about what might explain the patterns observed

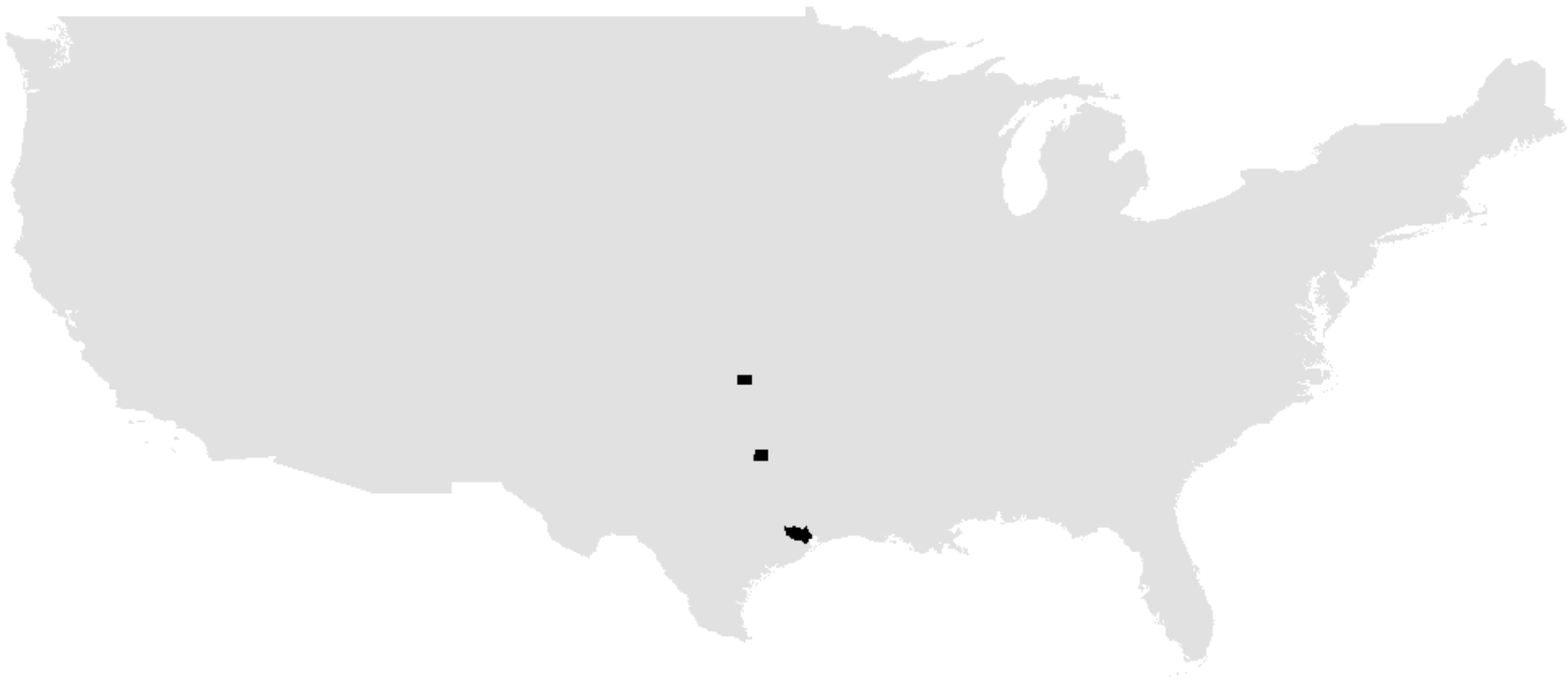
Counties with 116 or more executions since 1976



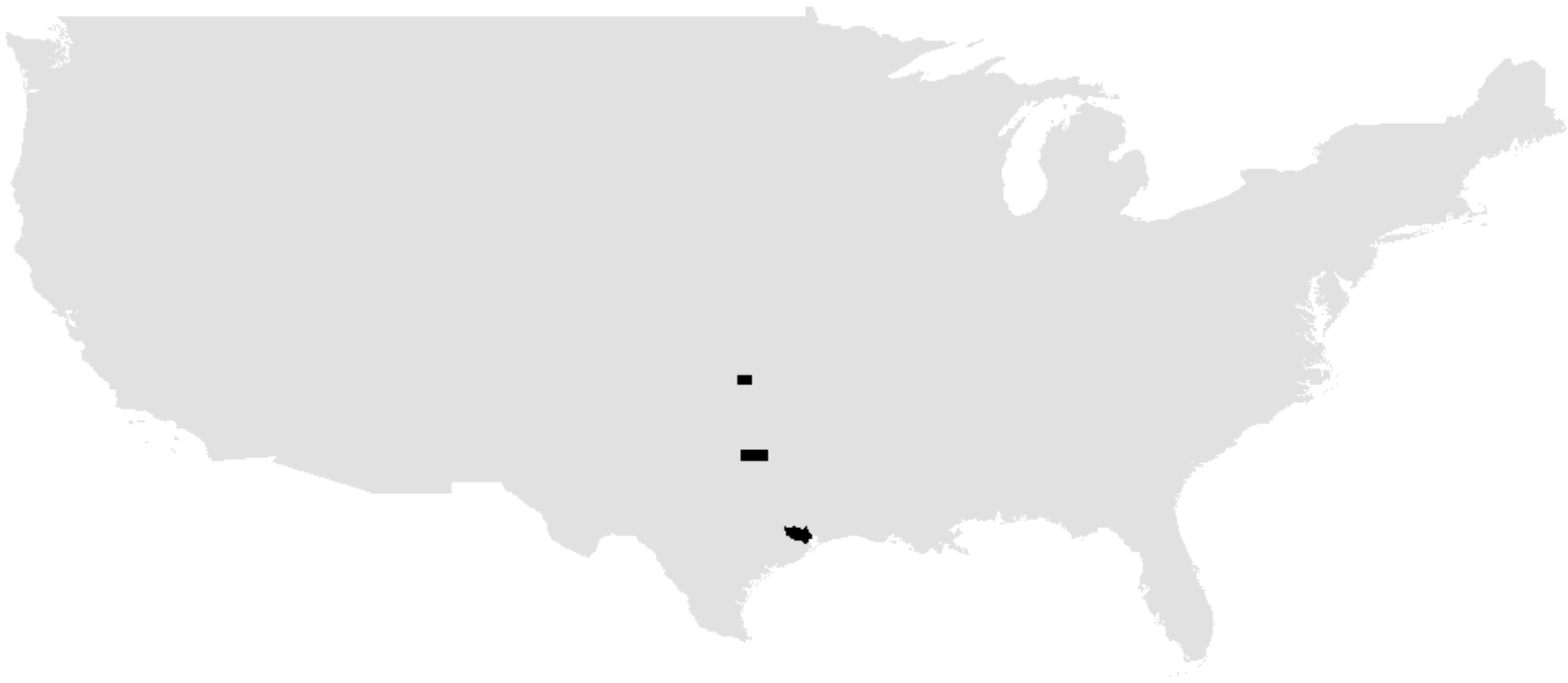
Counties with 44 or more executions since 1976



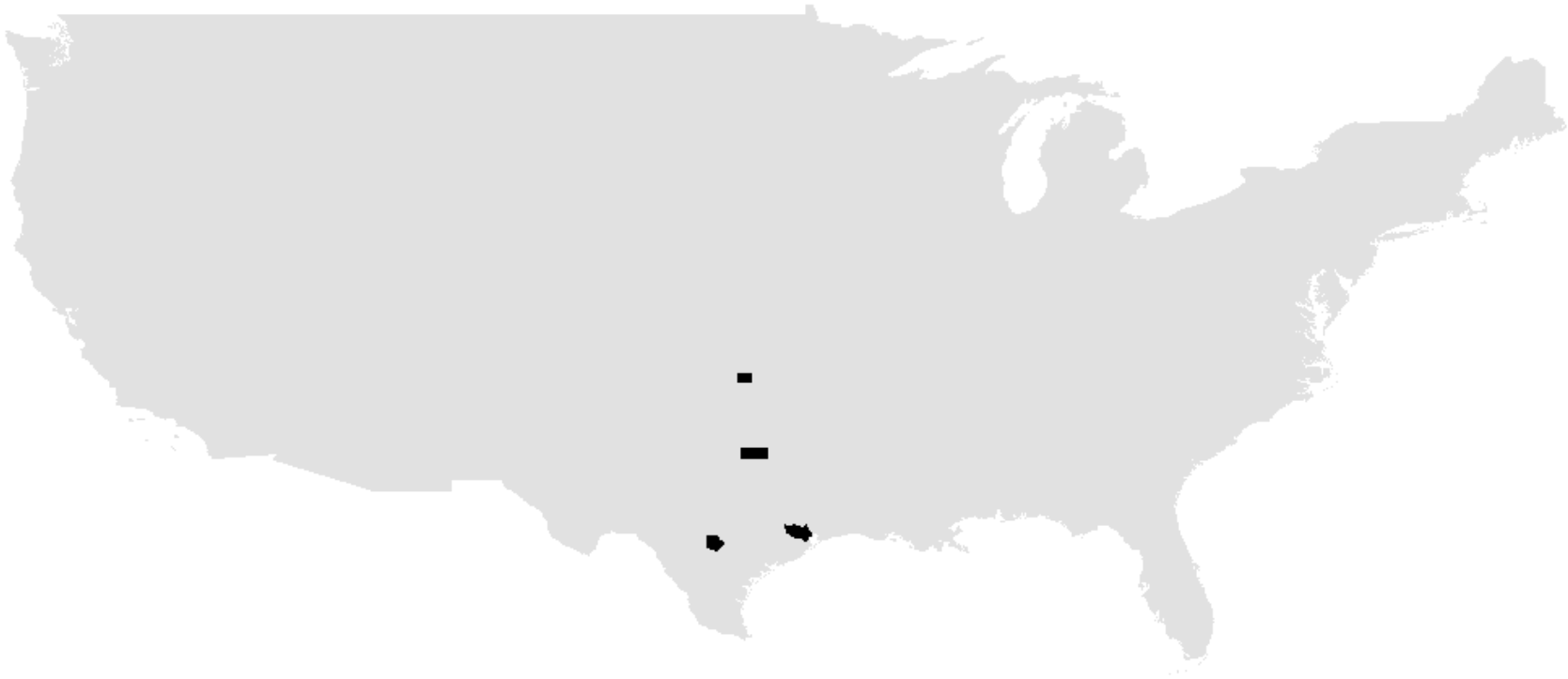
Counties with 36 or more executions since 1976



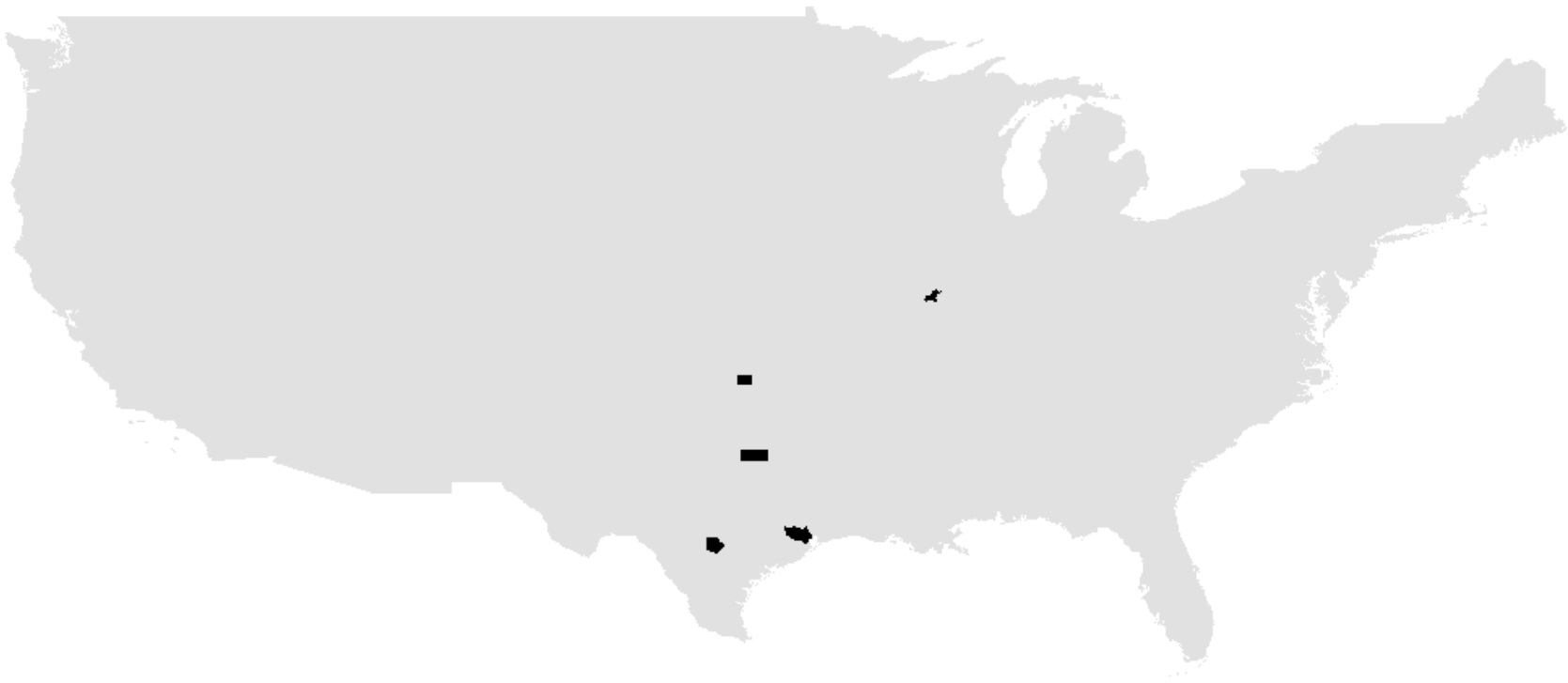
Counties with 35 or more executions since 1976



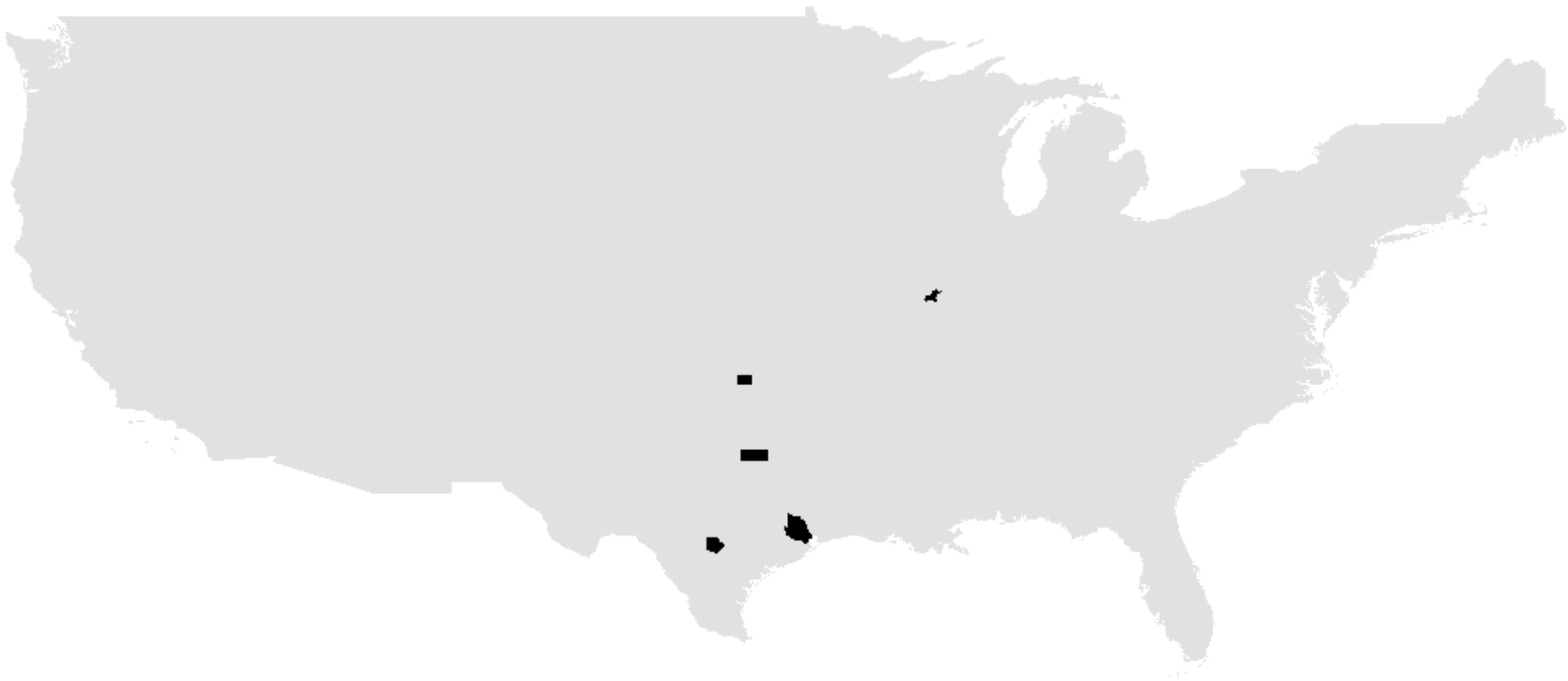
Counties with 31 or more executions since 1976



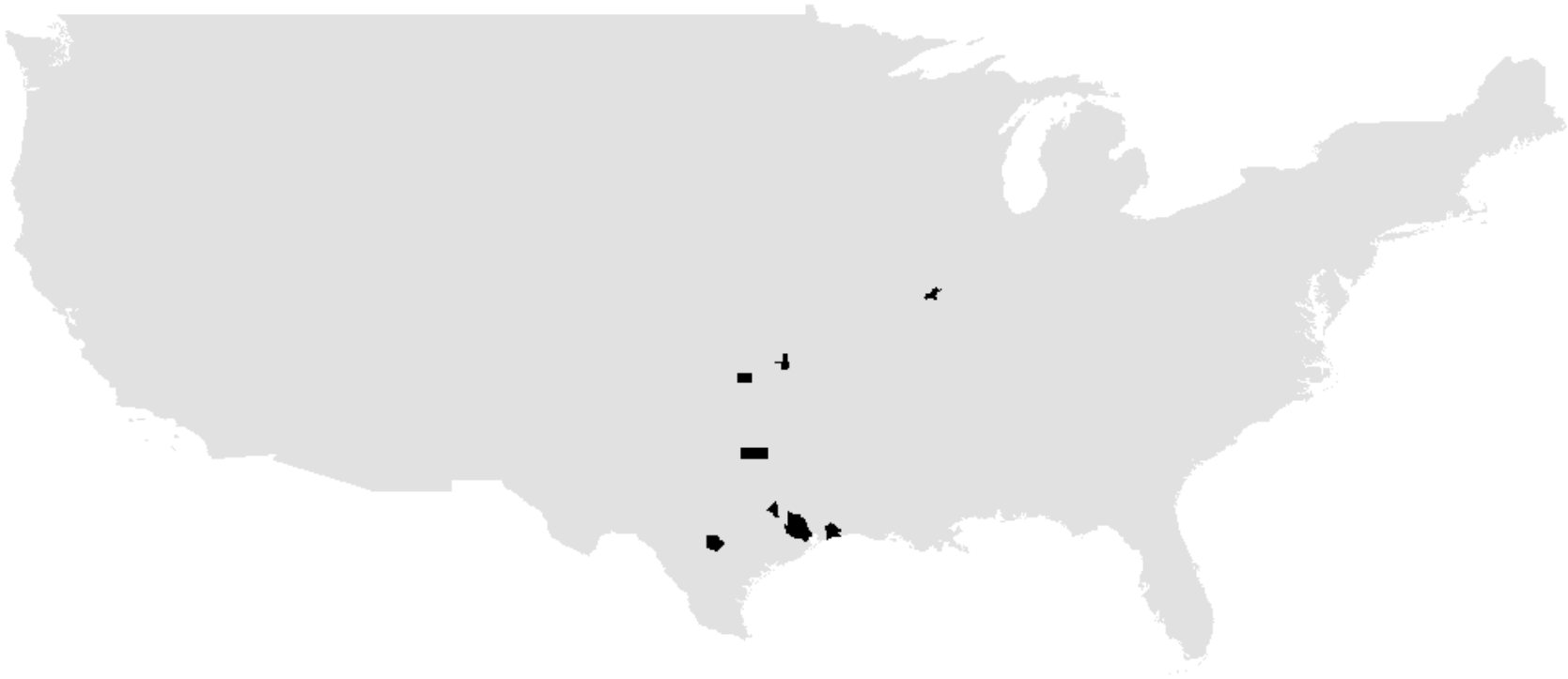
Counties with 17 or more executions since 1976



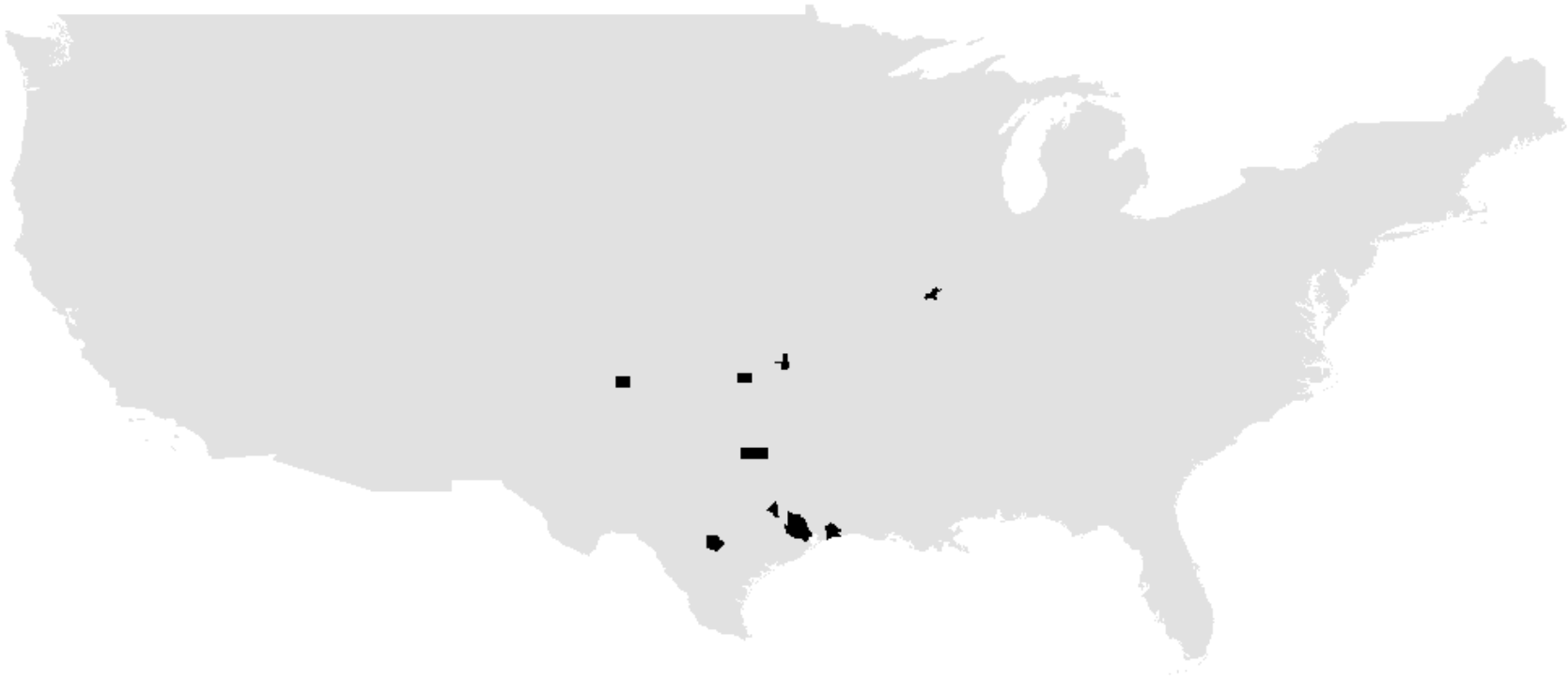
Counties with 14 or more executions since 1976



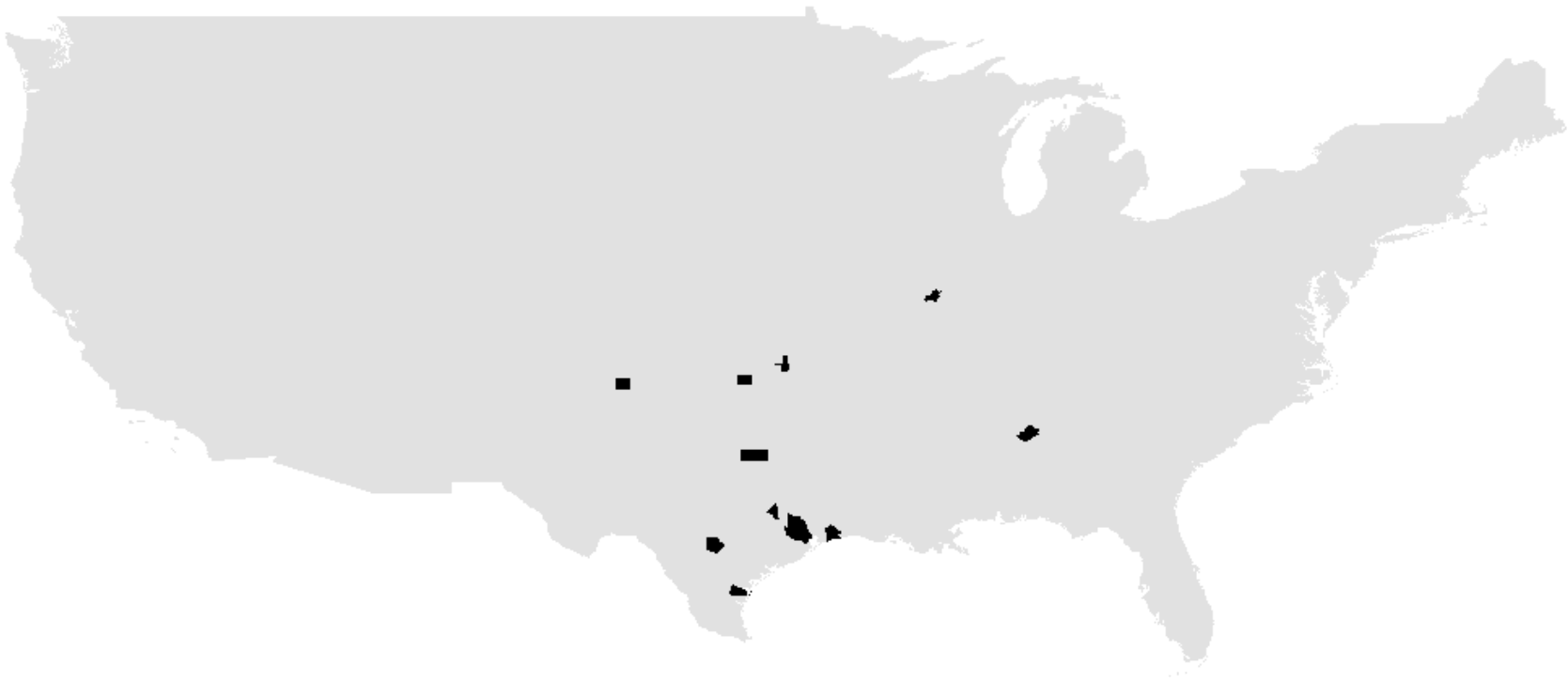
Counties with 12 or more executions since 1976



