**Eli Sakov**

**Econometrics Guns Lab Write-up**

**10.30.2014**

**Introduction**

Do concealed firearm laws, known as “shall-carry” laws, have an effect on crime? That question was investigated in “Shooting Down the ‘More Guns Less Crime’ Hypothesis” Stanford Law Review, 2003, Vol. 55, 1193-1312. This paper uses the same data and aims to reproduce the original results.

**Data and Methods**

Regression analysis was performed on panel data of the 50 US states and the District of Columbia, by year from 1977-99. Every observation is an individual state in a given year, totaling 51 states x 23 years = 1173 observations. The data was made available, by John Donohue and were used in his paper with Ian Ayres “Shooting Down the ‘More Guns Less Crime’ Hypothesis” Stanford Law Review, 2003, Vol. 55, 1193-1312.

Table 1 defines the variables used and table 2 displays summary statistics. Regressions on violent crime, robberies, and murders were performed using ordinary least squares regression with heteroskedastic-consistent standard errors.

|  |  |
| --- | --- |
| Table 1. Variables Used | |
| Variable | **Definition** |
| Violence | violent crime rate (incidents per 100,000 members of the population) |
| Robberies | robbery rate (incidents per 100,000) |
| Murders | murder rate (incidents per 100,000) |
| Shall-Carry | = 1 if the state has a shall-carry law in effect in that year = 0 otherwise |
| Incarceration  Rate | incarceration rate in the state in the previous year (sentenced prisoners per 100,000 residents; value for the previous year) |
| Density | population per square mile of land area, divided by 1000 |
| Average Income | real per capita personal income in the state, in thousands of dollars |
| Population | state population, in millions of people |
| Percent Male | percent of state population that is male, ages 10 to 29 |
| Percent White | percent of state population that is white, ages 10 to 64 |
| Percent Black | percent of state population that is black, ages 10 to 64 |
| State | ID number of the state (Alabama = 1, Alaska = 2, 51 = District of Columbia etc.) |
| Year | Year (1977-1999) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table 2. Summary Statistics | | | | | |
| Variable | **Observations** | **Mean** | **Std. Dev.** | **Min** | **Max** |
| Year | 1173 | 88 | 6.636079 | 77 | 99 |
| Violence | 1173 | 503.0747 | 334.2772 | 47 | 2921.8 |
| Murders | 1173 | 7.665132 | 7.52271 | .2 | 80.6 |
| Robberies | 1173 | 161.8202 | 170.51 | 6.4 | 1635.1 |
| Incarceration Rate | 1173 | 226.5797 | 178.8881 | 19 | 1913 |
| Percent Black | 1173 | 5.336217 | 4.885688 | .2482066 | 26.97957 |
| Percent White | 1173 | 62.94543 | 9.761527 | 21.78043 | 76.52575 |
| Percent Male | 1173 | 16.08113 | 1.732143 | 12.21368 | 22.35269 |
| Population | 1173 | 4.816341 | 5.252115 | .402753 | 33.14512 |
| Average Income | 1173 | 13.7248 | 2.554543 | 8.554884 | 23.64671 |
| Density | 1173 | .3520382 | 1.355472 | .0007071 | 11.10212 |
| State | 1173 | 28.96078 | 15.68352 | 1 | 56 |
| Shall-Carry | 1173 | .2429668 | .4290581 | 0 | 1 |

**Results**

Table 3 displays regression results. Regression 1 only accounts for whether a state had a shall-carry law in effect. Accounting for nothing else, having a shall-carry law decreases violent crime by 44%. Including the rest of the variables in the regression, regression 2 predicts that having a shall-carry law decreases violent crime by 36%. Adjusting for state-fixed effects, regression 3 predicts that a shall-carry law reduces violent crime by 4.61%. Regression 3 explains 93.8% percent of the data, giving it the second highest adjusted *R*2 of any model. Accounting for time-fixed effects, regression 4 predicts a reduction by 28.8%.

According to regression 5, having a shall-carry law reduces robberies by 0.78% when controlling for state effects, but it is not significant. Regression 5 explains 94.9% of the data, giving it the highest adjusted *R*2. Having a shall-carry law significantly reduces robberies by 34.1% when accounting for time effects in regression 6. Having a shall-carry law reduces murders by 6% when controlling for state effects in regression 7, and by 19.8% when controlling for time effects in regression 8. Having a shall-carry law is significant in all regressions except for 5.

Having a shall-carry law is a significant variable for violent crime and murders in all regressions, but it is not significant when adjusting for state-fixed effects and the dependent variable is robberies. Density is only a significant variable for murders. Average income is also significant for murders, in addition to for robberies when accounting for time effects.

The demographics of a state are very important determinants of crime. Population is highly significant in all regressions, except for violent crime and robberies when adjusting for state-fixed effects, which would account for some of the population effects on crime. The percent of the population that is black, incarcerated, male and female are all statistically significant. Percent male is a not significant factor when state and time effects are not accounted for and the dependent variable is violent crime. Percent white and percent black are both significant in all regressions, except for when predicting murders, accounting for state effects.

**Conclusion**

Having a shall-carry law is significant in most of the regressions. According to the model that explains the second most of the data, having a shall-carry law is significant at more than 95% confidence and reduces violent crime by 4.6%. In the regression that explains the most of the data, 94.9% of the variance, having a shall-carry law is not significant at 95% confidence. From this analysis, a shall-carry law has varying, but mostly significant, negative effects on each kind of crime studied.

**References**

Ian Ayres, and John Donohue “Shooting Down the ‘More Guns Less Crime’ Hypothesis” Stanford Law Review, 2003, Vol. 55, 1193-1312.