Prison Size and Inmate Rule Violation

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In recent decades the prison industry has grown at an unprecedented rate. Prisons have become overcrowded and underfunded. Because of the demographics of those housed in prisons, it is important to understand how increased overcrowding has affected their behavior and tendency to break prison rules. In this study we look at a data set collected by the Ohio Department of Rehabilitation to analyze any possible connections between prison size and inmate rule violation. Three distinct sizes were examined while also taking into consideration other factors such as age, ethnicity and education level. For our analysis we used a negative binomial regression model. Findings showed a relationship between ethnicity/age and prison size at smaller prisons. No significant relationships were found within medium and large prisons. Nevertheless, a more comprehensive study of prison size affects is needed to address the potentially disastrous effects of overcrowded prisons.

INTRODUCTION[1]

Today the prison industrial complex is a huge and profitable industry in the United States. The industry provides many jobs not only in the area where a particular prison is located, but nationally as well. The prisons themselves provide jobs for prison guards however the entire industry provides jobs in construction, uniforms, security, and other industries. The prison industrial complex also has a very powerful lobby machine in Washington D.C that requests funding from the federal government which ensures its continued growth and survival. With the recent media coverage on the overcrowding of prisons and prison riots, the question arises: Is there a relationship between prison size and rate of inmate rule violation? The purpose of this paper is to find out if the size of the prison (based on number of prisoners)

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affects the rate of inmate rule violations inside prisons. This topic is important because if research indicates that prisoners at larger prisons violate rules at a higher rate could eventually lead to policy change. If findings can exhibit that prison size is correlated or has a causal relationship between prison size and the rate of inmate rule violation, it could lead to a change in how prisons are built and how they are occupied.

RESEARCH HYPOTHESIS

Based on the Inmate Data Set the following hypothesis can be formed: prisoners in medium sized prisons (those having 1000 to 1999 prisoners) receive a greater number of class III tickets, than those inside smaller prisons (those having one thousand or less).

DATA AND VARIABLES

This paper will make use of the "Inmates Dataset" that was collected by the Ohio Department of rehabilitation. The dataset consists of information on 1,485 male inmates admitted to the Ohio Department of Rehabilitation and Correction during September and October 1985. The "variables reflect demographic and criminal history information for each inmate as well as individual lifestyle data and correctional-institution information regarding rule infractions during incarceration" (DeMaris, 2004:16).

Our dependent variable in this analysis is the number of class three tickets that prisoners receive. NUM-3TIX, number of Class three tickets, is a measure of inmate rule-violation behavior while incarcerated. The NUM-3TIX variable has a range of 0 to 28. A greater number of tickets reflect more rule-breaking.

Our independent variables in the analysis are prison size, either small or medium sized prisons. The variable for small prisons (SMALL) is a dummy variable in which 1 = prison has 1000 inmates or less and 0=other. The variable for medium sized prisons (MEDIUM) is also a dummy variable in which 1 = prison has 1000 – 1999 inmates and O=other. Prison size and rate of inmate rule violation will be analyzed and checked for a possible relationship.

A number of variables will be controlled for beginning with the amount of time a prisoner has served in jail. We will code time served the following way: Time will range from 2.3 to 4.1 months. Ethnicity will also be controlled as a dummy variable in which 1=black and 0=white. Years of formal schooling will range from 2 to 22 years. Age at first arrest will range from 6 to 71 years of age. Centered age at admission, and the square of centered age at admission will also be coded.

STATISTICAL MODELS

The best model of analysis to use is the Poisson or Negative Binomial Regression model which makes use of a count dependent variable. If an Ordinary Least Squares (OLS) model was to be used, the assumption of homoscedasticity is inherently violated. Also, the assumption of zero covariance between residual and covariates would be violated making the OLS estimates biased. Because the outcome would provide non-normal distribution of

Table 1. OLS Regression Analysis of the Number of Class III Tickets

Variable	Coef.	(s.e.)	Variance Inflation Factor (VIF)
Intercept	1.10	(0.35)**	0.00
Small size prison	0.68	(0.17)**	1.19
Medium size prison	-0.01	(0.13)	1.31
Time served	0.04	(0.02)	1.06
Ethnicity	0.27	(0.11)**	1.05
Education	-0.03	(0.02)	1.08
Age at first arrest	-0.01	(0.01)	1.42
Centered age at admission	-0.07	(0.01)**	2.64
Centered age at admission squared	0.002	(0.001)**	2.33
N	1,485		
F statistic	18.60 **		
Adjusted R-squared	0.08		
Breusch-Pagan Test	42.62 **		

*p<0.05; **p<0.01

residuals, the F-test and t-test could not be used. However, if robust conditions are present, the OLS model may be used. Robust conditions are met if the count variable has big enough counts or heteroscedasticity of error terms does not cause serious trouble and the number of observations (N) is large. This paper will make use of OLS model for its analysis.

