

2018 Update: Dynamic Marginal Costs in Fiscal Impact Analyses

This report updates the financial cost estimates used in SPAC’s fiscal impact analyses. SPAC uses a dynamic marginal cost, based on reported expenditure data and Illinois budgeting practices, to estimate fiscal impacts. After examining decades of criminal justice budgets at the state and local levels, SPAC determined that using dynamic marginal costs brings SPAC’s fiscal impact calculations more in line with actual budget and resource allocation practices in Illinois.

In Illinois, budgets are most frequently determined by past practices and minimizing disruptions in services and government spending. Currently, future services are seldom analyzed for projections and forecasts of expected needs, therefore foreseeable changes are seldom factored into budgets. This practice results in a divergence of costs from services: *i.e.*, the number of prisoners in state prisons, or probationers supervised by county probation departments, is not fully predictive of those agencies’ budgets. This is most clearly demonstrated by the fact that budget changes for the Illinois Department of Corrections (IDOC) have not correlated with the prison population over the past ten years. The same holds true for county public safety budgets.¹ Budgets “step” up or down when the level of services cross certain thresholds that require additional personnel.

Simply defined, dynamic marginal costs are the costs of adding additional clients compared to maintaining the status quo. The marginal costs can include: (1) **variable costs**, costs that directly relate to services (laundry, food, etc.); (2) **step costs**, personnel costs that are constant until service crosses a threshold, after which costs change (in a step) and then remain steady until the next threshold; and (3) **fixed costs**, costs related to physical space that vary only with large service changes. The types of costs included depends on the size of the change.

	State Prison Population per inmate per year	County Jail Populations per inmate per year <i>(SPAC-estimated Statewide Average)</i>
Variable Costs	\$7,776	\$3,177
Step Costs	\$32,505	\$33,452
Fixed Costs	\$4,686	\$1,834
Operational Costs <i>(Variable + Step Costs)</i>	\$40,281	\$36,629
True Total Costs <i>(Variable + Step + Fixed Costs)</i>	\$44,967	\$38,463

Source: SPAC analysis of IDOC FY2017 expenditures and sample of county sheriffs’ jail expenditures in recent years.

The IDOC step cost per inmate includes personnel costs for state prisons, which adds the off-budget expenditures of personnel medical insurance, workers compensation, and pension contributions. In past years, SPAC has included both variable and step costs when the expected change is greater than 800 inmates. The SPAC dynamic marginal cost estimates the costs per inmate as (1) the variable costs for small changes, (2) variable plus step costs at each threshold to reach the operational costs, and then (3) all three cost types at very large changes, representing the true total costs.

