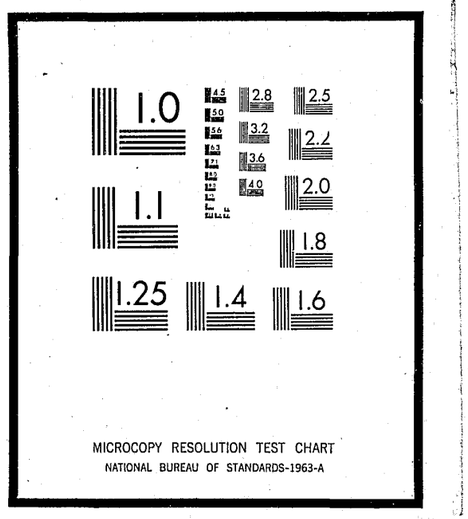


● HV 8442 74-95 ED

PRISON POPULATION AND COSTS --

ILLUSTRATIVE PROJECTIONS TO 1980

on

TABLE OF CONTENTS

I. Introduction

The Congressional Research Service was asked by the Subcommittee on Penitentiaries of the Senate Judiciary Committee to do a long-range projection of Federal and State prison population and costs based on both present and possible future sentencing policies. This report provides cost estimates of Federal prisons from 1973 to 1980 and State prisons from 1972 to 1980 on a year-by-year basis.1/

The report covers only the costs of Federal and State prisons. The costs of local jails and other correctional services, e.g. probation and parole programs, are not included. In addition, Federal and State prison costs are calculated separately, both for purposes of comparison and due to data differences for the Federal and State prison systems.

The report provides separate projections of Federal and State prison population, prices of providing correctional services, and various assumptions about the changes in the scope and quality of correctional services. These component projections form the base of a broader mathematical model used in making total cost projections. This model permits the projection of costs of correctional institutions under a variety of assumptions for crucial components of the system (e.g., average time served per offender, rate of change in scope and quality of services, price changes, etc.). Thus, in addition to testing the impact of using different assumptions, the model makes it possible to project potential future prison costs under various policy changes -- e.g., altering average time served due to possible changes in sentencing policies.

1/ At the conclusion of this study in the early fall of 1973, the most current available data included statistics for fiscal year 1972 in the Federal prison system and for calendar year 1971 in the State system. At the writing of this report (spring 1974) no further data has yet become available.

In brief, using a reasonable range of assumptions, the results of this study indicate that:

--The total prison population in both the Federal and State prison systems will fluctuate during the period from 1973 to 1980. Assuming no change in sentencing policy, it will reach a peak at approximately 26,300 for the Federal system, and exceed 252,000 for the State system in 1980, compared with 25,797 for the Federal system in 1972 and 180,361 for the State system in 1971.

--If the average length of time served were to be doubled, the number of prisoners in 1980 would increase from 26,300 to an estimated 54,600 in the Federal system. Similarly, the State prison population would increase from 252,000 to over 608,000.

--The total cost (operating cost plus capital cost) of serving the Federal prison population in 1980 will approximate:[2/]

. $181.5 million, if sentencing policy is unchanged and there is no improvement in the scope and quality of services provided, compared with $130.6 million in 1972;

. $272.7 million, using the same assumptions but doubling the average length of time served;

. $530.3 million, using the same assumptions as above, but also doubling the rate of increase in the scope and quality of services provided.

2/ The projected cost estimates listed throughout the report are expressed with spurious precision to tenths of millions. The numbers are the raw values yielded directly by the model, and are more truly accurate rounded off to ten-or hundred-millions.

--Corresponding costs for the State prison system are as follows:

. $2715.7 million, with sentencing policy and scope and quality of services unchanged, compared with $1194.0 million plus the cost of construction[1/] in 1971;

. $5915.8 million, for doubling average length of time served;

. $19,916.8 million, same as above, with a doubled rate of change in scope and quality of services.

--The cumulative cost of the Federal prison system over the 1973-1980 period would be in the neighborhood of $1105.5 million if sentencing policy and scope and quality of services remain the same. However, if the average length of time served were doubled, this cumulative cost would be as high as $3285.0 million--an increase of over $2 billion over the 8-year period.

--In the State prison system, the cumulative cost from 1972-1980 with the original assumptions would be $18,467 million. If the average length of time served were doubled, the cumulative cost would rise to approximately $48,207 million--a $30 billion difference.

It must be emphasized that the results hinge entirely on the assumptions and are used here not as a prediction, but for purposes of illustration.

Finally, the report discusses an intriguingly close correspondence between the unemployment rate and the change in size of the prison population. The relationship was found to be direct--as unemployment rises, so does the number of new prison admissions each year; as it falls, the

1/ Cost of construction in the State system was not available. Thus the $1194 million is only operating cost.

number of prison admissions drops, with a one year lag in the Federal prison system. In statistical terms the correlation between the unemployment rate and change in prison admissions for the Federal prison system was 0.91, meaning that over 80% of the variation in year-to-year changes in the number of prison admissions could be statistically related to changes in unemployment.1/ In the State prison system, the correlation coefficient was 0.86, with unemployment statistically explaining over 73% of the changes in prison admissions. The results are statistically significant according to to the Durbin-Watson statistic2/ and a probability test3/ which indicated that there is less than one possibility in 1,000 that these relationships are due entirely to chance.

We would emphasize that the report is carefully hedged about by assumptions. We cannot say that unemployment itself causes changes in prison admissions. Nor can we assume that it has any direct relationship to crime. We only indicate that our findings suggest that unemployment rates influence the prison population in several possible ways. High levels of unemployment could lead to social unrest and a lessening of support for social institutions, possibly affecting crime rates, sentencing policies, parole decisions, and other factors which in turn influence prison populations. Unemployment may also pose a stark choice in economic terms for those who

1/ Though the coefficient of correlation is derived directly from the data, the coefficient of determination (which is the square of the correlation coefficient) is more readily understood. For example, in our case, it is this index of determination which describes the actual percentage relationship between unemployment rate and prison admissions; i.e. index of determination = $(0.91)^2 - 0.82 = 82\%$.

2/ The Durbin-Watson statistic is a test of correlation to determine whether or not statistical results are simply reflecting common upward (or downward) trends, rather than some more fundamental relationship among the data.

3/ A test of probability based upon the F-distribution.

are on the border line of acceptable social action and must find alternative means of support. Finally, once in the prison system, parole officials may gauge the likelihood of successful parole in part on existence of meaningful work.

These are all suggestions. We definitely do not pretend to possess a new knowledge -- denied to most other analysts -- that we have established a direct causal link between unemployment and prison life. Numerous sociological studies have shown evidence of a positive relationship between crime rates, prison population, and unemployment.1/ Our findings, however, are tantalizing enough that we hope further research will be undertaken to add additional support -- or eliminate a false hypothesis. The reader is encouraged to read our section on conclusions for additional discussion of this point.

The report is divided into five parts. The first section furnishes background information on the Federal and State prison systems. Included is a brief summary of the differences between the systems and a description of certain population and cost trends over the past ten years.

1/ In a study on the relationship between crime and unemployment, Glaser and Rice found that crime rates vary directly with unemployment. In particular, they found that property crimes--the bulk of crimes reported --increased sharply with unemployment and declined sharply with full employment (Daniel Glaser and Kent Rice, "Crime, Age, and Unemployment," American Sociological Review, October 1959, pp. 679-686). These findings were confirmed by a later, extensive study by Belton Fleisher, who reanalyzed some of the national data used by Glaser and Rice, making corrections for long-run trends in the variables studied (Belton M. Fleisher, "The Effect of Unemployment on Delinquent Behavior," Journal of Political Economics, LXXI, 1963, pp. 543-555; and Belton M. Fleisher, The Economics of Delinquency, Chicago, Quadrangel Books, 1966).

Numerous studies also have shown that unemployment is a major factor in parole and mandatory release violations and that steady employment is directly related to lower recidivism (Dean Babst and James E. Cowden, Program Research in Correctional Effectiveness, Report #1, Madison, Wisconsin: Department of Public Welfare Division of Research, 1967; and Daniel Glaser, The Effectiveness of a Prison and Parole System, New York: The Bobbs-Merrill Company, Inc., 1964, pp. 232-259.

The second section is a discussion of the model used in making our projections. Included is both a general discussion of the reasons we chose to take the model approach and a more specific description of the model and methodology employed.

The third section outlines the results of our study for prison population and current operating costs.

The fourth and fifth sections assess the impact of taking capital costs into account, and the application of the model to State prisons.

The sixth contains results and discusses future research questions.

II. Background Information

A. Description of trends in systems

(1) Size of Federal and State prison populations. The size of the Federal and State prison populations stayed within a fairly constant range between 1960 and 1972, fluctuating between 20,000 and 30,000 Federal prisoners and 160,000 and 200,000 State prisoners.

(2) Type of offender in State versus Federal institutions. On the whole, offenses characteristic of the Federal prison population are of a less violent nature than those characteristic of the State prison population. For example, one-quarter of the more than 21,000 Federal prisoners in FY 1972 stood convicted of violating Federal drug laws; another quarter were convicted of robbery, primarily bank robbery; and still another quarter of

larceny/theft involving auto theft across state lines (one-half of the larceny/theft offenses), postal theft, and other forms of interstate theft.

Less than 3% of Federal prisoners were in prison on homicide, assault, or sex-offense charges.1/

On the other hand, 20% of the 37,415 State prisoners received from court in 1970 were convicted of such serious crimes...as follows: homicide (8.4%), assault (7.7%), and sex offenses (4%). Fewer than 10% were convicted of violating State drug laws, and fewer than 4% were convicted of auto theft.2/

(3) Costs of operating Federal and State prisons. The costs of operating the two systems can be broken down into two major components -- wages and salaries of prison employees, and goods and services provided to the prison population. The wage component has been responsible for the majority of the operating costs over the past ten years, with goods and services representing only a small percentage of these costs.

The annual increases in scope and quality of correctional services have been modest, averaging 3% between 1960 and 1972 for the Federal prisons and 6% for the State system.

According to the latest statistics, the total cost of operating Federal correctional institutions was $109,018,000 in FY 1972; the cost of operating State prisons was $1,194,000,000 in FY 1971.

1/ Federal Bureau of Prisons Statistical Report, FY 1971-1972, p. 26.
2/ National Prisoner Statistics, State Prisoners: Admissions and Releases -- 1970, p. 9.

(4) Capital costs for the Federal and State prisons. Statistics on the costs of construction and modernization of the prison systems are very scarce, and therefore, trends are difficult to determine. The limited statistics which are available indicate that modernization costs remain fairly constant over a period of time, but new construction costs are erratic.

In FY 1972, Federal prison modernization costs were estimated to be around $15 million. Total obligations for buildings and facilities in the Federal prison system reached $21.5 million.

Comparable cost estimates for the State prison system were not available within the sources used in this study.

B. Data Sources

In making our cost projections, we made use of the following sources of data:

(1) U.S. Bureau of Prisons. Statistical report. FY 1959-1972.

(2) U.S. Bureau of Prisons. National prisoner statistics. 1960-1971.

(3) U.S. Department of Justice, Law Enforcement Assistance Administration. Expenditure and employment data for the criminal justice system. 1967-1971.

(4) U.S. Congress. House. Committee on Appropriations. Departments of State, Justice, and Commerce, the Judiciary, and related agencies appropriations for FY 1960-1972.

III. Description of the Estimating Process

A. Why Use a Model?

Any projection is laden with risk. In addition to the anticipated problems of coping with uncertainty, the analyst must stand ready to defend his assumptions about what "really" influences activity in the area under study, as well as to test the sensitivity of his calculations to different assumptions and/or policies. To preclude the need to make arbitrary assumptions on the one hand, and to avoid the waste involved in duplicating the projection de novo under multiple assumptions on the other, it is sometimes useful to build a mathematical "model" of the study area which permits assumptions to be varied without having to duplicate all the subsequent calculations by hand. Such a model -- designed for computer application -- was constructed for this project.

