EFFECTS OF PUNISHMENT REGIMES ON CRIME RATES

You

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Abstract

Your abstract.

1 Introduction

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2 Problematic

Historically, the use of different forms of punishment is driven by a range of social, cultural and political factors, often quite unrelated to the effectiveness of these sanctions for crime control. There is by now a vast literature of empirical research on the deterrent effect of capital punishment, often pointing to quite opposite conclusions. Some of the research studies involve statistical models that are highly technical and inaccessible to the general reader. The sheer volume of publications on the topic is itself a barrier to an informed public opinion on the research evidence. It is generally agreed that a legitimate reason for the existence of governments is to procure for the citizenry the safety and security of their persons and possessions. Unfortunately, governments are never fully successful in this regard, with the result that they have as a major problem the task of reducing dangerous crime. Many public officials in the United States have advocated the use of more severe penal sanctions as a means of deterring crime.Unfortunately, very little research has been conducted to ascertain the deterrent effect of criminal sanctions, or to determine the possible impact of longer prison sentences on levels of serious crime. The preponderance of arguments both for and against punitive sanctions are founded on ethical grounds or "common sense," and generally have been advanced without scientific support. Deterrence, in its simplest definition, is an effect where a threat of punishment causes individuals who would have committed the threatened behavior to refrain from doing so. Different forms of multivariate analysis,some with and some without economic modeling, have continued to be employed in an attempt to reach a definitive answer regarding the deterrent effect of capital punishment. Primarily, the case for executions deterring further offenses is made by studies which adopt econometric models of analysis. These research papers have become highly technical, typically identifying problems with previous studies before positing a new technique or modified model [NSW, 2004].

3 Methodology

To achieve the proposed objectives, we are using a purely additive multiple linear regression problem. We hypothesize according to the summary results. It is important to know that there are an infinite number of ways to plan an hypothesis. In fact, we produced two more purely additive models but will only use the one mentioned above.Of the models produced, in the second one we subtracted some variables we thought were not needed; In the third one, even though we also used a purely additive model we also applied a logarithm to the variables. We are using data from Vandaele(1978) which was an study that re-analyzed Isaac Ehrlich's 1960 cross-section data on the relationship between aggregate levels of punishment and crime rates. It provides alternative

model specifications and estimations. The study examined the deterrent effects of punishment on seven FBI index crimes: murder, rape, assault, larceny, robbery, burglary, and auto theft. Socio-economic variables include family income, percentage of families earning below half of the median income, unemployment rate for urban males in the age groups 14-24 and 35-39, labor force participation rate, educational level, percentage of young males and non-whites in the population, percentage of population in the SMSA, sex ratio, and place of occurrence. Two sanction variables are also included: 1) the probability of imprisonment, and 2) the average time served in prison when sentenced (severity of punishment). Also included are: per capita police expenditure for 1959 and 1960, and the crime rates for murder, rape, assault, larceny, robbery, burglary, and auto theft.