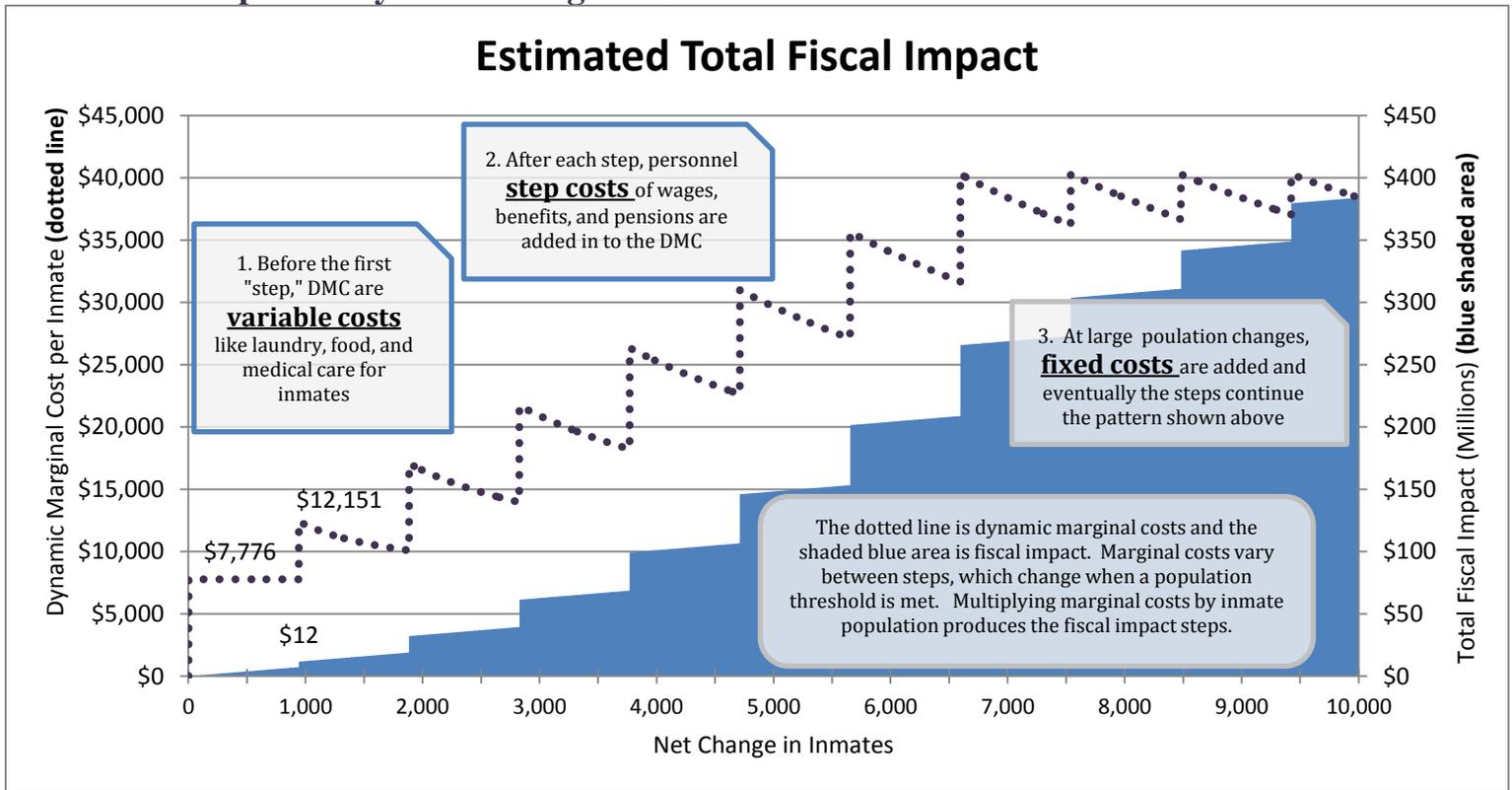
The IDOC true total cost per inmate includes fixed costs of not only infrastructure expenditures, but also the operational costs of non-prison IDOC activities, including ATCs, parole supervision, the Prisoner Review Board, field services, and administrative oversight of all of these functions. Changes larger than 22,386 inmates would begin to include the fixed costs.

The statewide jail costs are from SPAC analysis of seven counties’ sheriff’s budgets for recent years. For some counties, SPAC averaged budgets for several years to account for unexpected spikes or dips in spending.

Jail costs are adjusted for inflation to reflect 2017 dollars.

¹ See, *Quantifying County Adult Criminal Justice Costs*, available at: http://www.icjia.state.il.us/spac/pdf/Quantifying_County_Adult_Criminal_Justice_Costs_in_Illinois_120616.pdf.

Examples of Dynamic Marginal Costs:



Change To	Modeled Change to Average Daily Population	Dynamic Marginal Cost per Person per Year	Total Fiscal Impact For 1 Year
IDOC Population	+3,000 inmates	\$20,902	\$62.7 million
IDOC Population	+1,000 inmates	\$12,151	\$12.2 million
IDOC Population	+500 inmates	\$7,776	\$3.9 million
IDOC Population	- 500 inmates	\$7,776	- \$3.9 million
IDOC Population	- 1,000 inmates	\$12,151	- \$12.2 million
IDOC Population	- 3,000 inmates	\$18,688	- \$62.7 million
Statewide Jails	+3,000 inmates	\$22,193	\$69.5 million
Statewide Jails	+1,000 inmates	\$3,177	\$3.2 million
Statewide Jails	+500 inmates	\$3,177	\$1.6 million
Statewide Jails	- 500 inmates	\$3,177	- \$1.6 million
Statewide Jails	- 1,000 inmates	\$3,177	- \$3.2 million
Statewide Jails	- 3,000 inmates	\$22,193	- \$69.5 million

Agency and department managers in both state and local governments have become adept at accommodating fluctuations in services demanded. This accommodation is a practical necessity in public service management. Managers adapt operations as much as possible to meet new needs with constrained budgets. Only at great need will budgets shift up or down measurably.

The dynamic marginal cost approach matches SPAC's fiscal analysis with this practical reality. Almost all costs are held constant until the change in services provided crosses a threshold. Even

after the first few thresholds, the overall costs do not increase dramatically. SPAC will continue to work with Illinois stakeholders and fiscal managers to refine this approach and encourage its use in state and local budget analysis. Adding to the budget process a standard forecast of service needs in relation to policy changes would further inform the process and allow for prioritizing resources based on reasonably foreseeable changes in service needs rather than past practices.

