

A Cost-Effectiveness Analysis of Patuxent Institution

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Introduction

The cost-effectiveness of incarcerating offenders at Patuxent instead of a conventional high security prison was assessed in terms of two cost measures and one summary measure of effectiveness.¹ Costs included those incurred by the State for incarcerating offenders and earnings forgone by offenders during their incarceration. Effectiveness was measured by the Institution's impact on post-release criminal behavior. Selection of these measures was based on the study team's judgment of the factors most relevant to policy makers for which data of sufficient quality could be obtained.²

Results of the analysis were striking. First, the cost to the State of a typical Patuxent inmate was estimated to be roughly twice the corresponding cost of incarcerating the same offender in prison. Second, earnings forgone by the typical Patuxent offender were estimated to be slightly greater than the loss he would have incurred in prison. Third, although Patuxent's costs were considerably greater than those of prisons, its effectiveness in terms of reducing crime was almost identical to that of prisons.

Given the purpose of this paper — to summarize, not to repeat the original study — it has not been possible to explain fully the details of the analysis. Thus only an outline of the study's methodology and an overview of its principal findings are presented. Further details are available in the original report.³

Framework of the Analysis

The study compared the experience of a sample of Patuxent inmates to the experience of a similar group of inmates from the Maryland high security prison system. Comparability between the two groups was facilitated, first, by the criteria for their selection and, second, through the use of appropriate statistical analysis procedures. No non-experimental study (including the present one) can guarantee comparability among its study groups. Only through experimental random assignment of subjects can an analyst be confident of comparable treatment and control groups. Although true random assignment was impossible in this study, the procedures followed,

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coupled with the element of randomness in actual Patuxent commitments, provided an acceptable degree of comparability.⁴

The Patuxent group contained 102 offenders paroled for the first time from Patuxent in 1971 or 1972. This group was chosen to provide a minimum post-release follow-up period of 3 years. The comparison group contained 46 offenders who were diagnosed by Patuxent staff to be defective delinquents (and thus who warranted commitment to Patuxent), but were not so adjudged by the courts at their commitment hearings.⁵ Members of the control group served their terms in a Maryland Division of Corrections high security prison. Table 1 describes the characteristics of the two resulting groups. There were differences between the groups in important characteristics such as prior criminal record, age and length of sentence. In the analysis these differences were controlled for statistically through the use of multiple regression analysis.

To compare the Patuxent offender with one sentenced to a conventional prison, two alternative 9.7 year scenarios were constructed, as illustrated in Figure 1.⁶

The first scenario summarizes the time spent in confinement and at liberty by the typical Patuxent offender. During confinement he creates costs for the State and forgoes personal income. When he is at liberty neither of these costs arises, but the offender has a certain probability of committing a subsequent crime and being reincarcerated. Results of the analysis indicated that the typical Patuxent offender spends 6.8 years in confinement. Upon release he has a 69% chance of committing a crime and being reincarcerated. On average, his reincarceration (if any) occurs 2.9 years after his initial release.

The second scenario summarizes the projected experience of an offender having the characteristics of a typical Patuxent inmate, assuming that the offender were sent to prison instead of Patuxent. The data indicate that he would have spent 4.4 years in prison. Upon release he would have had a 72% chance of ever being reincarcerated, and the average reincarceration would have occurred 2.8 years after original release. Thus this offender would have spent the last part of the 9.7 year analysis period serving a subsequent prison term.⁷

Measures of Cost and Effectiveness

A detailed analysis was conducted to compare the monetary costs of Patuxent and conventional Maryland prisons. As previously indicated, both costs to the State and inmate earnings forgone were considered. The first step was to calculate the components of these costs and to determine when during the two scenarios they occurred.

1. Costs to the State

Unique aspects of Patuxent's physical design, administrative structure and programs for inmates and releasees precluded simple calculations of average annual State costs per inmate. Instead, total correctional costs were first disaggregated into capital and operating costs. Operating costs then were

split among custodial care and treatment programs, which in turn were divided into annual and infrequently recurring expenses. A summary of all cost components appears in Table 2.

2. Capital Costs

To estimate Patuxent's annual capital cost per inmate, capital fund appropriations over the Institution's lifetime (since 1951) were first converted to 1976 price levels.⁸ These appropriations were summed to obtain total capital outlays for the Institution. This total was converted to an annual cost equivalent, which in turn was divided by the design capacity of Patuxent (500 inmates) to yield an estimated annual capital cost per inmate of approximately \$5300.