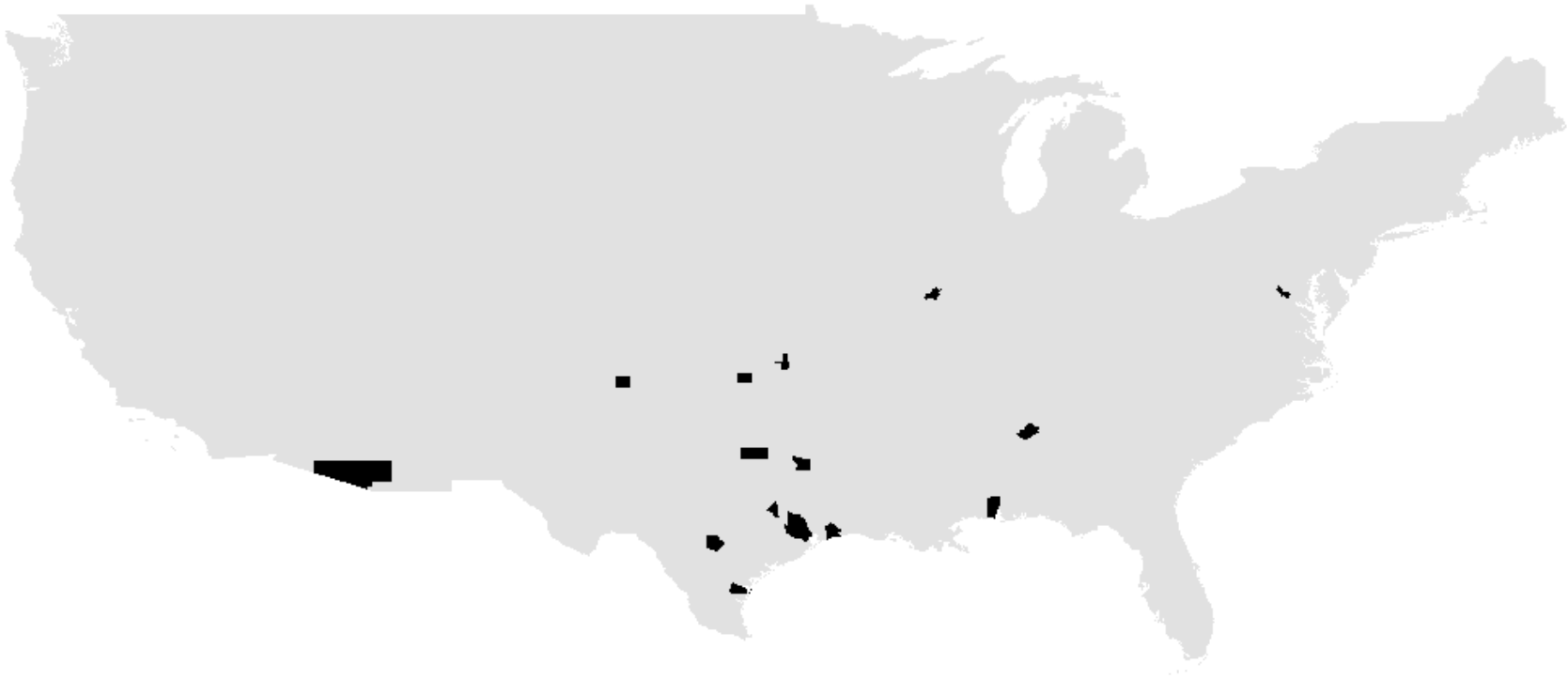
Counties with 11 or more executions since 1976



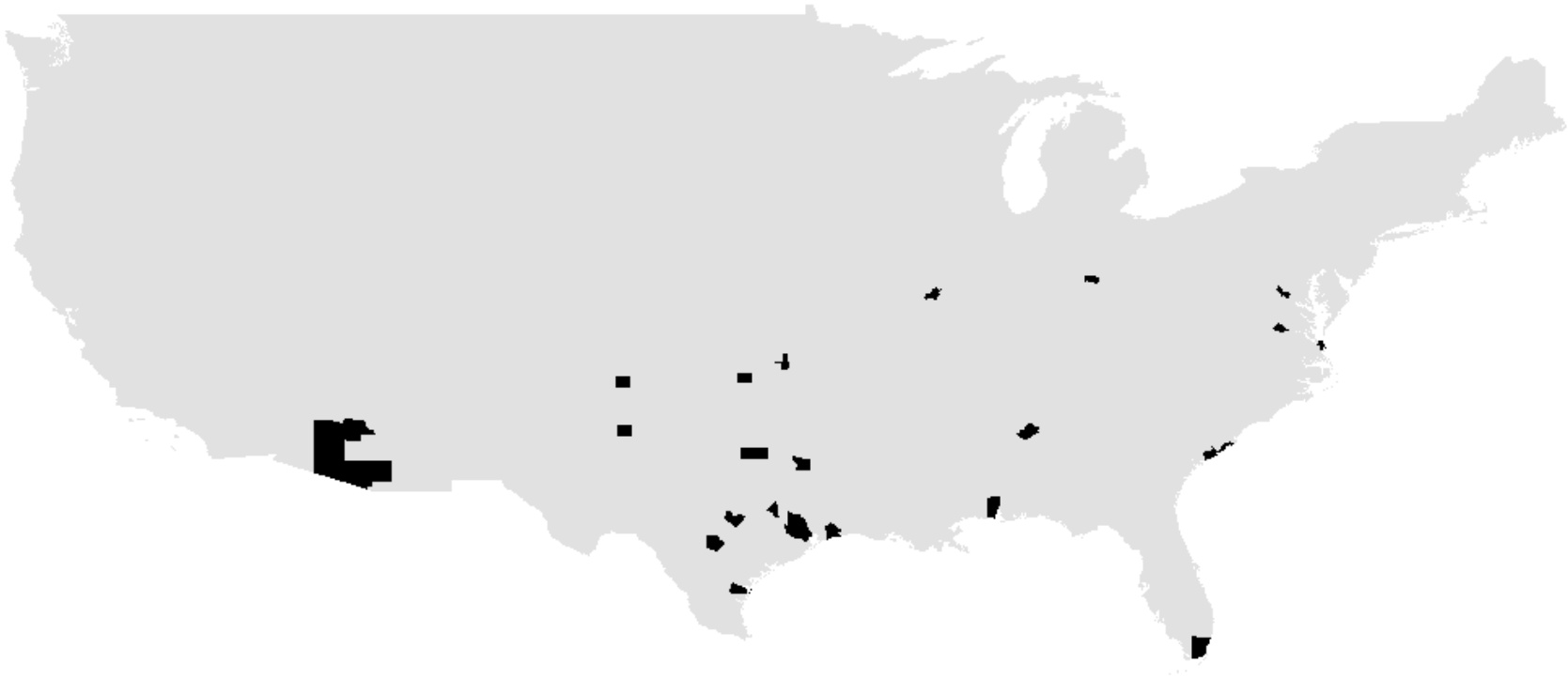
Counties with 10 or more executions since 1976

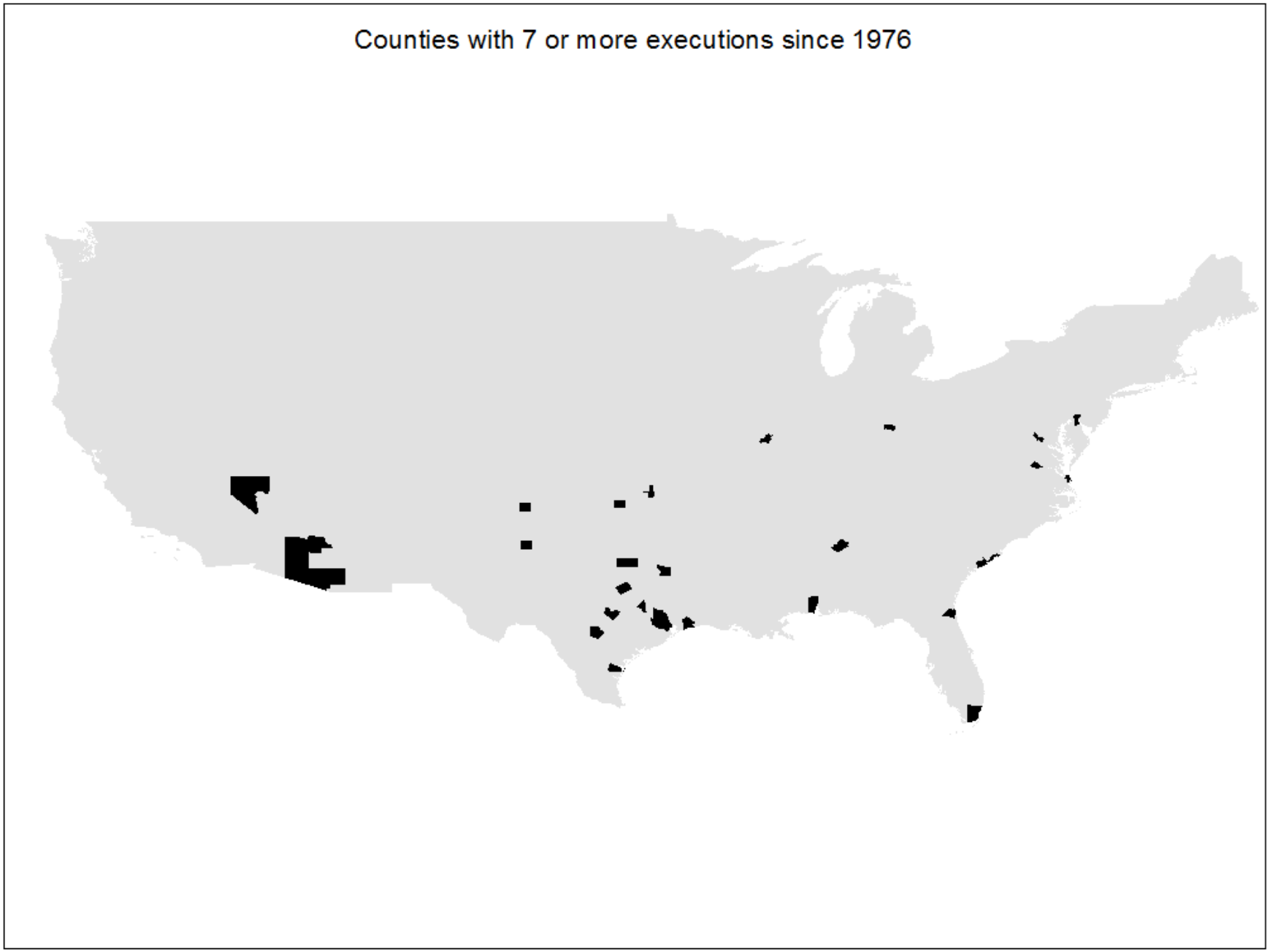


Counties with 9 or more executions since 1976

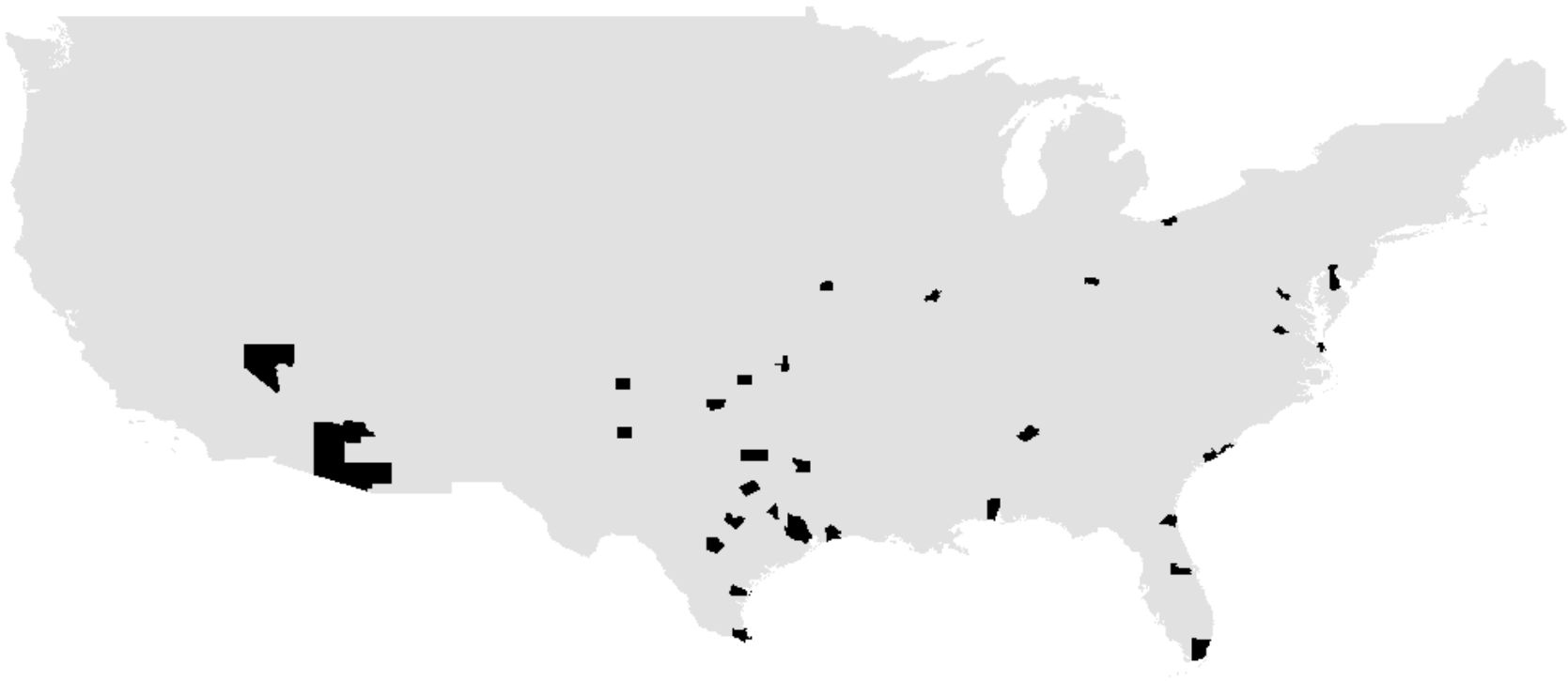


Counties with 8 or more executions since 1976

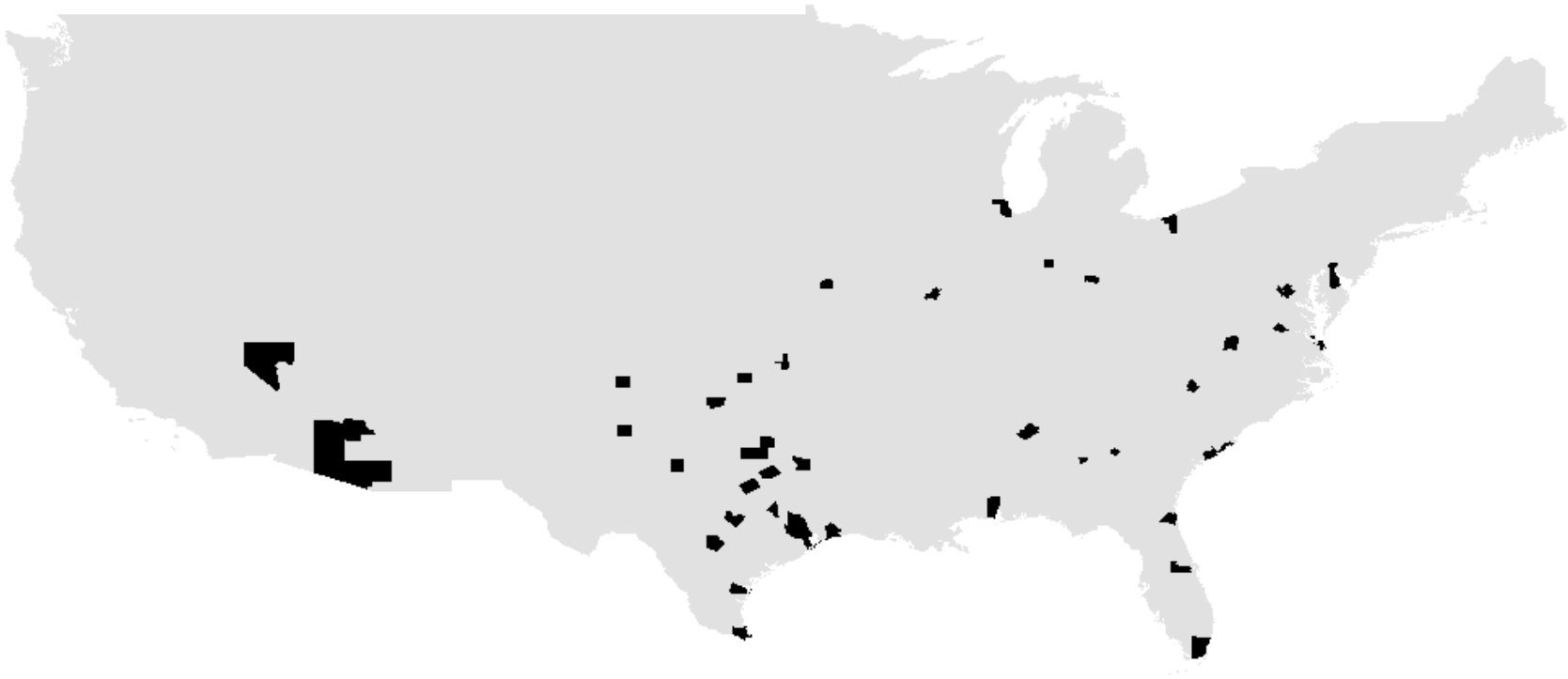



Counties with 7 or more executions since 1976

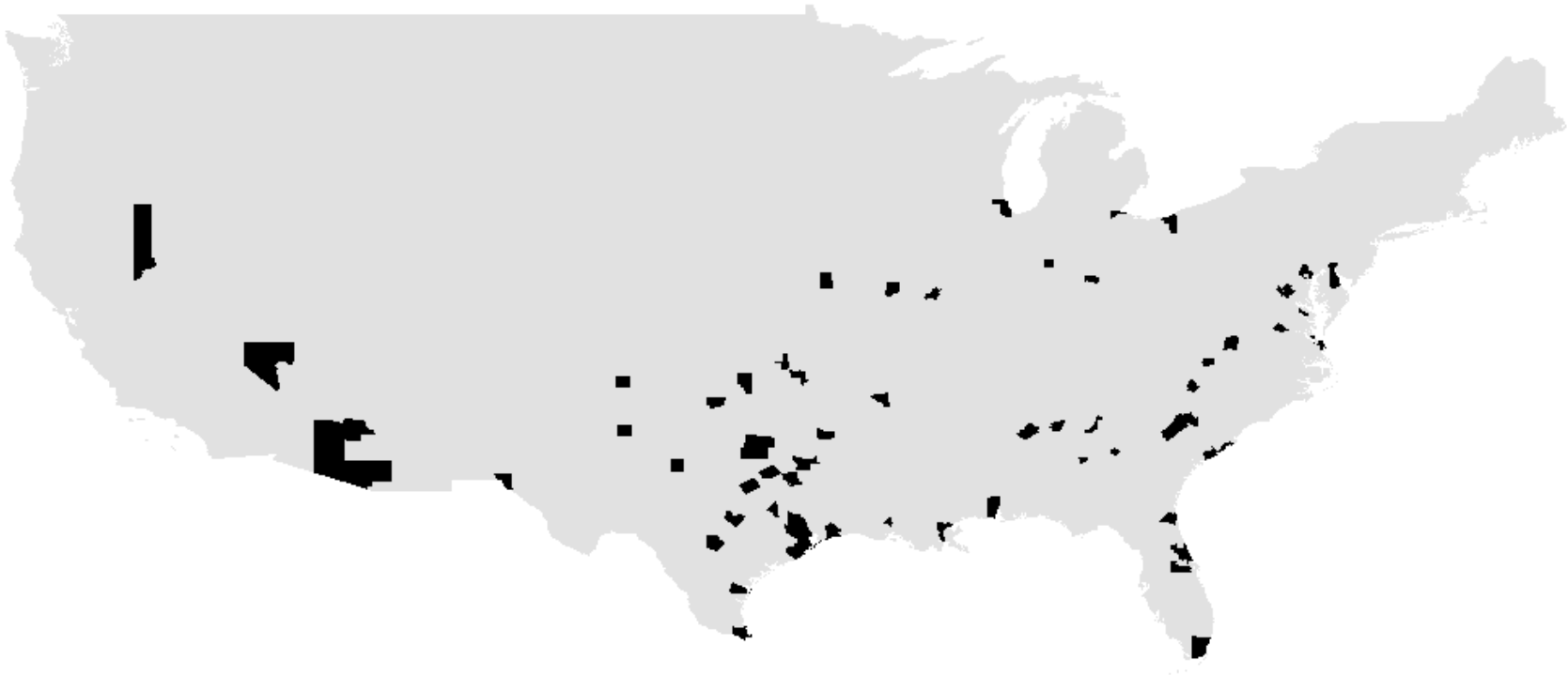
Counties with 6 or more executions since 1976



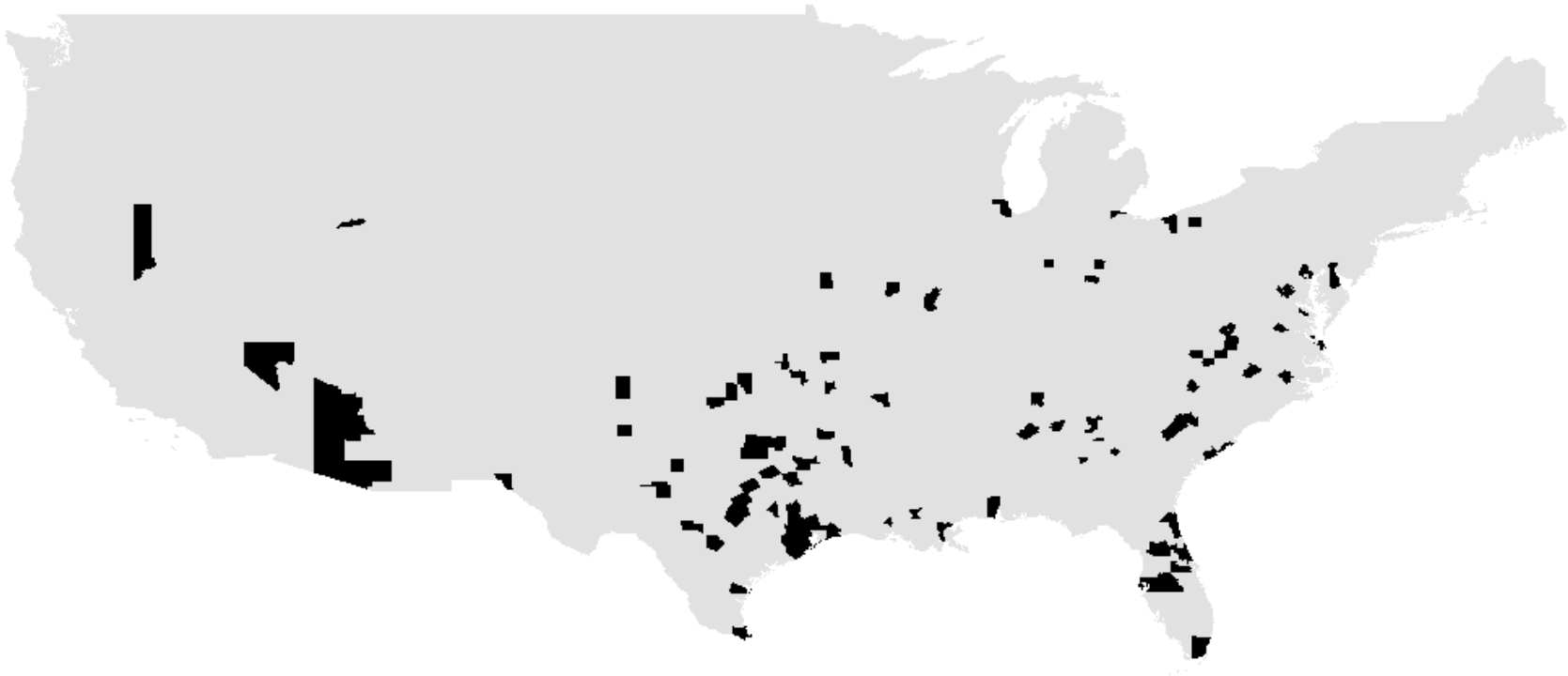
Counties with 5 or more executions since 1976



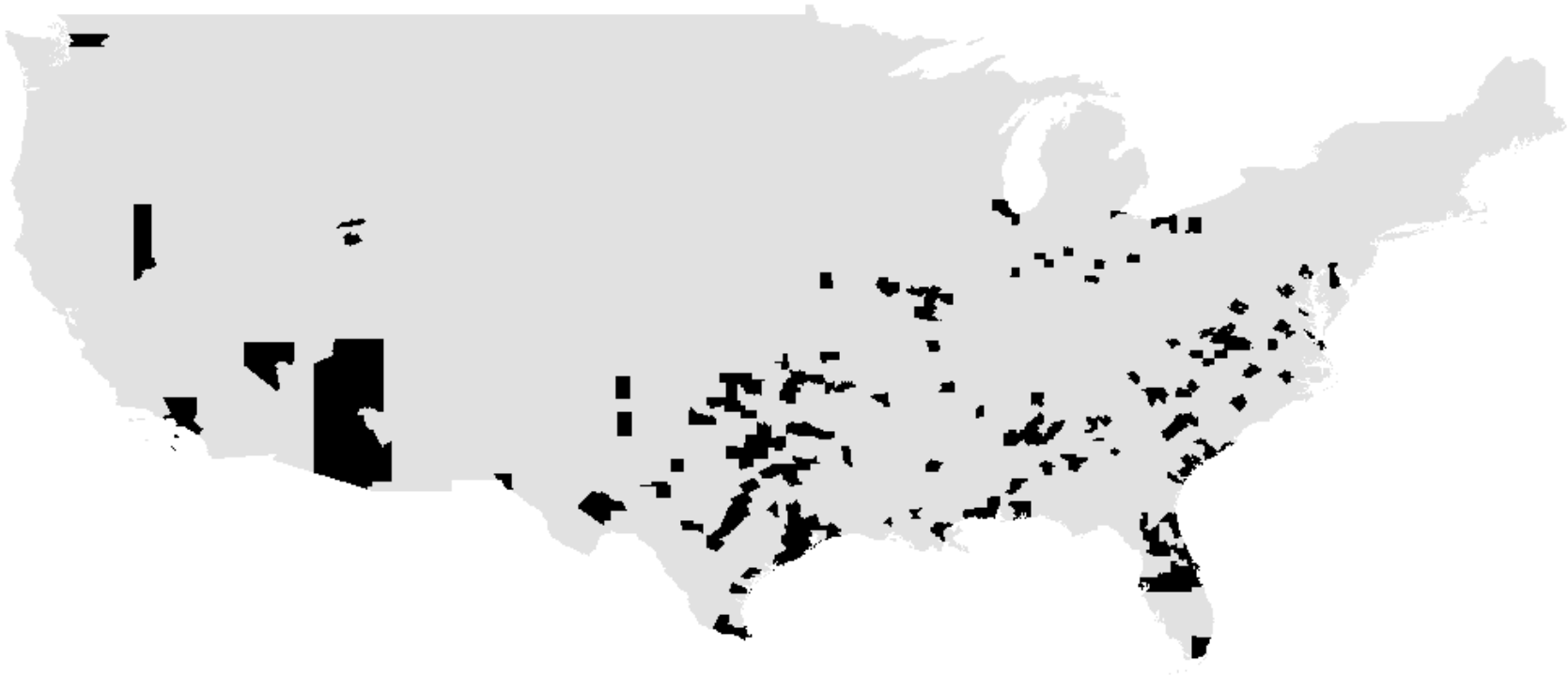
Counties with 4 or more executions since 1976