B. General Methodology

There are at least three general approaches to making projections, with some overlap among the categories:

--Intuition. ("My experience in this area leads me to feel that Goal 'X' would require at least twice as much money as the present program").

--Extrapolation. ("Expenditures for health have grown 72% over the last 5 years. Therefore, let us assume they will grow 72% in the next 5.")

--Component Analysis.[1] ("Total education expenditures depend on how many students must be taught, the rising costs of providing those services, and any extensions in the scope or improvement in the quality of those services. Let's look at how each of these factors is likely to behave over the projection period.")

Component analysis is the most sensitive of the methods discussed and was chosen for use in this projection of prison population and costs. As implied in the example above, there are three factors commonly employed in using this technique. They are:

(1) Workload -- usually measuring people needing services (e.g., the population in the age bracket 5-17 for elementary and secondary education).

(2) Prices -- gauging the expected increase in the cost of providing a unit of service.

(3) Scope and quality -- measuring the extension of the scope of a given service (e.g., increasing the participation rate in higher education services from 27% of the population aged 18-22 to 40% of the 18-22 group), and/or improvements in the quality of services provided (e.g. the costs of special tutoring).

1/ For examples see:

Selma Mushkin and Gabrielle Lupo, "Is there a Conservative Bias in State-Local Expenditure Projections:", National Tax Journal, September 1967, pp. 282-91.

Tax Foundation, Inc., Fiscal Outlook for State and Local Government to 1975 (New York: TF), 1966, 128 pp.

Kegan, Lawrence R. and George P. Roniger, "The Outlook for State and Local Finance," in Fiscal Issues in the Future of Federalism, CED Supplementary Paper Number 23, (New York: CED), 1968, pp. 231-83.

The product of the first two factors is readily recognized as the dollar cost of providing the same real level of services per unit of need, after adjusting for any decline in the purchasing power of the dollar. The National Planning Association terms this "pre-empted" demand, meaning the projected cost of simply continuing present policies.[1] This concept is similar to the projection approach used in the U.S. Budget which terms the expenditure changes stemming from workload and price increases under present law and policies as "built-in".[2]

However, analysts and policy officials alike usually want to go beyond the simple projected level of spending likely to occur under present law and policy. Policies are variable and do, in fact, change. To achieve what might be a more realistic level of costs, some adjustment must be made for changes in policy and/or changes in the scope and quality of the services provided. One way to approach the problem of policy changes is to consult experts in the field to obtain their judgment as to what "should" be.

1/ Leonard Lecht, Goals, Priorities and Dollars (New York: The Free Press), 1966, p. 9.
2/ 1974 Budget, p. 44.

Panels of experts were used by the National Planning Association to suggest professional judgment levels for services provided in its projection in 1966.[1/] Subjectivity is the chief weakness of this approach. To overcome the need to make challengable normative judgments, the scope-and-quality factor in component analysis can be used to build in some allowance for anticipated policy changes. One could, for example, assume that the scope and quality of services will increase at the same annual rate as in the preceding 5 years. Or, alternatively, one could double that rate to test the sensitivity of costs to improving services twice as fast as in the preceding period. An example here might be helpful.

How it works.

The three elements of component analysis are usually stated in the following form (first in words, then in a simple formula):

Word formula: Expenditure change (E) is equal to

--change in workload (W)

multiplied by

--change in prices (P)

multiplied by

--change in scope and quality of services (SQ)

Short formula: $\Delta E = \Delta W \times \Delta P \times \Delta SQ$
where the Greek symbol "Delta" takes on its traditional mathematical meaning of "change in".

1/ See the introduction by Gerhard Colm in Lecht, op. cit.

Let us assume, for hypothetical service "X", that in the immediate past period from 1963-1973:

--Workload (as measured by change in total population) increased by 70%, going from 300 units to 510;

--Price levels (as measured by the consumer price index) increased by 50%, going from an index value of 126 to 189;

--Total expenditures for the services rose 232%, going from $680.00 to $2257.60.

Working backward, we can solve the equation above to see how much services were improved in scope and quality during the past decade (stating each factor as a ratio of its 1973 value compared with its 1963 value):

$$\frac{510}{300} \times \frac{189}{126} \times SQ = \frac{2257.6}{680.0}$$

$$1.70 \times 1.50 \times SQ = 3.32$$

$$SQ = \frac{3.32}{1.70 \times 1.50} = 1.3$$

The ratio of 1973 SQ to 1963 SQ is 1.3; or stated another way, scope and quality of services increased 30% in the past decade. Assuming that we had a population projection to 1983, and could anticipate some measure of price increases to the same year, we could then take these new values and project two levels of costs for the year 1983, as follows:

--Pre-empted level. Assuming that population slows to a 30% increase over the next decade, and prices mount 40%, then 1983 expenditures will be 82% greater than their 1973 level.
[1.30 (workload) X 1.40 (prices) = 1.82 (expenditures)]

--Same quality increase as in past. Using the same economic and demographic factors as in the pre-empted level, but adding the proviso that scope-quality increases will occur at the same rate as in the preceding ten-year period, then expenditures will be 137% higher in 1983 than 1973.
[1.30 (workload) X 1.40 (prices) X 1.30(SQ)= 2.37 (expenditures)]

Moving from a general example, we are now ready to apply this approach to prison population and costs.

C. Description of Prison Model

Each of the factors for the prison projection model is described below along with the actual model relationships. Finally, there are additional points in the model where differing policy judgments can be inserted and their effects tested.

The prison projection model consists of four elements: prison population, correctional costs, variations in the scope and quality of services, and total expenditures. A multiplicative relationship of the first three

elements yields a measure of total expenditures, as described above in the general example. Specifically, the relationship is as follows:

$$\Delta W \times \Delta P \times \Delta SQ = \Delta E,$$

where

W(workload) = measure of change in prison population over a given time span

P(prices) = measure of change in costs over a given time span

SQ(scope-quality) = measure of change in scope and quality of services over a given time span

E(expenditures) = measure of change in total operating expenses over a given time span

As we noted above, if each of the first three elements (W,P, SQ) is projected individually, a projection of total expenditures can be derived.

This was the technique used in this study to project operating expenses for both Federal and State prison systems to 1980. Because the data for Federal prisons were more easily obtainable and more complete, the model was built first for the Federal system and later modified to encompass State data. Data were used covering the period from 1960 to 1972 and all calculations were made with 1960 as a base year. The number of data sources was limited, and much of the data between the two systems were inconsistent. Because of differences in the existing data sources, the two projections (Federal and State) were made with different definitions of "year". All Federal prison data are on a fiscal year basis. State data for prison population are on a calendar year basis except prices and costs, which are fiscal year (or modified fiscal year) figures.

In order to make the model as flexible as possible, multipliers were built in to the model in order to be able to vary the rate of growth for each element. For instance, if one wanted to see the effect of doubling the average length of time served by Federal prisoners, he could introduce a multiplier of 2 into the appropriate portion of the model and produce a new cost projection based on this assumption. Similarly, if the analyst wanted to posit that some economic influence would have only half the impact on prison prices in the next ten years as it has in the past ten years, he could introduce a 0.5 multiplier in the price element, thus decreasing the projection accordingly.

Use of these multipliers will be explained section-by-section as they appear in the model. A description of each of the four individual elements (or variables) in the Federal system is included below.

WORKLOAD --FEDERAL PRISON POPULATION

The workload variable was the first and most difficult element to project -- and is also the most important factor in the model. Fluctuations of the total prison population seemed to be erratic, bearing little relationship to expected determinants. Moreover, the many complex social, economic, and political forces influencing the prison population seem to have eluded the tools of social scientists thus far and proved far beyond the reach of our study. For this reason, we defined the total prison population at first with a simple formula:

$$P(2) = P(1) + A(2) - D(2).$$

This equation says that the prison population of any given year, P(2), can be determined by adding to the previous year's population, P(1), the new admissions during the given year, A(2), and then subtracting from that sum the discharges during the given year, D(2). For example, to obtain the total prison population for 1966, the formula would add the 1966 admissions to the 1965 total population, and then subtract from the sum, the 1966 discharges. In short, prison population in the year under consideration is simply the sum of the previous year's population and the net change in population for the year at hand.

$$P(1966) = P(1965) + A(1966) - D(1966).$$

Using this formula, the projection of total prison population was both simplified and opened up the model to further policy variations. The variables which we needed to project, admissions and discharges, were less complex taken by themselves than total population as a whole and therefore -- hopefully -- easier to analyze. Another rationale for this

projection technique was that it created a certain flexibility in the treatment which could be given the variables -- analyzing admissions and discharges -- separately. It permits the user to increase or decrease the rate of growth of either variable by using one of the multipliers mentioned earlier. (Thus, one could test the impact of both a more stringent sentencing policy and a liberalized policy on parole, or vice versa.)

Admissions: The term "admissions" includes all new arrivals to any of the Federal institutions during a given year. This category can be divided into three sub-categories: (1) those received from court and violators returned, (2) other admissions (including admissions from writs, furloughs, and escapees returned), and (3) transfers. The third-subcategory, transfers, includes only those prisoners being moved from one Federal institution to another. They are not new arrivals into the Federal system, merely new arrivals at one particular Federal institution. Thus, for purposes of obtaining a valid, unduplicated count of the number of prisoners in the entire Federal system, the transfer number was deleted. The other two sub-categories make up the actual number of new admissions, and therefore the sum of the two will be referred to in the remainder of this report as "total admissions."

In the Federal system, total admissions were examined as a single element. The pattern of fluctuations of admissions from 1960 to 1972 was quite irregular. There was neither an increasing nor a decreasing trend (See Appendix for data). Thus, it was obvious that we could not make a straight-line projection based on our data; neither were we

successful in correlating with our prison admissions any of the following: total U.S. population, (or some population subset); birth rate; crime rate; or any other measure which seemed to bear some a priori relationship to admissions. However, it was important to find some variable which would show a strong statistical correlation with our data for admissions from 1960 to 1972, as well as one which had been previously projected into the future by experts in the field -- to keep the number of arguable assumptions and de novo projections in this study to a minimum. Once a statistically valid correlation between the two elements is established, the reliable projected values of the second measure could be used to derive projections for admissions.

However, it was obviously not enough to find a purely statistical relationship; it was also our intent to find a variable which would in part plausibly explain the behavior of admissions.

After considerable searching (including crime rate, population, etc.), we found a close correlation between admissions and the yearly unemployment rate. The unemployment rate had a striking similarity to the pattern of admissions. The simple correlation between new admissions and the unemployment rate for the period 1960 to 1972 was 0.906 -- meaning that unemployment rates could describe 82% of the year-to-year variation in new admissions to prisons. According to the probability test,1/ the results are significant, with less than one chance in 1,000 that the relationship is purely a result of chance. The relationship was found to have a one-year lag -- particularly evident in the past few years -- and might