The study team felt that comparison of this figure with its counterpart for existing Maryland prisons was inappropriate since these other facilities are much older.⁹ As a result, they embody design standards and employed construction technologies which differ from those currently in use. Construction costs per unit of design capacity in conventional high security prisons recently completed in several other states, however, are very similar to those of Patuxent.¹⁰

A complication involving capacity utilization arose at this point in the analysis. While Patuxent operates at design capacity, Maryland's other high security prisons have inmate populations ranging from 133 to 200 per cent of design capacity. Overcrowding can be expected to reduce capital costs per inmate, perhaps at the risk of some reduction in program effectiveness. A comparison based on design utilization at Patuxent and other prisons would bear upon Patuxent's cost-effectiveness in principle. A comparison based on actual utilization, however, is more closely related to the effectiveness measures used in this study, which are derived from actual operations at the institutions involved.

Nevertheless, costs based on design capacity utilization were included since they are most useful for facility planning purposes. As a result, two sets of cost figures were developed for conventional prisons (see Columns 2 and 3, Table 2). Since Patuxent has always operated very near its design capacity, it required only one set of cost estimates. At design capacity utilization, annual capital costs at both Patuxent and conventional prisons were estimated to be \$5300 per inmate per year. At actual utilization the estimated annual capital costs of conventional institutions were \$3370.

3. Custody Costs

According to the Patuxent and Maryland Division of Corrections budget systems, custody costs consist of expenditures for security, food, plant maintenance, household items (*e.g.*, laundry and cleaning), and general administration. The study team developed estimates of each cost component for Patuxent and the three Division of Corrections high security prisons.

As in the case of capital costs, custody costs had to be computed under the alternative assumptions of actual and design capacity utilization. Food and household costs per inmate were assumed to be unaffected by facility

utilization, since they serve individual inmates directly and thus should not vary with the number of inmates involved. Security, maintenance and administration costs per inmate were assumed alternatively (1) not to vary, or (2) to be inversely proportional to capacity utilization. The latter case assumes that these costs are fixed by the institution's design capacity. The estimates resulting from these assumptions can be considered to represent upper and lower bounds on the "true" average custodial cost per inmate in conventional prisons. Table 2 shows that, under either assumption, each component of custody cost is higher at Patuxent than the average of conventional high-security Maryland prisons.

4. Treatment Costs

Unlike the preceding costs, all of which are incurred annually, treatment costs consist of one-time and infrequently recurring costs as well. These latter costs are shown in parentheses in Table 2. For example, one-time costs are involved in the process by which offenders enter and leave Patuxent or prison. On the other hand, the costs of therapy and ancillary services (*e.g.*, recreational, vocational and educational programs) occur annually during incarceration. Between these two extremes are redetermination hearings, which occur sporadically after initial commitment to Patuxent.¹¹

Table 2 indicates that Patuxent's extensive treatment programs result in considerably higher costs than those incurred at conventional prisons. For example, one-time entrance costs are \$6070 greater at Patuxent, stemming chiefly from the extensive psychiatric and psychological testing of felons assigned to Patuxent for diagnosis and the additional court hearing required for commitment to Patuxent. In addition, due to the extensive supervision received by Patuxent parolees and the halfway house facility available to them, the non-recurring exit costs of Patuxent are \$4850 greater than those of prisons. Furthermore, the more extensive therapy and educational, vocational and recreational programs available to Patuxent offenders result annually in \$1040 higher expenditures per inmate.

It should be noted that treatment costs per inmate were assumed to be unaffected by the level of capacity utilization. This conclusion was derived from the study team's observation that treatment costs reflect primarily professional services and materials provided for individual inmates.

5. Inmate Earnings Forgone

Inmate earnings forgone during incarceration depend on the inmates' annual earnings potential and the length of time they are incarcerated. Since the analysis compared two scenarios for a typical Patuxent offender, the annual earnings potential is the same in both cases. The expected incarceration period, however, is somewhat different.

Earnings potential is what the typical offender would have earned if he had been free.¹² This depends on the offender's skill and education level as well as his job stability. To account for these factors the study team based its estimates on a survey of Southern state prison inmates.¹³ The survey measured income earned during the year prior to each inmate's current

conviction. To make these results as comparable as possible to the typical Patuxent offender, factors which influence earnings potential (*i.e.*, education, age, race, criminal drug history and marital status) were controlled for through the use of multiple regression analysis. The resulting estimate of annual earnings forgone by the typical Patuxent offender was \$8900 (in 1976 dollars).

The second factor which determines total earnings forgone, the incarceration period, was estimated for each of the two scenarios through comparison of the terms served by the Patuxent and comparison groups, statistically controlling for differences in their sentence lengths. Results indicate an average 6.8 year Patuxent term and a 4.4 year conventional prison term. During the 9.7 year analysis period, however, prison releases have a 72% chance of returning to prison, and those who return are back in 2.8 years on average. Thus the total expected incarceration times are very similar in the two scenarios, although their distributions throughout the analysis period are quite different.