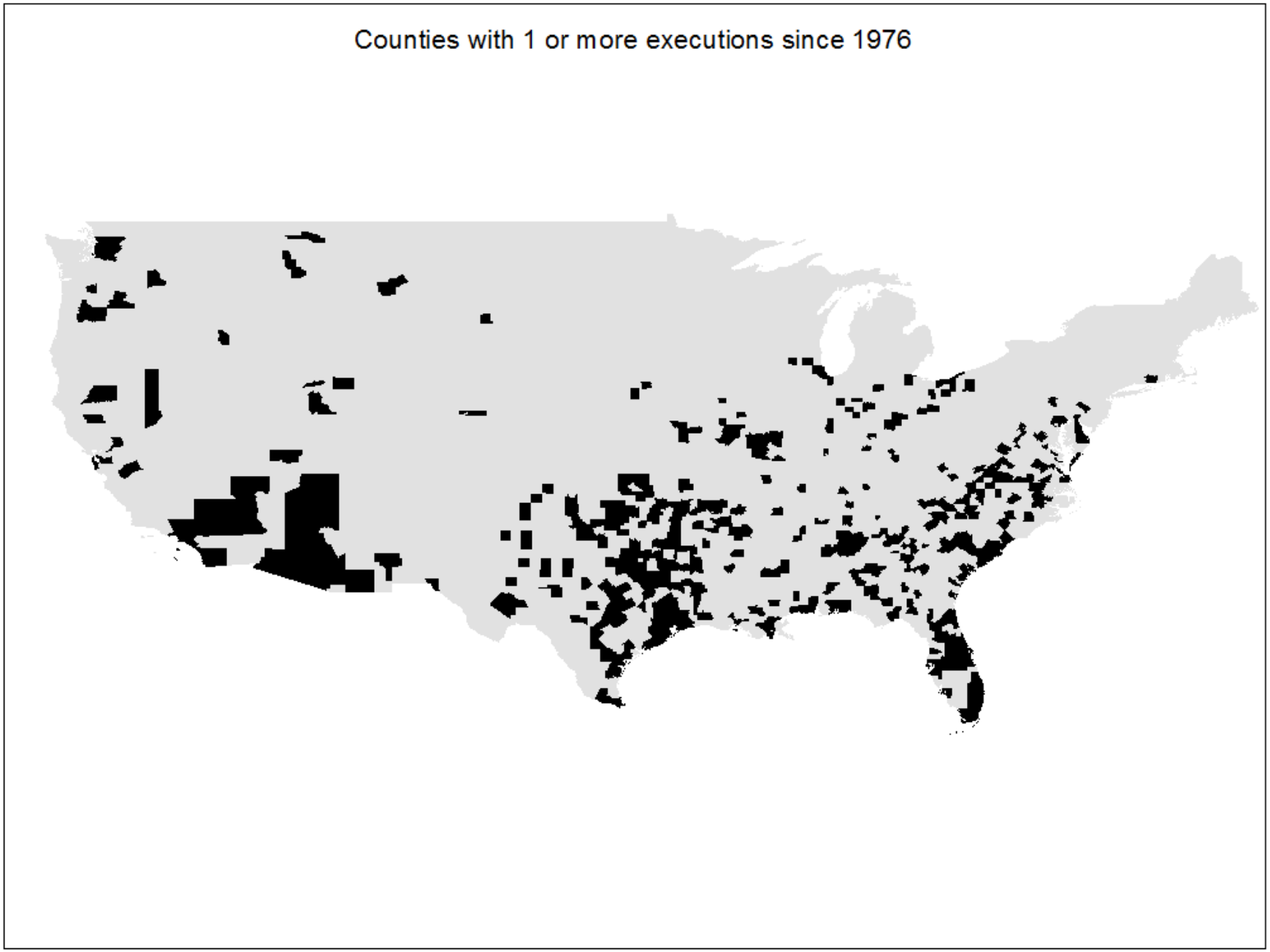


Counties with 3 or more executions since 1976

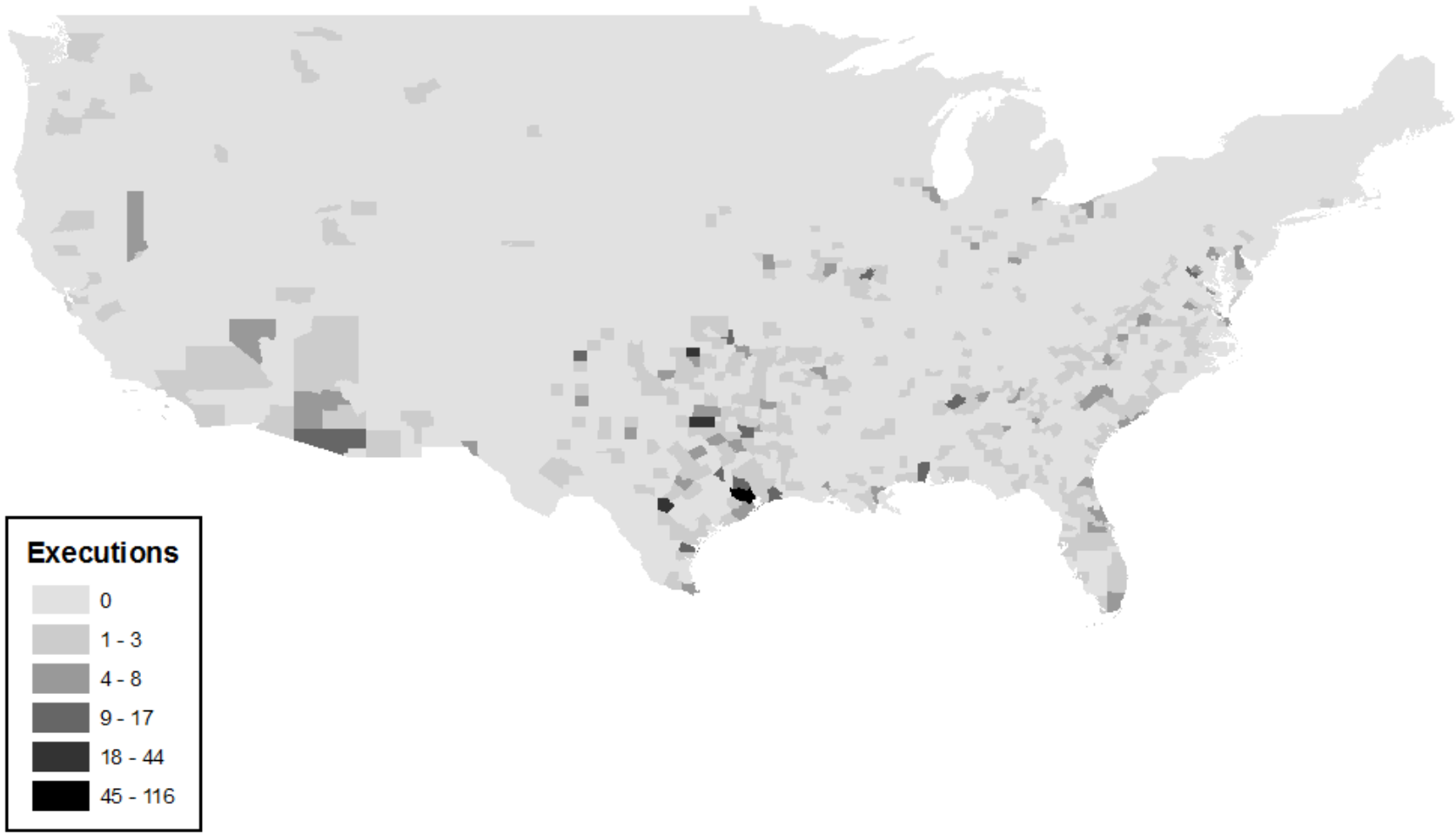


Counties with 2 or more executions since 1976




Counties with 1 or more executions since 1976

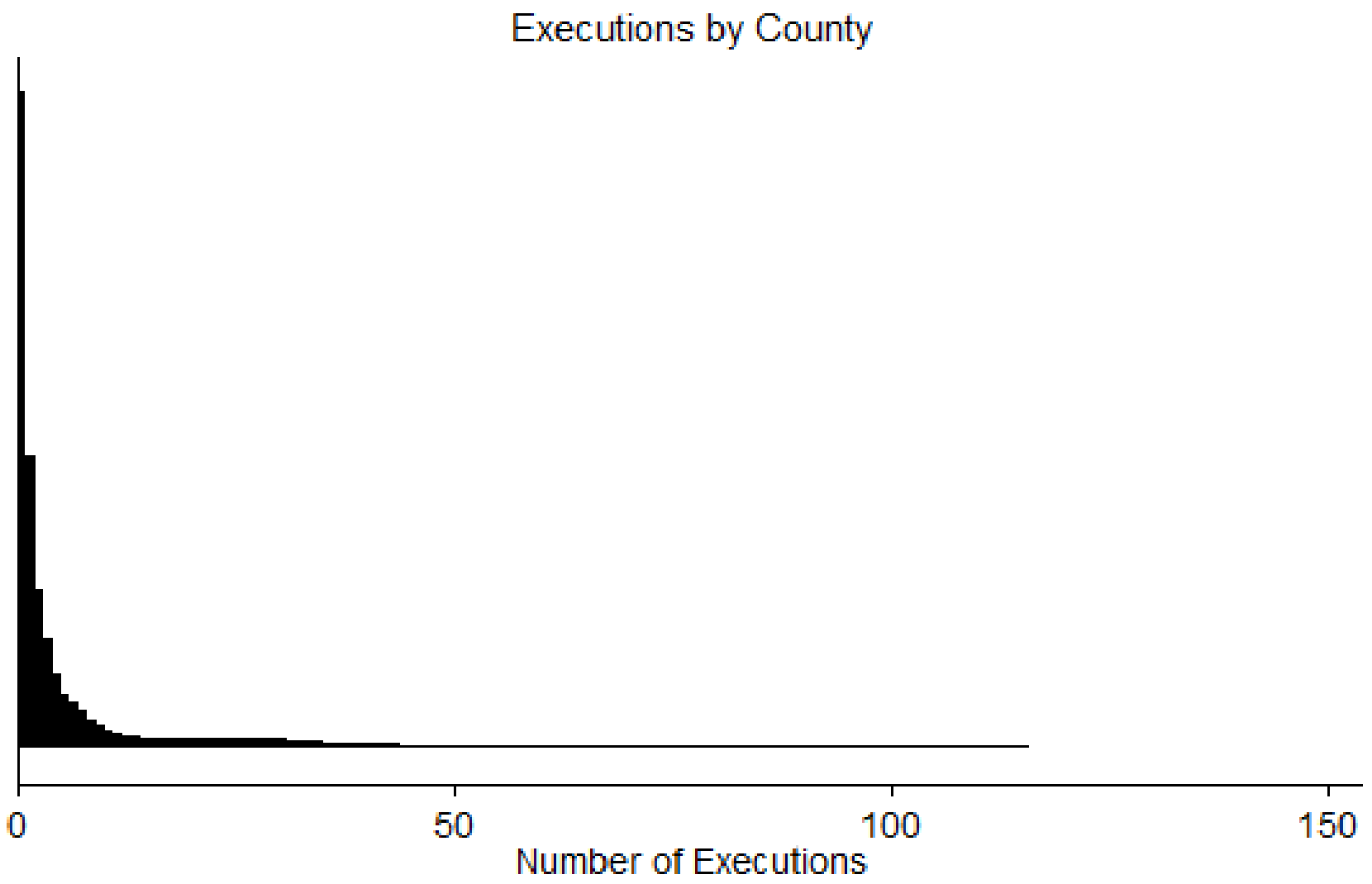
Number of executions per county since 1976



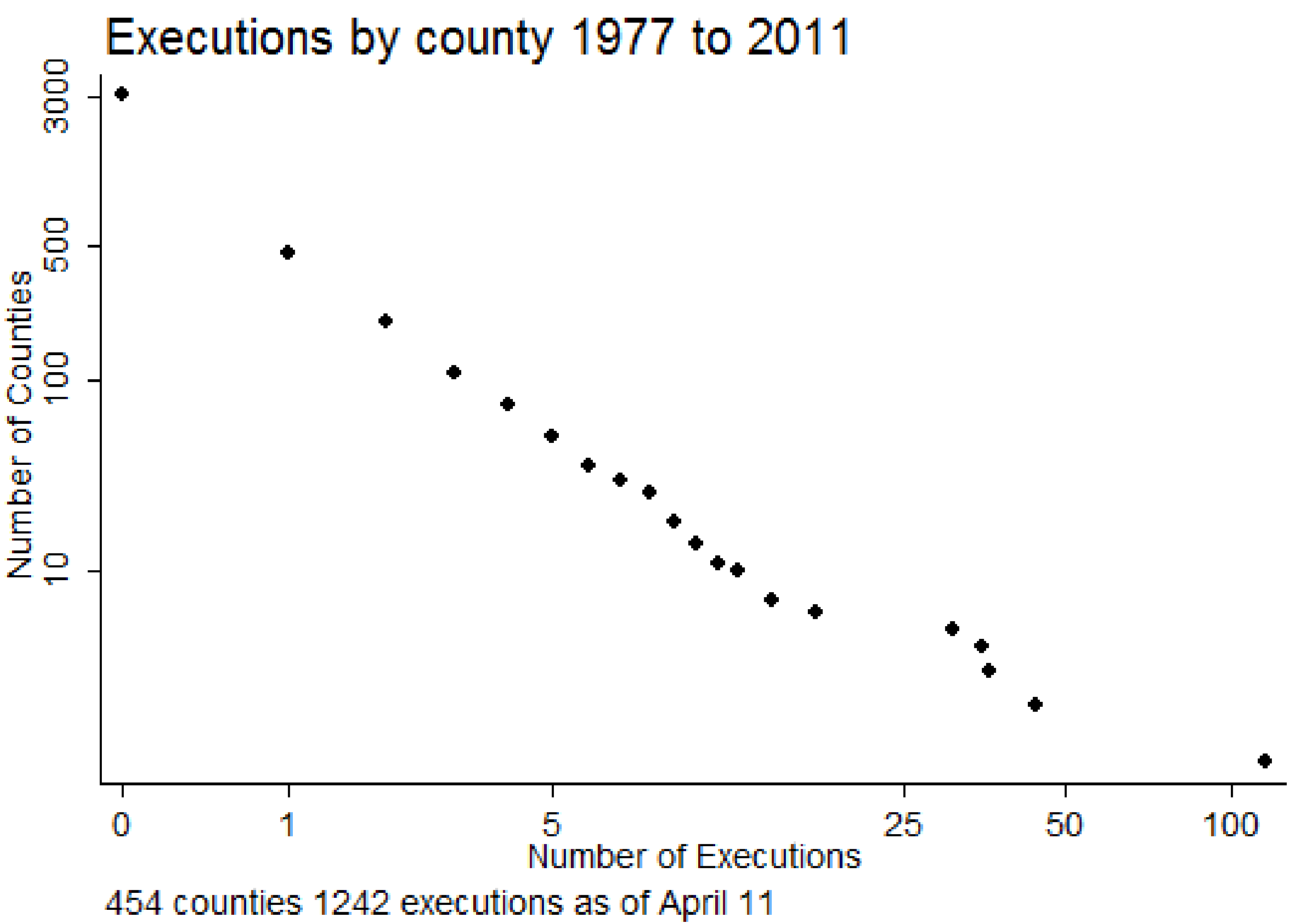
Five levels of scale, same pattern

- ~3,000 counties in the US
- Counties within individual states
- The 50 states
- The 12 federal judicial circuits
- ~200 countries of the world

- Patterns are not identical and some are more exponential than Paretian, but all are extreme

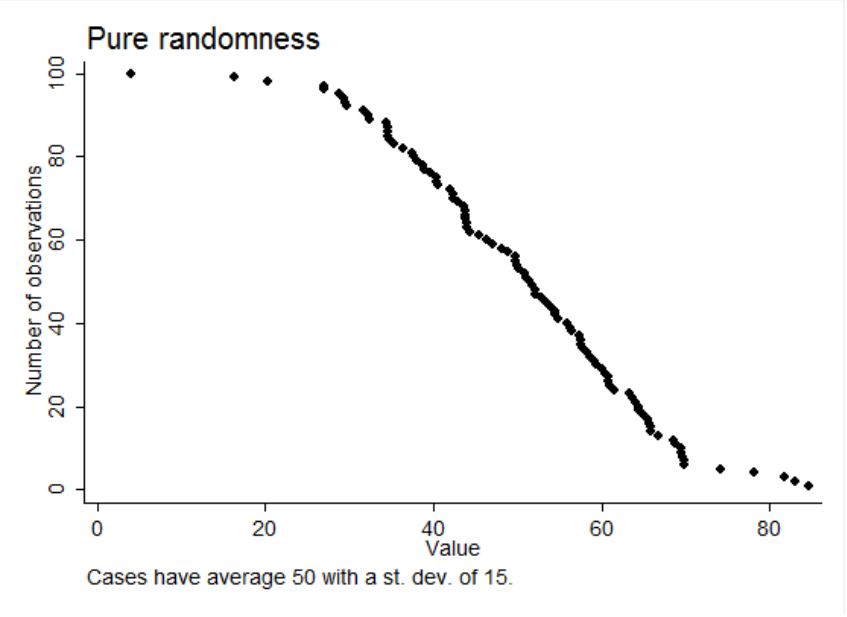


Includes 1245 executions from 1977 to April 10 2011.
2692 counties have executed no inmates 455 at least one and Harris County 116.

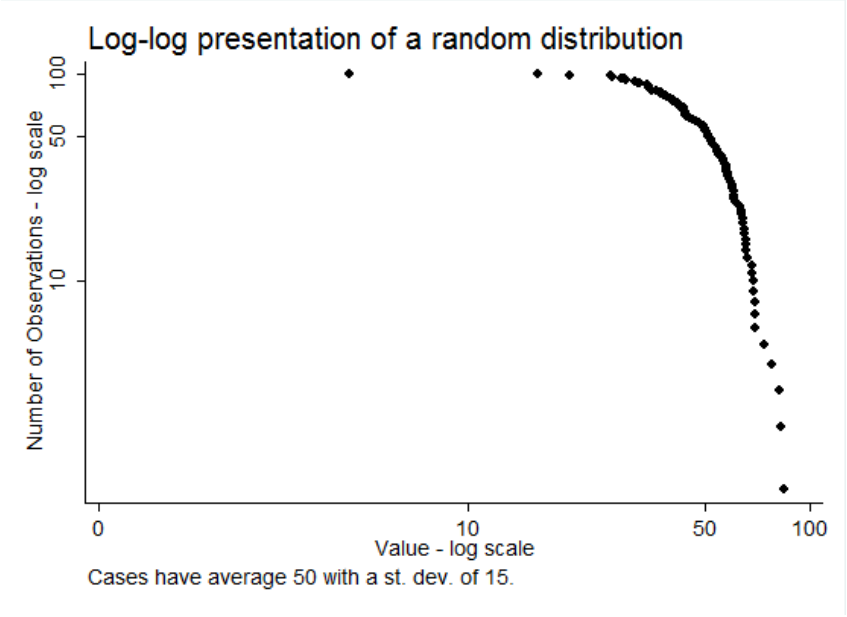

Executions by county 1977 to 2011
Number of Counties
3000
500
100
10
0
1
5
25
50
100
Number of Executions
454 counties 1242 executions as of April 11

If all cases were random

Frequency Distribution

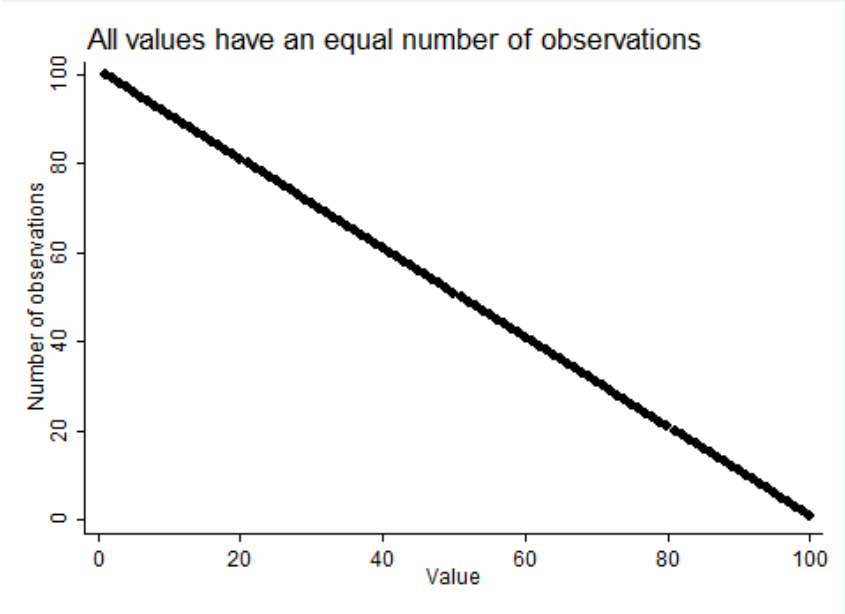


Log-Log Presentation

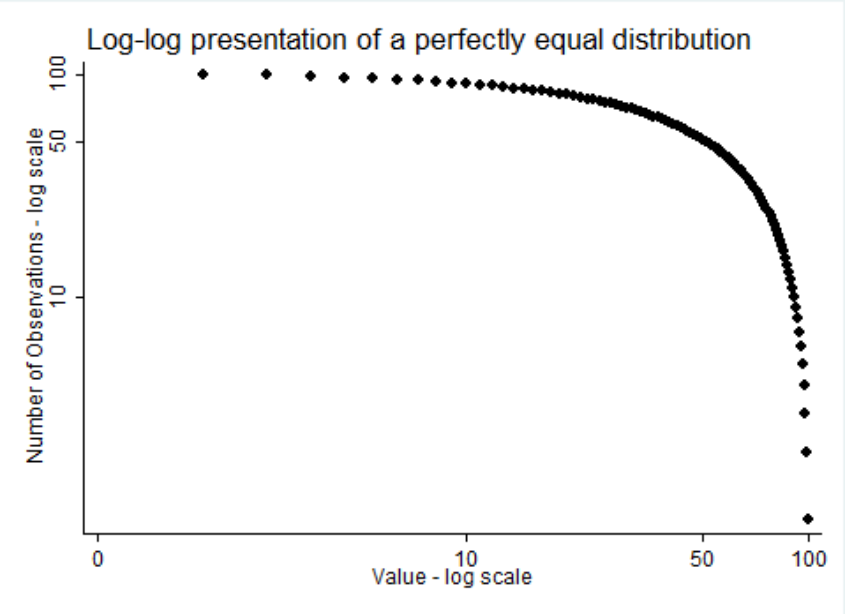


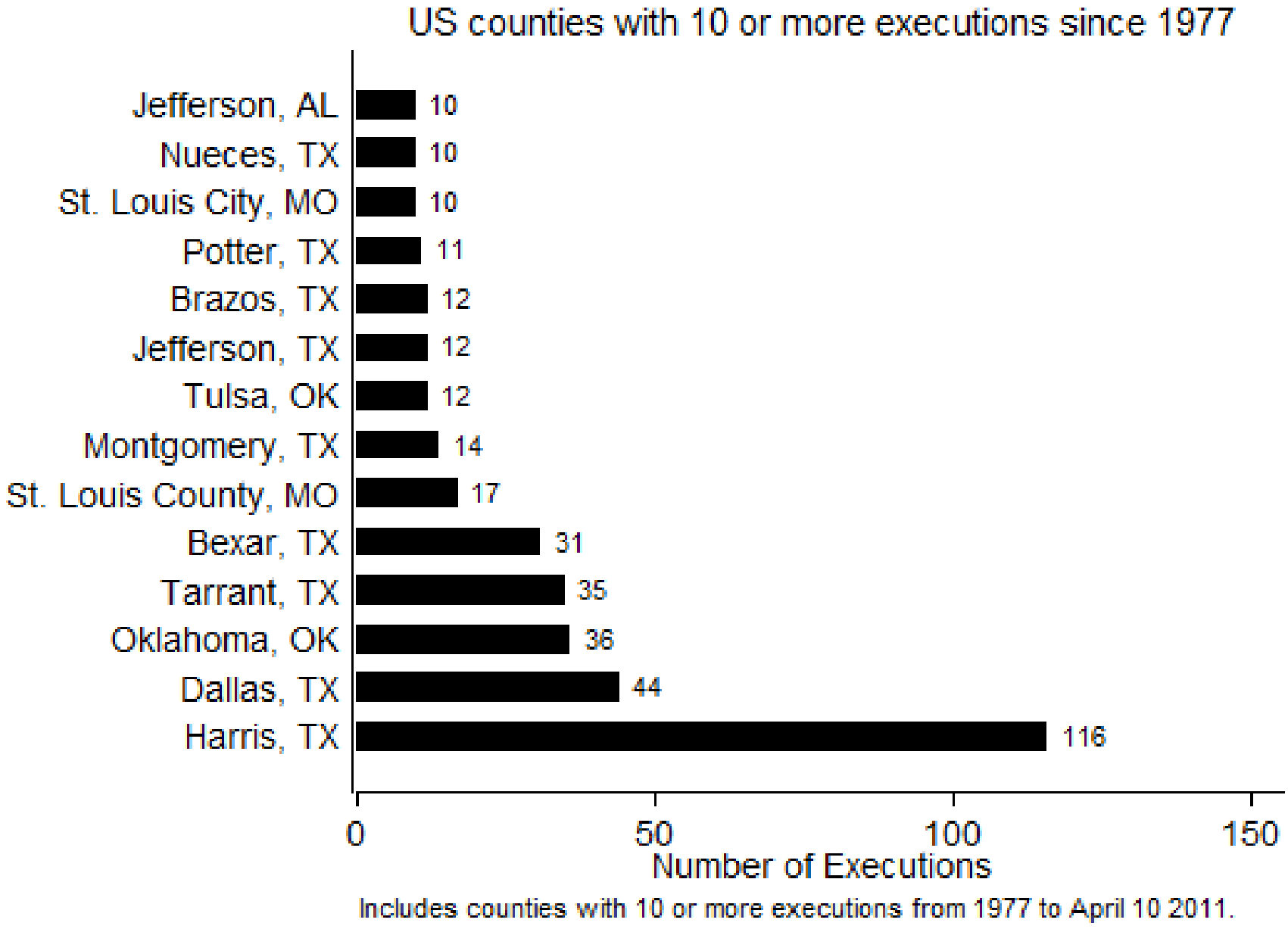
If all cases were equal

Frequency Distribution

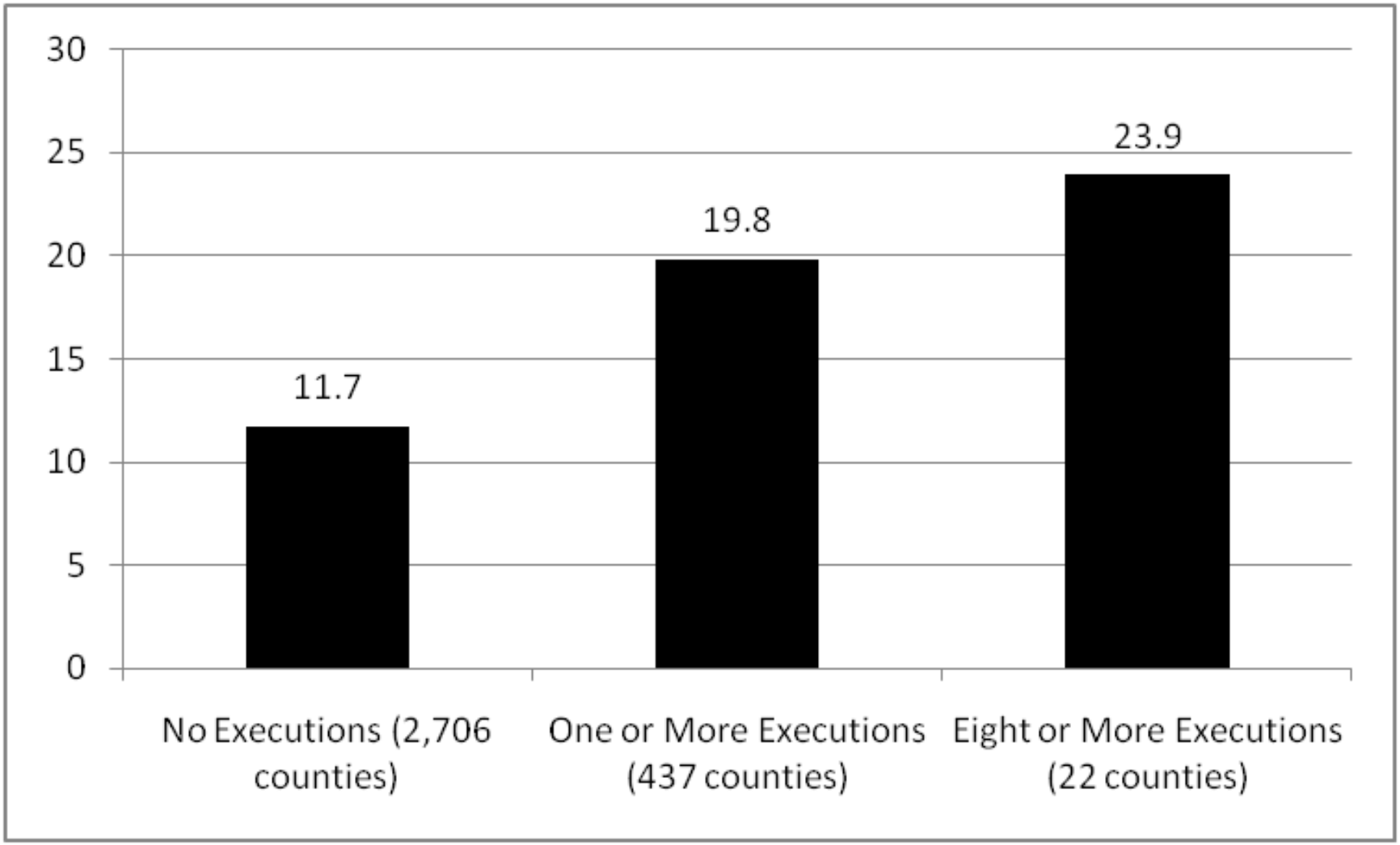


Log-Log Presentation




US counties with 10 or more executions since 1977
Jefferson, AL
10
Nueces, TX
10
St. Louis City, MO
10
Potter, TX
11
Brazos, TX
12
Jefferson, TX
12
Tulsa, OK
12
Montgomery, TX
14
St. Louis County, MO
17
Bexar, TX
31
Tarrant, TX
35
Oklahoma, OK
36
Dallas, TX
44
Harris, TX
116
0
50
100
150
Number of Executions
Includes counties with 10 or more executions from 1977 to April 10 2011.