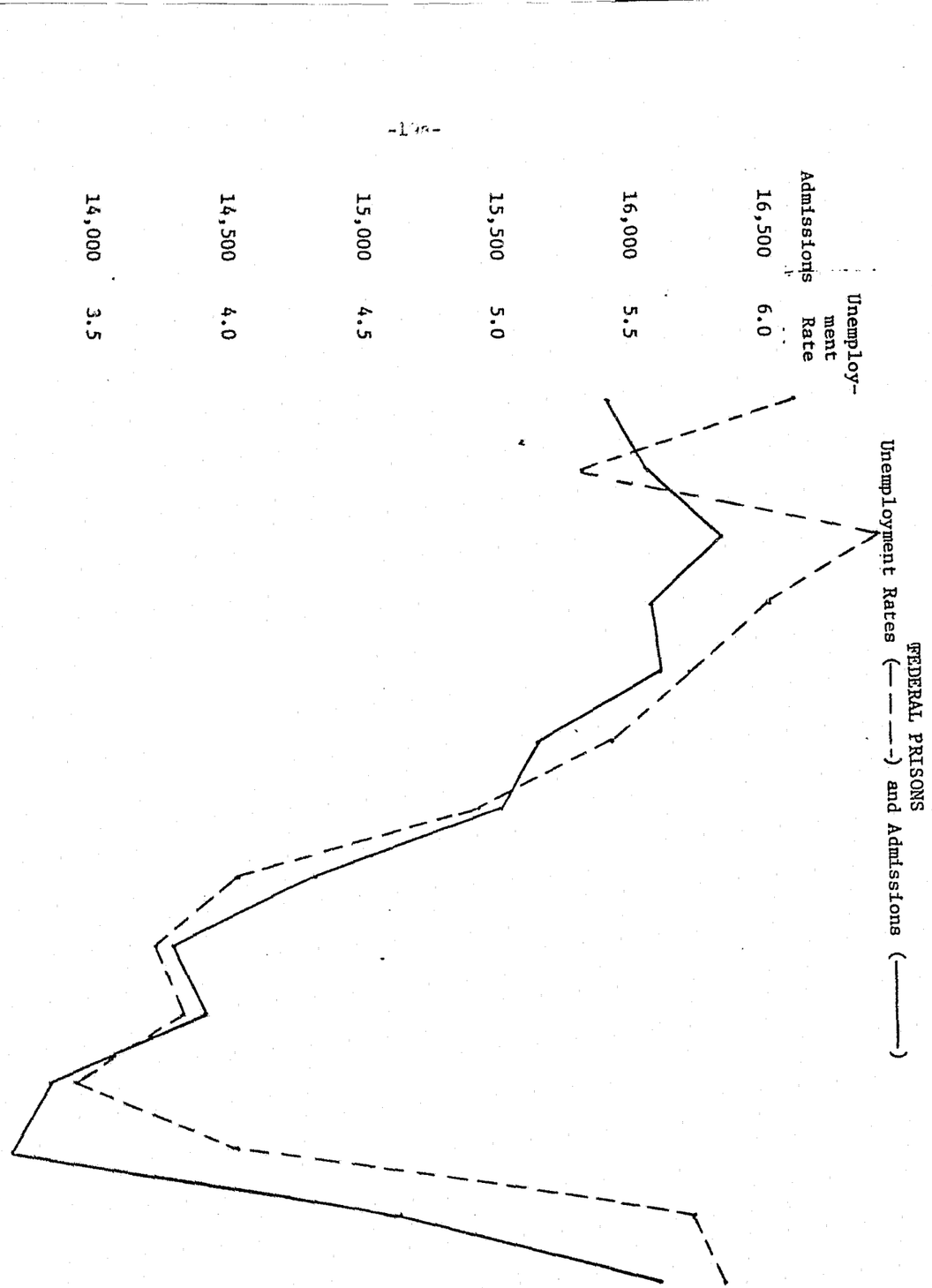
1/ See footnote (2), page 4.

be masked if the proper form of the relationship were not stated. (This is discussed below, and may account for the lesser degree of success enjoyed by other analysts seeking such a correlation between prison admissions/discharges and socio-demographic variables.) 1/

Statistical relationships can be satisfying only if there is some reasonable line of causation which can be hypothesized. It would be naive to say that unemployment "causes" admissions to the prison system. Rather, we believe that there are some plausible links that can be made between unemployment *per se* and the change in the prison population, as well as holding out the possibility that the unemployment rate may stand as a proxy for social malaise or disorders which do contribute in some way (unknown to us) to the prison admissions. Certainly, it is reasonable to assume that the economic pressures of unemployment on marginal workers (who are also "marginal" in terms of their ties to society) may culminate in criminal activity. The one-year lag also adds credibility to the relationship since there would be some delay between actions and sentencing. Finally, an offender would be more likely to be confined to prison in a time of high unemployment -- when job opportunities and, therefore, rehabilitation prospects would appear low.

Further analysis of the relationship between unemployment rate and new admissions strengthened our hypothesis that unemployment rate could be used as a measure of admissions. Of the two sub-categories:

1/ Christensen, Ronald A. Task Force Report: Corrections. Appendix B, "Population Projections for Correctional Subsystems." 1967, U.S. Govt. Print. Off.



(1) received from court and violators returned, and (2) other admissions the "other admissions" category included primarily only administrative movement of prisoners returning from writs, furloughs, etc. There is little reason to believe that this type of movement is subject to the same social, economic, and political influences as the movement of prisoners who enter the prison system for the first time or who are recidivists. This assumption places the weight of the correlation with unemployment rate on the first sub-category (received from court and violators returned). In other words, if our assumption were correct, we should have found a very high correlation between sub-category (1) and unemployment rate. This is precisely what happened. The correlation was even slightly higher than the original correlation, giving substance to the argument that it was, in fact, the sub-category most likely to be responsive to the unemployment rate which influenced the correlation and which is affected by it.

Discharges: Discharges -- or departures from prisons -- like admissions, can be divided into sub-categories, one of which is transfers. For identical reasons that we disregarded transfers under admissions, we also deletedthat sub-category from the sum of total discharges.

The approach taken to project discharges was quite similar to the one for admissions. We had hoped to find a measure of discharges which would yield a projection totally independent of admissions. This would have given us two independent variables, admissions and discharges, from which we could calculate total prison population. However, a visual

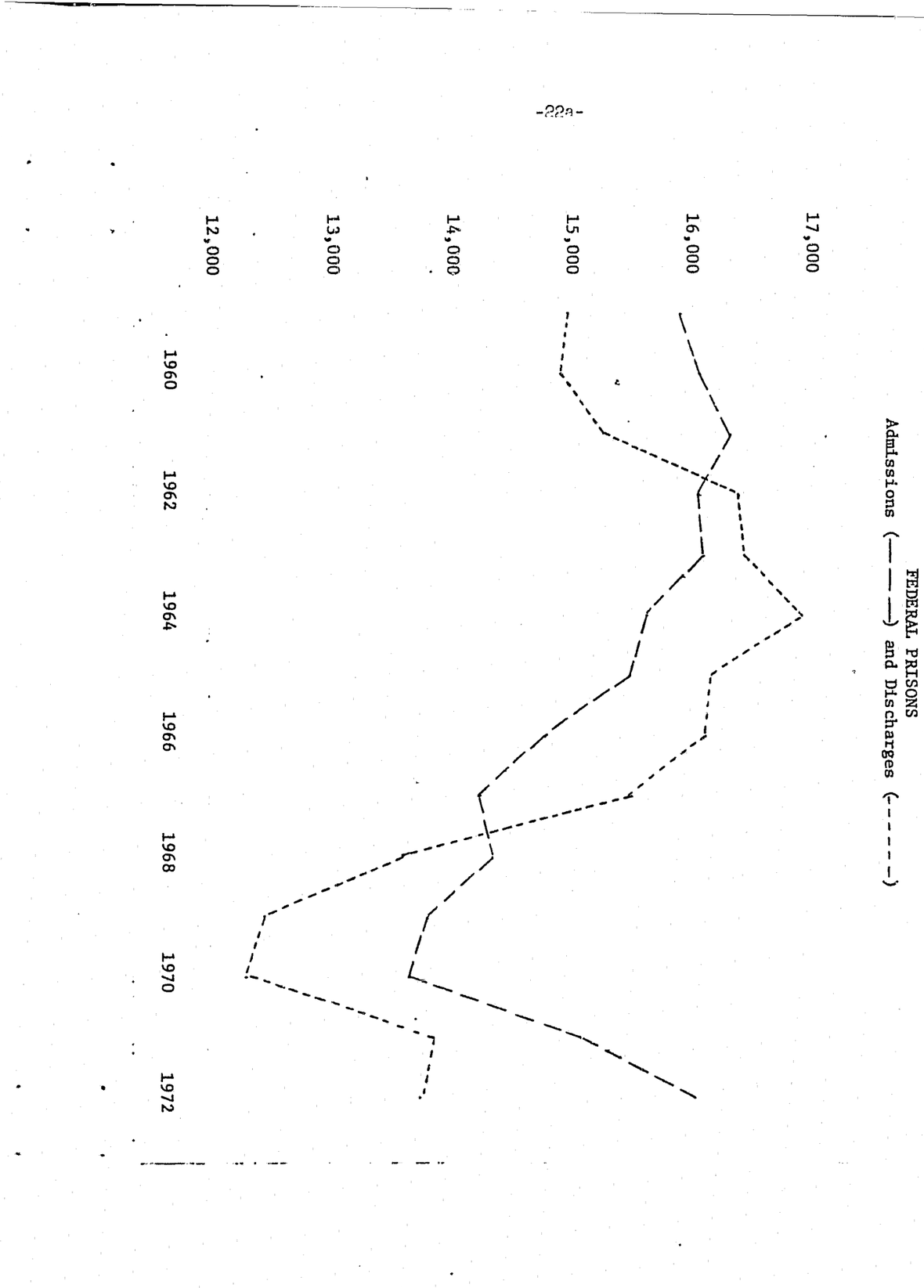
comparison or diagram of total admissions and discharges revealed such a strong similarity that the interrelationship between the two could not be denied. They were not independent variables; rather the number of discharges depended directly on the number of admissions, again with a one year time lag.

Thus, we developed an equation to describe discharges based on admissions. Projections of admissions, calculated as described in the preceding section, were then used to project discharges.

There are several plausible explanations for such an interdependent relationship. First, the forces which influence judges in sentencing may also affect parole officials in their role in the prison system, though perhaps in different directions. Certainly the social setting in which decisions are made will also be felt by all the decisionmakers in the system. Second, there may be some feelings regarding the quality and quantity of available prison capacity, which would influence judges in sentencing and parole officers in paroling in similar directions. In a situation of overcrowding, judges may be reluctant to rely upon confinement and seek other alternatives; and parole officers may seek to release a relatively larger proportion of the low-risk prison population.

Total Workload Element: Caluclation of the total prison population at this point involved merely simple combination of projected values of admissions and discharges with the previous year's population in our formula, $P(2) = P(1) + A(2) - D(2)$.

Variation in total prison population depends on variation of admissions and discharges, which in turn vary with unemployment rate. Therefore, the model offers to the user the option of introducing at this time whatever unemployment rate projection he wishes. This is the only external set of data which is not already built into the model.



For purposes of illustration in this report, we used in our model unemployment rate projections from an econometric model built by Data Resources, Inc. (DRI). The DRI forecasting system is a reliable econometric projection model used for economic analysis by many government agencies (including the Council of Economic Advisors, the Office of Management and Budget, and the Social Security Administration), as well as numerous private corporations. The data base on which this model relies was built and is updated continuously from sources such as the Bureau of the Census, the Bureau of Labor Statistics, the Office of Business Economics, and the Federal Reserve System. While the DRI model projections fall well within the normal range of other econometric projections, major innovative techniques were used in derivation of the model equations in an effort to encompass the most recent economic developments. The unemployment rate is projected by the DRI model to be 5.4% in fiscal year 1975 (compared to 5.8 in FY 1972), and is assumed to gradually fall to 4.0 and level off at that point.1/ This is a standard pattern for so-called full-employment-path projections.

There are other econometric forecasting models which project that unemployment rates will be as much as 0.5 higher than the DRI projection. If such an unemployment rate were used in our prison cost projection model, the cumulative cost from 1973 to 1980 for the Federal prison system--assuming no variation in the model factors--would be within 3% of the estimated value using the DRI unemployment rate projections.

1/ All of the projections used as illustrations in this report are based on model runs made in October 1973, using the latest unemployment rate projections available at that time. Since then, a new DRI projection estimates the unemployment rates at as much as 0.4 higher than it did in the fall of 1973. However, since the unemployment rate is a major variable in the model, it can be changed and updated each time the model is run.

PRICES -- FEDERAL PRISONS

A surface examination of the total operating cost for Federal prisons on a yearly basis reveals that prison employee salaries account for over 60% of the total cost. The other 40% covers the cost of goods and services, primarily custody, care, and treatment of prisoners. Comparable measures of these two variables (which we will call wages and commodities) could be projected by the same technique which we used in projecting elements of prison population. The sum of the two would then be a measure of the change in the cost of operating the prison system.

