

# The Economics of Private Prisons: the Tradeoff Between Cost-Efficiency and Recidivism

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# Background on Crime and Recidivism

- Compared with the rest of the world, the US has extraordinarily high incarceration rates
  - American constitute only 5% of the world's population but houses approximately 25% of the world's total prisoners (Walmsley, 2016)
  - Close to one in 100 adults in the US are behind bars (Carson & Anderson 2016)
    - For reference, in 2016 the incarceration rate of the US was 655 per 100,000 population and Germany had an incarceration rate of 77 per 100,000 population (Institute for Criminal Policy Research & Birkbeck, 2016)
  - ✓ *New Mexico has the 30<sup>th</sup> highest incarceration rate in the US but has the 2<sup>nd</sup> highest violent crime rate in the US*
- Recidivism rates in the US are also extremely high
  - Bureau of Justice Statistics study found re-arrest rates to be 56.7% for one year, 67.8% for three years, and 76.6% for five years
  - ✓ *In 2018 New Mexico had the 6<sup>th</sup> highest recidivism rate in the US*
- High crime leads to high costs
  - Negative effects: pain and suffering, loss of human capital and productivity, food insecurity, homelessness, negative effects on children
  - The cost of crime in the US has been estimated to be as high as \$1.7 trillion annually (Anderson 1999, Anderson 2011)

# Background on Private Prisons

- One *potential* way to reduce the short-run costs associated with recidivism is private prisons.
  - It has been argued that private prisons can be more efficient, nimble, and can cut out miscellaneous bureaucratic steps (Wooldredge and Cochran 2019)
  - Between 2000 and 2016, it is estimated that private prison populations grew five times faster than the total prison population (Gotsch and Basti 2018).
    - By the end of 2015, 8.27% of total inmates in the US were held in private prisons, and private prisons had total revenue of approximately \$5 billion (Bureau of Justice Statistics 2016)
  - ✓ *New Mexico drastically increased its level of private prisons*
    - As of 2019 New Mexico had the highest percentage (approximately half) of inmates held in private prisons (The Sentencing Project)
- However, increased reliance on private prisons because of potential short-run cost saving may be misleading
  - The impact on the wellbeing and rehabilitation of inmates is unclear (Sanders 2015; United States Department of Justice 2016)
    - Incarceration impacts a myriad of other economic outcomes including pain and suffering, human capital, loss of productivity, food insecurity, and homelessness
  - From an economic perspective, there may be increased *long-run costs* associated with increased **recidivism**
    - Depending on the contract structure, private prisons may actually benefit from increased recidivism rates (Morris 2007)

# Goal of the Research Study

## Goal of our research paper:

1. Review the literature to compare private and public prisons in terms of differences in short-term incarceration cost and recidivism rates
2. Study the overall/joint economic impact of private prisons including both short-term incarceration cost and recidivism rates

# Literature Estimates for the Short-Run Cost Savings Associated with Private Prisons

**Table 1.** Summary of key studies on cost efficiency in private and public prisons (1997–2013).

| Study                             | Study area  | Efficiency | Significance    | Findings   |
|-----------------------------------|-------------|------------|-----------------|--|
| Archambeault and Deis (1997)      | Louisiana   | 12.8%      | -               | Private prison is found to produce savings between 11.7% and 13.8%, based on the average for the past five fiscal years.   |
| Moore (1998)                      | Review      | 12.5%      | -               | 10% to 15% average savings on operations costs, based on 14 independent cost-comparison studies  |
| Pratt and Maahs (1999)            | Meta        | 6.4%       | Not significant | Based on 24 independent studies, private prisons are no more cost-effective than public prison.  |
| Blumstein, Cohen, and Seth (2008) | Multi-state | 2.8%       | P < 0.05        | States that use private prisons have a lower rate of growth of inmate housing costs compared to states that do not use private prisons.  |
| Lundahl et al. (2009)             | Meta        | 2.2%       | Not significant | Based on 12 independent studies, privately managed prisons provide no clear benefit or detriment. If we only consider the effect size without controlling for other quality measures, then private prisons save 2.2% on average. The range of savings is -14.2% to +15.2%. |
| Mean                              |             | 7.3%       |                 |  |

