Methods to Calculate Marginal Costs



Sentencing Reform Oversight Committee
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Agenda

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- Marginal costs
- Cost savings vs. cost avoidance
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- Reinvestment calculation
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- Discussion

Vera Institute of Justice

Making justice systems fairer and more effective through research and innovation.

Cost-Benefit Analysis Unit

- Created to assist jurisdictions in making informed decisions about justice system policies and programs.
- Helps policymakers get clear and accessible information on the economic pros and cons associated with criminal and juvenile justice investments.

Selected Projects

- Cost-Benefit Knowledge Bank for Criminal Justice
- Price of Prisons: What Incarceration Costs Taxpayers
- Cost-Benefit Analysis of Raising the Age of Juvenile Jurisdiction in North Carolina
- Cost-Benefit Analysis of the Center for Employment Opportunities

Background

Reinvestment in S. 1154

The powers and duties of the SROC include:

- Calculating any state expenditures that have been avoided by reductions in the revocation rate or reductions in the new felony offense conviction rate;
- Developing rules and regulations for calculating the savings, which shall account, at a minimum, for the variable costs averted, such as food and medical expenses, and also consider fixed expenditures that are avoided if larger numbers of potential inmates are avoided; and
- Recommending whether to appropriate up to thirty-five percent of any state expenditures that are avoided to the Department of Probation, Parole and Pardon Services.

Marginal costs

Average versus marginal cost

Average cost

- Per-inmate cost for the *entire* inmate population.
- Includes fixed expenses that are not affected when there is a change in the inmate population.

Marginal cost

- Per-inmate cost when there is a *change* in the inmate population.

Marginal cost of prison

The marginal cost per avoided bed-day consists of two components:

(1) Variable costs

(2) Step-fixed costs, which are the “fixed” expenditures that can change if larger numbers of potential inmates are avoided

Variable costs

- Expenses that vary directly with a change in the inmate population.
- Includes food, clothing, and health care supplies.
- Affected no matter how many inmates are added or subtracted to the total inmate population.

Step-fixed costs

- Affected when a larger number of potential inmates are avoided.
- Includes the salaries and benefits of corrections personnel and certain contracted and purchased goods and services.
- Budgetary savings that result when staffing levels and contracts are reduced.
- New costs that *would have been incurred* if a rising inmate population necessitated additional funding for new capacity.

Cost savings vs. cost avoidance

Why the distinction matters

- The distinction is important because the marginal cost of *cost savings* is sometimes different than the marginal cost of *cost avoidance*.
- The amount of costs saved when the inmate population decreases is sometimes different from the amount of the costs incurred when the inmate population increases.

Cost savings

- A reduction in the inmate population that causes future spending to fall below the level of current spending.
- These savings provide a tangible budget surplus (so long as the current budget fully funds annual expenses prior to the reduction in the inmate population).

Cost avoidance

- A reduction in the inmate population that causes future spending to fall, but not below the level of current spending.
- Often involves slowing the rate of cost increases. In other words, future spending *would have* increased *even more* in the absence of cost avoidance measures.

Selecting a measure

Inmate population	Recommended measure
Increases	Cost avoidance
Remains stable	Cost avoidance
Decreases by an amount less than the number of avoided inmates	Cost avoidance
Decreases by an amount that is greater than the number of avoided inmates	Cost savings

Methods to calculate marginal costs

Marginal cost methods

Cost savings

- Method 1 – Budget savings

Cost avoidance

- Method 2 – Pending funding requests
- Method 3 – Approved funding requests
- Method 4 – Staffing ratios

Method 1 – Budget savings

- Calculate the marginal cost by tallying the variable and step-fixed costs that have been, or will be, eliminated from the budget.
- Divide the reduction in expenses by the total number of inmates who are provided for by those expenses.
- For example, if SCDC closes a 300-bed prison and saves $3.6 million, the marginal cost is $12,000 ($3.6 million ÷ 300 = $12,000).

Method 1 – Budget savings (continued)

- An entire prison need not close to result in step-fixed cost savings. For example, the department could reduce step-fixed costs if it closed a housing unit within a prison.
- Any adjustments to staffing, contracts, or purchased services related to a reduction in the inmate population should be counted.
- If capacity cannot be downsized, then only the variable costs are saved.

Method 2 – Pending funding requests

- If SCDC has submitted a request for funding to accommodate a forecasted rise in the inmate population, this figure can be used as the marginal cost avoided.
- If $3.3 million was requested for a new 300-bed facility, then the marginal cost is $11,000 per-bed ($3.3 million ÷ 300 = $11,000).

Method 3 – Approved funding requests

- If new funding was recently approved to provide for an increase in the inmate population, this figure can be used as the marginal cost avoided.
- If $1 million for new corrections officers and other expenses was recently approved to expand an existing facility by 100 beds, the marginal cost is $10,000 per inmate ($1 million ÷ 100 = $10,000).

Method 4 – Staffing ratios

- Staffing ratios, relief factors, and salaries can be used to estimate the step-fixed costs of staffing.
- Because staffing levels are tied closely to the inmate population, this approach estimates the step-fixed costs by using the ratio of corrections officers (and other support staff) to inmates.
- This amount is then added to the variable costs to calculate the total marginal cost.

Method 4 – Staffing ratios (continued)

Example from a jail in Washington State:

- Each housing unit accommodates 84 beds.
- Staff cover three 8-hour shifts, 1.75 posts per shift, for a total of 5.25 posts in a 24-hour day.
- A "relief factor" of 1.8 is used to convert a 40-hour-per-week position to a post that is covered 365 days a year.
- Therefore, 9.45 FTEs (5.25 posts × 1.8 relief factor) are required to staff one unit with 84 beds.
- Average FTE is $101,456 for salary and benefits.

Source: Christopher Murray. *Process Evaluation of Breaking the Cycle*. Pierce County Performance Audit Committee. September 24, 2009

Method 4 – Staffing ratios (continued)

Step-fixed costs for personnel:

- $101,456 avg. salary × 9.45 FTEs = $958,760
- $958,760 ÷ 84 beds = $11,414 per-bed

Variable costs:

- $6,504 per-bed

Total marginal cost:

- $11,414 + $6,504 = $17,918

Source: Christopher Murray. *Process Evaluation of Breaking the Cycle*. Pierce County Performance Audit Committee. September 24, 2009

Reinvestment calculation

Calculating reinvestment

- Formula for calculating total cost avoidance:

  avoided bed-days × marginal cost per avoided bed-day = total cost avoidance

- Formula for calculating maximum reinvestment

  total cost avoidance × 35 percent = maximum reinvestment recommendation

- For example, if $2.74 million in costs were avoided, the maximum reinvestment recommendation would be $959,000 ($2.74 million × 35 percent).

Wrap up

Wrap up

- Calculation of cost savings versus cost avoidance depends on inmate population trends.
  - If population would have risen, or risen further without the avoided inmates, then cost avoidance is recommended.
  - If population would have fallen, even without the avoided inmates, then cost savings is recommended.

Wrap up

- Method to calculate marginal cost can be determined by the available data.
- Few other states can serve as a guide. However, the ones that are making these calculations often rely on oversight bodies and/or existing published information on marginal costs.

Discussion