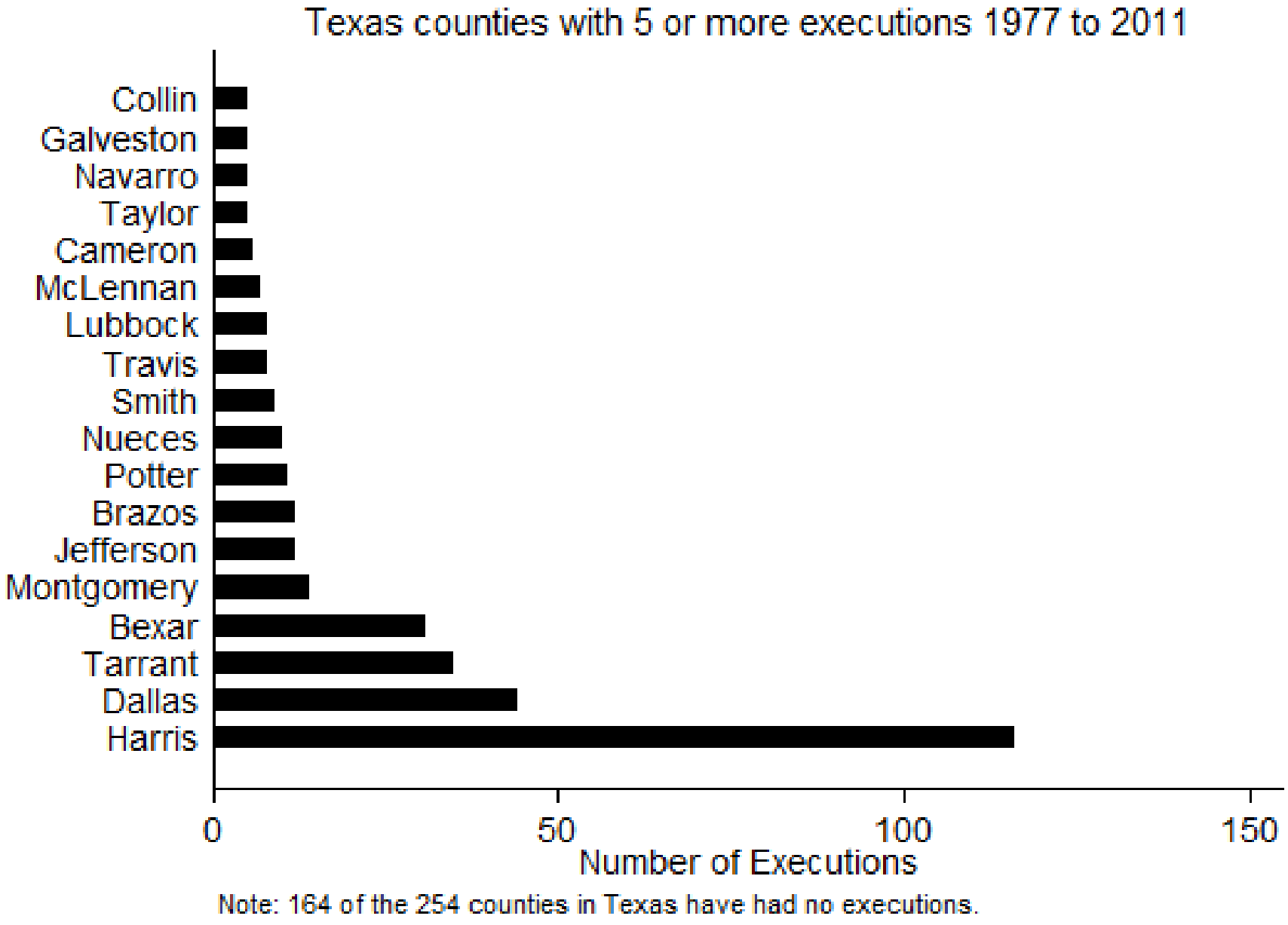
Percent Minority Population

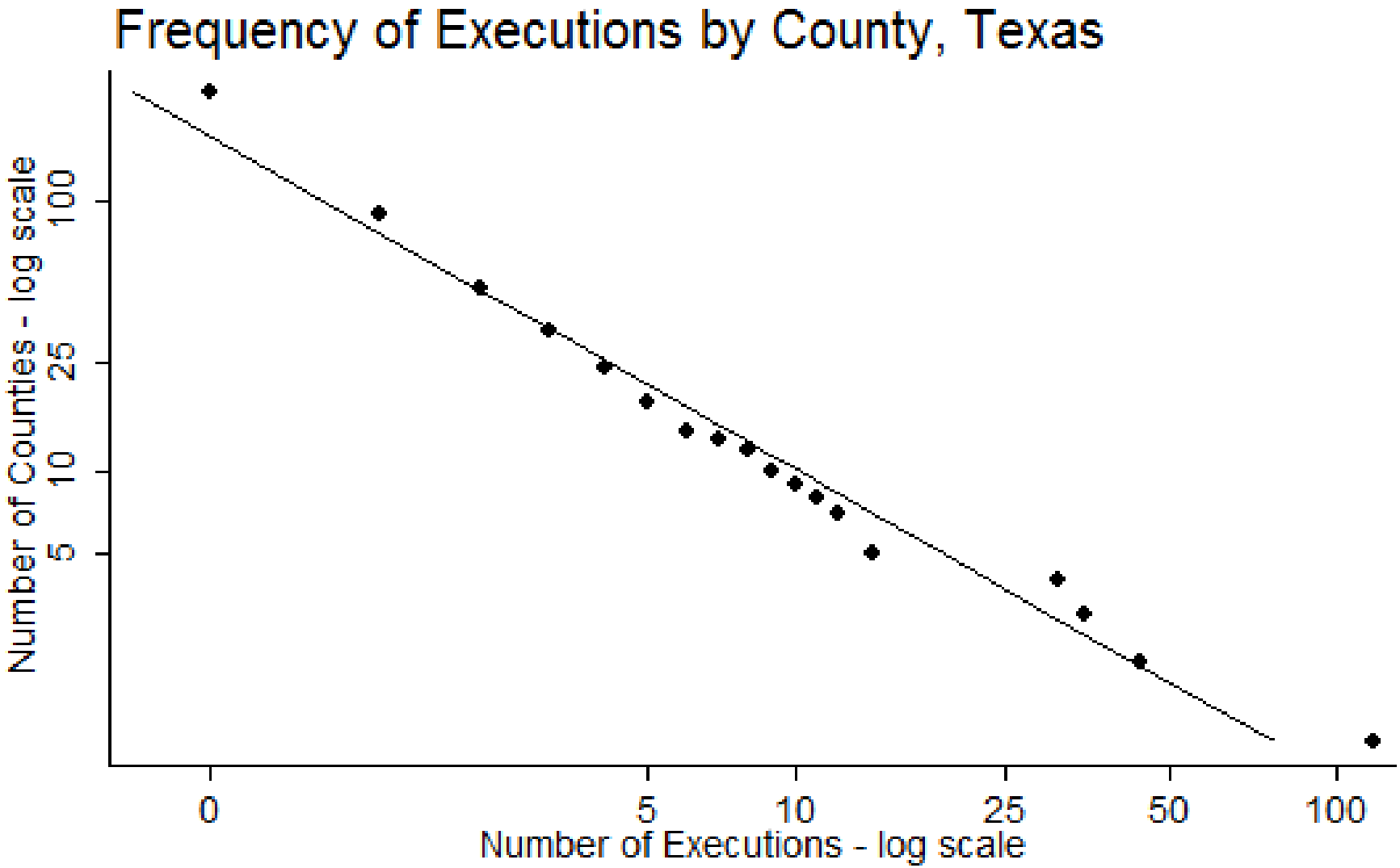


These trends also hold for individual states

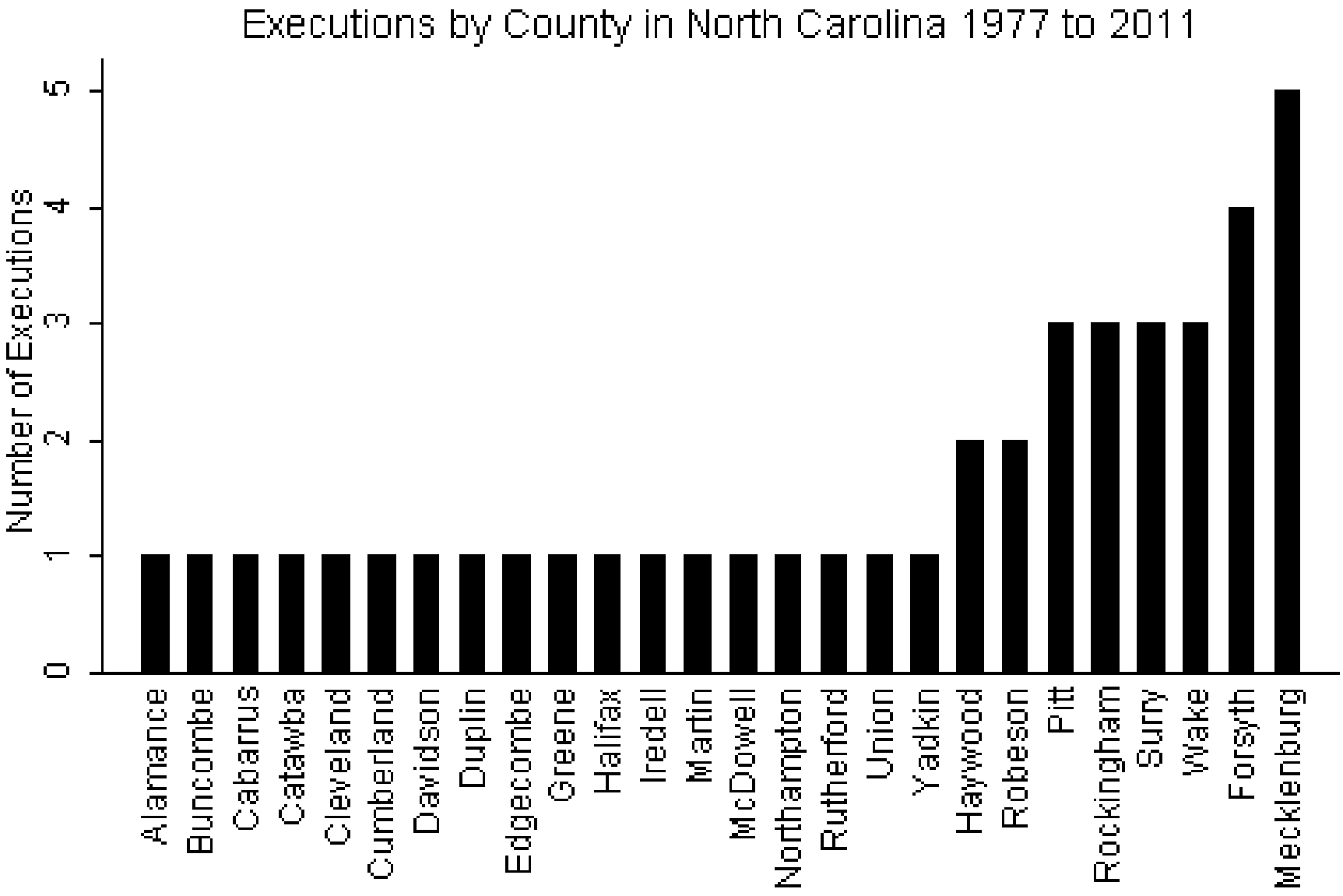
- The following slides show similar analyses for the state with by far the greatest number of executions, Texas, and for North Carolina.

- We can have greater confidence in the national analysis since it is based on a larger number of observations, but the pattern also holds within individual states.

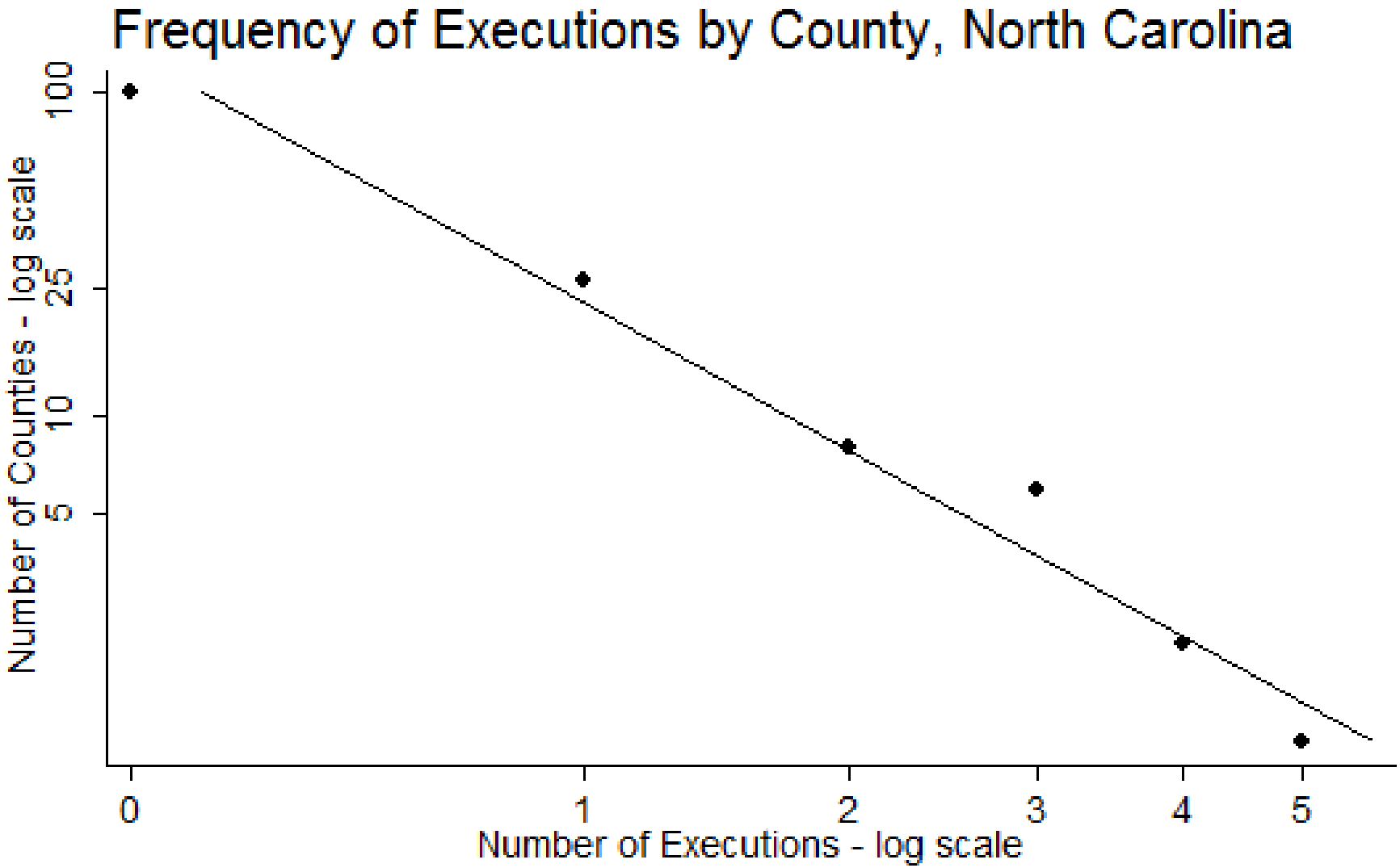

Texas counties with 5 or more executions 1977 to 2011
Collin
Galveston
Navarro
Taylor
Cameron
McLennan
Lubbock
Travis
Smith
Nueces
Potter
Brazos
Jefferson
Montgomery
Bexar
Tarrant
Dallas
Harris
0
50
100
150
Number of Executions
Note: 164 of the 254 counties in Texas have had no executions.



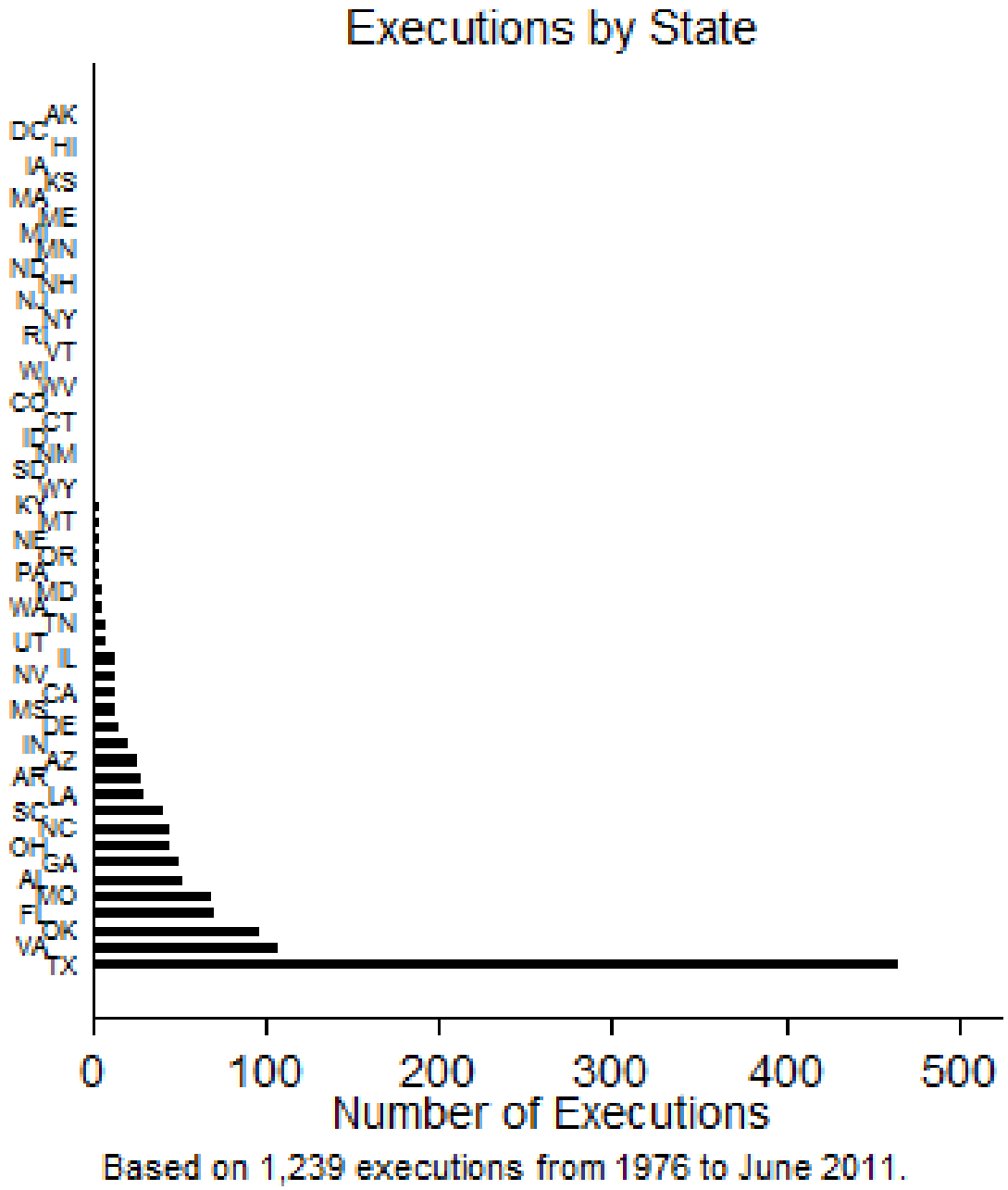
Among 254 counties in Texas, 90 have had one or more executions,
9 counties have executed 10 or more, and one (Harris) has executed 116.
Ln(Frequency) = 4.36 - 0.85(Ln (Executions+1) Adj. R2 = 0.97

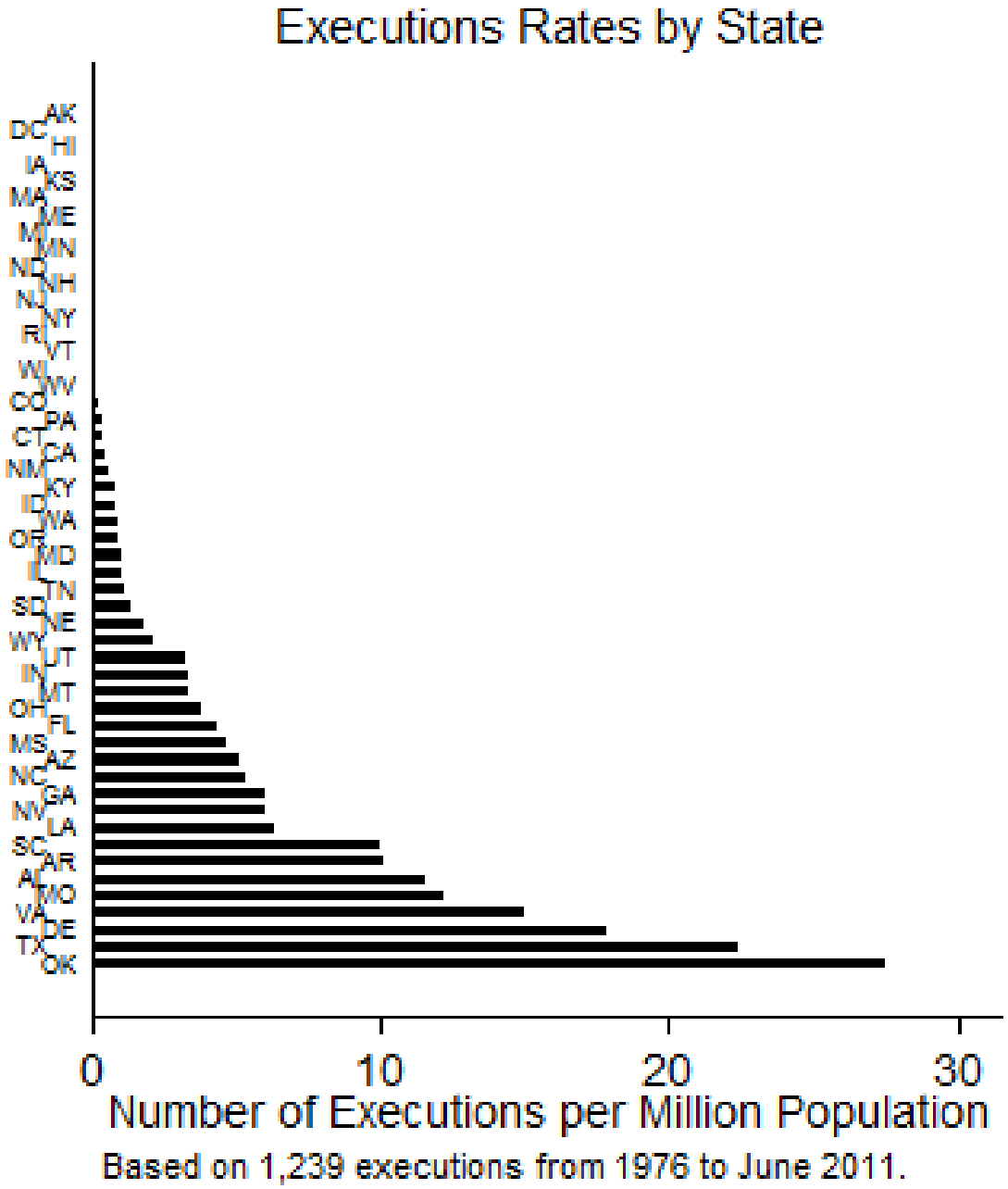


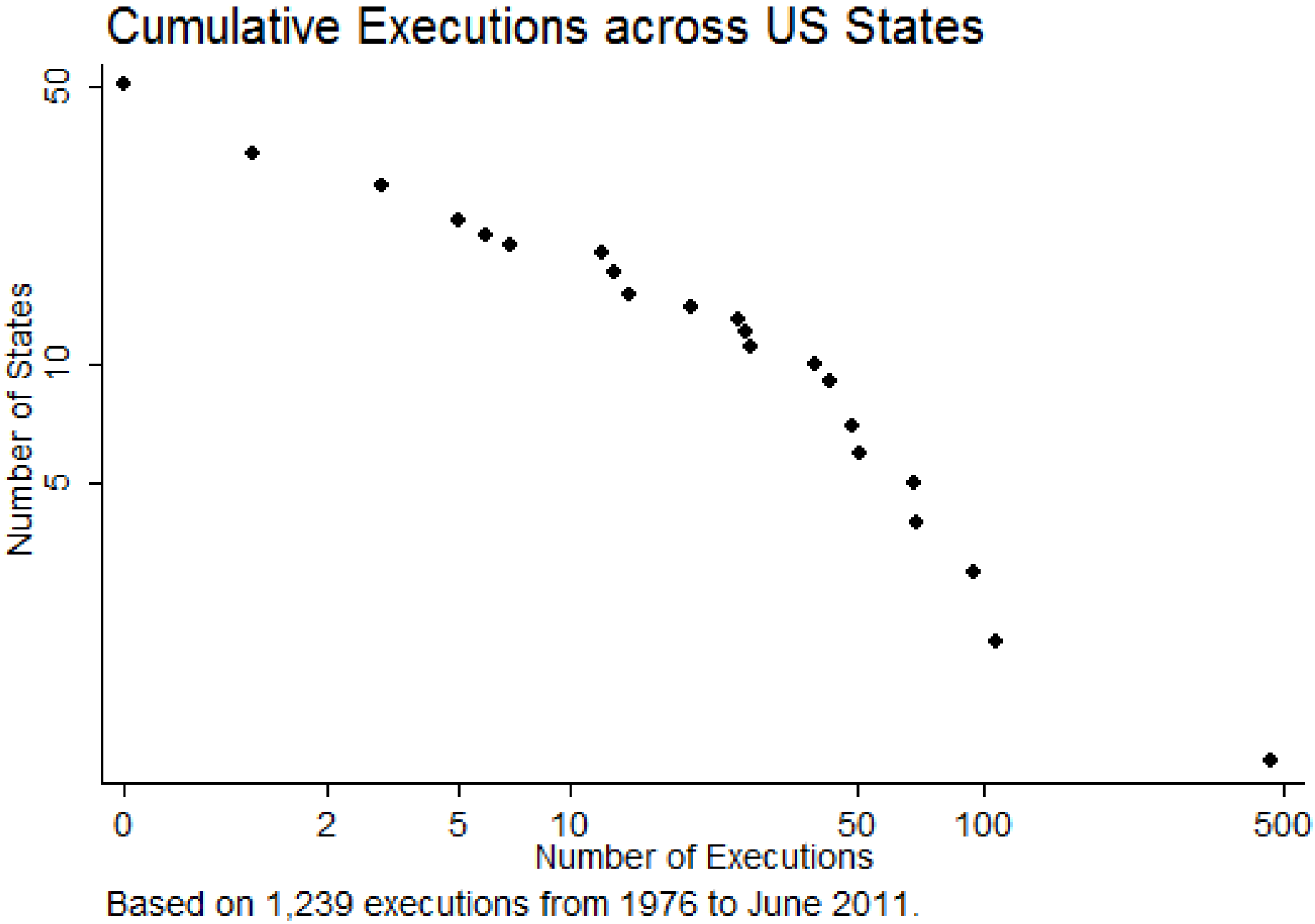
Note: 74 of the 100 counties in North Carolina have had no executions.