# Literature Estimates for the Differences in Recidivism Between Private and Public Prisons

**Table 2.** Summary of key studies on recidivism efficiency in private and public prisons (1997–2013).

| Study                   | Study area | Efficiency | Significance    | Findings   |
|-------------------------|------------|------------|-----------------|--|
| Bales et al. (2005)     | Florida    | 2%         | Not significant | Using an improved definition of release from the facility and an improved quasi-experimental design, the authors found no significant difference of recidivism between private and public prisons. |
| Spivak and Sharp (2008) | Oklahoma   | 17%        | $P < 0.05$      | Private prison inmates are 17% more likely to recidivate than public prison inmates.   |
| Duwe and Clark (2013)   | Minnesota  | 22%        | $P < 0.05$      | Private prison inmates are 22% more likely to recidivate than public prison inmates.   |
| Mean                    |            | 13.7%      |                 |  |

Lanza-Kaduce, Parker, and Thomas (1999), Farabee and Knight (2002), and Bales et al. (2005) found very different results using Florida Department of Correction (FDOC) data. Among these three studies, we believe that Bales et al. (2005) used the best methodology. Hence, for calculation of the mean, we have used Bales et al. (2005), Spivak and Sharp (2008), and Duwe and Clark (2013).

# Economic Methods to Compare Short-Run Cost and Recidivism Efficiency

- Dynamic systems model:

$$\begin{aligned}x_t = & (x_{t-1} - R_t + \psi) \\ & + \sum_{k=1}^K \{ (1 - m_{t-k}) \mu_{u,t-k} R_{t-k} \\ & + m_{t-k} \mu_{p,t-k} R_{t-k} \} \quad (1)\end{aligned}$$

- The number of prisoners in the system ( $x_t$ ) is a function of first-time inmates ( $\psi$ ), releases ( $R_t$ ), and recidivism rates
  - There can be differences recidivism rates for public ( $\mu_u$ ) and private prisons ( $\mu_p$ )

- Cost of incarceration

$$\sum_{t=0}^T (1 + r)^{-t} \left[ \beta_u m_t x_t + \beta_p (1 - m_t) x_t \right] \quad (2)$$

- There can also be differences in the per-inmate cost of incarceration ( $\beta_u$  vs.  $\beta_p$ )

✓ *from an economics perspective, the future gains of reduced recidivism must be discounted*