It is necessary at this point to distinguish the difference between the price element and the total operating cost -- which is our final product from the model. The price element is an index value used to measure absolute change in prices. Actual dollar figures show not only these price changes, but also changes in workload and scope and quality of services. In this model, price changes resulting from changes in workload and scope and quality of services will be accounted for in other factors of the formula. This leaves the definition of the price element as a pure indicator of price trends.

Wages: The most apparent measure of wage increases for prison employees is average annual wage per prison employee. The recent past trends of average annual wage have shown a consistent and steady increase. Assuming that the future trends will behave as these past trends have, we can project wages at the same rate of increase in the future as in the past -- simply a straight-line projection. These values are then converted to index numbers (with 1960 index = 100.00) to indicate year-by-year percentage changes.

However, in the event that the user of the model feels that there would be a more or less rapid increase in wages, he may introduce a multiplier into the wage element, thereby adjusting that variable as he desires.

Commodities: The commodity variable was treated as a measure of the cost trends of goods and services (beyond wage cost).

Assuming this variable followed the normal trends of commodity costs in the economy generally, its pattern would resemble that of non-durable goods for the GNP deflator. Therefore, this GNP index was used as our commodity variable, also with the 1960 index = 100.00.

Here again, however, we have left this prediction as an option for change. If one wishes to specify a larger or smaller GNP deflator growth rate, he has an opportunity to do so.

Total Price Element: With projection techniques for wages and for commodities already established, calculation of the total price element involved summing the two indices after weighting them at 63.7% for wages and 36.3% for commodities (the average percentages calculated from the composition of total expenditures). The result is a measure of change in absolute cost increases and decreases of the Federal prison system. The index in itself shows us little about the amount of funds needed for prison operation, but in the aggregate, the figures give us the information about trends and differences in costs that we need for completing our projection model.

SCOPE AND QUALITY -- FEDERAL PRISONS

Scope and quality of services refers to the extent to which services are actually provided to the target populations and the quality of those services. For instance, the scope and quality of services will increase as the ratio of employees to prisoners rises. Changes in the quality of food, medical care, and security also affect the SQ component, to mention only a few. The changes in the scope and quality of services is not directly measurable in the same way we gauged the trends of workload and prices. This is not a unique problem, since the nationwide Consumer Price Index has always been subject to the qualification that it could not measure price increases due to quality changes. However, we were able to derive a set of numbers for scope-quality from 1960-1972 indirectly, simply because we had data for all other elements of our formula (W x PxSQ =E), leaving SQ as the only unknown. [Workload (W) was our total prison population; prices (P) were the sums of wage and commodity elements; and expenditures (E) were the values of yearly total operating costs for the Federal prison system.]

Over the twelve-year period, 1960-1972, percentage differences were calculated year-by-year in each of the three known variables. Substituting these percentages (in the form of a ratio of the two variable values)1/ in the equation gave us a value for scope-quality year-by-year. For example, given that the known data are as follows:

W(1966) = 21,009	W(1965) = 22,345
P(1966) = 127.19	P(1965) = 121.63
E(1966) = 57,573	E(1965) = 55,998

1/ Using this ratio in the formula is similar to using a deflator such as the familiar GNP implicit price deflator in economic analysis. The result of deflator multiplication results in another deflator which can be transposed to a percentage change and subsequently to an actual amount of change.

then the formula would indicate:

$$\frac{21,009}{22,345} \times \frac{127.19}{121.63} \times SQ = \frac{57,573}{55,998}$$

or

$$0.94 \times 1.05 \times SQ = 1.03$$

or

$$SQ = \frac{1.03}{0.94 \times 1.05} = 1.04.$$

Once the actual values for scope and quality changes over a previous period are determined, projection of the changes in scope and quality (SQ) of services into the future is left to the discretion of the user. He may leave SQ changes out of the projection entirely by using a 1.00 value for SQ in the projected formula. This would show the pre-empted or built-in demand for spending. Or he may increase it at the same rate as it has increased over the last ten years by using the average value of SQ derived for past years as the projected SQ for future years. He may also double the current level or double the rate of increase. Almost any value of this variable may be inserted into the model to accommodate the interests of the user.

EXPENDITURES— FEDERAL PRISONS

The value of expenditures or total operating costs is the ultimate product of our model. It is now obvious that the combination of the three preliminary projections (workload, prices and scope-quality) into the model formula will produce the end-product for expenditures. The formula is used exactly as it was in determining the scope-quality values for past years. Now the base year becomes 1972 (the last year of existing data), and the year of projection is any year between 1973-1980, depending upon the choice of the user. The value which the formula assigns to expenditures is in the form of a percentage change from 1972 to the year of projection. From this value of percentage change, we can easily calculate the absolute amount of change and add it to our known expenditures for 1972, thereby providing us with a dollar amount representing the expenditures of the Federal prison system with the user-designated assumptions for the projection year.

IV. CAPITAL COSTS -- FEDERAL PRISONS

The model presented in this report calculates total operating cost projections for the prison system. However, it does not provide the means for including capital (or construction) costs. Over the projection period from 1960 to 1972, capital costs in the Federal prison system have accounted for less than 10% of the total prison expenditures. Therefore, the projection of operating costs constitutes the lion's share of the task -- and for some purposes may be sufficient. Nevertheless, to make ours a more accurate projection, an adjustment was made to the final model-projected cost to include capital cost.

Background materials and data on capital costs were scarce, and as a result, our projection relied primarily on information received directly from the Bureau of Prisons and the National Clearinghouse for Criminal Justice. This information provided us with an average cost per year for five years to cover modernization of existing facilities, and a current average cost per bed for construction of a new facility for the Federal prison system. We extended the average modernization cost ($15 million per year) over our entire projection period, and added to that a new construction cost for each individual year. The new construction cost was calculated as follows:

$$(\$36{,}000 \times CI) \times B = Cost)$$

where: $36,000 is the current average construction cost per bed,

CI is a construction price index indicating the change in cost of construction due to inflationary factors, and

B is the number of new beds per year.

The number of new beds for a given year was determined by the total increase (if any) in the prison population over the previous year.

This simply-derived capital cost adjustment may or may not be accurate year-by-year. There is no way to determine in which year the facilities will actually be built; though, theoretically at least, they must be built to accommodate the population. Thus, over a period of time the costs of this construction will exist, either as a one-year expenditure or distributed throughout the period. This model distributes them as the projected population either increases or decreases.

V. STATE PRISON PROJECTIONS

In general, it was found that the State prison data followed the same patterns as Federal data. Therefore, the procedure used to project State costs was almost identical to the Federal model with a few minor modifications.

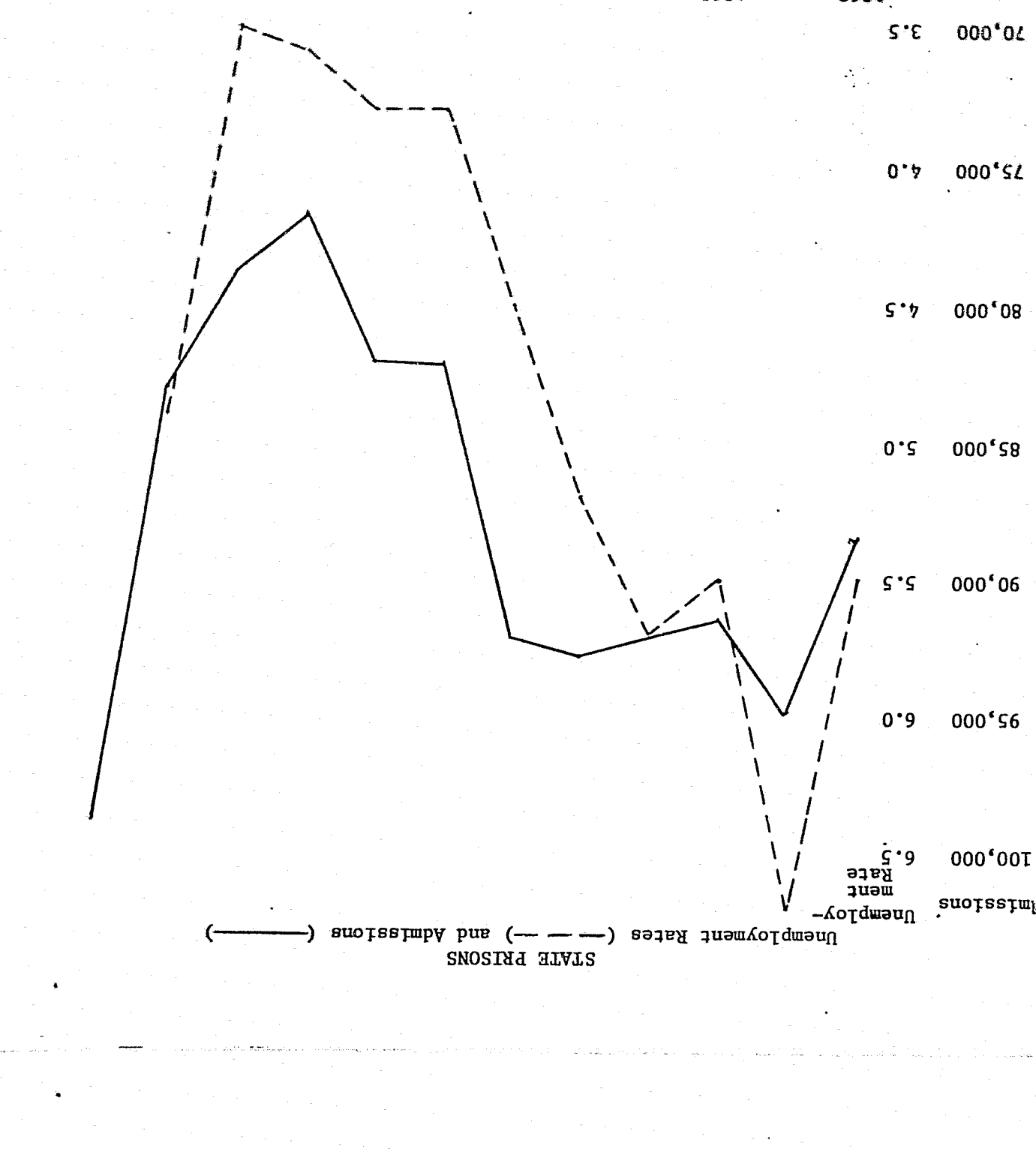
State prison admissions data -- i.e., those "received from court and violators returned" -- also showed a strong correlation with unemployment rate.[1/] The correlation coefficient was 0.859 with only one possibility in 1000 that the relationship is due purely to chance. In other words, the unemployment rate describes about 79% of the behavior of the admissions data. However, when the "other admissions" category (including admissions from writs, furloughs, etc.), was added to the total admissions, the correlation was distorted. This problem was alleviated by projecting the two admissions categories separately. The first category (received from court and violators returned) was projected from the correlation with unemployment rate. The "other admissions" have been increasing at a constant rate since 1960 and thus were easily predicted with a straight-line projection. The sum of the two projections was used as the total admissions, as they were in the Federal system.