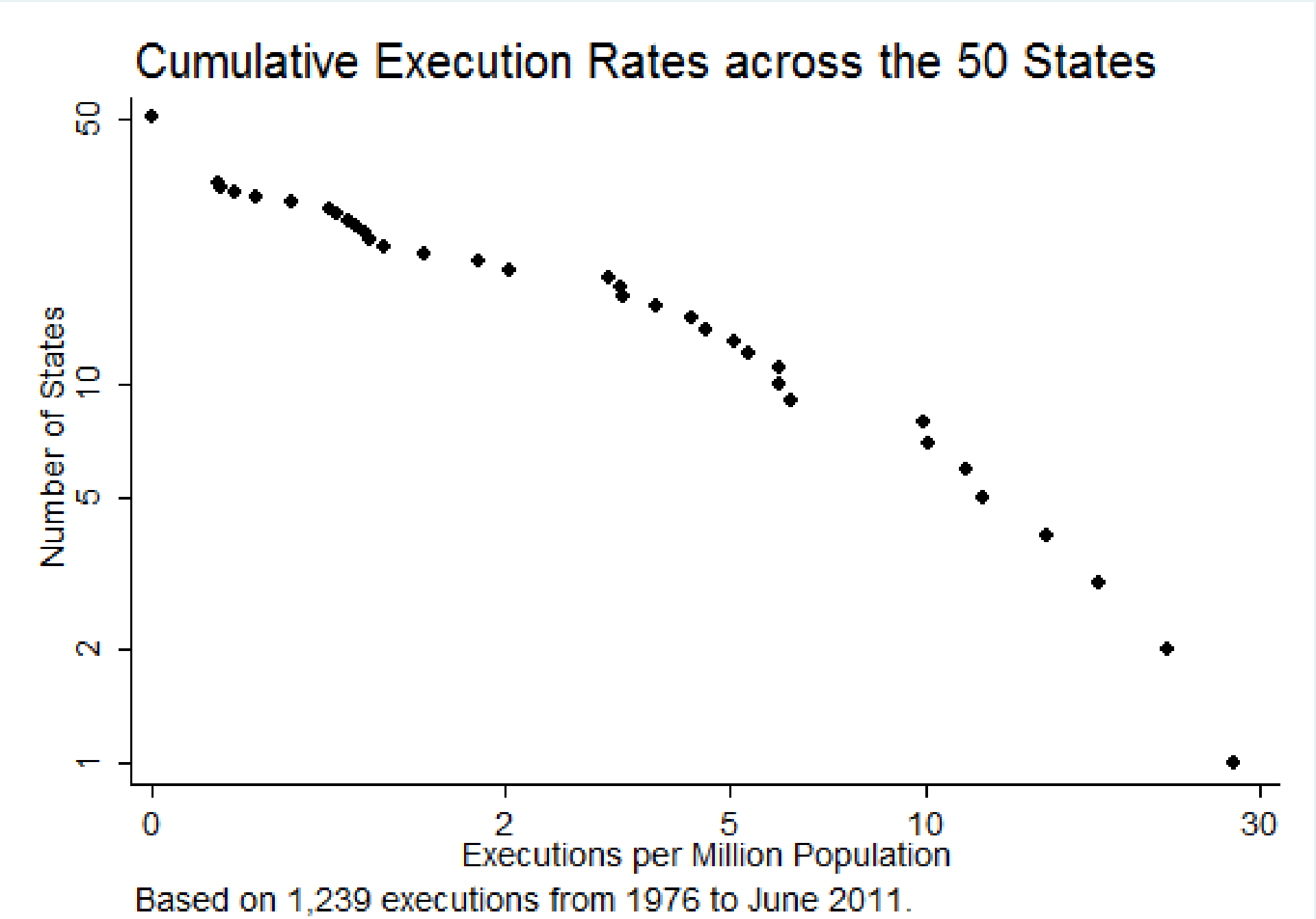


Among North Carolina's 100 counties, 26 have had one or more executions, 8 counties have executed 2 or more, and one (Mecklenberg) has executed 5.
Ln(Frequency) = 1.8 - 0.34(Ln (Executions+1) Adj. R2 = 0.95


Executions by State
AK
DC
HI
IA
KS
MA
ME
MI
MN
ND
NH
NJ
NY
RI
VT
WI
WV
CO
CT
ID
NM
SD
WY
KY
MT
NE
OR
PA
MD
WA
TN
UT
IL
NV
CA
MS
DE
IN
AZ
AR
LA
SC
NC
OH
GA
AL
MO
FL
OK
VA
TX
0
100
200
300
400
500
Number of Executions
Based on 1,239 executions from 1976 to June 2011.

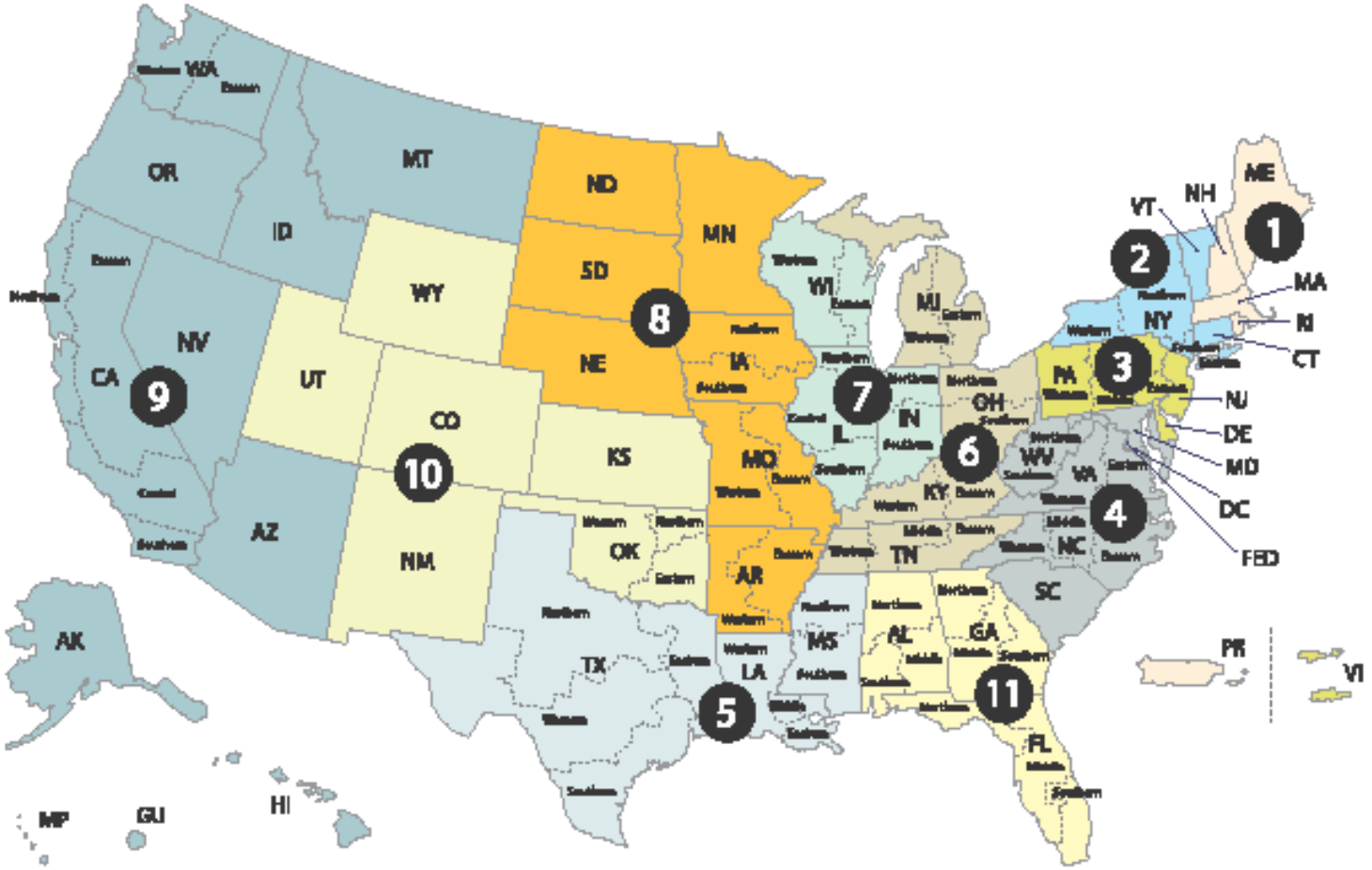

Executions Rates by State
AK
DC HI
IA KS
MA ME
MN
ND NH
NJ NY
R VT
WI WV
CO PA
CT CA
NM KY
ID WA
OR MD
TN
SD NE
WY UT
IN MT
OH FL
MS AZ
NC GA
NV LA
SC AR
AL MO
VA DE
TX OK
0
10
20
30
Number of Executions per Million Population
Based on 1,239 executions from 1976 to June 2011.

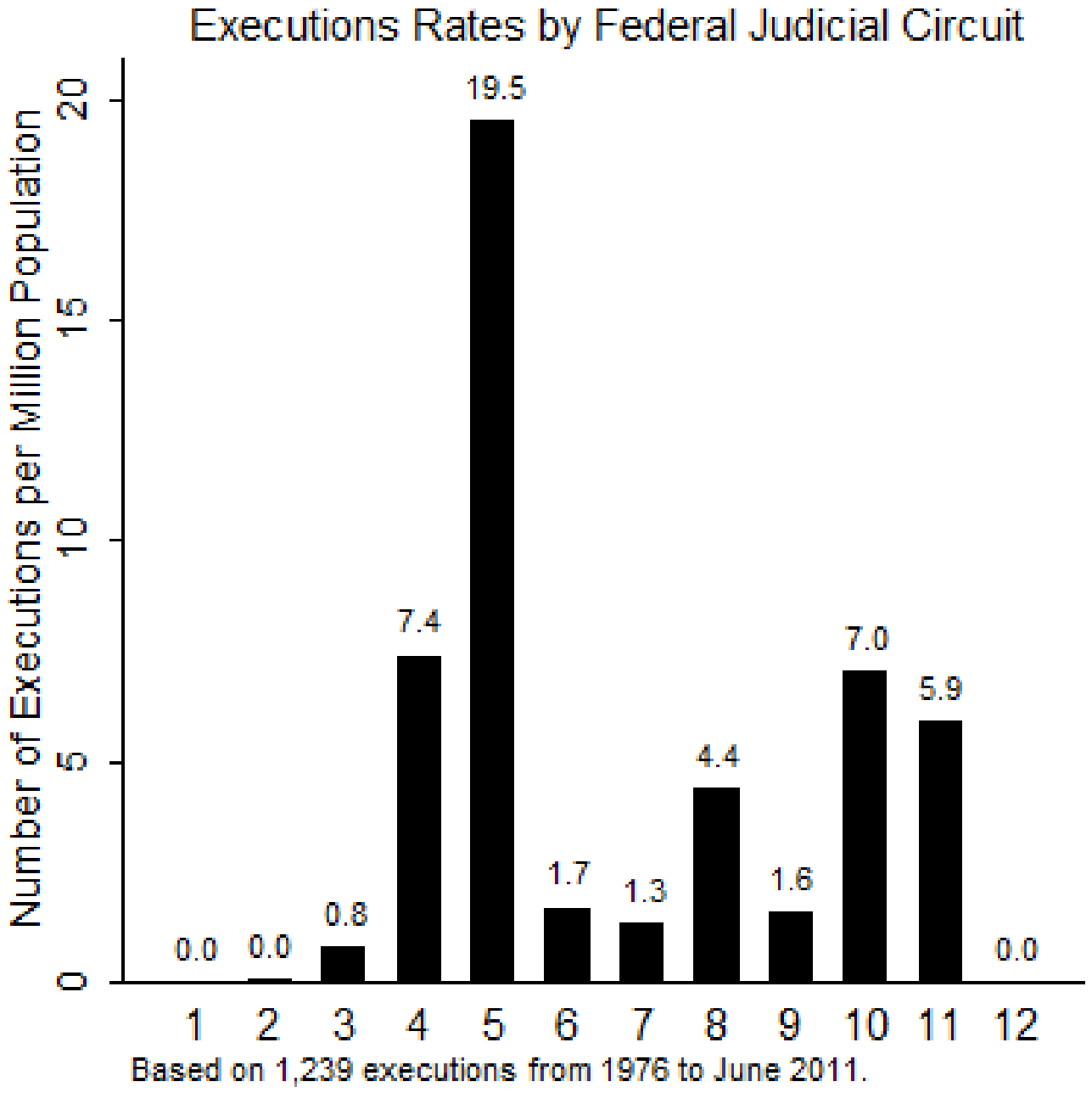

Cumulative Executions across US States
Number of States
50
10
5
0
2
5
10
50
100
500
Number of Executions
Based on 1,239 executions from 1976 to June 2011.

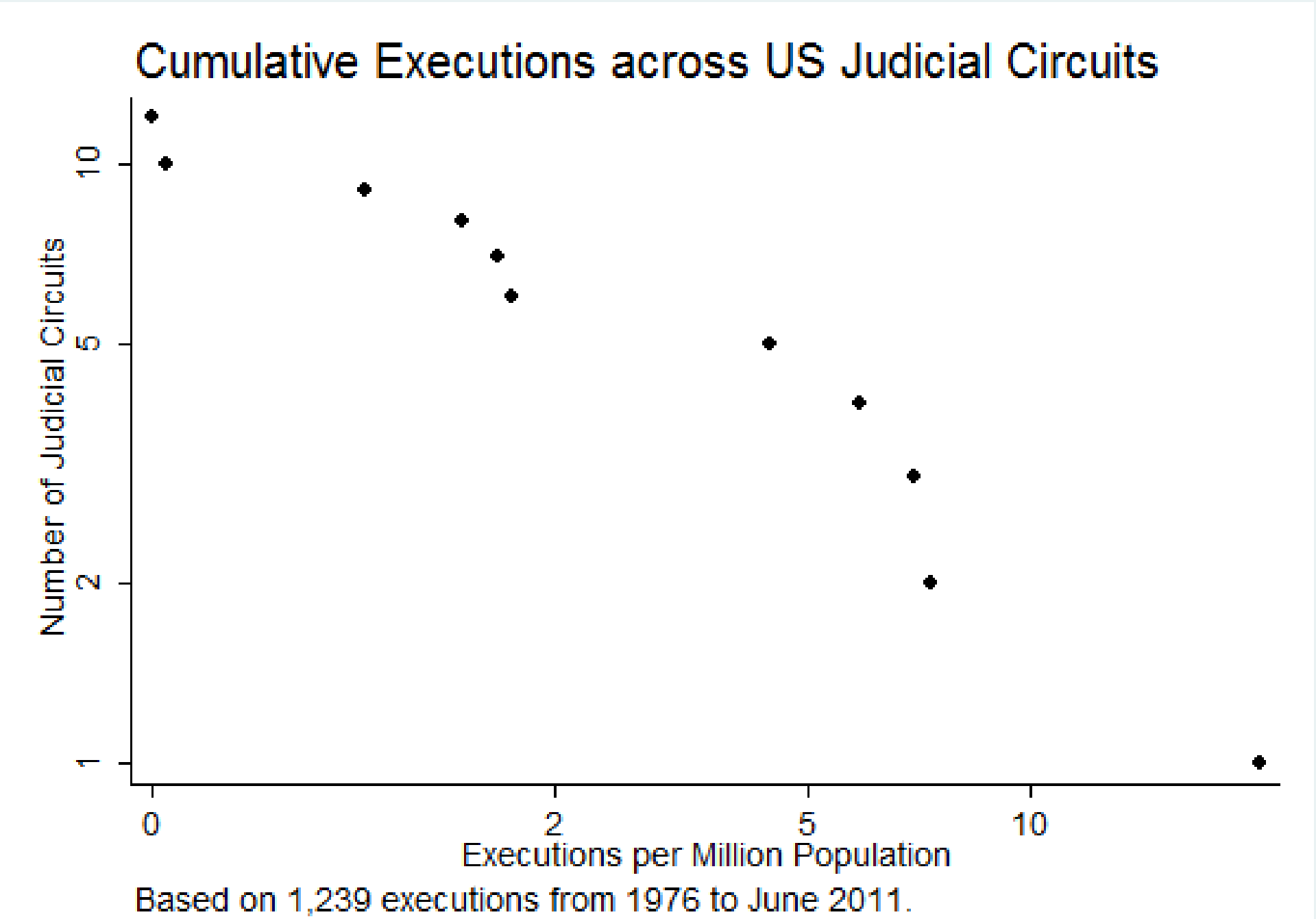

Cumulative Execution Rates across the 50 States
Number of States
50
10
5
2
1
0
2
5
10
30
Executions per Million Population
Based on 1,239 executions from 1976 to June 2011.

Geographic Boundaries

of United States Courts of Appeals and United States District Courts



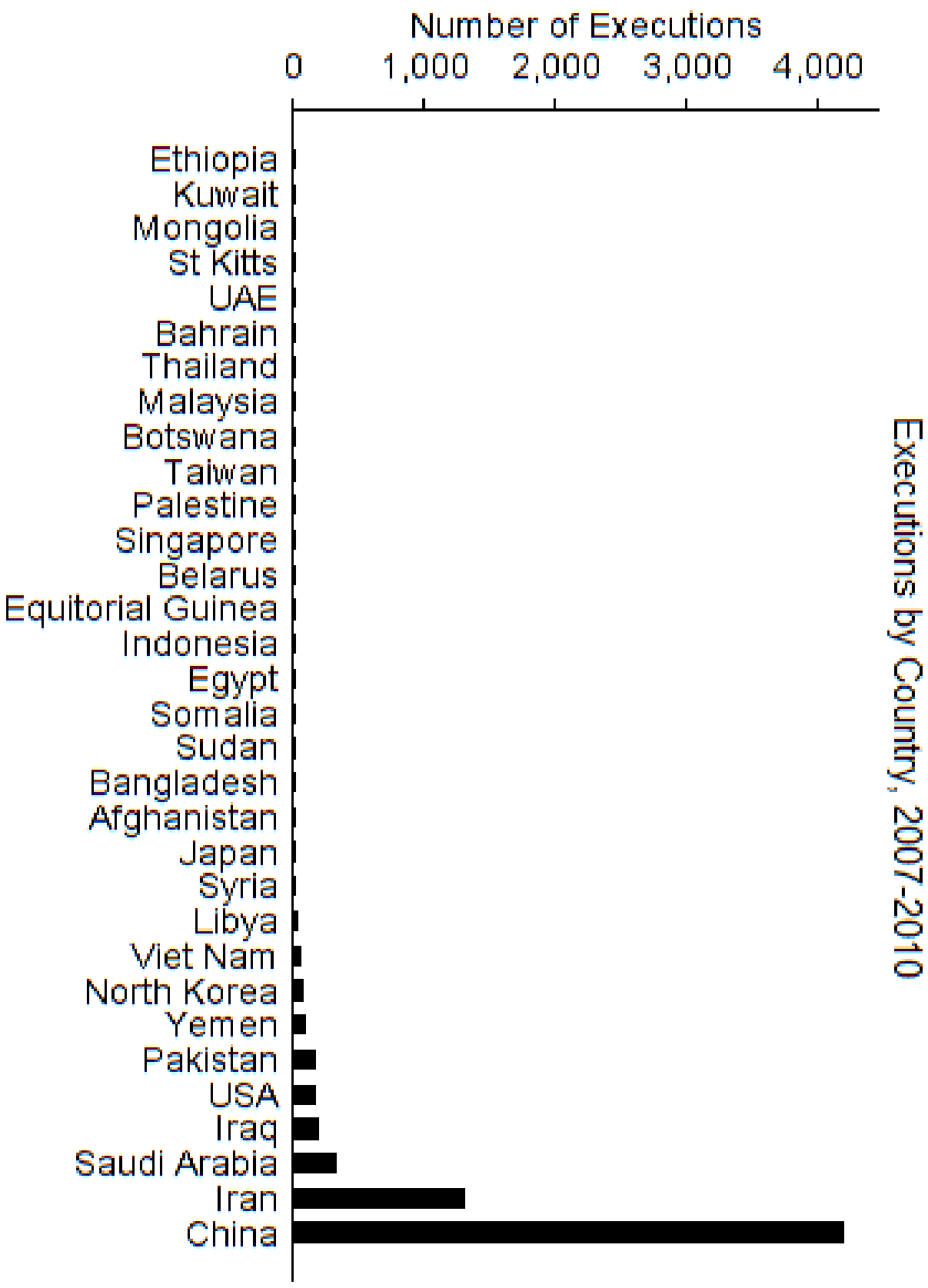

Executions Rates by Federal Judicial Circuit
Number of Executions per Million Population
0
5
10
15
20
0.0
0.0
0.8
7.4
19.5
1.7
1.3
4.4
1.6
7.0
5.9
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Based on 1,239 executions from 1976 to June 2011.

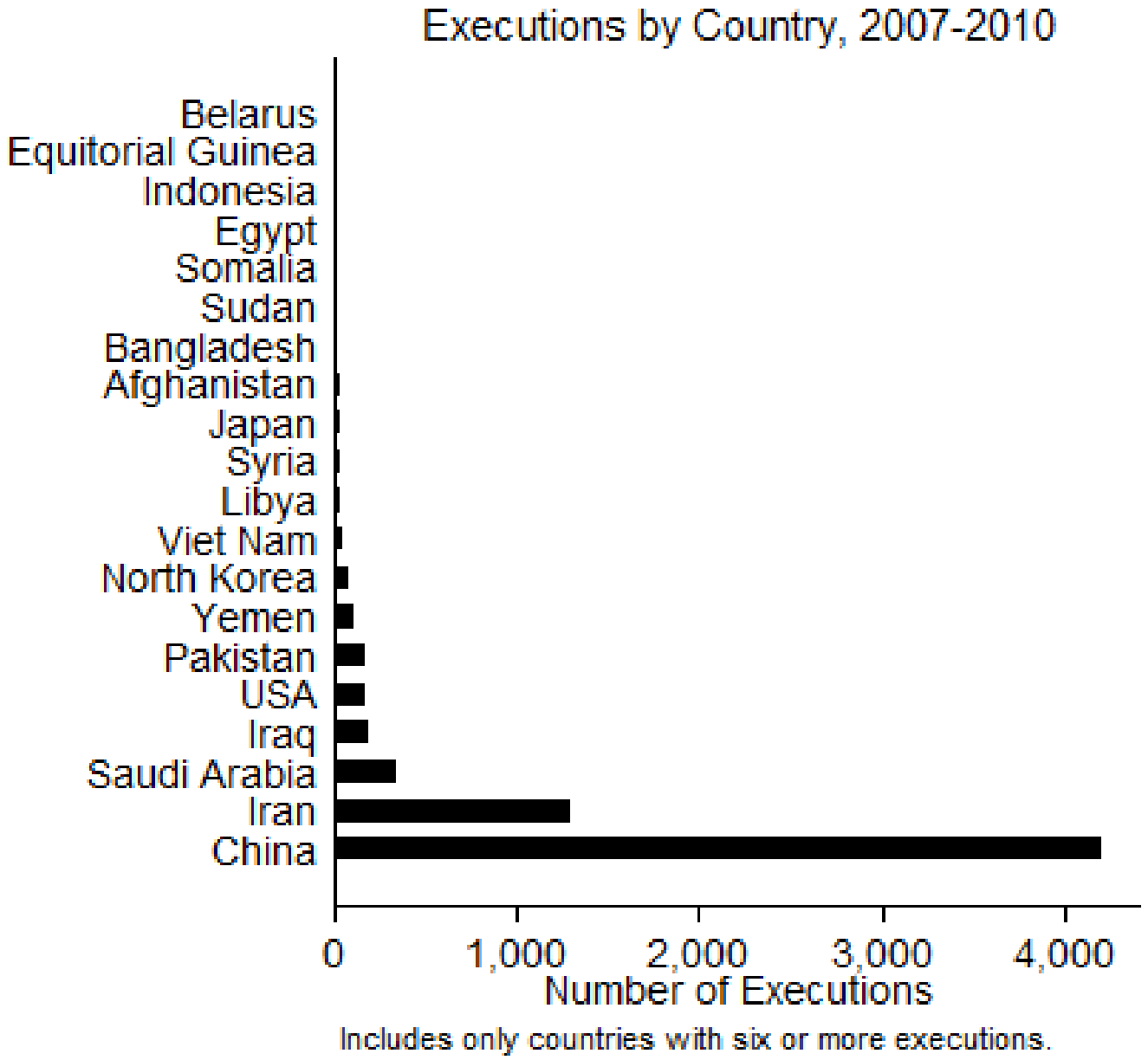

Cumulative Executions across US Judicial Circuits
Number of Judicial Circuits
10
5
2
1
0
2
5
10
Executions per Million Population
Based on 1,239 executions from 1976 to June 2011.