# Parameters Obtained From the Literature

**Table 3.** Simulation base case parameters.

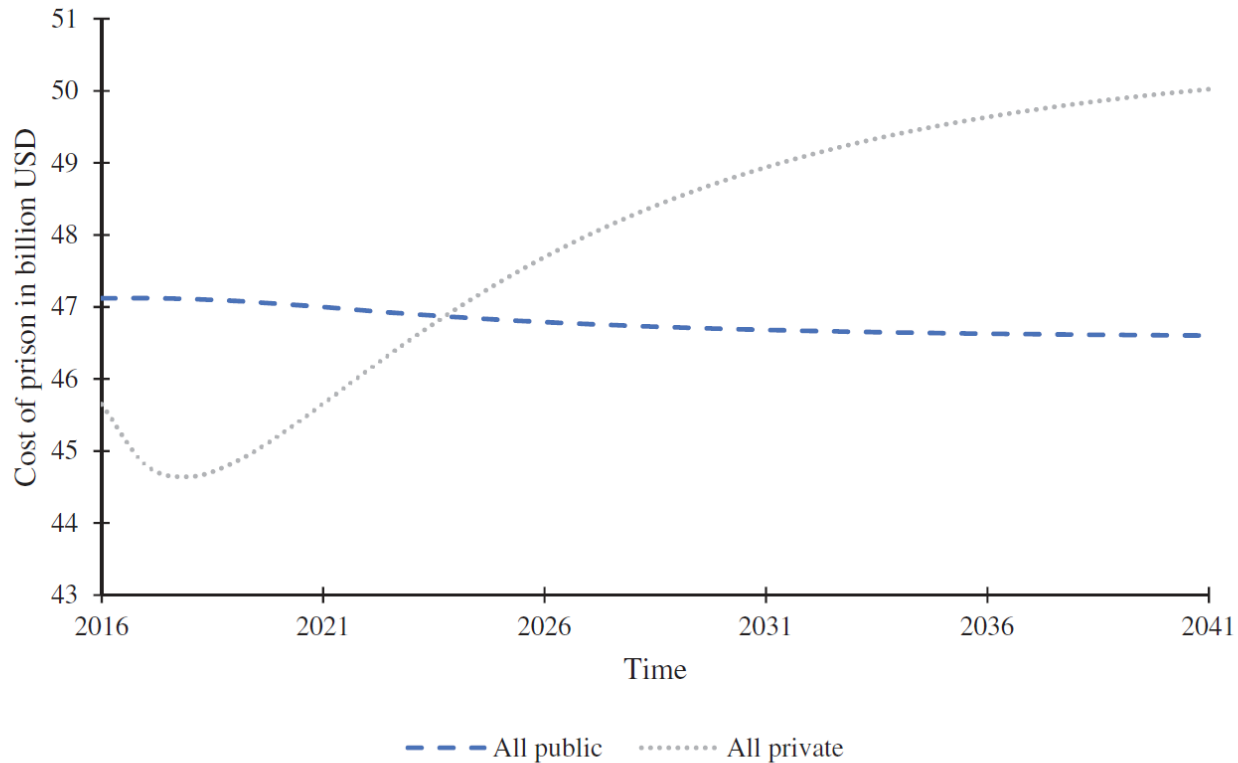
| Parameter  | Symbol         | Parameter values  | Source  |
|--|----------------|-------------------|---|
| First-time inmates                                 | $\psi$         | 287,244 inmates   | Calculated based on the 10-year average of total admissions (Carson and Anderson 2016) and new admission ratio (United States Sentencing Commission 2004).  |
| Releases   | $R_t$          | Varies            | Release is estimated as a linear function of the number of inmates in the current year and the 10-year average length of stay. The coefficients of the linear function are estimated using data in 2004–2015. |
| Average cost per inmate per year in public prisons | $\beta_u$      | \$31,286          | Henrichson and Delaney (2012)   |
| Recidivism rates                                   |                |                   | Durose, Cooper, and Snyder (2014)   |
| Year – 1   | $\mu_{t-1}$    | 0.3041            |   |
| Year – 2   | $\mu_{t-2}$    | 0.1287            |   |
| Year – 3   | $\mu_{t-3}$    | 0.0638            |   |
| Year – 4   | $\mu_{t-4}$    | 0.0322            |   |
| Year – 5   | $\mu_{t-5}$    | 0.0223            |   |
| Cost efficiency                                    | $\phi$         | 7.3%              | Based on calculation on Table 1   |
| Recidivism efficiency                              | $\gamma$       | 13.7%             | Based on calculation in Table 2   |
| Discount rate                                      | $r$            | 2.50%             | Average interest rate of US 30-year constant-maturity treasury bond   |
| Initial number of inmates                          |                |                   |   |
| Private prisons                                    | $\bar{x}_{p0}$ | 126,272 inmates   | Bureau of Justice Statistics (2016); Carson and Anderson (2016)   |
| Public prisons                                     | $\bar{x}_{u0}$ | 1,400,518 inmates | Bureau of Justice Statistics (2016)   |

1. The 10-year average of total admissions and the 10-year average of length of stay is calculated using data from 2006 to 2015.

2. Federal Reserve Economic Data (FRED) publishes the 30-year constant-maturity treasury bond rate. The average rate for 2016 is 2.59%. We have used 2.5% as our discount rate.



