FLORIDA DEPARTMENT OF OFFENDER REHABILITATION
LOUIE L. WAINWRIGHT, SECRETARY

A STATISTICAL ANALYSIS OF THE DEGREE OF ASSOCIATION BETWEEN OFFENSE, SENTENCE LENGTH AND TIME SERVED IN DOR INSTITUTIONS

SEPTEMBER 22, 1977

EXECUTIVE SUMMARY

The purpose of this study was to determine if knowledge of offense and length of sentence could add significantly to the ability to predict the time an inmate would serve while in the custody of the Department of Offender Rehabilitation.

Using a multiple regression technique it was determined that both offense and length of sentence were significantly associated with time served. It was further found that both length of sentence and offense were related in such a way that, while both were of significant help in predicting time served, the sum total of their predictive ability was little better than length of sentence taken alone.

The conclusion of this study was that length of sentence was the best predictor of time served and that adding offense did little to increase the accuracy of the prediction. Therefore, the advantage gained in simplicity by using length of sentence alone in predicting time served far outweighted any improved accuracy gained by using a more complex model (using both offense and length of sentence).

A STATISTICAL ANALYSIS OF THE DEGREE OF ASSOCIATION BETWEEN OFFENSE, SENTENCE LENGTH AND TIME SERVED IN DOR INSTITUTIONS

PURPOSE

The purpose of this study is to determine whether a knowledge of length of sentence and offense will improve the ability to predict the length of time an individual inmate will serve in the Department's custody.

BACKGROUND

This study is part of a research effort directed toward estimation of future inmate populations utilizing three primary factors: admissions, time served and releases. Recognizing that these factors depend on many other variables, the Department has undertaken an effort to more thoroughly examine the relationships among factors which are associated with the actual length of time that an inmate will spend in prison.

It is expected that time served will depend upon many variables unique to each case, including length of sentence imposed, type of offense, prior criminal record, parole policy, administrative options regarding gain time, aggravating or mitigating conditions pertinent to the criminal act, age of the offender, etc. This study is intended to examine the significance of the association between length of sentence, offense and time served, and to determine whether or not a knowledge of these variables can contribute to a more accurate prediction of time to be served.

METHODOLOGY

The Hypothesis

The null hypothesis of this study is that there is no association between the independent variables (offense and length of sentence) and the dependent variable (time served) and that therefore a knowledge of these variables will contribute little to the prediction of time served.

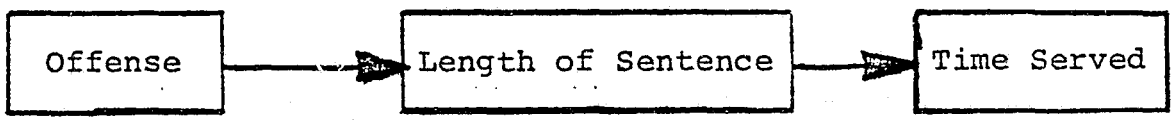
Since we are dealing with the interaction of three factors, there are many alternative hypotheses. For the purpose of this study the following was selected:

> Type of offense and length of sentence are both associated with time served, and knowledge of either will significantly improve the ability to predict time to be served.

The correlary hypothesis to this latter hypothesis is as follows:

> Although knowledge of both offense and length of sentence improve the ability to predict time served, these variables interact in such a way that taken together there is no significant improvement in association over length of sentence taken by itself.

The alternative hypothesis is based in concept on the following model: offense results in a specific length of sentence being imposed; subsequently the length of sentence causes a specific length of time to be served. The concept can be diagramed as follows:



The Data

The data used in this analysis is comprised of computer records of all inmates released from the Department during the fiscal years 1974-1975 and 1975-1976. Release records must of course be used in order to determine the length of time served. Unfortunately, it must be pointed out that although this data is the best presently available there are many problems to consider before a reasonable analysis may be made. Many of these problems are pointed out in detail in Research Document #77-R-061 entitled Inmate Population Projections - Short and Long Range Estimates - (1977 to 1980 and 1977 to 2000). Due to an elaboration of these problems elsewhere they will only be highlighted here. The main problems may be summarized as follows:

1. Original admission date is lost for any inmate being readmitted to the system (i.e., violators of conditional release) and therefore must be excluded from the analysis.
2. Due to recent dramatic changes in admission, the release data is not truly representative of either new admissions to the system or inmates currently in the system.

These problems were dealt with as follows:

1. It was determined that excluding violators from the data resulted in a slight underestimate in the length of time served, this difference was not of great significance to the analysis.

2. Due to the fact that only the numbers of admissions have increased while the proportions by offense and length of sentence have remained relatively constant, a legitimate analysis may be made by statistically controlling for these changing trends, thereby eliminating their influence from the analysis.

The Statistical Techniques

After examining the problem it was determined that the best analytical technique to be applied was that of multiple regression. Since one of the variables to be examined (offense) was nominal in nature, a dummy variable strategy was used to place this variable in the regression equation.

The Variables

The time served variable was computed by subtracting each inmate's release date from his admission date. The length of sentence variable is the maximum length of sentence entered in each inmate's computerized record. The maximum length of sentence is in most cases the only length of sentence, because most inmates are currently sentenced to fixed rather than indeterminate sentences[1].

Sentences In Florida

The offense variable represents a total of thirteen offense categories that were selected to represent the inmate population. These offense categories were: murder, manslaughter, armed robbery,

---

1. (See Document #77-R-063) An Historical Analysis of Fixed Versus Indeterminate Sentencing for Inmates Committed to the Custody of the Department of Offender Rehabilitation.

unarmed robbery, assault, burglary, theft, forgery, sex offenses, drug offenses, firearms, escape and all other offenses. These offense types (excluding "all others") account for approximately 98% of the release population under analysis. The remaining 2% were collapsed into the category "all others". Because of the nominal nature of this variable, the categories were treated as dummy variables. The reason for treating offenses as dummy variables is because regression analysis operates under the assumption of interval scales. Offense is a nominal scale; thus by treating offense categories as dummy variables, they take on the dimension of an interval scale.

FINDINGS

For the purposes of simplicity only relivant regression statistics will be reported here. Primarily, the "R squared" statistic will be examined, because it can be given a "variance explained" interpretation.

By entering each variable into the equation in a stepwise manner the degree with which the addition of each variable adds to the explanation of the variance in time served can be determined. Specifically the variable length of sentence is found to explain 27.9% of the variation in length of time served. When offense is added to the equation the explained variation is increased 30.38%, or an increase in the explained variance of 2.48%.

When the offense is entered into the equation first, 13.88% of the variation in length of time served is explained. By adding length of sentence subsequently the explained variance is increased to 30.38%, or an increase of 16.51%.

The above findings suggest that the null hypothesis may be rejected because both length of sentence and offense are significantly associated with time served. In addition, support for the alternative and correlate hypothesis is found because of the observed interaction between offense and length of sentence.

CONCLUSION

It may be concluded from the findings that while both length of sentence and offense are significantly correlated with time served, when taken together the total variation explained for time served is little better than when length of sentence alone is considered.

Given this, there appears to be a clear advantage (of simplicity) in use of sentence length alone to predict the time that an inmate will serve. The more complicated model, using offense, would add little to the accuracy of the prediction while making the predictions more complicated.

END