These trends also hold for countries across the world

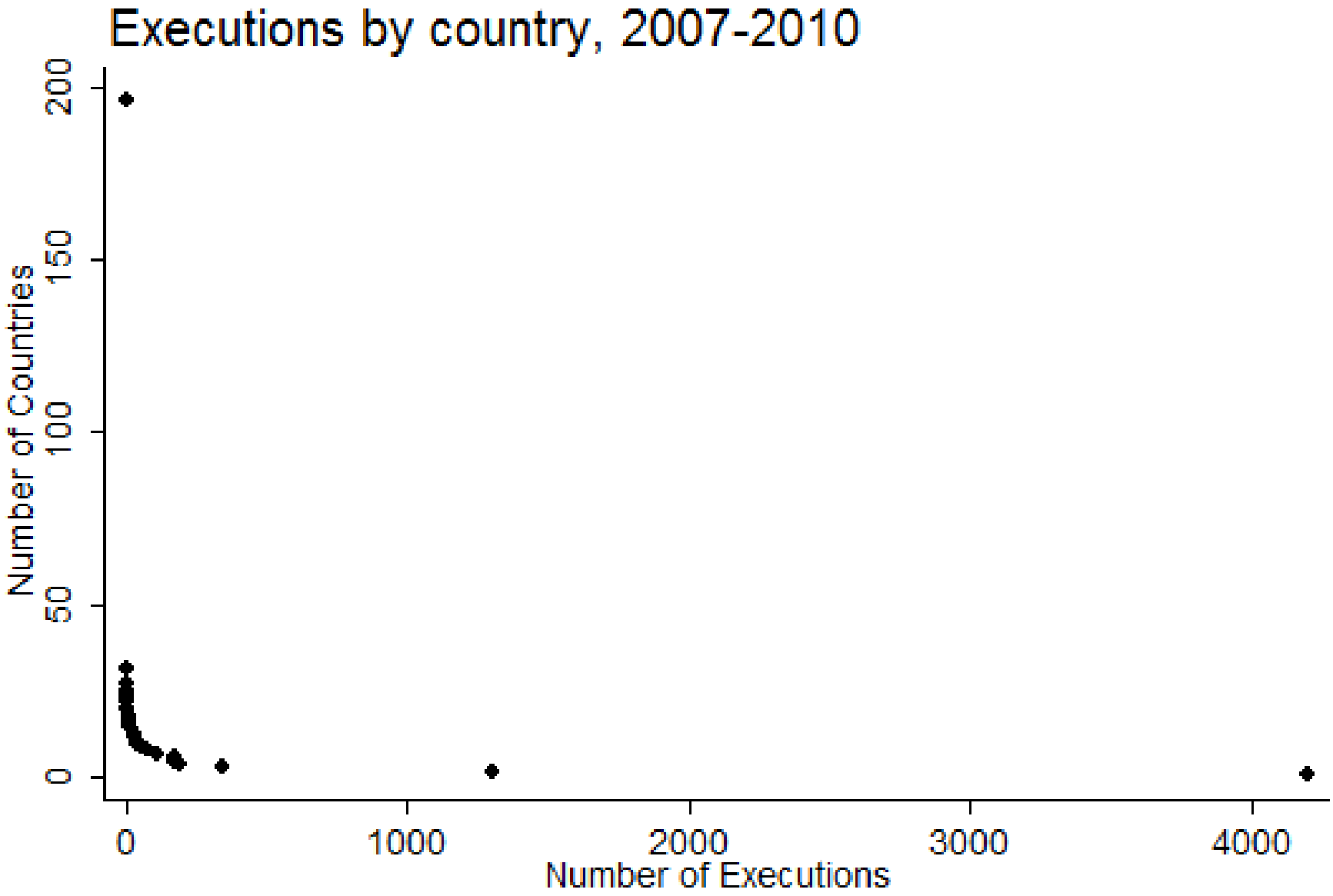
- Since 2007, Amnesty International has published an annual review of capital punishment around the world: http://www.amnesty.org/en/death-penalty/numbers

- Where they present a range, I use the lowest number in order to be conservative.
- Following charts combine 2007 through 2010.


Number of Executions
0
1,000
2,000
3,000
4,000
Ethiopia
Kuwait
Mongolia
St Kitts
UAE
Bahrain
Thailand
Malaysia
Botswana
Taiwan
Palestine
Singapore
Belarus
Equitorial Guinea
Indonesia
Egypt
Somalia
Sudan
Bangladesh
Afghanistan
Japan
Syria
Libya
Viet Nam
North Korea
Yemen
Pakistan
USA
Iraq
Saudi Arabia
Iran
China
Executions by Country, 2007-2010

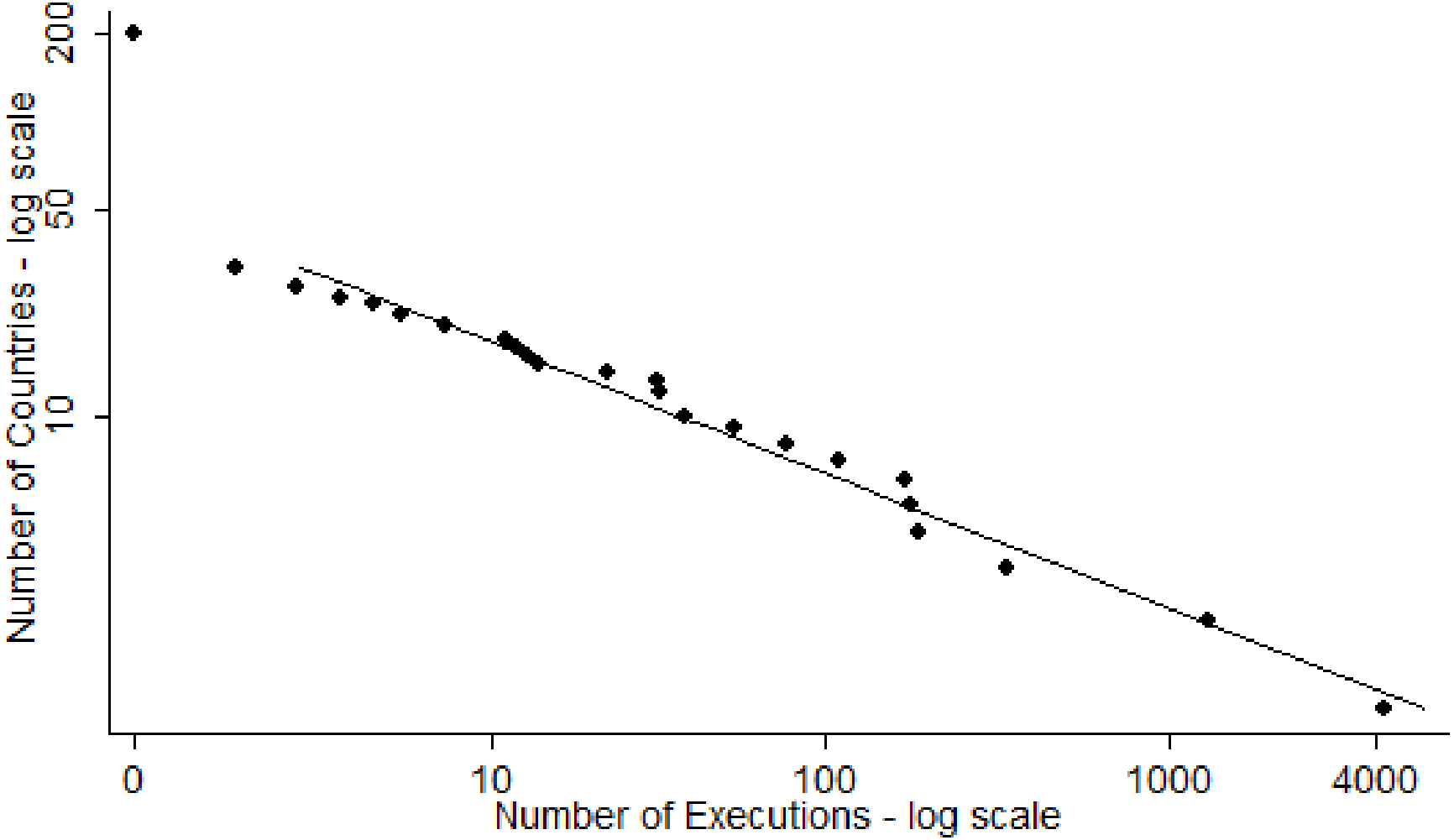

Executions by Country, 2007-2010
Belarus
Equitorial Guinea
Indonesia
Egypt
Somalia
Sudan
Bangladesh
Afghanistan
Japan
Syria
Libya
Viet Nam
North Korea
Yemen
Pakistan
USA
Iraq
Saudi Arabia
Iran
China
0
1,000
2,000
3,000
4,000
Number of Executions
Includes only countries with six or more executions.


Executions by Country, 2007-2010
Viet Nam
54
North Korea
77
Yemen
111
Pakistan
171
USA
177
Iraq
188
Saudi Arabia
341
Iran
1303
China
4198
0
1,000
2,000
3,000
4,000
Number of Executions
Includes only countries with 50 or more executions.

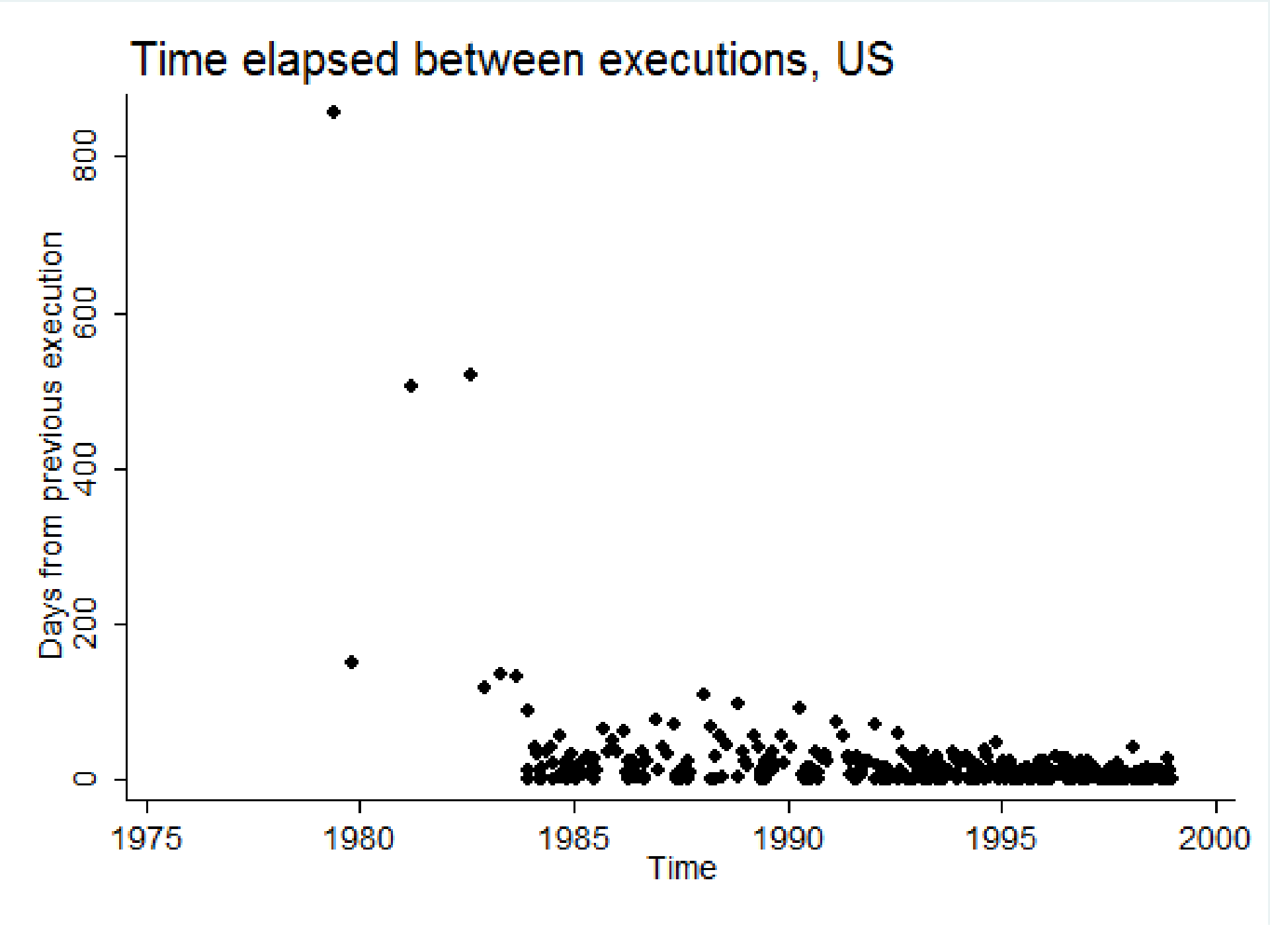


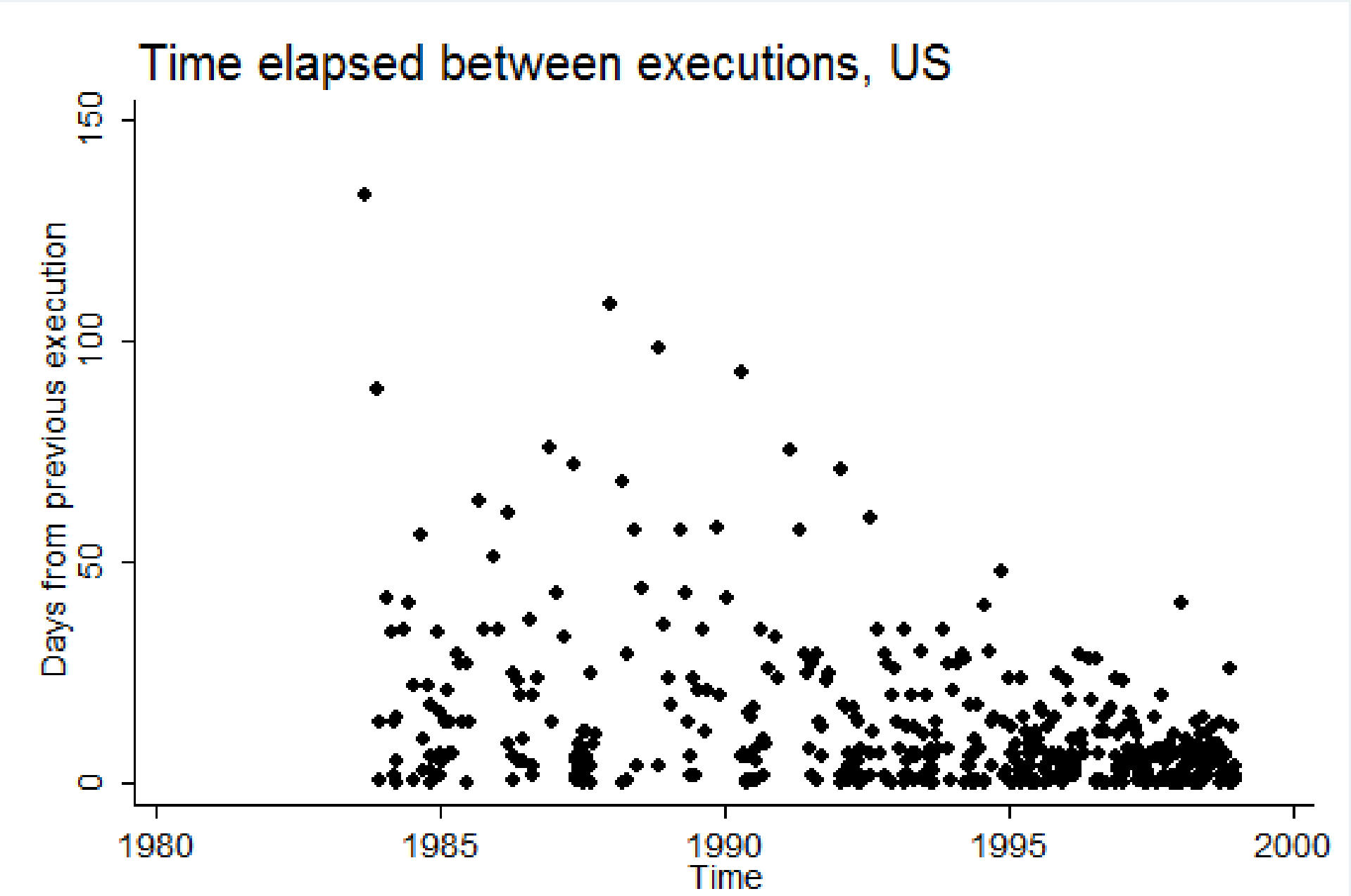
Of 196 countries, 164 executed no one but China executed over 4,000.

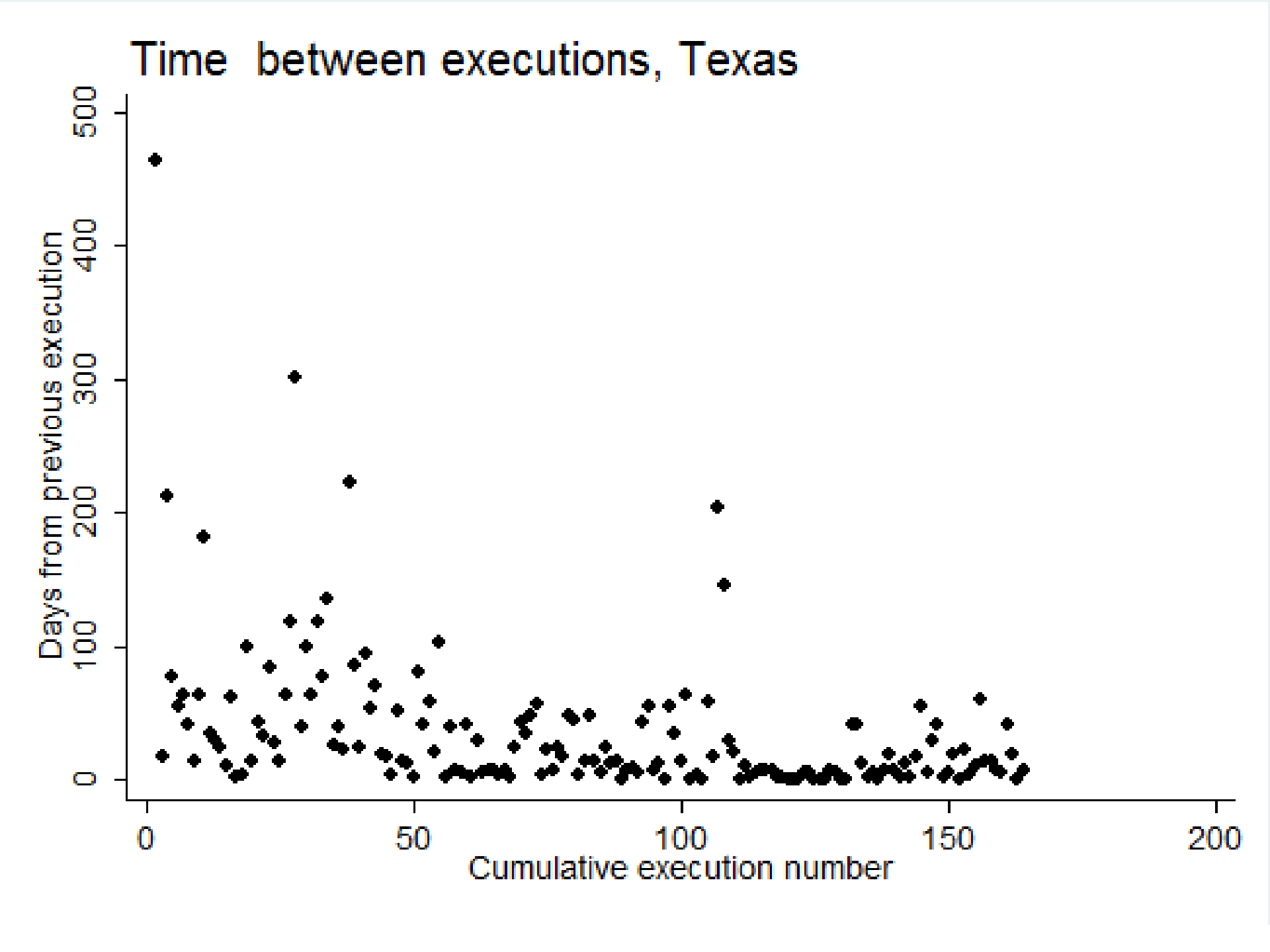
A Power Law of Death Across the World, 2007 to 2010

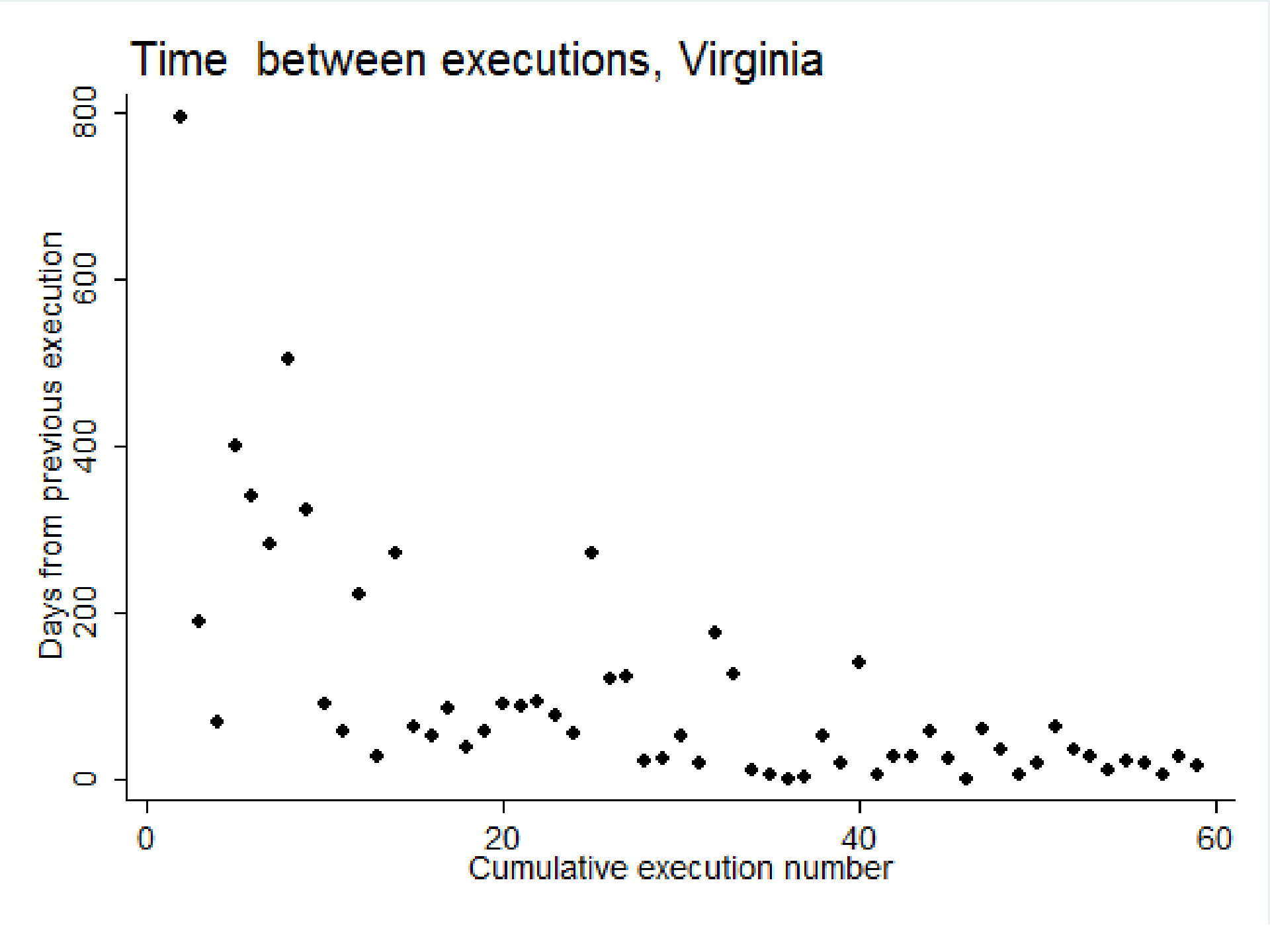


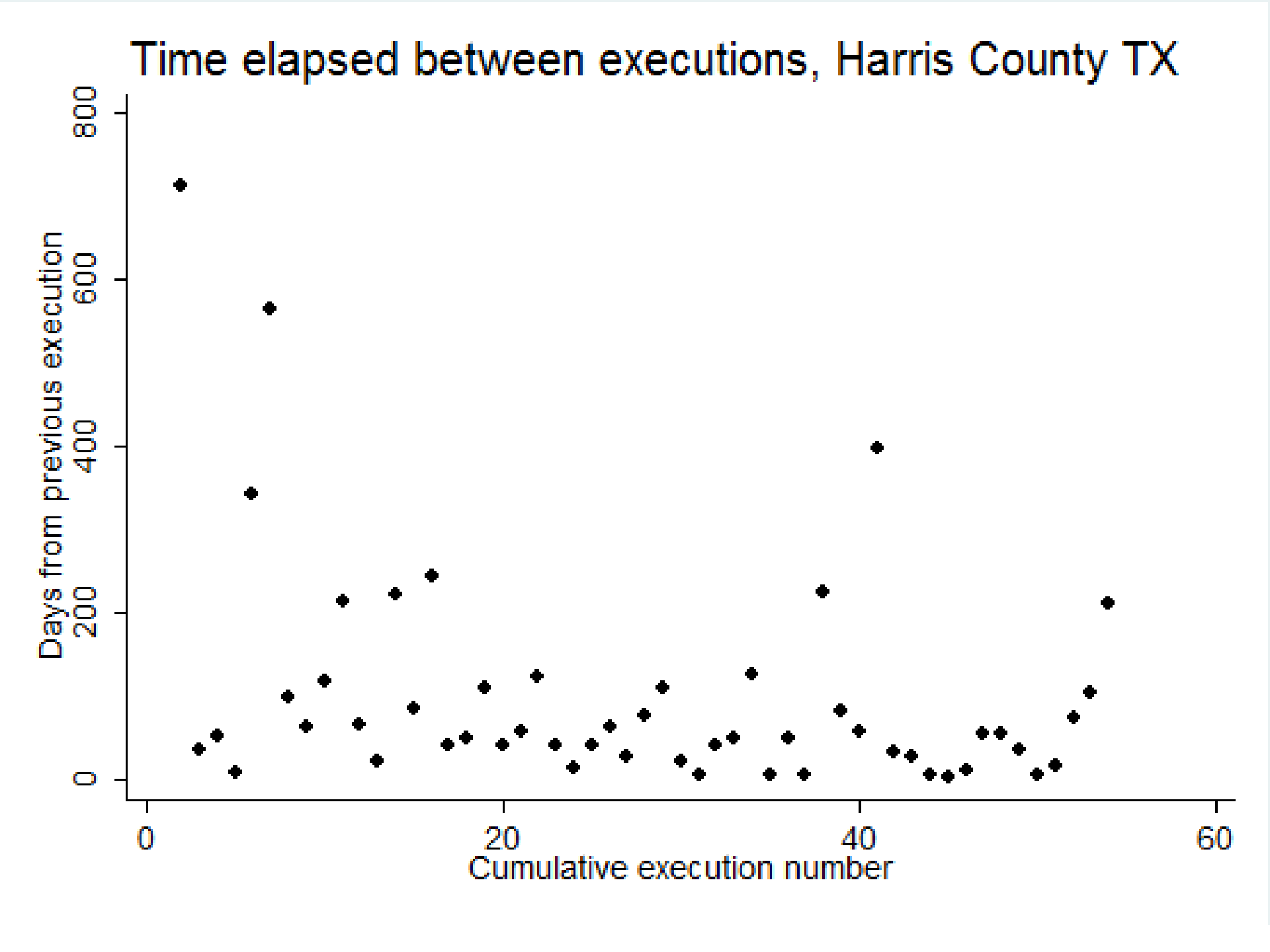
Among 196 countries in the world, 164 have had no executions, 7 have executed 100 or more, and one (China) has executed over 4,000.
Ln(Frequency) = 8.62 - 2.17(Ln (Executions+1) Adj. R2 = 0.98