6. Institutional Effectiveness

Patuxent's effectiveness versus that of conventional prisons was estimated through a complex statistical procedure based on data from FBI "rap sheets."¹⁴ The measure of effectiveness chosen by the study team was the number of new offenses committed after release. Unfortunately, a direct measure of this variable was unavailable, because many crimes are not reported, many criminals are not arrested, and guilty defendants are not always convicted. Conversely, innocent individuals sometimes are arrested, and even convicted.

The study team dealt with this issue by estimating criminal behavior as the number of arrests that resulted in reincarceration. This figure had to be obtained indirectly through a two-step process. First the probability of post-release arrest was estimated for the Patuxent and control groups using multiple regression analysis to control statistically for differences in their prior criminal records and age upon release. These two factors were included since they are frequently cited as predictors of criminal behavior.¹⁵ Arrests were used rather than convictions or recorded incarcerations, since recent arrests are reported much more accurately to the FBI. Arrests were then converted to subsequent reincarcerations based on the relationship between arrests and incarcerations obtained from offenders' prior criminal records.

Two key parameters were estimated by this procedure: (1) the probability of reincarceration, and (2) the average time of reincarceration for releasees who commit new offenses. The first of these parameters was the measure of effectiveness ultimately used for the study. The second was necessary to construct the scenarios through which overall costs and effectiveness were compared.

Comparative Cost Effectiveness

The preceding discussion focused on the individual parts of the analysis. These parts were combined to yield an overall comparison of the

cost-effectiveness of Patuxent and conventional prisons.

The standard practice for making cost comparisons across time is to discount future costs at an agreed-upon rate, to account for the fact that future expenditures impose a smaller burden than current ones due to the possibility of earning interest while the expenditure is deferred. Controversy exists in the economics literature, however, over the appropriate discount rate to use.¹⁶ The study team chose three different rates (5%, 7.5% and 15%) which encompass the range generally considered to be appropriate.¹⁷

The final calculation of total costs throughout each scenario at their present value (*i.e.*, appropriately discounted) is presented in Table 3, for each discount rate. The cost to the State and the cost of inmate earnings forgone are shown separately. Furthermore, two sets of costs are presented for prisons, one based on design capacity utilization and another based on actual facility utilization. As previously noted, only one set of cost estimates was necessary for Patuxent since it was operated very near design capacity.

Under any set of assumptions about utilization and discount rates, Patuxent is more expensive than conventional prisons. For example, at a 7.5% discount rate and actual utilization, Patuxent's per-inmate cost to the State is \$101,910 while that of conventional prison is \$46,640. Correspondingly, Patuxent's typical inmate earnings forgone are \$47,800, while those of conventional prison are \$45,620.

For these substantially higher costs, Patuxent exhibits only negligibly greater effectiveness in reducing crime. During the analysis period, .69 crimes resulting in reincarceration are committed by the typical Patuxent releasee. On the other hand, .72 such crimes would have been committed if the same offender had been sent to prison instead. These findings suggest that the Patuxent program is not an efficient use of resources, and that taxpayers and offenders could be made better off by some other use of correctional funds. In fact, diversion of funds now spent for Patuxent to other law enforcement activities might even result in benefits to potential victims.

Addendum: Patuxent's Cost-Effectiveness – A Rejoinder

We would like to take this opportunity to address several issues raised by Professor Gordon concerning the cost-effectiveness analysis of Patuxent.* These issues arise from his exclusive focus on the effectiveness of Patuxent's incapacitation function. This focus both understates the importance of our findings with respect to the cost-ineffectiveness of Patuxent's rehabilitation function and ignores the cost implications of using Patuxent simply to confine offenders.

First, Professor Gordon's emphasis on incapacitation notwithstanding, it would appear from Patuxent's elaborate treatment program that rehabilitation is indeed one of its principal objectives. Thus the negligible difference we find between the abilities of Patuxent and of conventional prisons to rehabilitate serious offenders should be a major cause for concern about the Institution in light of its substantially greater costs.

Second, we agree with Professor Gordon that because of its 9.7 year time

*Our discussion is a result of several stimulating conversations with Professor Gordon.

frame, our analysis does not yield information about possible future incapacitation benefits arising from Patuxent's longer initial term. This is due to the fact that total incapacitation benefits depend upon offenders' lifetime criminal careers (see Professor Gordon's footnote 134). Since appropriate data are not available for examining behavior beyond our analysis period, one can only speculate about this behavior and thus about Patuxent's incapacitation benefits.

