Forecasting Prison Populations, Costs, and other Outcomes

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Presentation Overview

• Overview of prison population forecasting

• Developing a forecast
  o Urban’s Prison Population Forecaster (PPF)
  o Key considerations, inputs, and outputs
  o Population, cost, and other outcomes
Overview of prison population forecasting
Forecasting

• Terms
  o Forecasting, simulation, projection

• Uses
  o Model impact of policy changes
  o Inform state budgets, resource allocation, and other decisions
  o Guide legislation
Forecasting tools

- Underlying methods
  - Linear regression
  - ARIMA/time series models
  - Exponential smoothing (weighted averages of past observations)

- Statistical programs
  - Excel, SPSS, Stata, SAS, R, Python, etc.
  - Many resources/guides available online!
Forecasting tools

• State-specific tools and reports
  o Oregon Office of Economic Analysis: Oregon Corrections Population Forecast
  o Colorado Division of Criminal Justice: Colorado Criminal Justice Forecasting Model
  o California Department of Corrections and Rehabilitation: Population Projections
  o Florida Office of Economic and Demographic Research: Criminal Justice Estimating Conference
Developing a forecast
The Prison Population Forecaster

- PPF = Urban Institute interactive tool
  - urbn.is/ppf
  - Methodology and code freely available

- Estimate impact of policy changes
  - Changes in length of stay or admissions
  - Outcomes: population, cost, racial/ethnic makeup

- 45 states and DC
Developing a Forecast

• Identify...
  o Aims and uses of forecast
  o Data sources and structure
  o Subgroups for analyses (offense categories, admission type, etc.)

• Select existing method or develop new approach
Forecast Inputs

(1) Stock population
(2) Admissions to prison
(3) Length of Stay/time served

• All inputs
  o Primary drivers of population, costs, etc.
  o Can be disaggregated to relevant categories based on aims/uses (offense type, admission type)
  o Can be manipulated in the forecast to reflect various policy changes
Forecast Inputs

(1) Stock population

(2) Admissions to prison

(3) Length of Stay/time served

• All people in prison on a specific date

• Stock population for any given year

  = Stock population from previous year
  - people released during previous year
  + people admitted during previous year
Forecast Inputs

(1) Stock population

(2) Admissions to prison

(3) Length of Stay/time served

• How many people are expected to be admitted during the forecast period?
  o Alternative sentences
  o Felony thresholds
  o Crime prevention efforts
  o State-wide population/demographic changes
Forecast Inputs

(1) Stock population

(2) Admissions to prison

(3) Length of Stay/time served

- Of those in prison during the forecast period, how long are they expected to remain?
  - Sentence lengths
  - Mandatory minimums
  - Indeterminate vs. determinate sentencing
  - Early release/earned time policies
Step 1: Obtain and Process Data

- Individual-level vs. aggregate data
- Ties to aims/uses of forecast
  - Offense categories (broad vs. granular)
  - Admission type (revocation vs. new crime)

PPF example:
- NCRP – term record data for 45 states and DC
- Aggregated to 18 standardized offense categories
Step 2: Create Baseline Estimate

• Expected prison population in XX years based on stock, admissions, and LOS
  o Past trends (weighted?)
  o Informed by statutory or policy changes

PPF example:
- 10 year forecast based on weighted 5-year average of year-over-year changes in admissions \( (A) \) and LOS
- Converted LOS to an estimate of the share of people expected to remain in prison for more than one year \( (P) \)

\[
N_{year} = (N_{year-1} \times P_{year}) + A_{year}
\]
Step 3: Create Forecast Estimate

- Model changes in prison population based on policy changes
  - Manipulate admissions or LOS based on policy

PPF example:
- Slider allows 100% increase or decrease in either input, by offense category
- Broad applications without specific knowledge of policy implementation and impacts
  - “100% reduction in admission for drug possession”
  - “15% increase in LOS for sexual assault”
Additional Outputs

• Cost
  o Marginal vs. operating

  “sliding scale marginal cost multiplier”
  Sharp increases/decreases in the population have larger marginal impacts on the corrections budget

• Demographic changes
  o Racial disparities
  o Percentages from most recent year of data applied to forecasted years
Visualization and dissemination

- Goals, uses, and intended audience
The Prison Population Forecaster
The PPF

Prison Population Forecaster

Last updated: September 6, 2018

Use our forecaster to explore how policy changes could affect state prison populations. Adjust prison admissions and term lengths. Customize your choices by state and by type of offense. Compare your forecast with the latest year of data or what’s expected (the baseline) in 2025. And save and share what you find.

Show demographics and cost
The PPF: Step 1

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Show demographics and cost
The PPF: Step 3

Population
Compared with the 2025 baseline population, these changes would lead to a -7.9 percent decrease (1,978 fewer people) in the prison population in 2025.

Cost
By 2025, these changes would lead to a cumulative savings of $18.1 million in state corrections spending.

Racial and ethnic makeup of the prison population

- White: +0.88
- Black: -0.98
- Native American: +0.00
- Asian: +0.00

Alabama does not report ethnicity in its prison population data.
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Save my forecast
The PPF: Step 5

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Features

Start here

Alaska

Not all offense categories are available for all states

Make policy changes

All violent offenses

All drug offenses

All property offenses

All other offenses

Save my forecast

Your selections

State: Alabama

Adjusted offenses

All violent offenses

Length of prison term: +19%

All drug offenses

Admissions: 0%

Length of prison term: 0%

All property offenses

Admissions: 0%

Length of prison term: 0%

All other offenses

Admissions: 0%

Length of prison term: 0%

Saved forecasts

AL Example 1

AL Example 2

AL Example 3

AL Example 4
The PPF: Step 6

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Questions?

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