A Method for Explaining Prison Growth: Elderly in Prison

NCRP Data Provider Conference
April 22 & 23, 2014
Presentation Roadmap

- Statement of the Problem
- Analytic Approach
- Results
- Concluding Remarks
Presentation Roadmap

- Statement of the Problem
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Prison populations are getting older ("The Graying of Prisons")

– From 1991 – 2011, the nat’l population of inmates,
  
  • **over 54** went from 22,653 (3%) to 115,690 (8%).
  
  • **over 44** grew 4 times faster than < 35.

– Occurring at the national and state level
**“The Graying of Prisons”**

- Significant costs to incarcerating elderly (over 50)

<table>
<thead>
<tr>
<th>Economic Costs</th>
<th>Social Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of housing is 2-3 times greater than the average</td>
<td>Elderly populations are more vulnerable in prison</td>
</tr>
<tr>
<td>Health care costs make up 10 – 20% of a state’s prison expenditures</td>
<td>Elderly populations are less of a threat to society</td>
</tr>
</tbody>
</table>
“The Graying of Prisons”

What are the right policy levers?

- Understand the *causes*

- Historically, the literature has suggested,
  
  - Intuitive argument; supported by some study in prison growth
  
  - Measurable impact on aging has been hard to assess (strong data requirements)
Recent analyses of prison growth has emphasized,

- use of data simulations to partition the impacts of factors of growth,

- findings that suggest a more limited influence of sentence severity. [Pfaff (2012); Raphael & Stoll (2009)].

Virtually no extension to analyses of aging populations, [Auerhahn (2002)].
New Contribution

- Using the NCRP,
  - we investigate the aging problem
  - introduce a methodology for analyzing factors
  - Method can be applied more broadly

- Results show,
  - Rising admission age & falling admission rates have played the greatest role in prisoner aging over the last 13 years.
  - the impact of sentence severity and changing offense mix have been minimal.
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Focused on 4 drivers of change (in age composition):

1. Age at Admission (direct)
2. Number of Admissions (direct)
3. Length of Stay (direct)
4. Mix of Offense Types (indirect)
Analytic Approach

Change in Admission Rate Since 2000

- South Carolina
- North Carolina
- New York
- California

0% 10% 20% 30%

-30% -20% -10% 0% 10% 20% 30%
Analytic Approach

The graph shows the time served in years from 2000 to 2012 for different states:
- South Carolina (red line)
- North Carolina (dark grey line)
- New York (green line)
- California (purple line)

The x-axis represents the years from 2000 to 2012, and the y-axis represents the time served in years.
Analytic Approach

The diagram illustrates the percentage distribution of violent, property, drug, and minor/other crimes in S. Carolina, N. Carolina, New York, and California from 2000 to 2012. The graph shows a significant increase in violent crimes from 2000 to 2012 in all states, with New York and California having the highest percentages of violent crimes.
## Analytic Approach

<table>
<thead>
<tr>
<th>Year</th>
<th>S. Carolina</th>
<th>N. Carolina</th>
<th>New York</th>
<th>California</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Violent**
- **Property**
- **Drug**
- **Minor/Other**
Analytic Approach

- Our approach is to,

  1. Create a steady-state solution that *holds all factors constant*

  2. Vary factors (1 – 4) individually, *simulating observed conditions*

  3. Compare population totals
Analytic Approach

- **Steady State** is achieved by,
  - replicating the 2000 admission cohort over 13 years

- **Comparison State** is achieved by,
  - reweighting those replications to impose new conditions

- Result is,
  - simulated 2012 populations, under various conditions
  - compared to observed changes
Analytic Approach

- Weights are derived using a data process called *raking* (Deming & Stephan, 1940)

- Technique utilized by statisticians to simulate sample conditions

- Details are available in a paper
A Simple Illustration

- **True Change**
  
  2000  2001  2002
  
  2002 Population

- **Steady State**
  
  2000  2001  2002
  
  2002 Population
A Simple Illustration

- True Change

2000  2001  2002

- Simulated State

2000  2001  2002

2002 Population
A Simple Illustration

- **Comparisons**

<table>
<thead>
<tr>
<th>Steady State Population</th>
<th>True or Simulated Population</th>
<th>Difference</th>
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<tr>
<td><img src="image1" alt="Steady State Population" /></td>
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- Statement of the Problem
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- Concluding Remarks
Results

- Two Representations
Results

- Two Representations
  - Absolute Numbers

<table>
<thead>
<tr>
<th>State Name</th>
<th>Age</th>
<th>Steady State</th>
<th>Observed</th>
<th>Prediction X</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-29</td>
<td>2,000</td>
<td>1,000</td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>30-49</td>
<td>6,000</td>
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Results

- Two Representations
  - Absolute Numbers
    | Age  | Steady State | Observed | Prediction X |
    |------|--------------|----------|--------------|
    | 18-29| 2,000        | 1,000    | 1,500        |
    | 30-49| 6,000        | 5,000    | 8,000        |
    | 50+  | 1,000        | 2,000    | 1,500        |

- Proportional Changes
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Growth Explained by Admission Age

Predicted Change in 50+ Group as a Proportion of the True Change

(SC NC NY CA)

Percent Change

-100.0% -50.0% 0.0% 50.0% 100.0% 150.0% 200.0%

SC NC NY CA

- Admission Rate (Factor 1)  - Admission Age (Factor 2)
- Offense Mix (Factor 3)     - Time Served (Factor 4)
Differences Across Subgroups

- Observed Change
- Admission Rate (Factor 1)
- Admission Age (Factor 2)
- Offense Mix (Factor 3)
- Time Served (Factor 4)
Differences Across Subgroups

- Violent
- Property
- Drug

- Observed Change
- Admission Rate (Factor 1)
- Admission Age (Factor 2)
- Offense Mix (Factor 3)
- Time Served (Factor 4)
Differences Across Subgroups

Percent Change

Violent  Property  Drug

-60.0%  -40.0%  -20.0%  0.0%  20.0%  40.0%  60.0%  80.0%  100.0%  120.0%  140.0%  160.0%

Observed Change  Admission Rate (Factor 1)
Admission Age (Factor 2)  Offense Mix (Factor 3)
Time Served (Factor 4)
Differences Across Subgroups

- Violent
  - Observed Change
  - Admission Rate (Factor 1)
  - Admission Age (Factor 2)
  - Offense Mix (Factor 3)
  - Time Served (Factor 4)

- Property

- Drug
Presentation Roadmap

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Concluding Remarks

- We present a novel approach,
  - Demonstrates the utility of NCRP
  - Straightforward inferences
  - Model changes separately or together

- Results suggest,
  - Admission age is primary driver in many cases
  - Impact of sentence length over this time frame is marginal
Concluding Remarks

- Challenges for addressing policy
  - Addressing contextual aspects of change
    - i.e., what is causing the admission age to change? New admission or supervision policies?
  - Analyzing historical changes and context
    - Forward looking as of 2000
Concluding Remarks

- Looking forward,
  - National simulations
  - Extend analyses (e.g. stratification by admission type)
  - Simulating policy impacts