Third, and most important, is the fact that even if one could document incapacitation benefits due to Patuxent's longer initial sentence, the argument derived therefrom would be a very weak one, from a cost-effectiveness standpoint, for maintaining the Institution. Patuxent, with its elaborate treatment program and special services, is a very expensive way to provide simple incapacitation benefits (*i.e.*, to confine offenders). Our analysis indicates that annual Patuxent costs per inmate are \$16,540, while those for prisons are \$8,310 to \$12,660.** If Patuxent's principal objective were incapacitation rather than rehabilitation, it would be more appropriate to confine eligible offenders in prison for correspondingly longer terms. Longer terms could be imposed, if Patuxent did not exist, through a variety of legislative, judicial and administrative measures. For example: (1) mandatory lengthy sentences could be legislated; (2) judges could use their discretion to specify longer sentences; and (3) parole boards could become more restrictive and thus lengthen terms actually served.

In light of the preceding we believe that our results accurately reflect the most relevant factors to be considered in determining Patuxent's cost-effectiveness.

**See Table 2 of our summary article, below.

TABLE 1
THE TREATMENT AND COMPARISON GROUPS

<u>Characteristics</u>	<u>Treatment Group, Patuxent (N=102)</u>	<u>Comparison Group, Conventional Prison (N=46)</u>
Number of prior arrests	4.4	3.4
Number of prior convictions	3.2	2.2
Number of prior incarcerations	2.6	1.6
Maximum current sentence	12.3	9.7
Percentage incarcerated for violent crime ¹	68	57
Percentage incarcerated for property crime	10	33
Age at current incarceration	27.0	23.8
Percentage white	51	45
Percentage married	21	13

Sources: Data for race and marital status were obtained from the Patuxent datatape. Other data were obtained from FBI "rap sheets."

1. Violent crimes include murder, manslaughter, assault, robbery, kidnapping and arson.

TABLE 2
COMPONENTS OF COSTS TO THE STATE PER INMATE

Cost Component:	Cost in 1976 Dollars For:		
	Patuxent	Prison	
		At Design Capacity Utilization	At Actual Utilization
CAPITAL	5300	5300	3370
Custody			
Security	6250	3750	2310
Food	850	600	600
Plant Maintenance	1120	1070	670
Household (e.g. laundry)	360	290	290
Administration	830	460	280
TREATMENT			
During entrance			
Diagnosis	(5520) ¹	(2440)	(2440)
Commitment	(2990)	(0)	(0)
During incarceration			
Therapy	1130	200	200
Ancillary (e.g. education, vocation and recreation programs)	700	590	590
Redetermination	(2460) ²	(0)	(0)
During exit			
Pre-release center	(170)	(0)	(0)
Halfway house	(1970)	(0)	(0)
Parole	(2900)	(190)	(190)
TOTAL			
Annual	16540	12660	8310
Other	(16010)	(2630)	(2630)

1. Figures in parentheses are one-time or infrequently recurring costs.
2. This figure is the mean total cost per inmate for redetermination hearings. It is based on (1) a cost of \$2989 per hearing; and (2) the fact that 29% of the Patuxent group had one hearing, 11% had two and 11% had three.

TABLE 3
THE COST-EFFECTIVENESS OF PATUXENT AND CONVENTIONAL MARYLAND PRISONS

Measure of Cost or Effectiveness	For		
	Patuxent	Prison	
		At Design Capacity Utilization	At Actual Capacity Utilization
COST DISCOUNTED AT 5%			
Cost to the State	109570	73150	50990
Forgone Earnings	51490	49980	49980
Total	161060	123130	100970
COST DISCOUNTED AT 7.5%			
Cost to the State	101910	66870	46640
Forgone Earnings	47800	45620	45620
Total	149710	112490	92260
COST DISCOUNTED AT 15%			
Cost to the State	83960	53160	37150
Forgone Earnings	39040	36090	36090
Total	123000	89250	73240
Effectiveness (expected number of crimes resulting in reincarceration)	0.69	0.72	0.72

available.

14. FBI "rap sheets" are continually updated criminal records.
15. For example see Palmer J and Carson P: Regression analysis in prediction. *Journal of Research in Crime and Delinquency*, January, 1976, p 77
16. For a summary of the literature see Singer NM: *Public Microeconomics*, Revised Edition. Boston: Little, Brown and Co, 1976, pp. 331-340.
17. The 5% rate represented current borrowing costs to the State, 7.5% represented the current commercial borrowing rate, and 15% represented the full social opportunity cost of capital.