# Cost Estimates For Private and Public Prisons Over Time



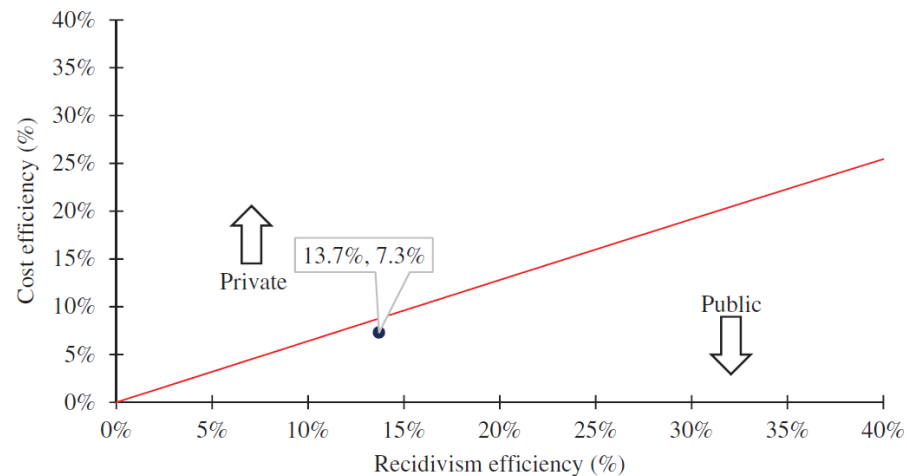
**Figure 1.** Simulated total annual costs of incarceration.

# Economic Impact of Private Prisons

**Table 4.** A comparison of net costs of private prisons and public prisons.

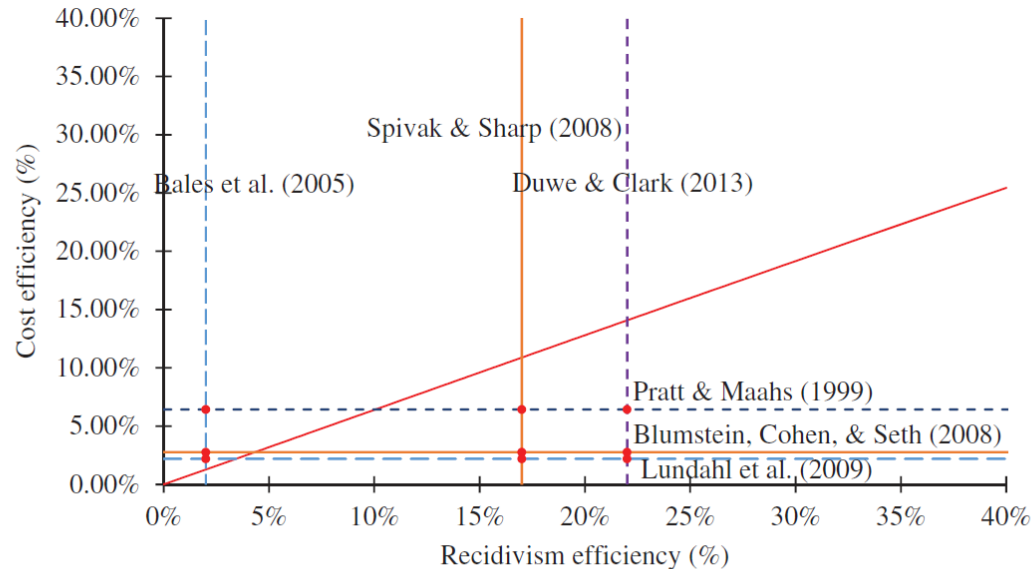
|                         | Cost efficiencies |      |            |                |      |            |   |      |     |                                     |       |              |       |
|-------------------------|-------------------|------|------------|----------------|------|------------|---|------|-----|-------------------------------------|-------|--------------|-------|
|                         | 5%                | 7.3% | 10%        | 5%             | 7.3% | 10%        | 5%  | 7.3% | 10% | 5%                                  | 7.3%  | 10%          |       |
|                         | Private prisons   |      |            | Public prisons |      |            | Cost savings of private prisons (billion USD) |      |     | Cost savings of private prisons (%) |       |              |       |
| Recidivism efficiencies | 20%               | 963  | 941        | 915            | 888  | 888        | 888   | -74  | -52 | -27                                 | -8.3% | -5.9%        | -3.0% |
|                         | 13.7%             | 922  | <b>901</b> | 876            | 888  | <b>887</b> | 887   | -34  | -13 | 11                                  | -3.9% | <b>-1.5%</b> | 1.3%  |
|                         | 10%               | 899  | 879        | 855            | 887  | 887        | 887   | -12  | 8   | 32                                  | -1.4% | 0.9%         | 3.6%  |

All monetary values are shown in billion USD after discounting to the present value using a 2.5% discount rate. The cost savings of private prisons (%) are calculated by dividing the cost savings of private prisons (billion USD) by total private prison costs. The boldface values represent our base case.