4 Results and Discussion

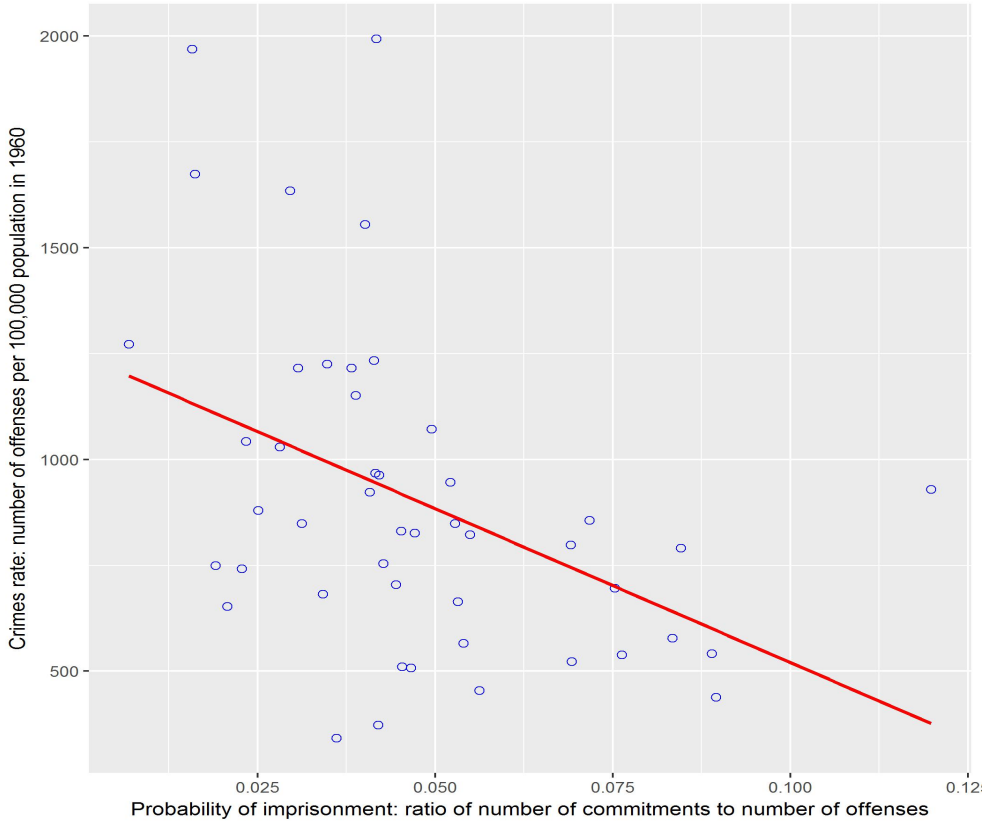

Figure 1: Nota de imagen.

From the figure 1, we can visualize that there is not a somewhat strong relationship between the probability of imprisonment and the crimes rate, i.e. The lower the probability of imprisonment increases the greater the crimes rate. That is because the probability of imprisonment is given by the ratio of number of commitments to number of offenses. We can note some outliers in the plot, which means significant change in the estimation.

From the figure 2, we can visualize that there is not a somewhat strong relationship between the income inequality and the crimes rate, i.e. The lower the income inequality increases the greater the crimes rate. We can note that regression line is not so steep. We can note some outliers in the plot near to 2000 in the crimes rate, which means significant change in the estimation.

From the figure 3, we can visualize that there is not a somewhat strong relationship between the schooling population and the crimes rate, i.e. The greater the schooling population increases the greater the crimes rate. We can note that regression line has a positive slope. We can note

