A Guide to Calculating Justice-System Marginal Costs

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Fact Sheet

Glossary

MARGINAL COST: The amount of change in total cost when a unit of output changes

AVERAGE COST: The total cost of all output divided by total output

VARIABLE COST: The cost that changes directly in proportion to output; also called *short-run marginal cost*

FIXED COST: The cost that remains constant, even when the output changes

STEP-FIXED COST: The cost that remains constant for a certain range of output and changes when output exceeds or falls below a certain threshold

SHORT-RUN MARGINAL COST: The cost affected as soon as the output changes; also called *variable cost*

LONG-RUN MARGINAL COST: Short-run marginal costs, plus the step-fixed costs that change in the long run as adjustments are made to staffing levels in response to larger changes in output

Read the complete guide at www.vera.org/marginalcosts

Justice policies and programs generate taxpayer benefits and costs. If you want an accurate picture of those costs and benefits, you need to understand marginal costs. In cost-benefit analysis (CBA), "marginal" does not mean small or insignificant. It means at the margin of an existing level of operations and describes the cost or benefit that will be realized because of changes in output or workload.

TYPES OF GOVERNMENT COSTS

The costs of a government agency—or a private firm, for that matter—are said to be variable, fixed, or step-fixed. Identifying these costs is the first step in calculating marginal costs. **Variable costs** are those directly related to workload and change immediately as workload increases or decreases. Examples include overtime, supplies, and fuel. **Fixed costs**—such as rent, utilities, and central administration—remain fixed over a given period and are not usually affected even if the workload changes. **Step-fixed costs** remain constant for a certain range of workload, but change if the workload exceeds or falls below that range. The most common types of step-fixed costs are staff salaries and benefits, which increase when, for example, a prison population or probation caseload exceeds a certain threshold and more staff is needed.

MARGINAL COSTS IN THE JUSTICE SYSTEM

The **marginal cost** is the amount of change in total cost when a unit of output changes. In the context of the criminal justice system, it is how much the total operating costs of an agency change when workload (such as arrests, court filings, or jail intakes) changes because of a policy or program.

It is critical to use marginal costs in CBA calculations. One fundamental error an analyst can make is to use average costs rather than marginal costs—a mistake that usually results in overestimating the costs related to a policy change.[1] This is because the **average cost** includes fixed costs—such as administration and other overhead costs—that policy changes may not affect.

The difference between average and marginal costs is often considerable. In Massachusetts, for example, the average annual per-inmate cost of incarceration is $46,000, whereas the marginal cost is $9,000.[2] The average cost includes costs for administration, utilities, and other expenses that will not change when the prison population decreases slightly. A small change in the population affects expenses such as food, clothing, and medical care: these are the marginal costs of a small increase or decrease in the prison population.

SHORT-RUN AND LONG-RUN MARGINAL COSTS

Marginal costs depend on the size of the change in workload and how the government adjusts the budget in response to this change. This means that more than one marginal cost could potentially be used in justice-system CBAs. Costs that change immediately with even a small change in workload are often called **short-run marginal costs** (or "variable costs"). When a policy has a larger impact on workload, staffing costs need to be considered, yet it may take time for the government to change these step-fixed costs. Thus, the **long-run marginal cost** includes the short-run marginal cost, as well as the step-fixed staffing costs that change as governments modify staffing levels in future budget cycles.

Cost-benefit studies of criminal justice initiatives should use the long-run marginal cost when the effect of the policy on workload is expected to affect staffing needs. Analysts should use the short-run marginal cost when the policy impact anticipated is not large enough to affect staffing.

AN EXAMPLE OF MARGINAL COSTS IN THE JUSTICE SYSTEM

The marginal cost of incarceration to use in a CBA depends on the estimated change in the size of the inmate population. If the population is expected to change modestly, only variable costs—for expenses such as food, clothing, and medical care—will be affected. These are the short-run marginal costs. If the size of the inmate population is expected to change considerably—for example, if the prison could close a housing unit—analysts must consider the step-fixed costs of staffing in addition to the short-run costs. These are the long-run marginal costs. The following table illustrates the differences among these costs relative to the average cost of incarceration in Washington State's prisons and jails. Note that short-run marginal costs are lower than long-run marginal costs, which include step-fixed expenses. Long-run marginal costs are lower than average costs, which include fixed expenses.

Annual Per-Inmate Costs in Washington State, 2009[3]

	AVERAGE COST	LONG-RUN MARGINAL COST	SHORT-RUN MARGINAL COST
Prison	$31,446	$13,921	$4,495
Jail	$28,900	$21,469	$3,457

SOURCES

1 Douglas C. McDonald, "The Cost of Corrections: In Search of the Bottom Line," *Research in Corrections* 2, no. 1 (1989): 1-25.

2 Paul Heroux, "Addressing the prison's budget and population," *Taunton Daily Gazette*, Feb. 17, 2011.

3 Washington State Institute for Public Policy, *WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections*, August 2010.

For More Information

The Vera Institute of Justice is an independent nonprofit organization that combines research, demonstration projects, and technical assistance to help leaders in government and civil society improve the systems people rely on for justice and safety.

The Cost-Benefit Knowledge Bank for Criminal Justice (CBKB) is a project of Vera's Cost-Benefit Analysis Unit and is funded by the U.S. Department of Justice's Bureau of Justice Assistance. CBKB helps to broaden the knowledge base of practitioners and policymakers about criminal justice cost-benefit analysis, deepen the knowledge and practice in this area, and support practitioners in building their capacity to promote, use, and interpret cost-benefit analysis in criminal justice settings.

For more information, please visit the CBKB website at cbkb.org or contact Tina Chiu at 212-376-3038 or tchiu@vera.org.

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