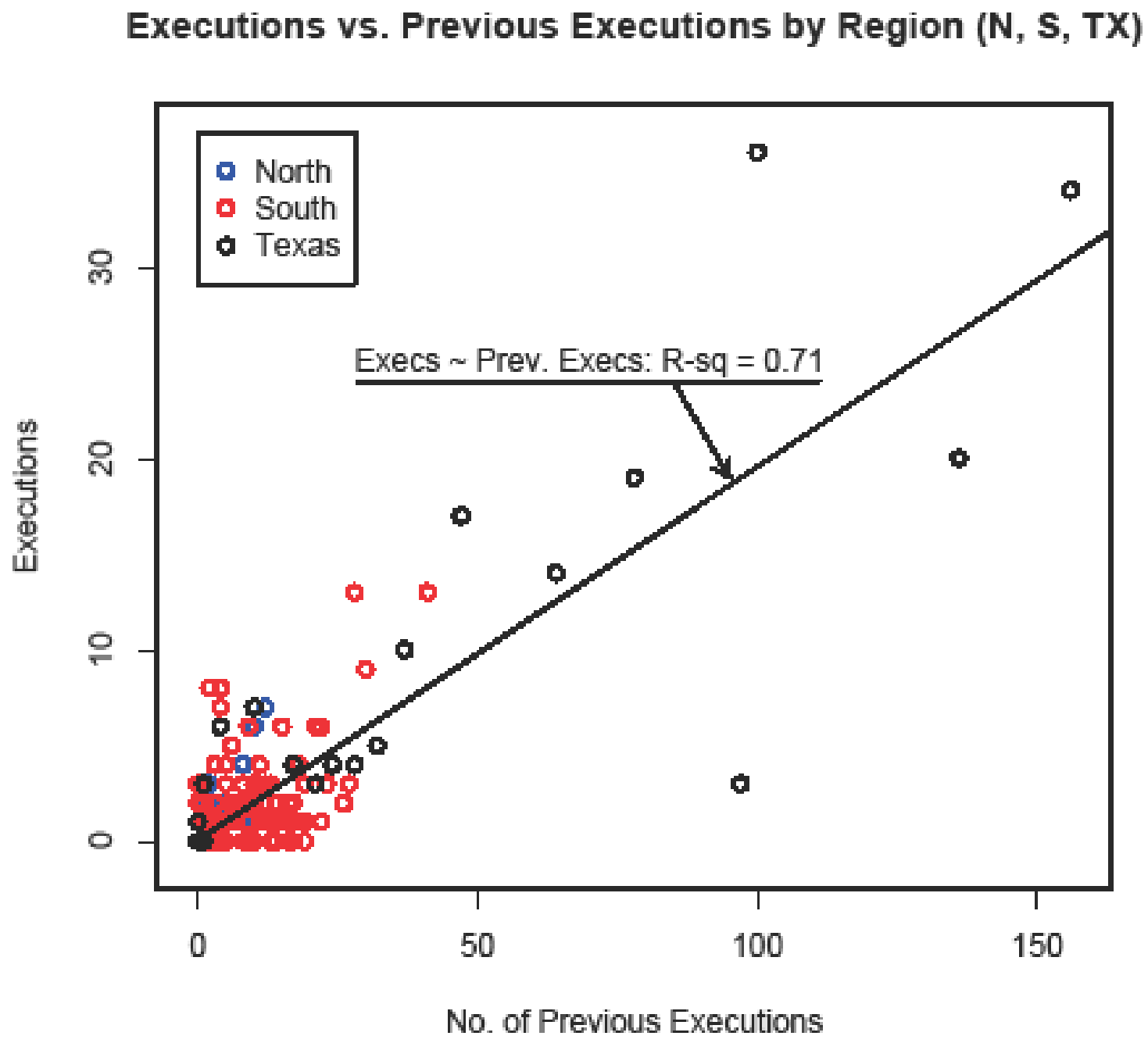

Time elapsed between executions, US
Days from previous execution
0
200
400
600
800
1975
1980
1985
1990
1995
2000
Time

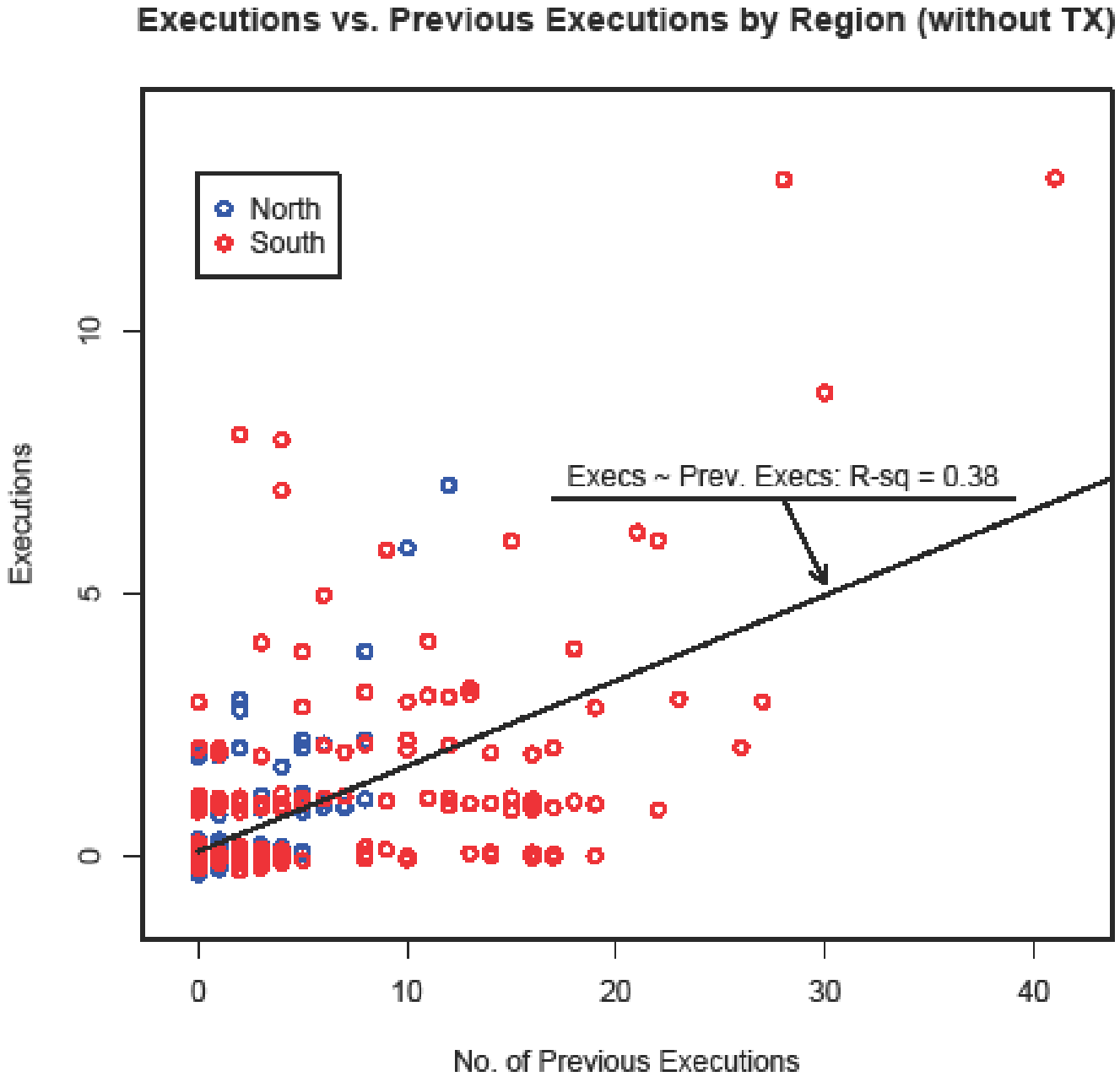

Time elapsed between executions, US
Days from previous execution
0
50
100
150
1980
1985
1990
1995
2000
Time
Excludes the first 7 executions, which had long delays.


Time between executions, Texas
Days from previous execution
0
100
200
300
400
500
0
50
100
150
200
Cumulative execution number


Time between executions, Virginia
Days from previous execution
0
200
400
600
800
0
20
40
60
Cumulative execution number


Time elapsed between executions, Harris County TX
Days from previous execution
0
200
400
600
800
0
20
40
60
Cumulative execution number

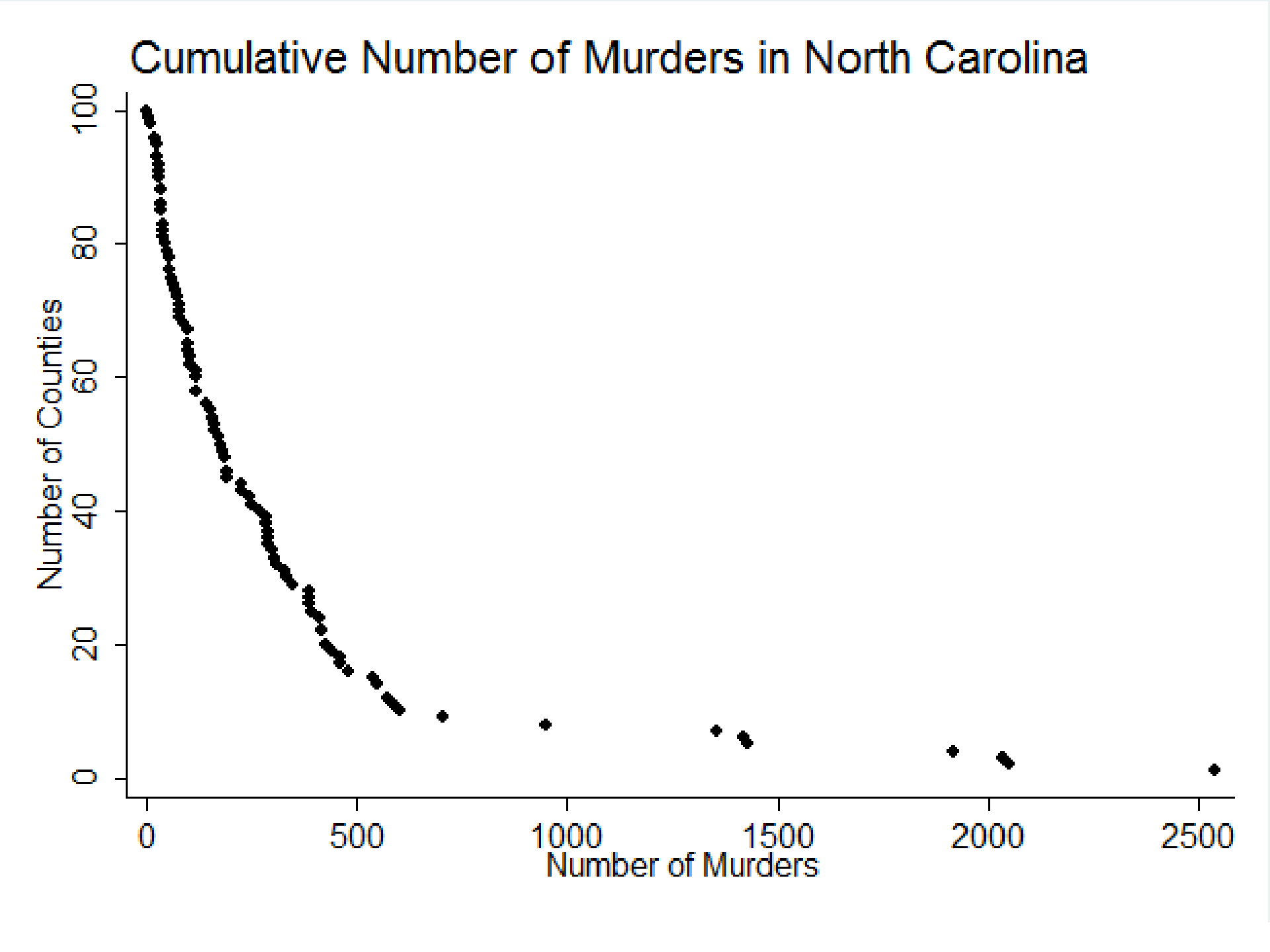

Executions vs. Previous Executions by Region (N, S, TX)
North
South
Texas
Execs ~ Prev. Execs: R-sq = 0.71
Executions
0
10
20
30
0
50
100
150
No. of Previous Executions

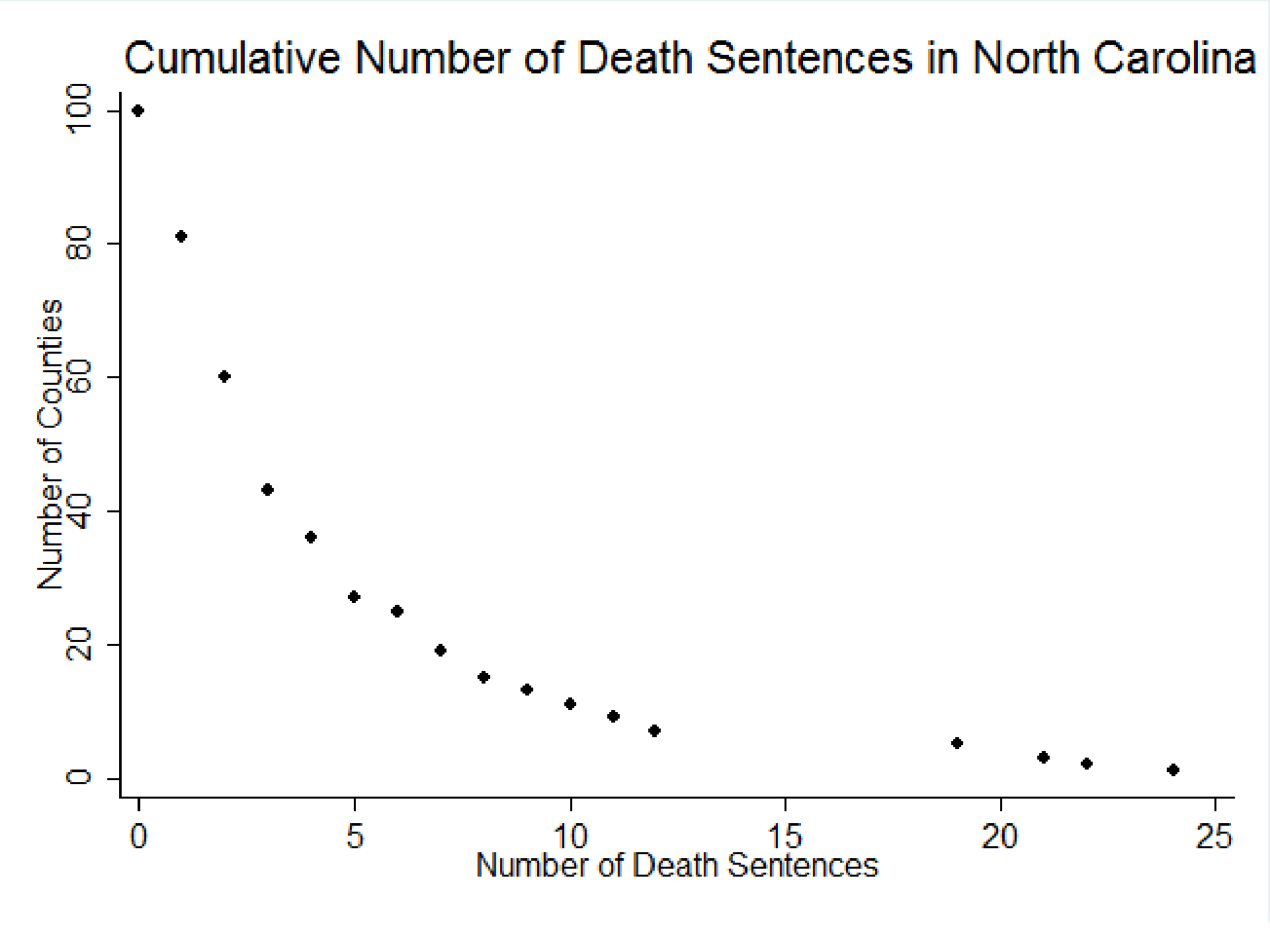

Executions vs. Previous Executions by Region (without TX)
North
South
Execs ~ Prev. Execs: R-sq = 0.38
Executions
0
5
10
0
10
20
30
40
No. of Previous Executions

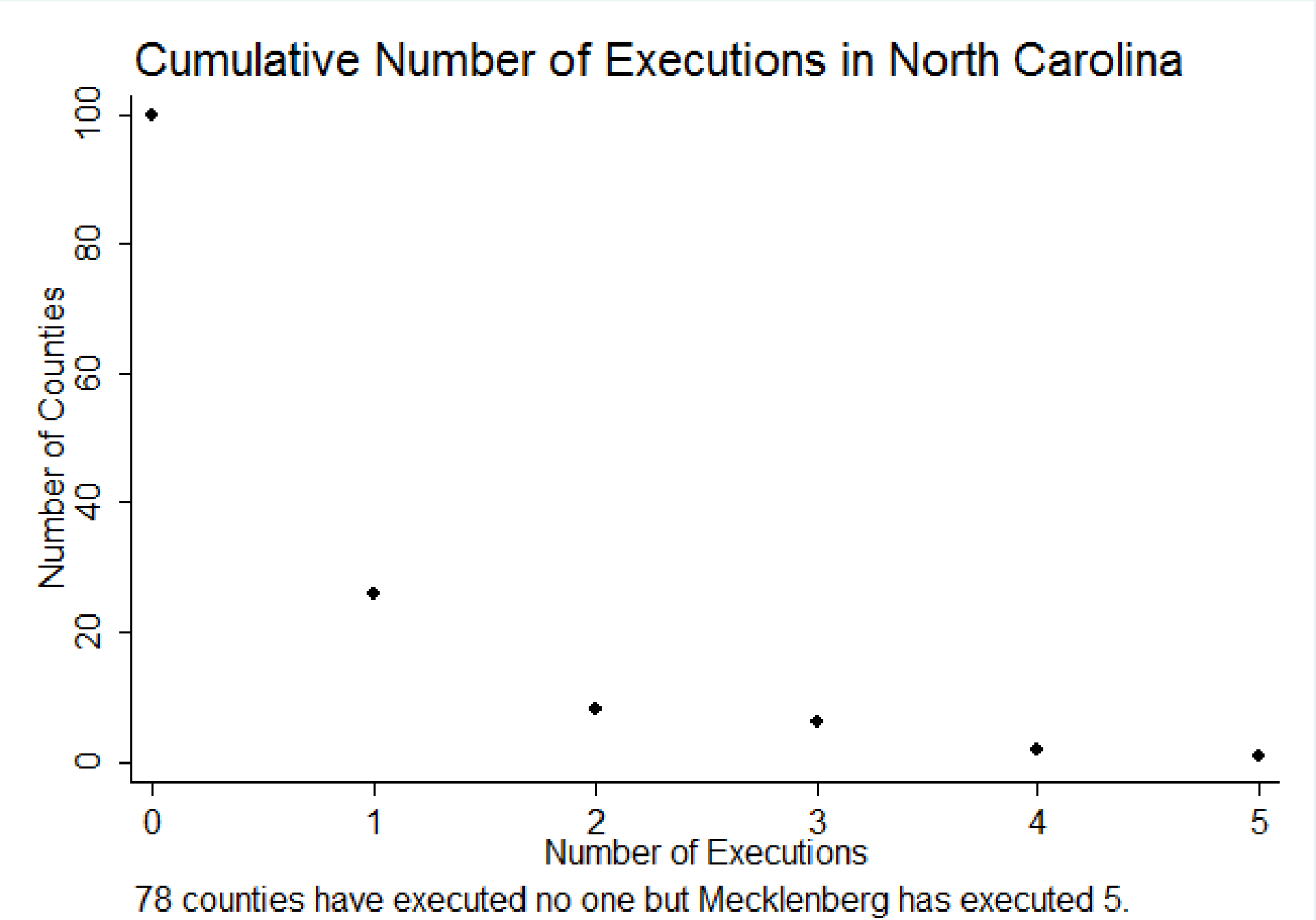
Are the stages progressively more skewed?

- For North Carolina, I have data from the state indigent defense services database of all murder cases from approx 1977 to 2011.

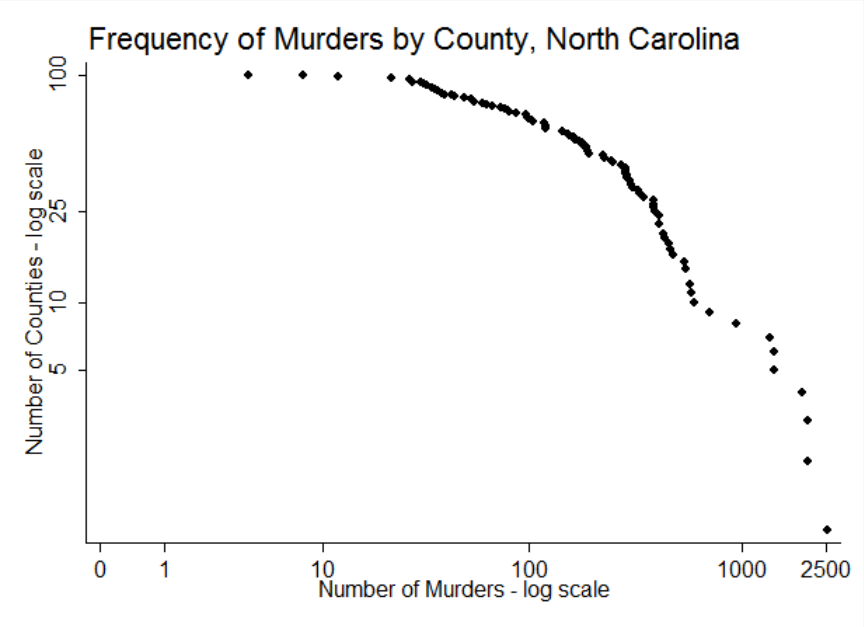
- Following slides show progressively more skew in the distributions as we move from:
- Murders
- Death sentences
- Executions

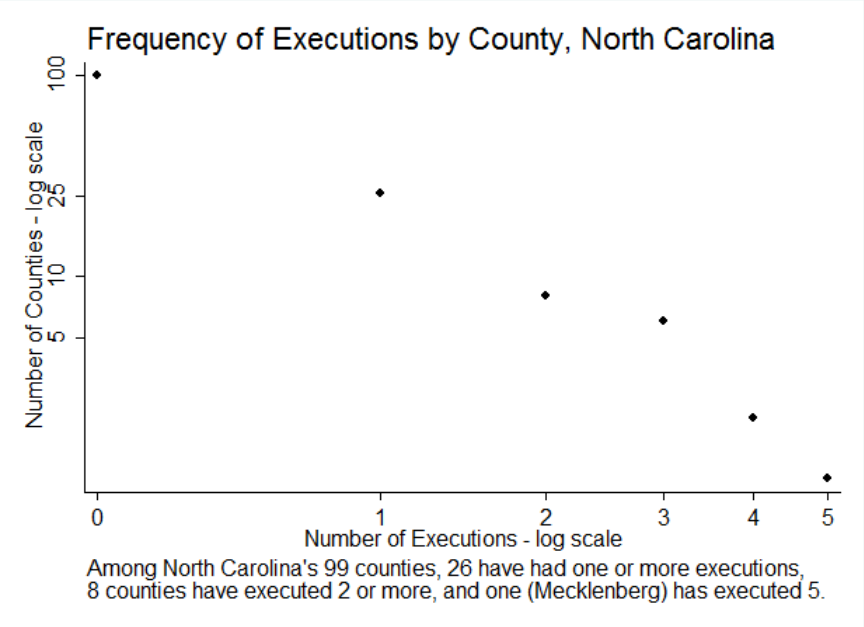

Cumulative Number of Murders in North Carolina
Number of Counties
0
20
40
60
80
100
0
500
1000
1500
2000
2500
Number of Murders


Cumulative Number of Death Sentences in North Carolina
Number of Counties
0
20
40
60
80
100
0
5
10
15
20
25
Number of Death Sentences

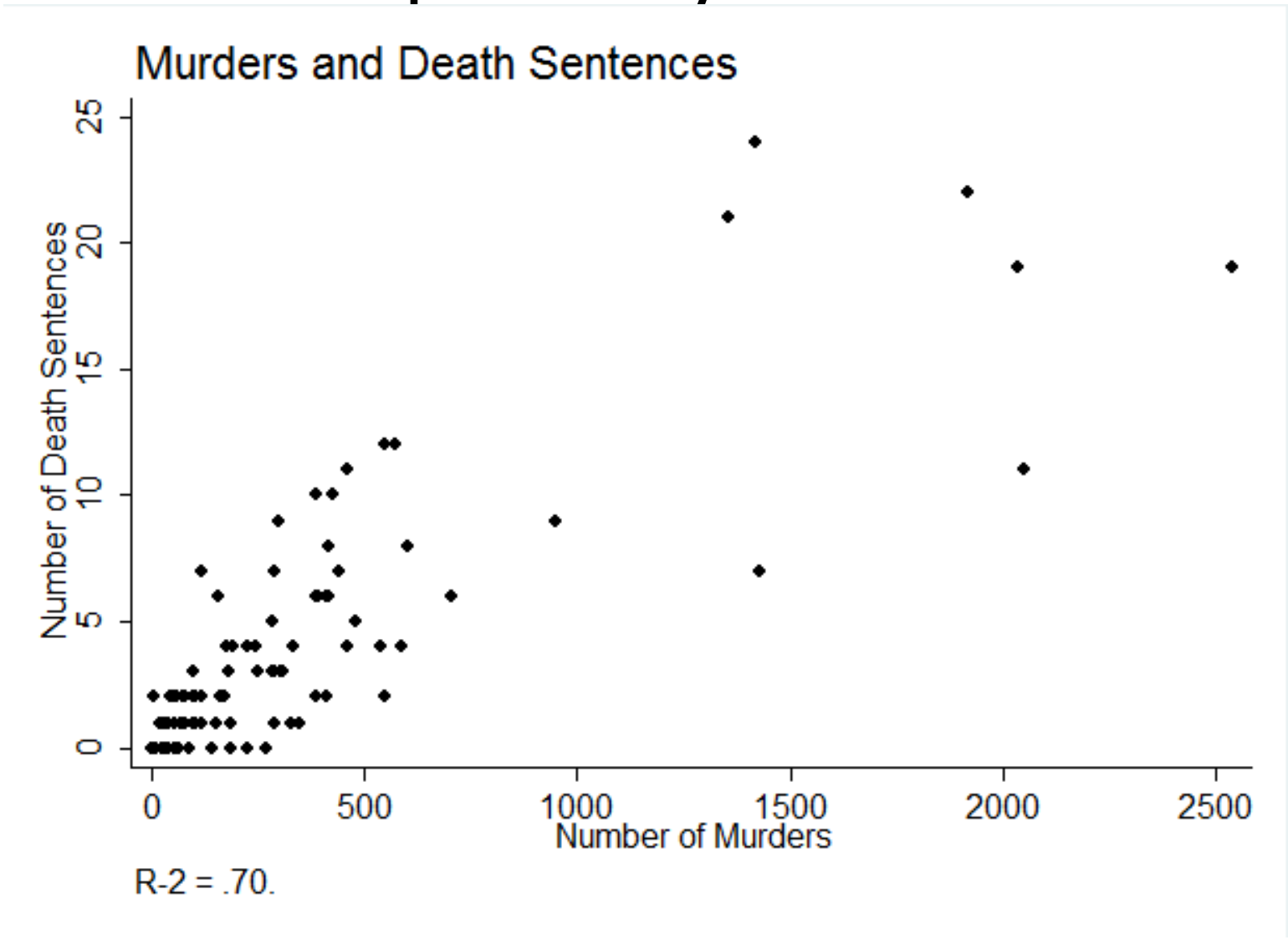

Cumulative Number of Executions in North Carolina
Number of Counties
0
20
40
60
80
100
0
1
2
3
4
5
Number of Executions
78 counties have executed no one but Mecklenberg has executed 5.