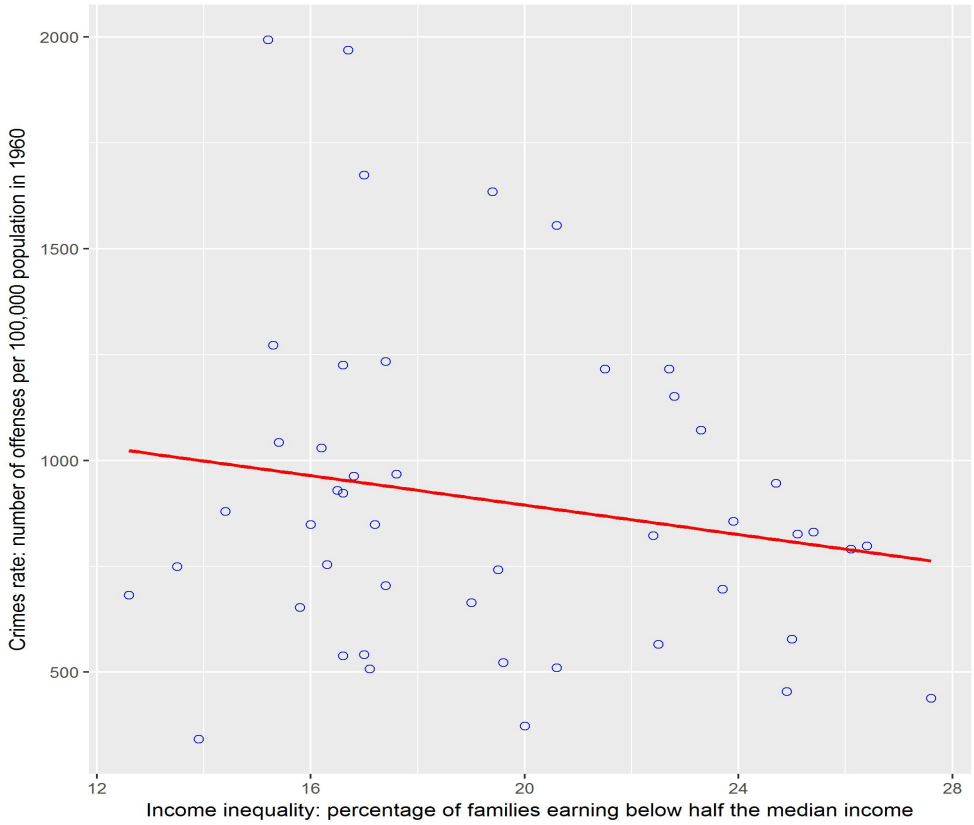

Figure 2: Nota de imagen.

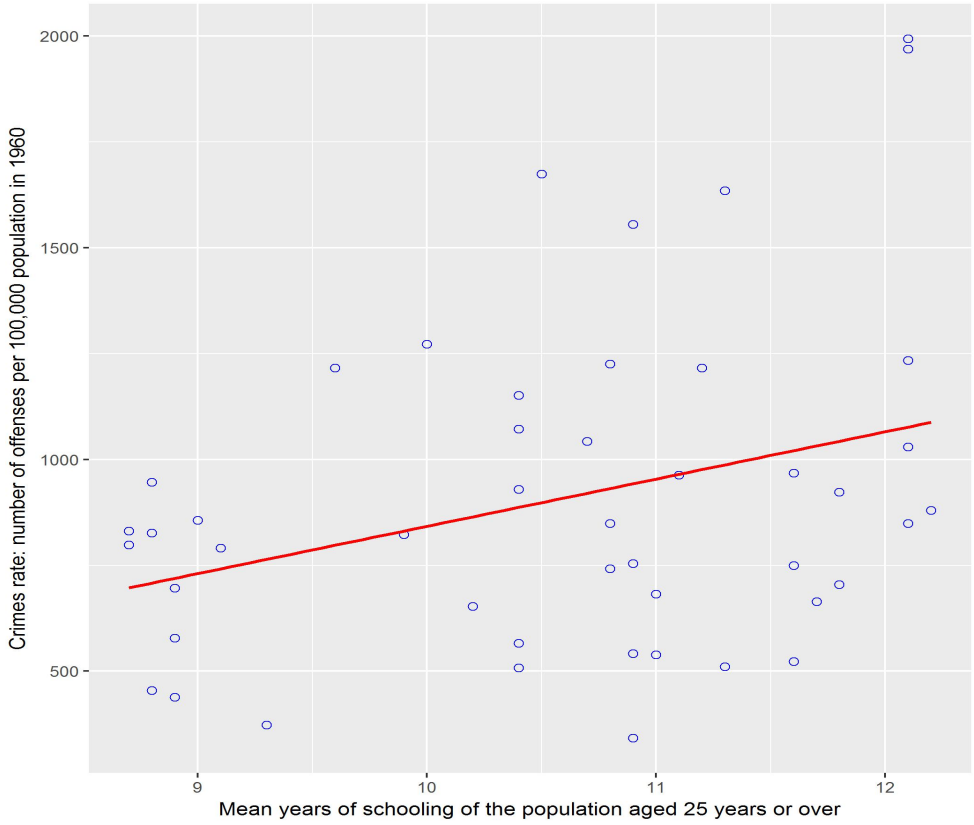

Figure 3: Nota de imagen.

some outliers in the plot near to 2000 in the crimes rate, which means significant change in the estimation.