Wages and commodities were calculated for the State system as they were for the Federal, but the determination of the weighted values varied somewhat. The Federal system has maintained a constant ratio between the wage and commodity elements. They have both been increasing at constant

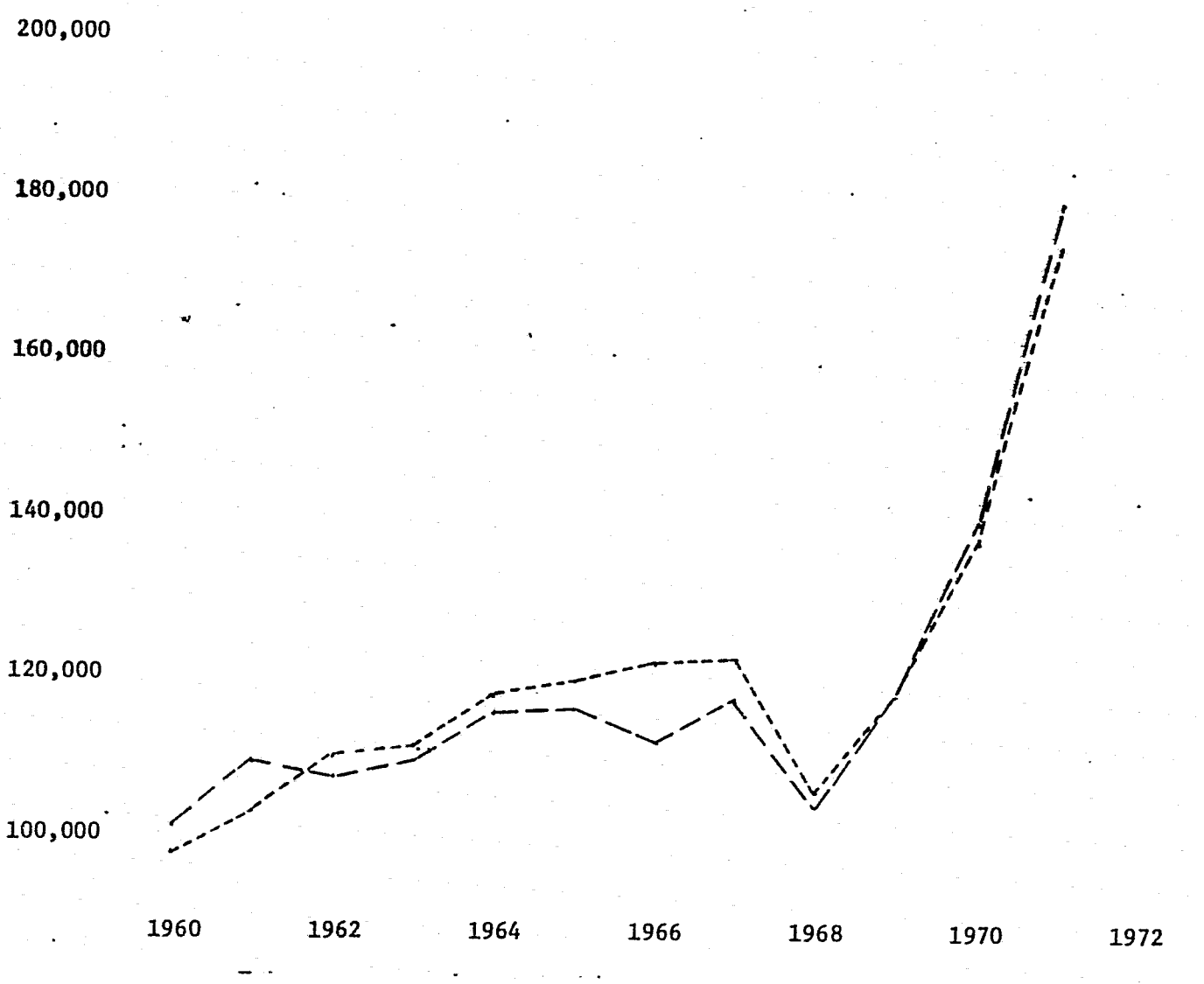
---

1/ In the State system the one-year lag in correlation disappeared. This occurrence may be attributed to a number of influences. However, they are all relatively minor in relationship to our model, and therefore, were not pursued in the course of our study.

STATE PRISONS
Unemployment Rates (— — —) and Admissions (————)



STATE PRISONS
Admissions (— — —) and Dischages (- - - - - -)



rates. Thus the weight given to each factor has also been constant (around 60% for wages and 40% for commodities.) However, in the State system, wages have become an increasingly larger percentage of the total operating cost over the past years. Thus, the wages have been growing more rapidly than the commodity prices. Assuming this trend will continue, we varied the weight percentages of the two factors year-by-year.

Capital costs for the State system were calculated as they were for the Federal prisons using an average cost per bed of $30,000 for the State system compared with $36,000 for the Federal prisons.[1/] Modernization costs were not available from any source; so in order to take this cost element into account (regardless of the fact that it is a minute segment of the total cost estimate) we used $15 million (the same as the Federal cost) as an arbitrary figure, assuming that State prison modernization costs will be in the same neighborhood as Federal modernization costs.

All other State projections were performed identically to the Federal projections.

1/ Cost estimates obtained from the National Clearinghouse for Criminal Justice, Planning and Architecture.

VI. Results and Research Questions

RESULTS

The projection model described in this report lends itself to infinitely varied results. These results depend upon the variety of optional features selected by the user of the model. This built-in flexibility establishes the model as a usable tool to accomodate nearly any set of assumptions for the principal variables.

Included below are several examples of cost projections obtained from the Federal prison system.

(1) Assumptions:

a. Admissions, releases, wages, and commodities remain as projected directly from the model.
b. Average length of time served remains the same as current length of time served (2 years)[1/]
c. Unemployment rates are as projected by the DRI model.
d. Average yearly increase in the commodity price index is 3.5% and in the construction price index is 9%.
e. Rate of increase in scope and quality of services is the same as the 1960-1972 rate.

Total operating costs 1980 = $124.2 million
Total capital costs 1980 = 57.2 million
Total expenditures 1980 - 181.4 million

Cumulative expenditures 1973-1980 = $1105.5 million

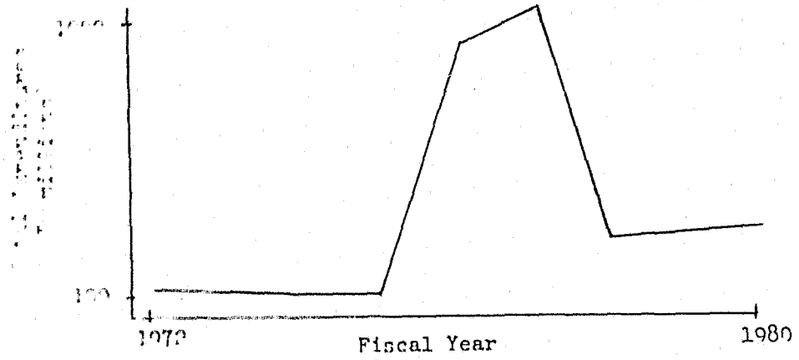
1/ Based on data from U.S. Bureau of Prisons. Statistical Report: Fiscal years 1971 and 1972. Washington, D.C. 1973 ... and rounded to the nearest year.

(2) Assumptions:

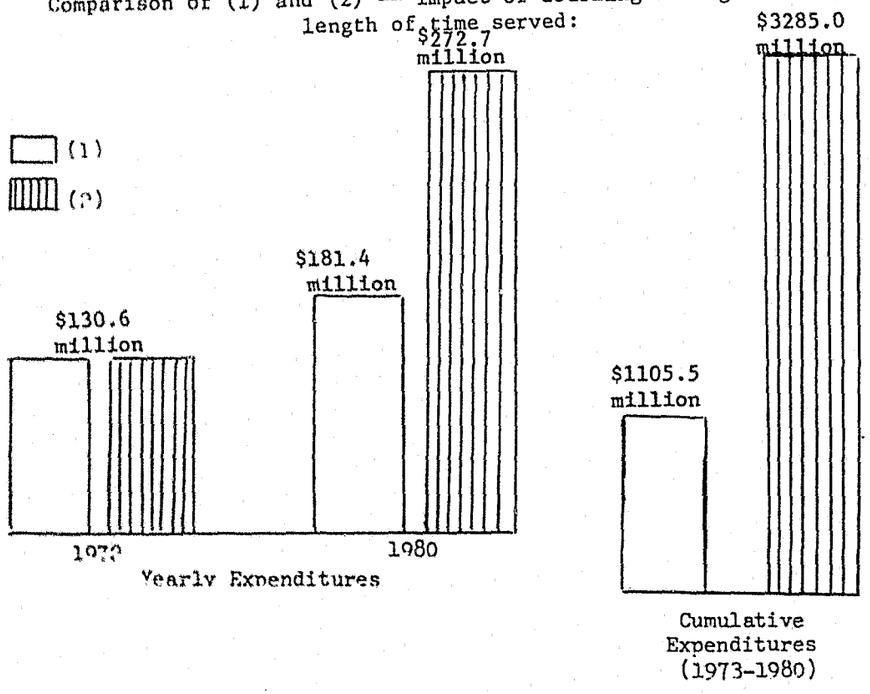
a. Double average length of time served.
b. All else the same as (1).

Total operating costs 1980 = $257.7 million
Total capital costs 1980 = 15.0 million
Total expenditures 1980 = 272.7 million

Cumulative expenditures 1973-1980 = $3285.0 million



Comparison of (1) and (2) -- Impact of doubling average length of time served:

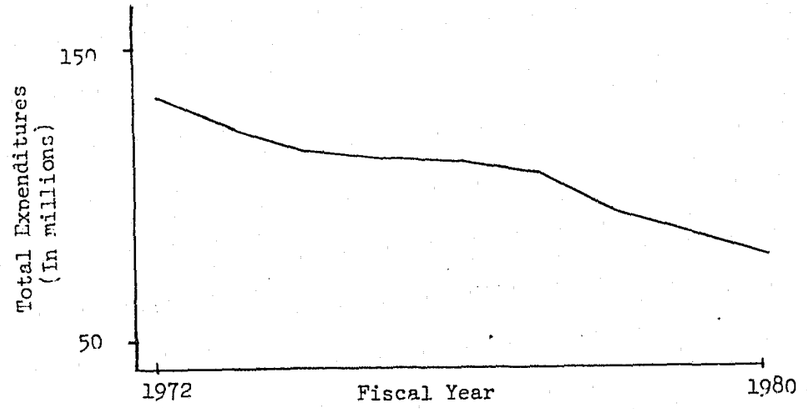


(3) Assumptions:

a. Discharge rate is 10% higher than projected.
b. All else the same as (1).

Total operating cost 1980 = $67.2 million
Total capital costs 1980 = 15.0 million
Total expenditures 1980 = 82.2 million

Cumulative expenditures 1973-1980 = $772.8 million

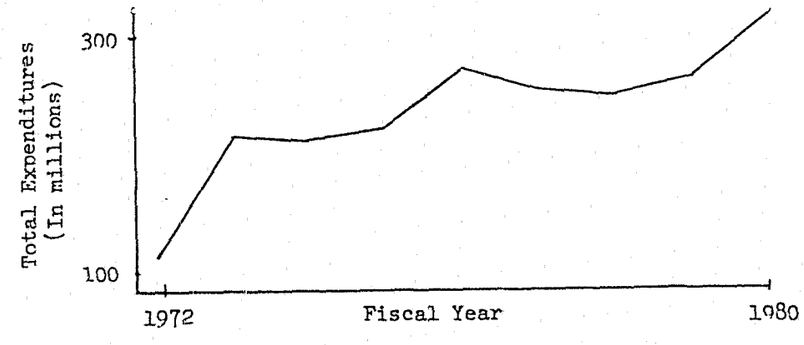


(4) Assumptions:

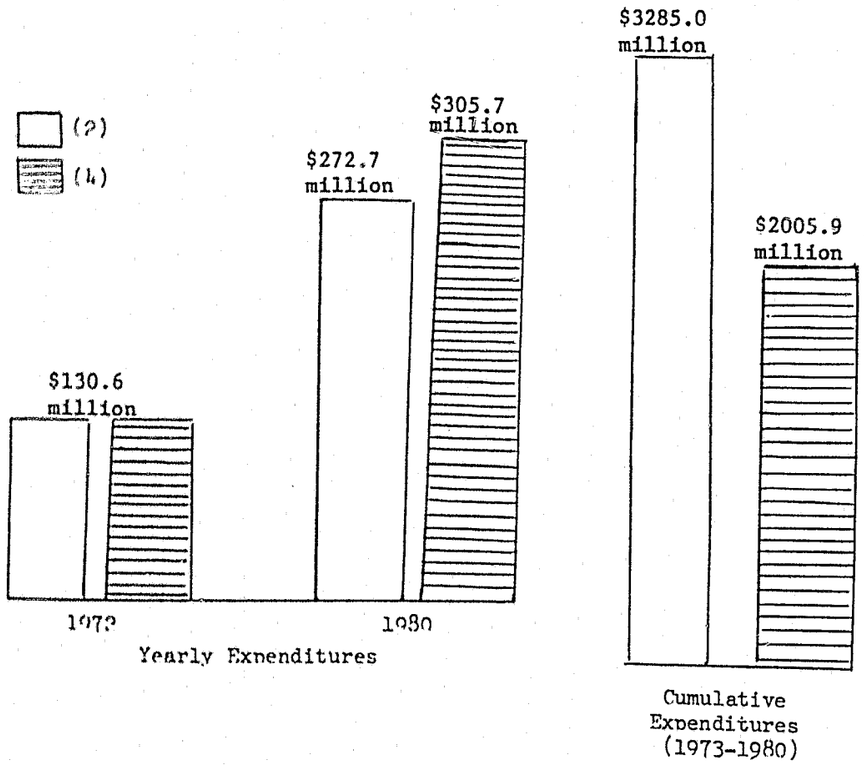
a. Scope-quality increases twice as rapidly as it did from 1960-1972.
b. All else the same as (1).