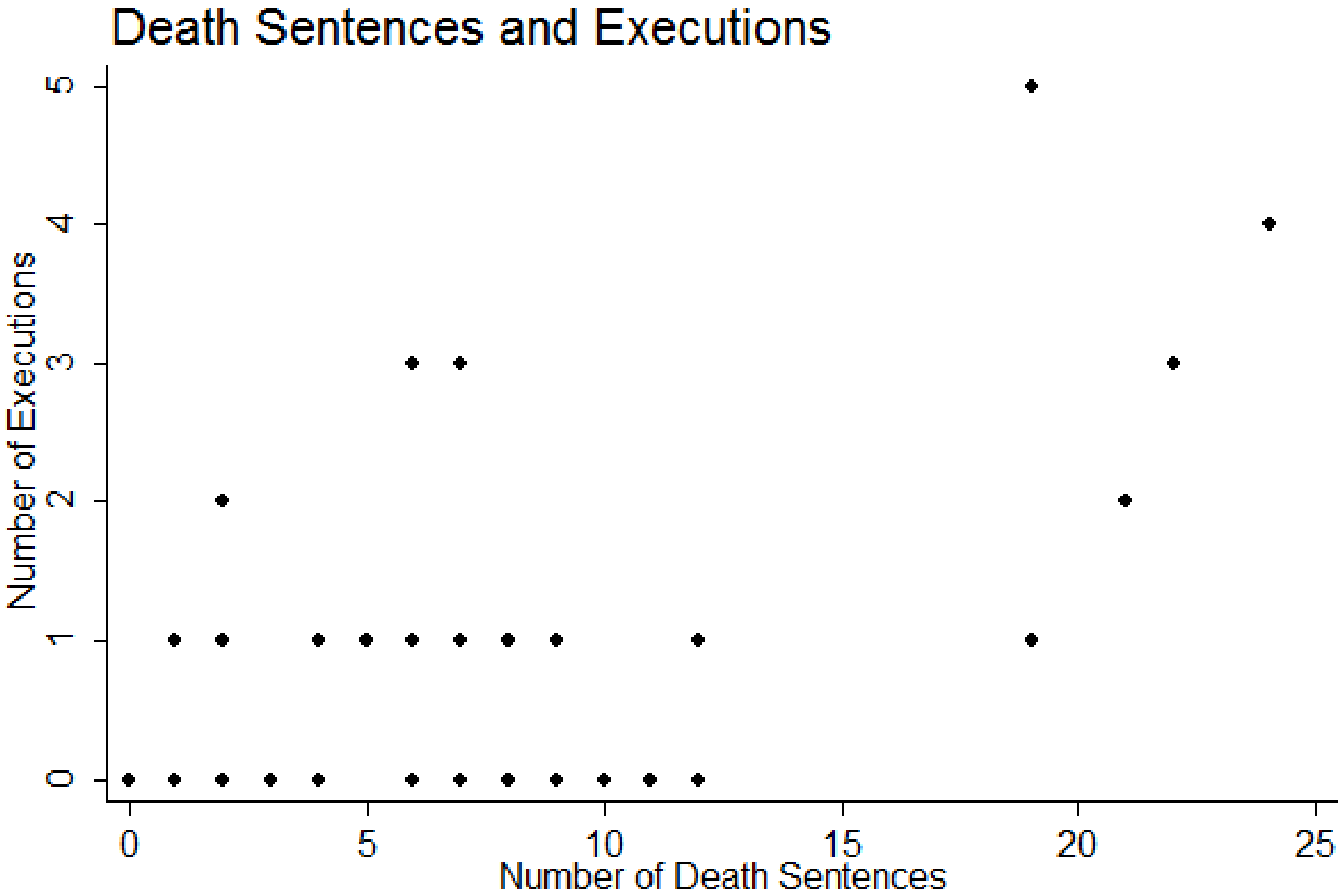
Murders are not close to a log-log distribution but executions are



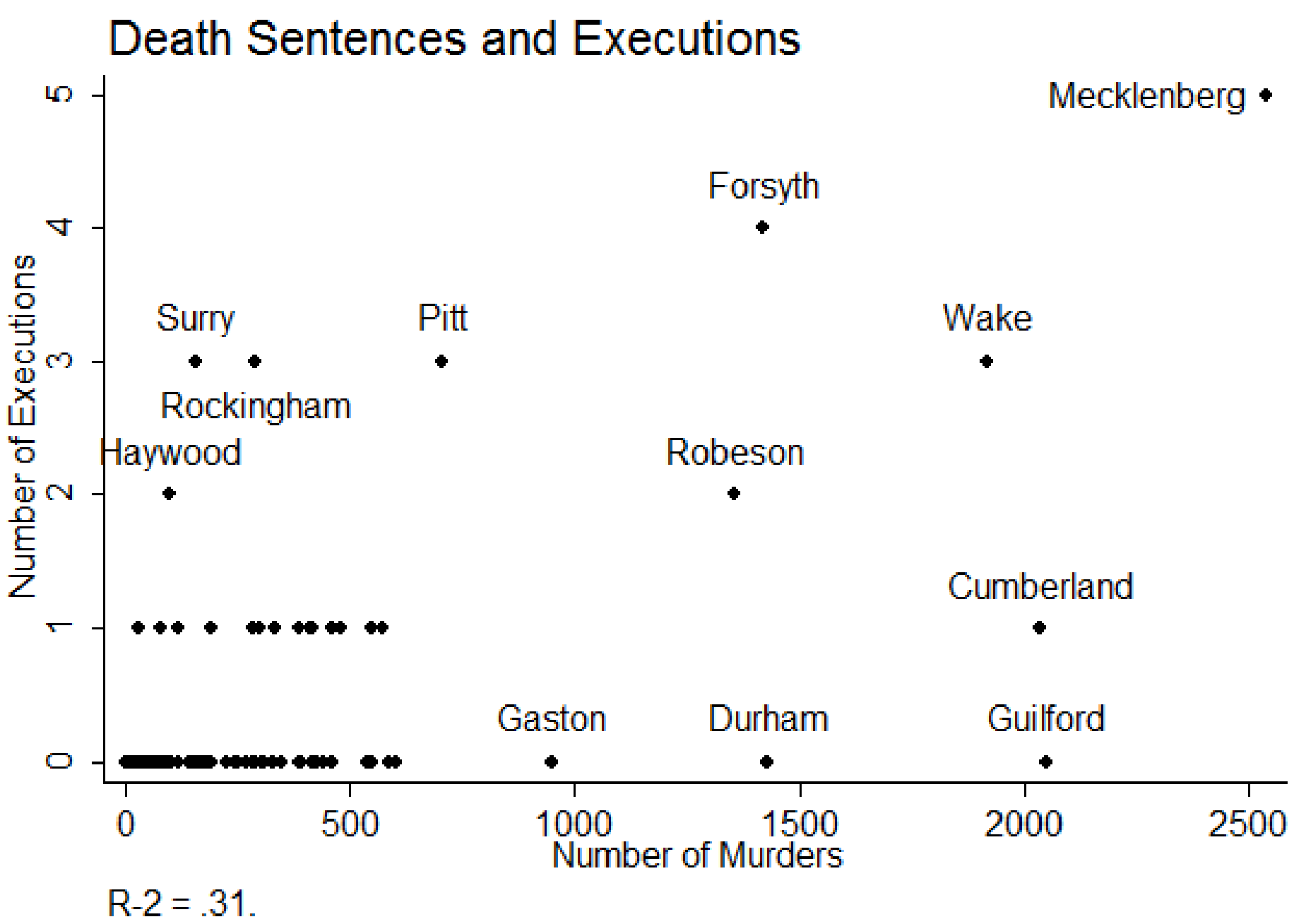


Murders, Sentences, and Executions are imperfectly correlated




Death Sentences and Executions
Number of Executions
0
1
2
3
4
5
0
5
10
15
20
25
Number of Death Sentences

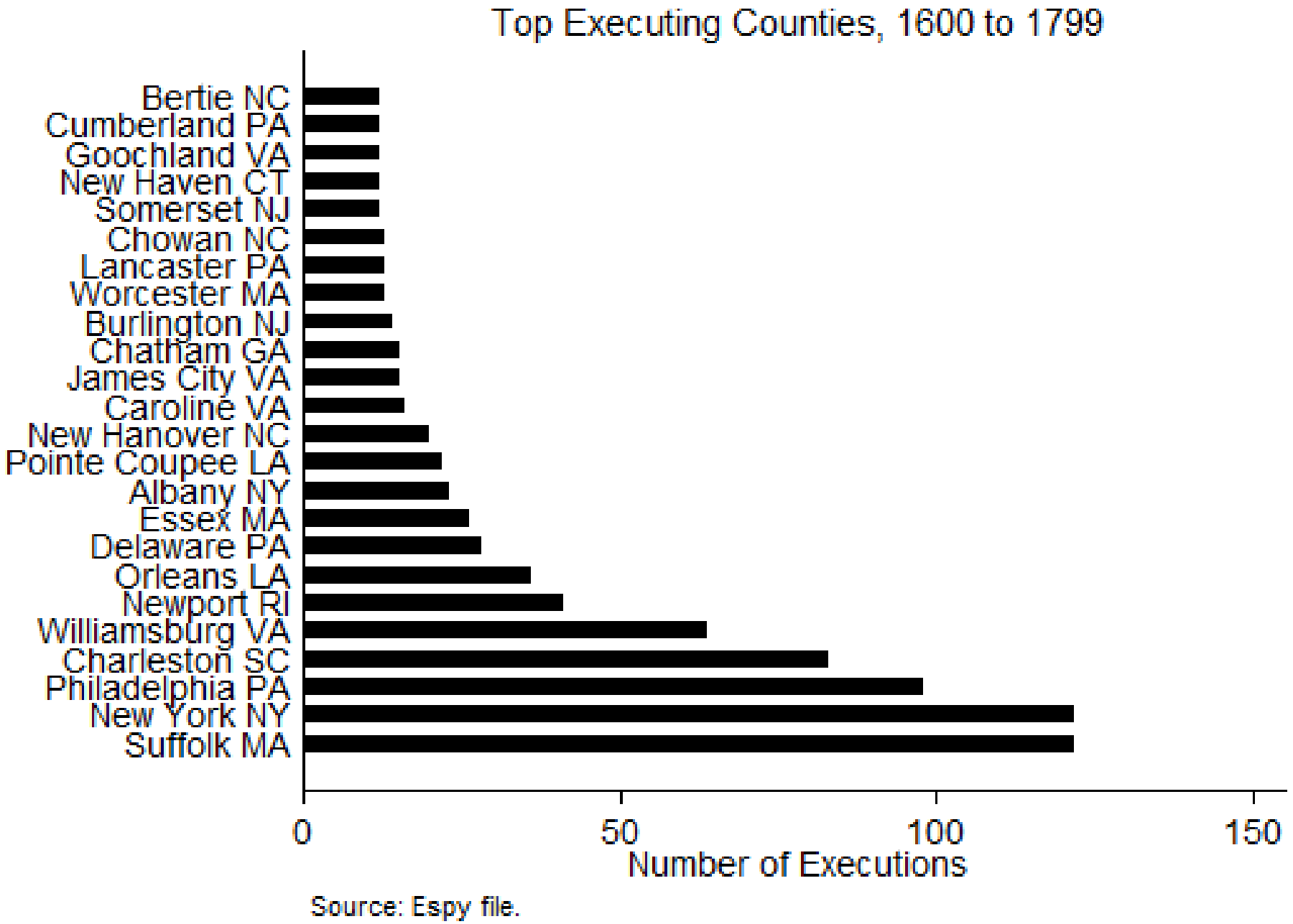
R-2 = .41.

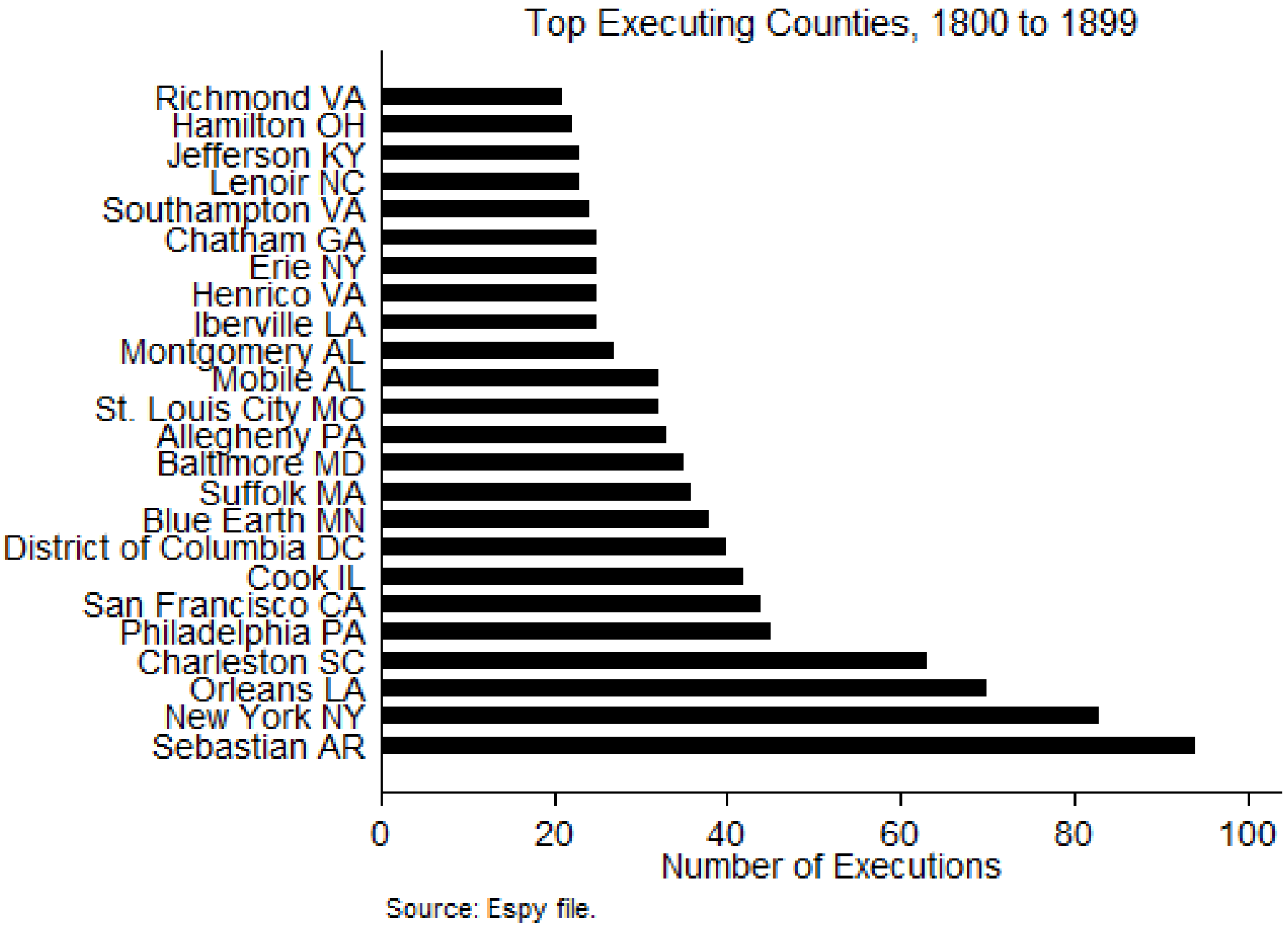

Death Sentences and Executions
Mecklenberg
Forsyth
Surry
Pitt
Wake
Rockingham
Haywood
Robeson
Cumberland
Gaston
Durham
Guilford
Number of Executions
0
1
2
3
4
5
0
500
1000
1500
2000
2500
Number of Murders

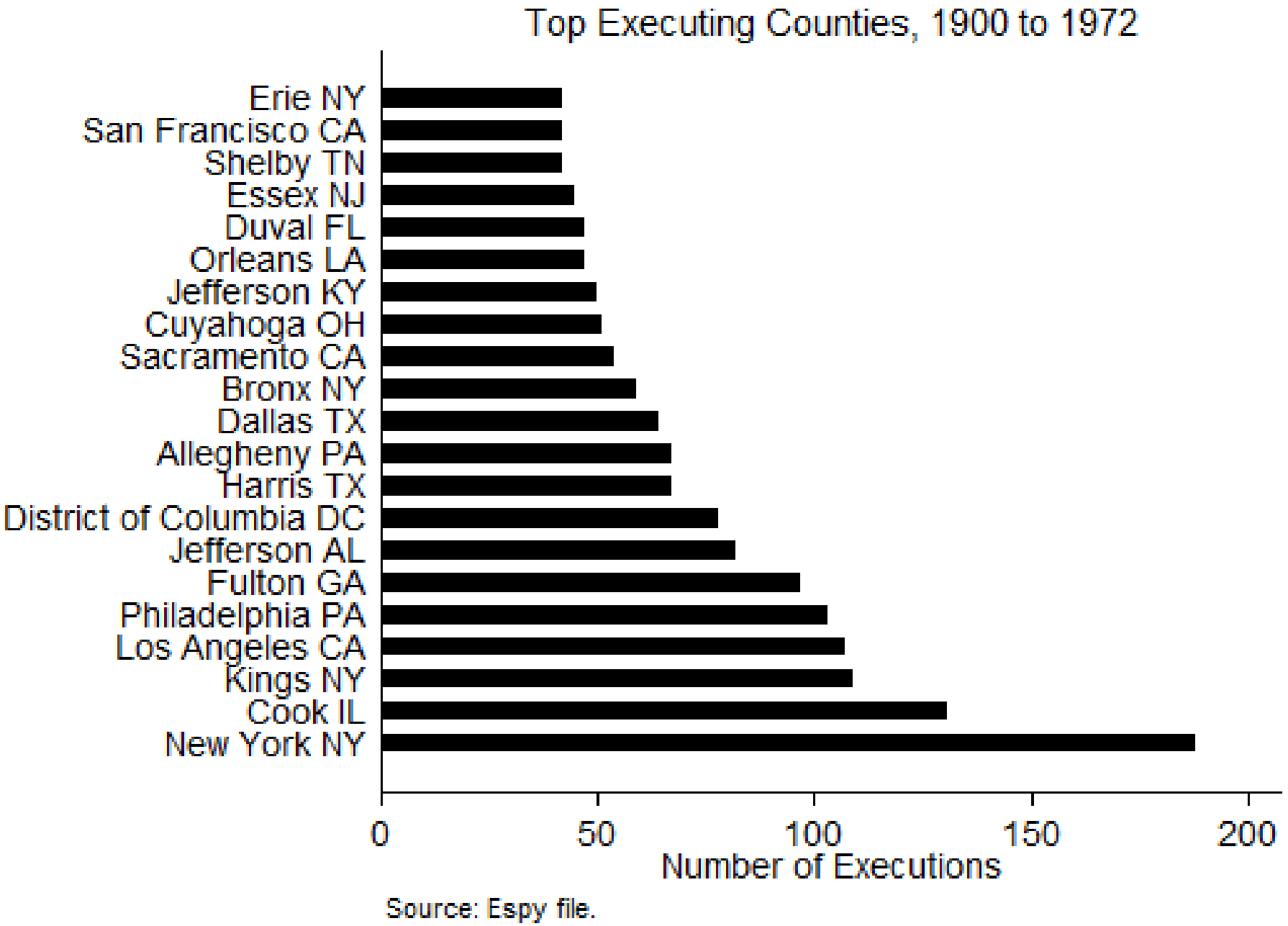
R-2 = .31.

Note: Modern era shows different geographic patterns than previous eras

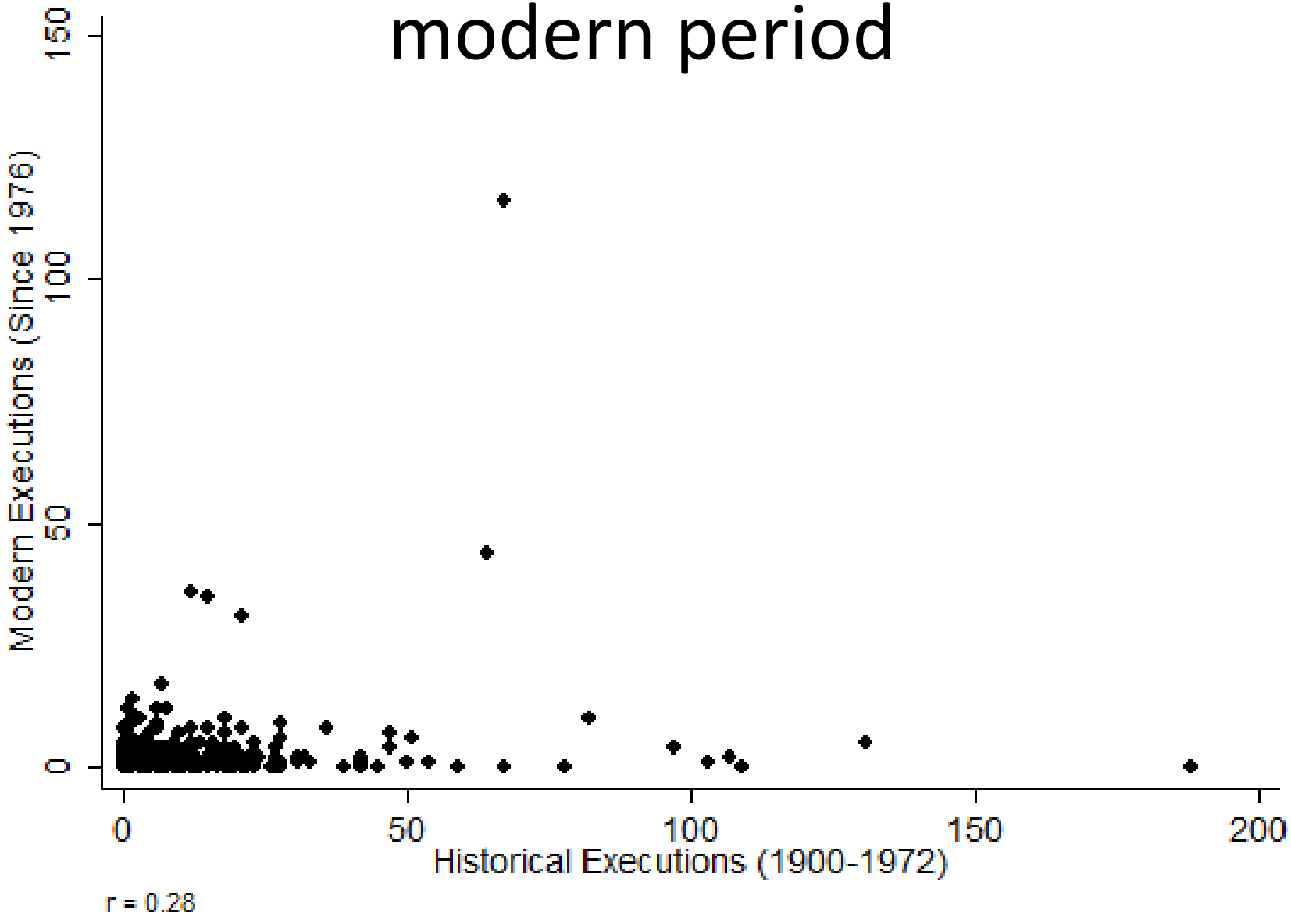
- Early period: very common in large northern cities as well as in the South
- Modern period: almost entirely limited to the slave states
- Strong “states’ rights” reaction to Supreme Court decisions from the 1960s and 1970s
- Very little historic continuity in these patterns
- So it is possible to “break the cycle”
- Nothing inevitable about certain counties rather than others having most of the executions


Top Executing Counties, 1600 to 1799
Bertie NC
Cumberland PA
Goochland VA
New Haven CT
Somerset NJ
Chowan NC
Lancaster PA
Worcester MA
Burlington NJ
Chatham GA
James City VA
Caroline VA
New Hanover NC
Pointe Coupee LA
Albany NY
Essex MA
Delaware PA
Orleans LA
Newport RI
Williamsburg VA
Charleston SC
Philadelphia PA
New York NY
Suffolk MA
0
50
100
150
Number of Executions
Source: Espy file.


Top Executing Counties, 1800 to 1899
Richmond VA
Hamilton OH
Jefferson KY
Lenoir NC
Southampton VA
Chatham GA
Erie NY
Henrico VA
Iberville LA
Montgomery AL
Mobile AL
St. Louis City MO
Allegheny PA
Baltimore MD
Suffolk MA
Blue Earth MN
District of Columbia DC
Cook IL
San Francisco CA
Philadelphia PA
Charleston SC
Orleans LA
New York NY
Sebastian AR
0
20
40
60
80
100
Number of Executions
Source: Espy file.


Top Executing Counties, 1900 to 1972
Erie NY
San Francisco CA
Shelby TN
Essex NJ
Duval FL
Orleans LA
Jefferson KY
Cuyahoga OH
Sacramento CA
Bronx NY
Dallas TX
Allegheny PA
Harris TX
District of Columbia DC
Jefferson AL
Fulton GA
Philadelphia PA
Los Angeles CA
Kings NY
Cook IL
New York NY
0
50
100
150
200
Number of Executions
Source: Espy file.

Little correlation from early 20th c. to modern period



This is slide # 83

Thank you for your patience

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