	Estimate	Std. Error	t value	Pr(>|t|)
Intercept	-5.984e+03	1.628e+03	-3.675	0.000893
M	8.783e+01	4.171e+01	2.106	0.043443
So	-3.803e+00	1.488e+02	-0.026	0.979765
Ed	1.883e+02	6.209e+01	3.033	0.004861
Po1	1.928e+02	1.061e+02	1.817	0.078892
Po2	-1.094e+02	1.175e+02	-0.931	0.358830
LF	-6.638e+02	1.470e+03	-0.452	0.654654
M.F	1.741e+01	2.035e+01	0.855	0.398995
Pop	-7.330e-01	1.290e+00	-0.568	0.573845
NW	4.204e+00	6.481e+00	0.649	0.521279
U1	-5.827e+03	4.210e+03	-1.384	0.176238
U2	1.678e+02	8.234e+01	2.038	0.050161
Wealth	9.617e-02	1.037e-01	0.928	0.360754
Ineq	7.067e+01	2.272e+01	3.111	0.003983
Prob	-4.855e+03	2.272e+03	-2.137	0.040627
Time	-3.479e+00	7.165e+00	-0.486	0.630708

Table 1: Summary of model 1

From the table 1, in the column estimate, we can see the estimation for each variable which indicate the increasing of crimes rate by variable. The first row, intercept, is essentially the expected value of the crimes rate when we consider the average of all the variables in the dataset. The second column is the standard error, which measures the average amount that the coefficient estimates vary from the actual average value of our response variable. We can see that there are values of $e + 03$ which is large. In the third column, the t-statistic values are relatively close to zero and are small relative to the standard error, which could indicate a strong relationship does not exist. In the fourth column we can see the p-value which should be small, but we have in our model some cases like So (indicator variable for a southern state) where the p-value is close to 1. However, in the intercept row we have a p-value less than 0.05 then we can say that we reject the null hypothesis. Furthermore, Using the R application we can say that the variables M (percentage of males aged 14–24 in total state population), Ed (mean years of schooling of the population aged 25 years or over), $Ineq$ (income inequality) and $Prob$ (probability of imprisonment) represent a highly significant p-value.

Multiple R-squared	0.8031
Adjusted R Squared	0.7078

Table 2: Nombre sin definir

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	46	6880928				
2	31	1354946	15	5525982	8.4286	3.539e-07

Table 3: Overall Regression

From the table 3 we can see that the p-value of our overall regression is lower than 0.05, then we reject the null hypothesis.

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	32	1757063				
2	31	1354946	1	402117	9.2001	0.004861

Table 4: Hyphotesis Test. Ed=0

From the table 4 we can see that if our null hypothesis is that Ed (mean years of schooling of the population aged 25 years or over) is equal to zero, then the p-value of our regression is lower than 0.05, hence we reject the null hypothesis.

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	33	2038089				
2	31	1354946	2	683143	7.8149	0.001786

Table 5: Hyphotesis Test. Ed=Ineq=0

From the table 5 we can see that if our null hypothesis is that Ed (mean years of schooling of the population aged 25 years or over) is equal to $Ineq$ (income inequality) and these are equal to zero, then the p-value of our regression is lower than 0.05, hence we reject the null hypothesis.

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	34	2303529				
2	31	1354946	3	948583	7.2343	0.0008141

Table 6: Hyphotesis Test. Ed=Ineq=Prob=0

From the table 6 we can see that if our null hypothesis is that Ed (mean years of schooling of the population aged 25 years or over) is equal to $Ineq$ (income inequality) and these are equal to $Prob$ (probability of imprisonment) and these are equal to zero, then the p-value of our regression is lower than 0.05, hence we reject the null hypothesis.

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	32	1533405				
2	31	1354946	1	178459	4.083	0.05203

Table 7: Hyphotesis Test. Ed+Ineq+Prob=0

From the table 7 we can see that if our null hypothesis is that Ed (mean years of schooling of the population aged 25 years or over) plus $Ineq$ (income inequality) and plus $Prob$ (probability of imprisonment) and this sum is equal to zero, then the p-value of our regression is greater than 0.05, hence we do not reject the null hypothesis.