Community Supervision Costs:

- For probation and parole, SPAC will use the average “per capita” costs until we have a better understanding of how resource needs adjust to service changes over time.
 - Cost of one year of supervision on **Mandatory Supervised Release** by IDOC’s Parole Division: **\$2,841** per person supervised per year.
 - Cost of one year of supervision on **Probation** by county probation departments: **\$1,900** per person supervised per year.

Definitions:

- **Dynamic Marginal Costs: SPAC-calculated the cost of adding or subtracting one inmate into or out of the criminal justice system.**² Depending on the size of the change of inmates, dynamic marginal costs may include variable, step, and fixed costs. Specifically:
 - A small change in inmates will only involve variable costs.
 - At a calculated threshold, a change in inmates will include both variable and at least some portion of step costs.
 - At larger thresholds, a change in inmates will include variable, step, and fixed costs.
- **Variable Costs: Direct relationship to the addition or subtraction of one inmate into or out of the criminal justice system.** A variable cost is a cost that directly relates to agency services/output. Variable costs are incurred if the agency has to process one additional inmate and would change directly as the number of inmates increase or decrease. Examples include:
 - Laundry, food, and medical costs for jail inmates; and
 - Staff overtime costs.
- **Step Costs: Driven primarily by increasing or decreasing full-time employment in the justice system.** A step cost is a constant cost for the agency until service/output crosses a discrete threshold, after which the costs change and remain steady until the next threshold. Step costs are incurred when the change in inmates is sufficient to alter staffing levels; for example, opening or closing a portion (wing, housing unit, etc.) of a facility. Examples include:
 - Staff salaries, benefits, and pension costs; and
 - Office supplies, vehicles, and other equipment or training for staff.
- **Fixed Costs: Costs that are primarily driven by factors other than inmates or employees.** A fixed cost is one that does not change with an increase or decrease in the number of clients or employees. Examples include:
 - Capital costs for construction;

² SPAC uses Dynamic Marginal Costs for Illinois prisons and jails. The methodology may be applied to other system actors, including courts (changes in cases for judicial, prosecutorial, and defense offices) and supervision (changes in probation or MSR populations), as SPAC gathers more data and experience with DMCs.

- Overhead and constant administrative offices; and
- Interest payments on bonds.

Assumptions and Limitations:

- The dynamic marginal costs analyzed here are for jails and prisons. The dynamic marginal cost concept can be applied to other parts of the criminal justice system. SPAC is gathering fiscal and system data to incorporate this methodology into fiscal analysis for those systems.
- SPAC has analyzed each key component of the criminal justice system on the state and county level to develop a reliable top-down budgetary analysis of the costs. SPAC assumes that the resource needs are roughly in line with the current costs. If costs and resources used do not reflect the level of services provided, the fiscal impact analysis could misstate future costs. However, the analysis relies on the best available data and presents these fiscal impacts as reasonable estimates.
- The total dollar impact is dependent on the step thresholds. If an expected impact is close to a step, the cost estimate could be either high (cross the threshold in our dynamic cost model but in reality stay below the threshold) or low (just below the model threshold but in reality staffing increases). Because of this limitation in the model, all cost estimates should be viewed as approximations. More detailed analysis by the operational departments affected can improve the calculations, however, these estimates are a reasonable basis for policymakers to consider the fiscal impact of new policies.
- At this time, the steps are assumed to be similar in size and magnitude regardless of whether the service change is positive or negative (*i.e.*, an increase or decrease in inmates or criminal cases). In private sector cost management, costs generally change differently when the demand increases vs. decreases. SPAC is reviewing this literature, public-sector data, and considering how it may apply to public sector budget predictions; however, at this time, the assumption is that the steps do not vary depending on the direction of the change in clients.
- As stated earlier, SPAC assumes that the current resources match current needs. Importantly, the fiscal impact does not address systemic under- or over-staffing but merely increases or decreases the estimated budget from the current status quo. If the agency or department is already in need of a step increase or decrease, the fiscal impact estimate produced by this approach will not account for that need.
- The capital construction costs, as well as bond and debt repayments, are not included unless the service change is 50% or more of the past maximum or minimum services. In addition, no continuous escalation rates or inflation are included in the estimates.
- The analysis excludes consistent growth in costs caused by inflation and/or regular increases in costs. For example, if inmate medical care costs increase regularly over time, it would be wrong to assume that no change in inmates means no change in future costs. Further, because the model does not control for inflation, if medical costs per person or staff wages grow faster than overall inflation, the estimates of future costs will be low.
- Jail costs are consolidated for a statewide estimate. The same dynamic marginal cost calculation was conducted on seven counties across the state. If jail populations increased or decreased in each county jail proportionally, the overall dynamic marginal costs can be calculated from a statewide analysis. In other words, a 6% increase in the statewide jail population is assumed to be an increase of 6% in each county's jail population.