Total operating costs 1980 = $248.5 million
Total capital costs 1980 = 57.2 million
Total expenditures 1980 = 305.7 million

Cumulative expenditures 1973-1980 = $2005.9 million



Comparison of (2) and (4) -- Impact of doubling average length of time served vs. doubling scope-quality:



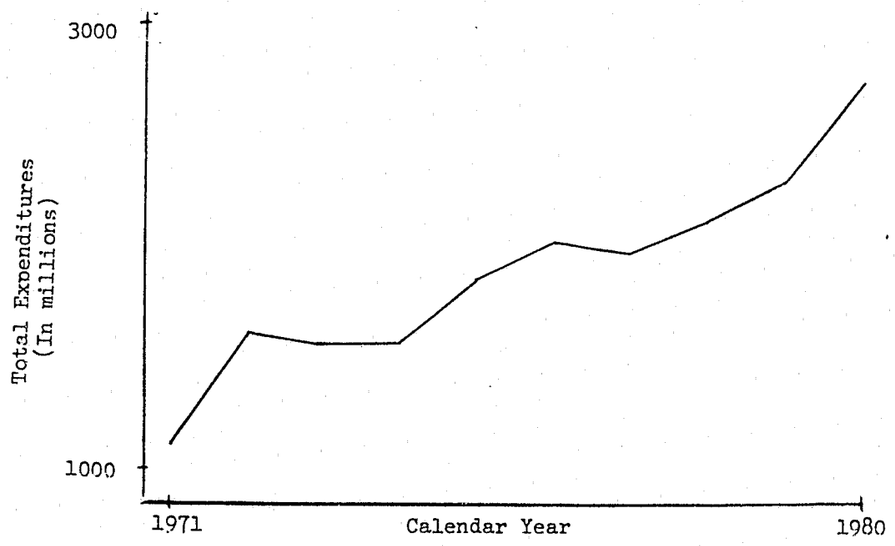
Below are several similar results from the State Prison model.

(1) Assumptions:

a. Admissions, releases, wages, and commodities remain as projected directly from the model.
b. Average length of time served remains the same as current length of time served (2 years).1/
c. Unemployment rates are as projected by the DRI model.
d. Average years increase in the commodity price index is 3.5% and in the construction price index is 9%.
e. Rate of increase in scope and quality of services is the same as the 1960-1971 rate.

Total operating costs 1980 = $2072.6 million
Total capital costs 1980 = 643.1 million
Total expenditures 1980 = 2715.7 million

Cumulative expenditures 1972-1980 = $18,467.4 million



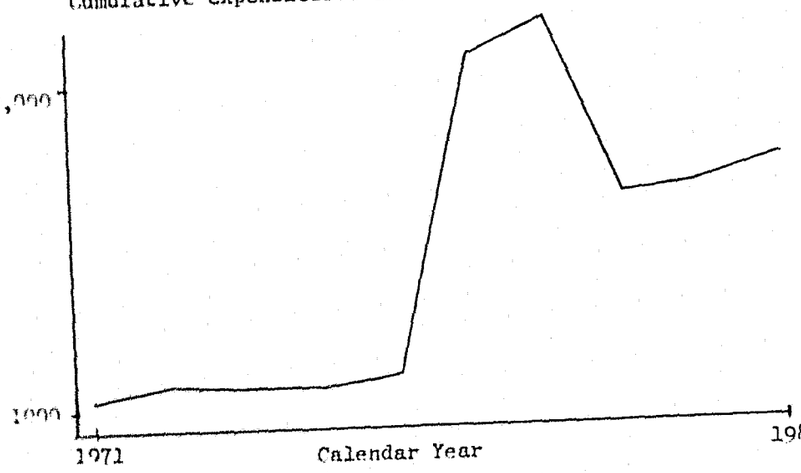
1/ Based on data from the President's Commission on Law Enforcement and Administration of Justice. Task Force Report: Corrections. Washington, D.C., U.S. Gov't. Print. Off., 1967...and rounded to the nearest year.

(2) Assumptions:

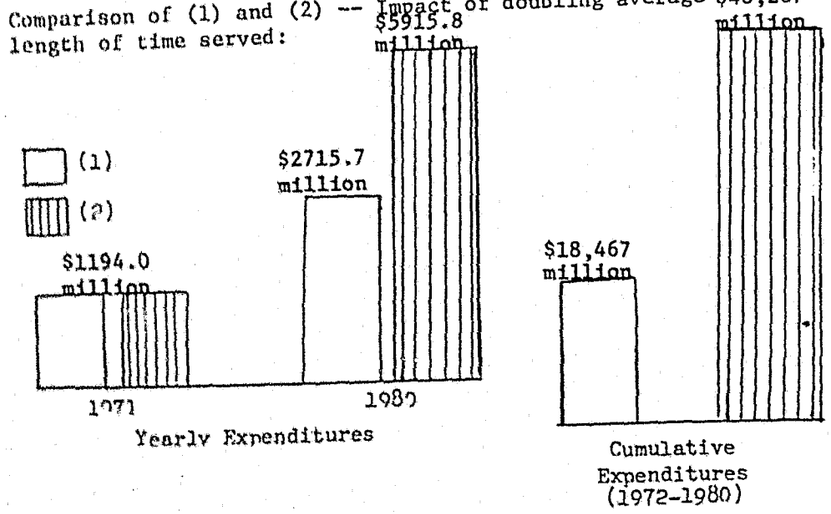
a. Double average length of time served.
b. All else the same as (1).

Total operating costs 1980 = $5001.0 million
Total capital costs 1980 = 914.8 million
Total expenditures 1980 = 5915.8 million

Cumulative expenditures 1972-1980 = $48,207.4 million



Comparison of (1) and (2) -- Impact of doubling average length of time served:

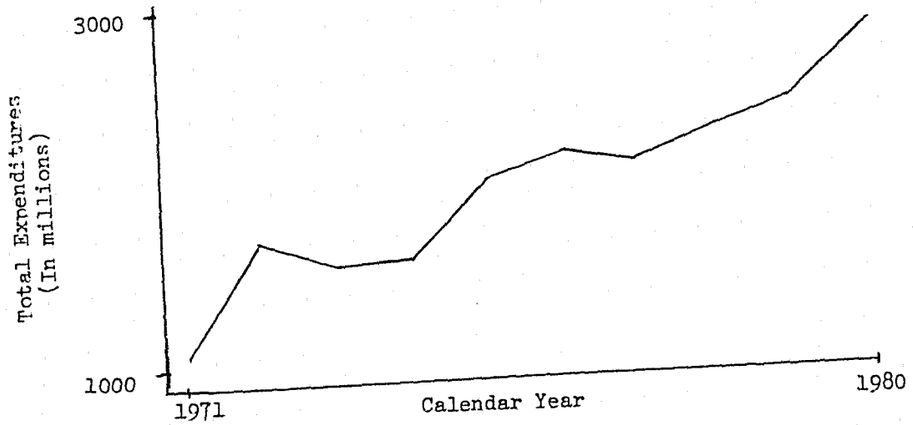


(3) Assumptions:

a. Commodity costs 20% higher than projected.
b. All else the same as (1).

Total operating costs 1980 = $2120.3 million
Total capital costs 1980 = 643.1 million
Total expenditures 1980 = 2763.4 million

Cumulative expenditures 1972-1980 = $18,940.2 million

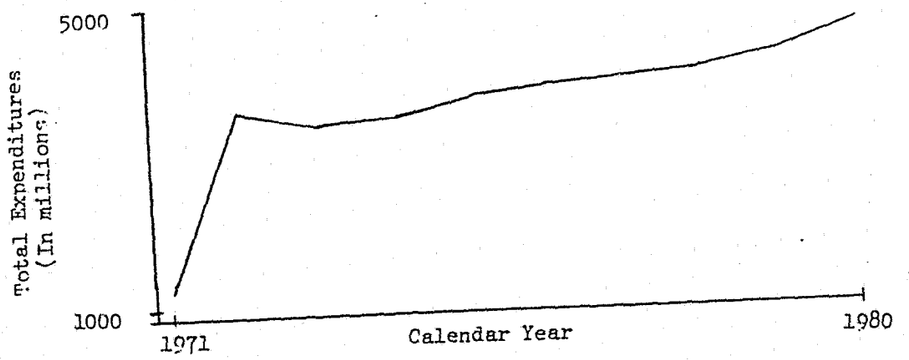


(4) Assumptions:

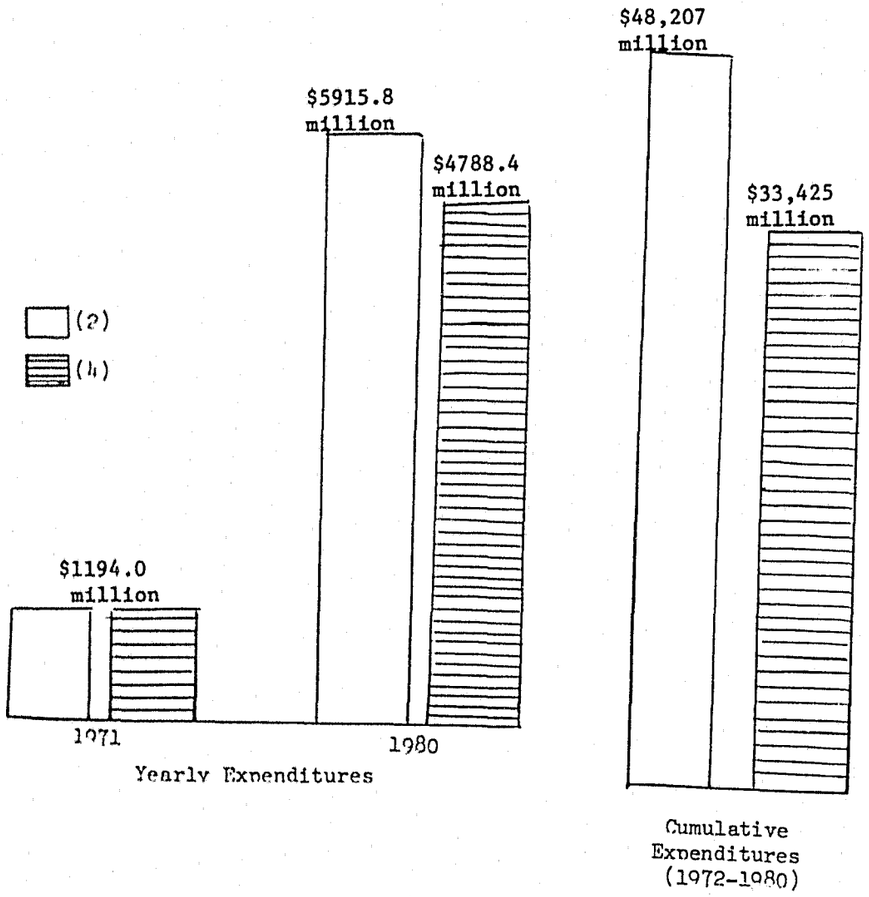
a. Scope-quality increases twice as rapidly as it did from 1960-1971.
b. All else the same as (1).