	Res.Df	RSS	Df	Sum of Sq	F	Pr(>F)
1	32	1779121				
2	31	1354946	1	424176	9.7048	0.00394

Table 8: Hyphotesis Test. Wealth-Ineq=0

From the table 8 we can see that if our null hypothesis is that $Wealth$ (median value of transferable assets or family income) minus $Ineq$ (income inequality) and this subtraction is equal to zero, then the p-value of our regression is lower than 0.05, hence we reject the null hypothesis.

References

[Ehrlich, 1973] Ehrlich, I. (1973). Participation in illegitimate activities: a theoretical and empirical investigation. *Political Economy*, (81):521–565.

[NSW, 2004] NSW (2004). The deterrent effect of capital punishment: A review of the research evidence. *Crime and Justice*, (84):1–11.

[Vandaele, 1978] Vandaele, W. (1978). Participation in illegitimate activities: Ehrlich revisited. In Deterrence and Incapacitation. *National Academy of Sciences*, pages 270–335.

5 Anexes

M	So	Ed	Po1	Po2	LF	M.F	Pop	NW	U1	U2	Wealth	Ineq	Prob	Time	Crime
15.1	1	9.1	5.8	5.6	0.51	95	33	30.1	0.108	4.1	3940	26.1	0.084602	26.2011	791
14.3	0	11.3	10.3	9.5	0.583	101.2	13	10.2	0.096	3.6	5570	19.4	0.029599	25.2999	1635
14.2	1	8.9	4.5	4.4	0.533	96.9	18	21.9	0.094	3.3	3180	25	0.083401	24.3006	578
13.6	0	12.1	14.9	14.1	0.577	99.4	157	8	0.102	3.9	6730	16.7	0.015801	29.9012	1969
14.1	0	12.1	10.9	10.1	0.591	98.5	18	3	0.091	2	5780	17.4	0.041399	21.2998	1234
12.1	0	11	11.8	11.5	0.547	96.4	25	4.4	0.084	2.9	6890	12.6	0.034201	20.9995	682
12.7	1	11.1	8.2	7.9	0.519	98.2	4	13.9	0.097	3.8	6200	16.8	0.0421	20.6993	963
13.1	1	10.9	11.5	10.9	0.542	96.9	50	17.9	0.079	3.5	4720	20.6	0.040099	24.5988	1555
15.7	1	9	6.5	6.2	0.553	95.5	39	28.6	0.081	2.8	4210	23.9	0.071697	29.4001	856
14	0	11.8	7.1	6.8	0.632	102.9	7	1.5	0.1	2.4	5260	17.4	0.044498	19.5994	705
12.4	0	10.5	12.1	11.6	0.58	96.6	101	10.6	0.077	3.5	6570	17	0.016201	41.6	1674
13.4	0	10.8	7.5	7.1	0.595	97.2	47	5.9	0.083	3.1	5800	17.2	0.031201	34.2984	849
12.8	0	11.3	6.7	6	0.624	97.2	28	1	0.077	2.5	5070	20.6	0.045302	36.2993	511
13.5	0	11.7	6.2	6.1	0.595	98.6	22	4.6	0.077	2.7	5290	19	0.0532	21.501	664
15.2	1	8.7	5.7	5.3	0.53	98.6	30	7.2	0.092	4.3	4050	26.4	0.0691	22.7008	798
14.2	1	8.8	8.1	7.7	0.497	95.6	33	32.1	0.116	4.7	4270	24.7	0.052099	26.0991	946
14.3	0	11	6.6	6.3	0.537	97.7	10	0.6	0.114	3.5	4870	16.6	0.076299	19.1002	539
13.5	1	10.4	12.3	11.5	0.537	97.8	31	17	0.089	3.4	6310	16.5	0.119804	18.1996	929