FINDINGS

Table 1 reports the OLS regression coefficients for each of the independent variables. The F-test evaluates the overall fit of the model on the data. The F-test is statistically significant at least at the 0.01 level showing that at least one ofthe independent variables has statistical significant effect on the number of class three tickets that the inmates receive. Furthermore, the Adjusted R-squared is 0.08, indicating that a total of 8 percent of the variance in the dependent variable is successfully explained by the model.

Table 1 shows the regression coefficient for small sized prisons is positive and statistically significant at least at the 0.01 level. For small sized prisons, the number of class three tickets is larger by 0.68, in comparison to prisons with 2000 or more inmates, net of all other independent variables in the model. Because both dummy variables were used in the OLS model, the contrast group is prisons with 2000 or more inmates.

The regression coefficient for medium sized prisons is negative and statistically insignificant at the 0.05 level. In other words, medium sized prisons have no significant effect on the number of class three tickets that an inmate receives.

The time served variable has a positive regression coefficient which is statistically insignificant at the 0.05 level. The amount of time served has no significant effect on the number of class three tickets that an inmate receives.

Table 1 shows that ethnicity has a positive regression coefficient which is statistically significant at least at the 0.01 level. In other words, for Blacks the number of class three tickets is larger by 0.27, in comparison to Whites, net of all other independent variables in the model.

Education has a negative regression coefficient and it is statistically insignificant at the 0.05 level. In other words, the amount of education that an inmate acquires has no significant effect on the number of class three tickets he receives.

The age at first arrest variable has a negative regression coefficient which is statistically insignificant at the 0.05 level. The age at which the prisoner was arrested has no significant effect on the number of class three tickets that he receives.

The centered age at admission variable has been de-meaned, meaning that the mean has been subtracted from the variable itself. Table 1 shows that the centered age variable has a negative regression coefficient and it is statistically significant at least at the 0.01 level. To compensate for this issue the variable has been squared (see Table 1). The squared centered age at admission has a positive regression coefficient and it is statistically significant at least at the 0.01 level. In other words, for one unit increase in centered age at admission squared, the number of class three tickets is expected to increase by 0.002, net of all independent variables in the model.

DIAGNOSIS OF OLS REGRESSION ASSUMPTIONS

Although OLS estimates are BLUE (best, linear, and unbiased estimates), the properties only hold true when OLS assumptions are satisfied. The OLS assumptions are assessed by examining the partial regression residual plots and by examining the variance inflation factors (VIF) (see Table 1).

The Variance Inflation Factors are close to 1, indicating that the independent variables are not collinear with each other and much less perfect multicollinearity.

The Breusch-Pagan test checks for homoscedasticity. The test assumes a null hypothesis of homoscedasticity, and since the outcome for this analysis shows statistical significance (see Table 1), this indicates that the residuals are heteroscedastistic. In other words the assumption of homoscedasticity is violated thus making the OLS regression coefficients still unbiased but no longer best or efficient. The assumption violation of homoscedasticity can be resolved by testing the statistical significance of heteroscedasticity while using robust standard errors that take into consideration heteroscedastistic disturbances. We can also use a weighted least square estimator and regress this estimator on the variables associated with heteroscedasticity.

No test was conducted to check for the assumption of zero covariance with regressors, but the partial regression residual plots seem to indicate linear relationships for the independent variables.

If variables are omitted the assumption of zero conditional mean is most likely violated. Since other ethnicities have been omitted, we concluded that the assumption of zero conditional mean has been violated. No test was conducted for the assumption of no autocorrelation. However since our data is not time series, we conclude that the assumption of no autocorrelation has not been violated.

OLS estimates are also sensitive to the influence of outliers. To check for influential outliers the partial regression residual plots are examined. The partial regression residual plots for all the independent variables show that there is a possible influential outlier. However when the observation is omitted and the OLS model is run again, the outcome shows that the original findings hold true. All the independent variables have the same statistically significant coefficients. Interestingly, the direction of the medium sized prison variable changes from negative to positive. However, the statistical significance shows no change. Also, the magnitude for ethnicity changes but not the significance.

CONCLUSION

The OLS regression analysis shows that the number of class three tickets that an inmate receives in not affected by; medium sized prisons, amount of time served, education, and the age at first arrest. The analysis does show that small sized prisons, ethnicity, and centered age at admission do have a significant effect on the number of class three tickets that an inmate receives. While we have learned much from our analysis, further research is needed. To have solid conclusions on whether there is a relationship between the size of prisons and the rate of inmate rule violations, more research needs to be conducted that includes prisons of different sizes. There also needs to be an analysis that includes other race/ethnicities and female inmates. Also, there needs to be a comparison done between prisons in different states.