Total operating costs 1980 = $4145.3 million
Total capital costs 1980 = 643.1 million
Total expenditues 1980 = 4788.4 million

Cumulative expenditures 1972- 1980 = $33,425.3 million



Comparison of (2) and (4) -- Impact of doubling average length of time served and doubling scope-quality.



Research Questions

In examining the intermediate and the final results of this study, several interesting questions were raised, each of which would constitute an entire research project in itself. As this point, we mention only a few of these areas where further research might prove enlightening.

(1) The first amd most striking question which was revealed in the study dealt with the correlation found between prison admissions and the unemployment rate. As we noted, the unemployment rate can **statistically** describe **over 80% of the year-to-year variation in prison admissions at the Federal level, and 79% at the State level. It was not our purpose to establish** this particular relationship, and we are at a loss to explain why such a relationship might exist aside from our few "plausible hypotheses" on pages 4, 5, and 18-20. Simple-minded statistical projections are intriguing, but the research that explains "why" something happens is far more useful in the world of policy. It is our ardent hope that others will pursue this question and establish the "why" of things here. The questions is too important to be left in so tantalizing a state.

(2) Another interesting question raised by **these** data concerns the scope and quality of correctional services in State versus Federal institutions. The data indicate that over the past decade, the commodities component of the price factor in Federal institutions (which includes such services as food and medical programs for inmates) increased steadily, as did the wages component. In the State institutions, however, the commodities factor of the price component has not increased, but has remained almost constant, while the CPI, GNP, and wages all increased.

For example, in 1960, the amount of wages paid in Federal institutions was $25,614,000 -- 60.5% of the Federal prisons' total operating cost. In 1970, the amount of wages paid increased to $51,646,000 -- but remained at roughly the same percent (65.5) of total expenditures. Thus, the price of commodities has accounted for 35-40% of total expenditures throughout the period.

In State institutions, however, the relative share of total costs accounted for by commodities has dropped from 42% of the total expenditures in 1960 to 28% in 1971. Wages, nevertheless, have grown at a normal inflationary rate. This indicates that actual yearly commodity purchases have declined in volume or that prices have either remained constant or have grown at a rate far below the rate of inflation.

At the same time, the data indicate that scope and quality of services has grown twice as rapidly in State prisons as in Federal institutions. This evidence leads us to the conclusion that most -- or perhaps all -- of the scope-quality increase in State prisons comes from the wage component rather than the goods and services covered by the commodity component. For example, it is possible that the State prisons have been hiring an increasing number of employees so that the employee-to-prisoner ratio has been growing --thereby causing the increase in scope and quality of services. At the same time, the scope and quality of commodities may have remained at a constant level or even decreased. This, in fact, is the situation which exists. From 1960-1972 the employee to prisoner ratio in the Federal system has fluctuated within a

range of 0.18 to 0.25, indicating that the number of prisoners to each employee has stayed between 3.9 and 5.3. In the State system the ratio has risen from 0.28 in 1960 to 0.53 in 1971 (significantly higher than the Federal numbers). The number of prisoners to each employee in State prisons has dropped from 3.6 in 1960 to 1.9 in 1971.

This raises the question of the priority State institutions have given to the kind of scope and quality increases provided the inmate over the past ten years, or the possible greater substitutability of people for goods at the State level. Whether a higher ratio of employees to prisoners in the State system is significant may in part depend upon the level of services provided by the additional employees. Again, it is not the task of this paper to explore the relationship between Federal and State trends, but we hope others will do so.

APPENDIX

FEDERAL PRISONS
WORKLOAD DATA

$$P(X) = P(X-1) + A(X) - D(X)$$

Fiscal Year	Unemployment Rates 1/	Admissions 2/	Discharges 2/	Total Population (Workload)
1959	6.1	15,900	14,972	22,838
1960	5.3	16,042	14,900	23,980
1961	6.4	16,331	15,279	25,032
1962	6.0	16,054	16,401	24,685
1963	5.7	16,100	16,467	24,318
1964	5.4	15,638	16,908	23,048
1965	4.9	15,491	16,194	22,345
1966	4.0	14,781	16,117	21,009
1967	3.7	14,265	15,491	19,783
1968	3.8	14,370	13,601	19,552
1969	3.4	13,802	12,472	20,882
1970	4.0	13,662	12,302	22,242
1971	5.7	15,115	13,875	23,482
1972	5.8	16,064	13,749	25,797

1/ Source: U.S. Bureau of Labor Statistics
2/ Source: Federal Bureau of Prisons Statistical Reports 1959-1972

FEDERAL PRISONS
PRICE DATA

(wages + commodities)

Fiscal Year	Average Annual Wage Per Employee 1/	Wage Index	Commodity Index GNP Deflator Nondurable Goods 2/	Total Price Factor (0.637)W + (0.363)C
1960	$ 5362	100.00	100.00	100.00
1961	6042	112.68	100.69	108.33
1962	6028	112.44	101.58	108.49
1963	6302	116.98	102.76	111.82
1964	6680	122.97	103.64	115.95
1965	7201	130.76	105.61	121.63
1966	7675	137.34	109.34	127.19
1967	7972	141.20	111.62	130.46
1968	8390	146.44	115.66	135.26
1969	8815	151.50	120.69	140.32
1970	10235	167.60	126.12	152.54
1971	10903	174.12	130.04	158.11
1972	11521	179.78	134.11	163.20

1/ Source: U.S. Budget Appendices FY 1962-FY 1974
2/ Source: U.S. Department of Commerce, Bureau of Economic Analysis

FEDERAL PRISONS
TOTAL OPERATING COST DATA

($\Delta W \times \Delta P \times \Delta SQ = \Delta E$)

Fiscal Year	Workload Index 1/	Price Index 1/	Scope-Quality Index 1/,2/	Total Cost Index 1/	Total Cost 3/ (In Thousands)
1960	1.05	1.02	1.06	1.14	$ 42,346
1961	1.04	1.08	0.96	1.07	45,192
1962	0.99	1.00	1.05	1.04	46,782
1963	0.99	1.03	1.05	1.07	50,119
1964	0.95	1.04	1.07	1.06	53,127
1965	0.97	1.05	1.03	1.05	55,998
1966	0.94	1.05	1.04	1.03	57,573
1967	0.94	1.03	1.08	1.05	60,698
1968	0.99	1.04	1.01	1.04	62,991
1969	1.07	1.04	0.96	1.07	67,612
1970	1.07	1.09	1.00	1.17	78,873
1971	1.06	1.04	1.04	1.15	90,398
1972	1.10	1.03	1.07	1.21	109,018

1/ Measure of change from previous year
2/ As obtained from the formula
3/ Source: U.S. Budget Appendices FY 1962-FY 1974

FEDEPAL PRISONS
PROJECTION DATA AND EQUATIONS

Admissions (A) and Unemployment Rates (R), with one-year lag:
A = 11, 164.0 + 816.4971 x R
*Coefficient of Correlation = 0.906
Coefficient of Determination = 0.821

Admissions (A) and Discharges (D), with one-year lag:
D = -6177.3819 + 1.3873 x A
*Coefficient of Correlation = 0.828
Coefficient of Determination = 0.685

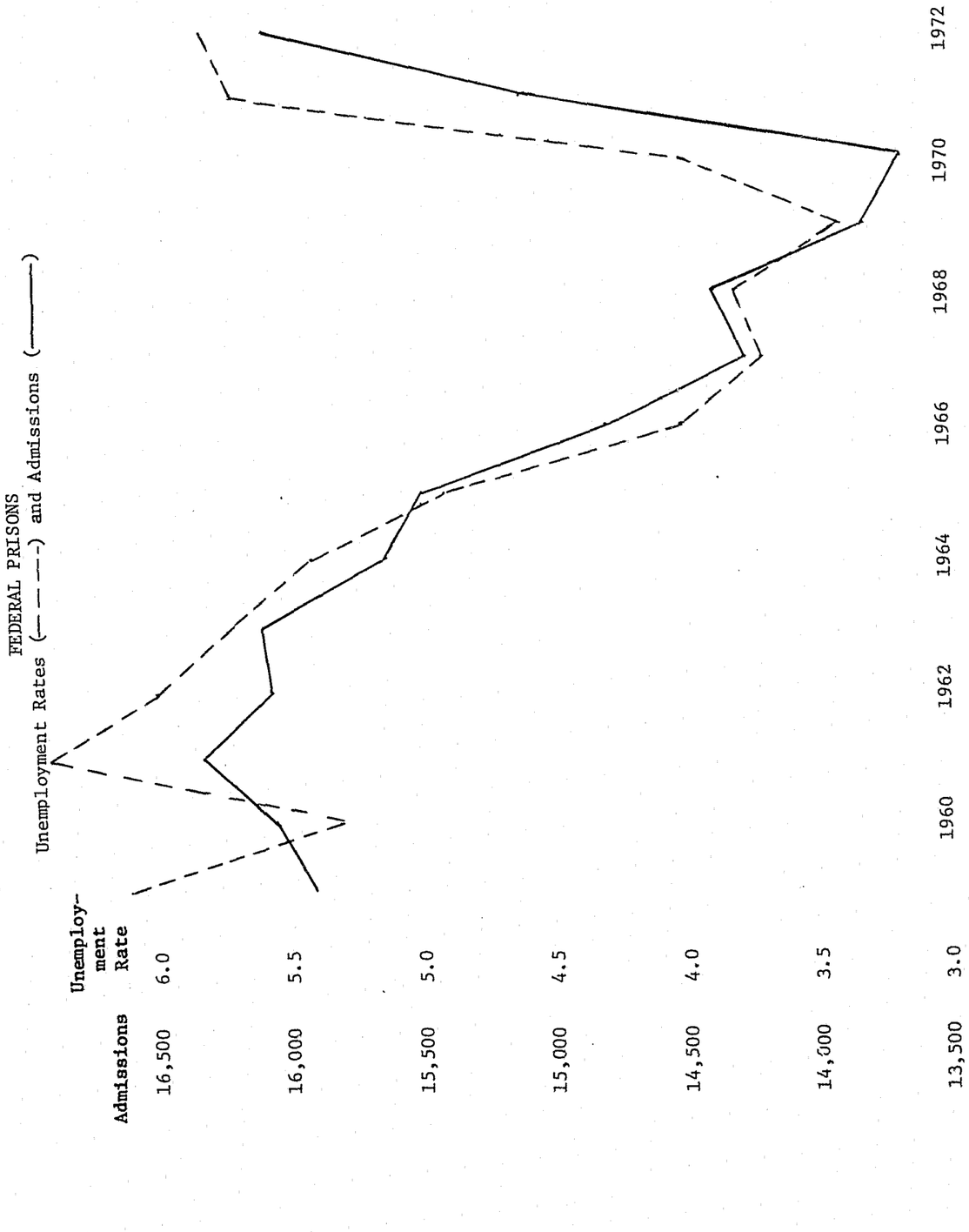
Average Annual Wage (W) --- straight-line projection, Y = yearly trend indicator with values 1 to 13.
W = 4478.26 + 493.4998 x Y
*Coefficient of Correlation = 0.975
Coefficient of Determination = 0.951

Projected Unemployment Rates --- Fiscal Years 1/

1973 --- 5.2	1977 --- 4.5
1974 --- 5.0	1978 --- 4.0
1975 --- 5.4	1979 --- 4.0
1976 --- 5.3	1980 --- 4.0

*All correlations, according to the F-distribution probability statistic, are significant, and there is less than a 0.1% probability that they are due entirely to chance.

1/ As projected on a quarterly basis by Data Resources, Inc. through 1975. After 1975, the unemployment rates are assumed to level off to 4.0.