13	0	11.6	12.8	12.8	0.536	93.4	51	2.4	0.078	3.4	6270	13.5	0.019099	24.9008	750
12.5	0	10.8	11.3	10.5	0.567	98.5	78	9.4	0.13	5.8	6260	16.6	0.034801	26.401	1225
12.6	0	10.8	7.4	6.7	0.602	98.4	34	1.2	0.102	3.3	5570	19.5	0.0228	37.5998	742
15.7	1	8.9	4.7	4.4	0.512	96.2	22	42.3	0.097	3.4	2880	27.6	0.089502	37.0994	439
13.2	0	9.6	8.7	8.3	0.564	95.3	43	9.2	0.083	3.2	5130	22.7	0.0307	25.1989	1216
13.1	0	11.6	7.8	7.3	0.574	103.8	7	3.6	0.142	4.2	5400	17.6	0.041598	17.6	968
13	0	11.6	6.3	5.7	0.641	98.4	14	2.6	0.07	2.1	4860	19.6	0.069197	21.9003	523
13.1	0	12.1	16	14.3	0.631	107.1	3	7.7	0.102	4.1	6740	15.2	0.041698	22.1005	1993
13.5	0	10.9	6.9	7.1	0.54	96.5	6	0.4	0.08	2.2	5640	13.9	0.036099	28.4999	342
15.2	0	11.2	8.2	7.6	0.571	101.8	10	7.9	0.103	2.8	5370	21.5	0.038201	25.8006	1216
11.9	0	10.7	16.6	15.7	0.521	93.8	168	8.9	0.092	3.6	6370	15.4	0.0234	36.7009	1043
16.6	1	8.9	5.8	5.4	0.521	97.3	46	25.4	0.072	2.6	3960	23.7	0.075298	28.3011	696
14	0	9.3	5.5	5.4	0.535	104.5	6	2	0.135	4	4530	20	0.041999	21.7998	373
12.5	0	10.9	9	8.1	0.586	96.4	97	8.2	0.105	4.3	6170	16.3	0.042698	30.9014	754
14.7	1	10.4	6.3	6.4	0.56	97.2	23	9.5	0.076	2.4	4620	23.3	0.049499	25.5005	1072
12.6	0	11.8	9.7	9.7	0.542	99	18	2.1	0.102	3.5	5890	16.6	0.040799	21.6997	923
12.3	0	10.2	9.7	8.7	0.526	94.8	113	7.6	0.124	5	5720	15.8	0.0207	37.4011	653
15	0	10	10.9	9.8	0.531	96.4	9	2.4	0.087	3.8	5590	15.3	0.0069	44.0004	1272
17.7	1	8.7	5.8	5.6	0.638	97.4	24	34.9	0.076	2.8	3820	25.4	0.045198	31.6995	831
13.3	0	10.4	5.1	4.7	0.599	102.4	7	4	0.099	2.7	4250	22.5	0.053998	16.6999	566
14.9	1	8.8	6.1	5.4	0.515	95.3	36	16.5	0.086	3.5	3950	25.1	0.047099	27.3004	826
14.5	1	10.4	8.2	7.4	0.56	98.1	96	12.6	0.088	3.1	4880	22.8	0.038801	29.3004	1151
14.8	0	12.2	7.2	6.6	0.601	99.8	9	1.9	0.084	2	5900	14.4	0.0251	30.0001	880
14.1	0	10.9	5.6	5.4	0.523	96.8	4	0.2	0.107	3.7	4890	17	0.088904	12.1996	542
16.2	1	9.9	7.5	7	0.522	99.6	40	20.8	0.073	2.7	4960	22.4	0.054902	31.9989	823
13.6	0	12.1	9.5	9.6	0.574	101.2	29	3.6	0.111	3.7	6220	16.2	0.0281	30.0001	1030
13.9	1	8.8	4.6	4.1	0.48	96.8	19	4.9	0.135	5.3	4570	24.9	0.056202	32.5996	455
12.6	0	10.4	10.6	9.7	0.599	98.9	40	2.4	0.078	2.5	5930	17.1	0.046598	16.6999	508
13	0	12.1	9	9.1	0.623	104.9	3	2.2	0.113	4	5880	16	0.052802	16.0997	849

Table 9: Data Table-Effect of Punishment Regimes on Crime Rates