**Figure 2.** The tradeoff between cost efficiency and recidivism efficiency.

# Economic Impact Using



**Figure 3.** The tradeoff between cost efficiency and recidivism efficiency.

Note: The upward sloping line represents the set of points where the policymaker is indifferent about the choices of  $m = 0$  and  $m = 1$ . The blue point represents the base case recidivism efficiency and corresponding cost efficiency at which a policymaker is indifferent about their choice. In the lower panel, three recent cost-efficiency studies and three recent recidivism studies are plotted. The vertical lines represent recidivism studies while the horizontal lines represent cost-efficiency studies.

# Sensitivity Analysis

**Table 5.** Comparison of net costs based on time horizon.

| Assumption   | Time horizon | Private | Public | Cost savings of private prisons (billion USD) | Cost savings of private prisons (%) |
|--|--------------|---------|--------|---|-------------------------------------|
| Base   | 25 years     | 901     | 887    | -13   | -1.5%                               |
| US presidential administration (2 terms)                       | 8 years      | 326     | 337    | 12  | 3.5%                                |
| Government agencies planning horizon or prison contract length | 10 years     | 400     | 411    | 11  | 2.7%                                |
| 5-year decrease from base                                      | 20 years     | 763     | 759    | -4  | -0.6%                               |
| 5-year increase from base                                      | 30 years     | 1023    | 1001   | -22   | -2.2%                               |
| 15-year increase from base                                     | 40 years     | 1132    | 1102   | -30   | -2.7%                               |

**Table 6.** Sensitivity analyses.

| Parameter                        | Assumption  | Value                              | All private costs | All public costs | Cost savings of private prisons <sup>a</sup> (billion USD) |
|----------------------------------|---|------------------------------------|-------------------|------------------|--|
| I. New inmate admission          | Base  | 287,244 inmates                    | 901               | 887              | -13  |
|                                  | 2015 total admission  | 256,710 inmates                    | 840               | 828              | -12  |
|                                  | New admission ratio from USSC 1992 data   | 339,656 inmates                    | 1005              | 989              | -16  |
|                                  | Base  | Imprisonment length = 55.36 months | 901               | 887              | -13  |
| II. Release                      | 2015 imprisonment length  | Imprisonment length = 53 months    | 915               | 903              | -12  |
|                                  |   |                                    |                   |                  |  |
| III. Discount rate               | Base  | 2.50%                              | 901               | 887              | -13  |
|                                  | Average monthly 30-year Treasury Constant Maturity Rate during 2008 recession (Dec 2007 – Jun 2009) | 4.14%                              | 745               | 738              | -7   |
|                                  | Highest monthly 30-year Treasury Constant Maturity Rate within last 10 years (Jan 2007 – Dec 2016)  | 5.20%                              | 665               | 660              | -5   |
|                                  | Lowest monthly 30-year Treasury Constant Maturity Rate within last 10 years (Jan 2007 – Dec 2016)   | 2.23%                              | 931               | 916              | -15  |
| IV. Recidivism rate <sup>b</sup> | Base  | 55.11%                             | 901               | 887              | -13  |
|                                  | 10% increase from base  | 60.62%                             | 993               | 962              | -31  |

<sup>a</sup>All monetary values are shown in billion USD after discounting to the present value.

<sup>b</sup>The recidivism rate is the cumulative rate of recidivism over five years. Note that, in the analysis, recidivism rates are used in five-yearly lags.

# Discussion/Conclusion

- Estimates from the literature suggest that private prisons provide modest reductions in short-term incarceration costs
  - Initial estimates from late 1990s found large gains, but more recent papers found small and sometimes insignificant effects on incarceration costs
- Estimates from the literature suggest that private prisons have higher recidivism rates
  - Initial estimates suggested that this effect was low, but more recently considerable differences have been found
- Jointly considering short-term incarceration costs and recidivism rates, we find that, private prisons are more costly than public prisons
- Future work is needed
  - More research is needed to understand the impact of private prisons on both incarceration costs and recidivism
    - Recently proposed changes provide an interesting natural experiment
  - Our estimates only consider the incarceration costs, not the larger (societal) costs associated with crime

# Thanks!

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