FEDERAL PRISONS
Admissions (— — —) and Discharges (- - - - - -)

CRS-50

STATE PRISONS
WORKLOAD DATA

$$P(X) = P(X-1) = A(X) - D(X)$$

Calendar Year	Unemployment Rates [1]	Admissions [2],[3]	Other Admissions [2],[4]	Total Admissions [2]	Discharges [2]	Total Population (Workload)
1960	5.5	88,538	12,287	100,825	96,590	189,924
1961	6.7	94,895	13,698	108,593	102,122	196,395
1962	5.5	91,492	15,656	107,148	109,095	194,448
1963	5.7	92,201	17,721	109,922	111,234	193,136
1964	5.2	92,963	21,457	114,420	116,367	191,189
1965	4.5	92,294	23,704	115,998	119,016	188,171
1966	3.8	82,265	29,601	111,866	120,946	179,091
1967	3.8	82,212	34,211	116,423	122,248	173,266
1968	3.6	76,863	27,071	103,934	104,070	173,130
1969	3.5	78,925	42,726	117,528	117,528	173,130
1970	4.9	83,068	54,625	137,693	137,214	173,609
1971	5.9	98,920	79,712	178,632	171,880	180,361

CRS-51

1/ Source: U.S. Bureau of Labor Statistics
2/ Source: National Prisoner Statistics 1960-1971
3/ Includes admissions received from court and violators returned
4/ Includes admissions from writs, furloughs, etc.

STATE PRISONS
PRICE DATA

(wages + commodities)

Calendar Year	Average Annual Wage Per Employee 1/	Wage Index	Commodity Index GNP Deflator Nondurable Goods 2/	Total Price Factor
1960	$4618	100.00	100.00	(0.576)W + (0.424)C = 100.00
1961	4613	99.89	100.69	(0.559)W + (0.441)C = 100.24
1962	5060	109.58	101.58	(0.598)W + (0.402)C = 106.37
1963	5118	110.72	102.76	(0.611)W + (0.389)C = 107.62
1964	5480	117.79	103.64	(0.627)W + (0.373)C = 112.51
1965	5657	121.11	105.61	(0.627)W + (0.373)C = 115.33
1966	6230	131.23	109.36	(0.685)W + (0.315)C = 124.34
1967	6742	139.44	111.62	(0.686)W + (0.314)C = 130.71
1968	7200	146.23	115.66	(0.679)W + (0.321)C = 136.42
1969	7842	155.14	120.69	(0.721)W + (0.279)C = 145.53
1970	8360	161.74	126.12	(0.716)W + (0.284)C = 151.63
1971	8900	168.19	130.04	(0.716)W + (0.284)C = 157.35

1/ Source: U.S. Census Bureau, Public Employment 1960-1971
2/ Source: U.S. Department of Commerce, Bureau of Economic Analysis

STATE PRISONS
TOTAL OPERATING COST DATA

($\Delta W \times \Delta P \times \Delta SQ = \Delta E$)

Fiscal Year	Workload Index 1/	Price Index 1/	Scope-Quality Index 1/, 2/	Total Cost Index 1/	Total Cost 3/ (In Millions)
1960					$ 425
1961	1.03	1.00	1.10	1.13	479
1962	0.99	1.06	1.01	1.06	508
1963	0.99	1.01	1.06	1.06	536
1964	0.99	1.05	1.05	1.09	586
1965	0.98	1.03	1.07	1.08	632
1966	0.95	1.08	1.02	1.05	664
1967	0.97	1.05	1.11	1.13	747
1968	1.00	1.04	1.08	1.12	838
1969	1.00	1.07	1.02	1.09	914
1970	1.00	1.04	1.11	1.15	1051
1971	1.04	1.04	1.05	1.14	1194

1/ Measure of change from previous year
2/ As obtained from the formula
3/ Source: U.S. Census Bureau, U.S. Summary, Direct General Expenditure by Function, by Level of Government, 1960-1971.

STATE PRISONS
PROJECTION DATA AND EQUATIONS

Admissions - received from court and violators returned - (A) and Unemployment Rates (R):

A = 59,726.8 + 5766.437 x R
*Coefficient of Correlation = 0.859
Coefficient of Determination = 0.738

Other Admissions (OA) - writs, furloughs, etc. --- straight-line projection, Y = 1 - 12:

OA = -561.273 + 4861.594 x Y
*Coefficient of Correlation = 0.886
Coefficient of Determination = 0.786

Total Admissions (TA) and Discharges (D):

D = 9974.56 + 0.919966 x (TA)
*Coefficient of Correlation = 0.976
Coefficient of Determination = 0.952

Average Annual Wage (W) --- straight-line projection, Y = yearly trend indicator with values 1 to 12.

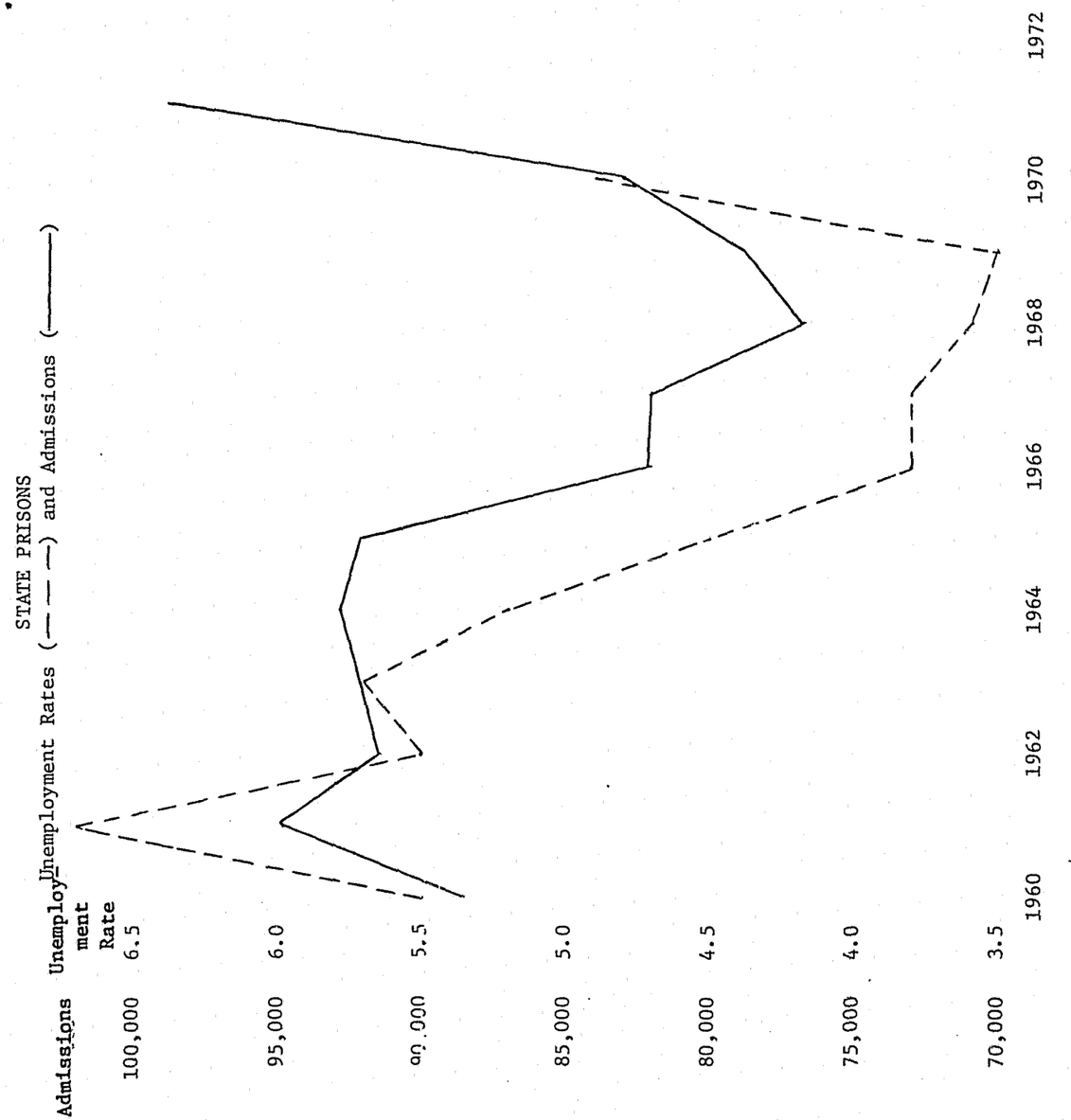
W = 3703.15 + 402.3354 x Y
*Coefficient of Correlation = 0.980
Coefficient of Determination = 0.961

Projected Unemployment Rates --- Calendar Years 1/

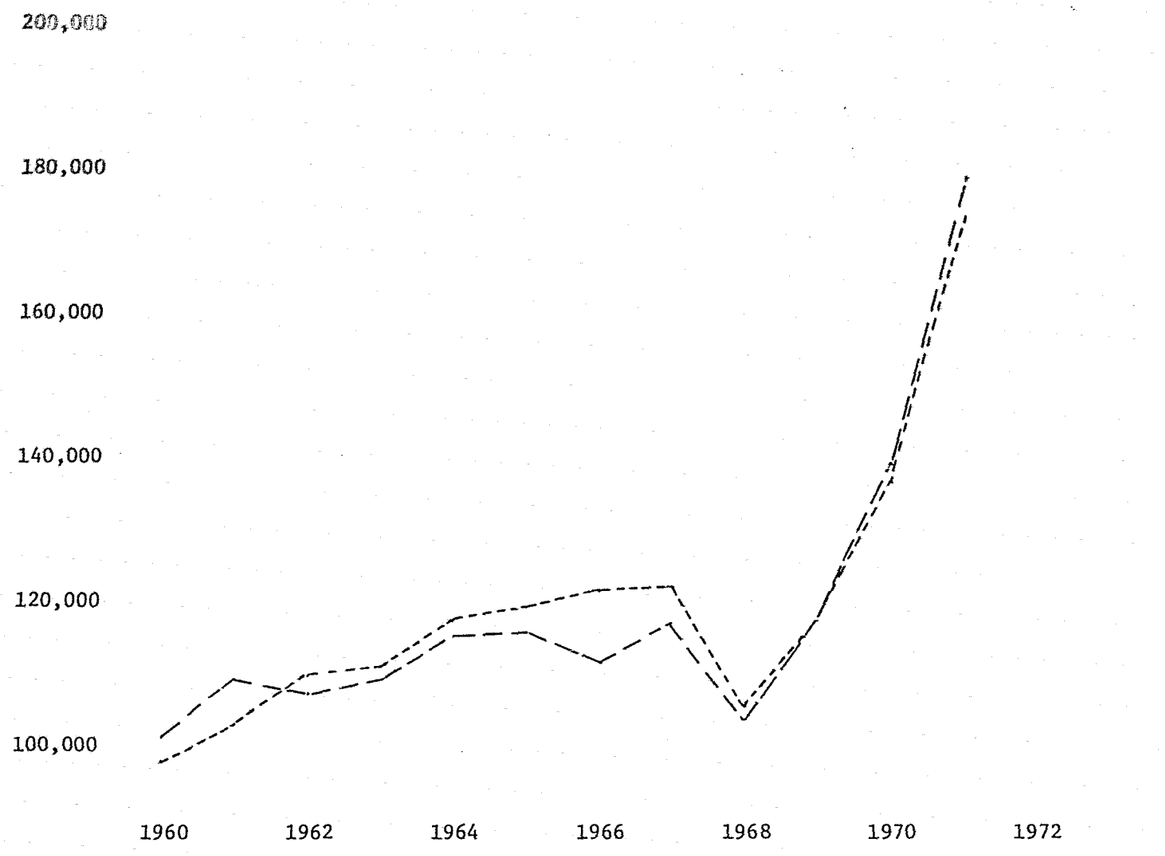
1973 --- 4.9	1977 --- 4.3
1974 --- 5.2	1978 --- 4.0
1975 --- 5.4	1979 --- 4.0
1976 --- 4.9	1980 --- 4.0

* All correlations, according to the F-distribution probability statistic, are significant, and there is no more than a 0.1% probability that they are due entirely to chance.

1/ As projected on a quarterly basis by Data Resources, Inc. through 1975. After 1975, the unemployment rates are assumed to level off to 4.0.



STATE PRISONS
Admissions (— — —) and Dischages (- - - - - -)



CRS-56

END