

Factors that Impact Rates of Firearm Mortality Levels by State

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MOTIVATION

Several studies studied gun violence. “The Effects of State and Federal Gun Control Laws on School Shootings” studied the impact of background checks on gun violence and school shootings using data from 1990-2014. Gius found that the only law with a significant impact on the number of school shootings was assault weapon bans (Gius, 2017). This paper will focus specifically on stand your ground laws and focus on state level data and nationwide gun violence, not just school shootings. This paper will also look at the impact of income on gun mortality rates. Vacha and McLaughlin studied the impact of income on firearm violence and concluded that low-income families are more likely to have guns and store them unsafely, which leads to more gun accidents among low-income children (Vacha and McLaughlin, 2000). Race is another crucial factor of gun violence. Blumstein and Cork said that black children are more likely to live in urban areas and have higher rates of drug use, thus leading to more gun deaths among black children (Blumenstein and Cork, 1996). This paper will study impacts of both income and race, not only among children, but among the entire U.S. population. Pah et al found that a poor economy contributes to school shootings, because unemployment rate and school shooting rate is correlated. That is, when unemployment rate increases, more school shootings occur. This essay will consider many of the topics discussed in these essays such as gun laws, income, unemployment rate, and race, and will look at some additional factors such as education and divorce rate. Also, this paper will use data from 2019, so it is more recent than these previous studies. This paper concludes that all x variables do have a significant impact on rates of firearm mortality.

EMPIRICAL TECHNIQUE

This paper will examine the effect of stand your ground laws, household income, percentage of state population with a high school diploma, unemployment rate, divorce rate, and race have on the yearly rate of firearm mortality.

$$\text{FMR} = b_0 + b_1(\text{LAW}) + b_2(\text{INCOME}) + b_3(\text{DIPLOMA}) + b_4(\text{UNEMPLOYMENT}) + b_5(\text{DIVORCE}) + b_6(\text{RACE}) + u \quad (1)$$

where FMR is the annual firearm mortality rate per state, LAW is a dummy variable with a value of 1 if that state has stand your ground laws and 0 otherwise, INCOME is the mean household income, DIPLOMA is the percentage of the state population with a high school diploma, UNEMPLOYMENT is the unemployment rate, DIVORCE is the divorce rate, RACE is the percent of state population that is black, and u is a normally distributed, random error term.

Theory and anecdotal evidence suggest that these factors do have a significant impact on rates of firearm mortality. In theory, stand your ground laws should increase the rate of firearm mortality, since if there is no duty to retreat before shooting, more people will use guns, even if they could run away without shooting. Also, prior research states that lower income families are more likely to have guns and are more likely to keep them in unsafe locations that violate child access prevention laws. This leads to more gun related deaths among lower income children. Anecdotal evidence suggests that education and firearm mortality are negatively correlated. If more people are educated, they may be more likely to learn how to safely use guns and attend gun safety courses. Also, theory and previous research suggest unemployment rate is positively

correlated with gun mortality because if more people are unemployed, they may use bad measures to make money, such as robbery. Thus, it makes sense that all x variables are statistically significant.

DATA AND RESULTS

This paper looks at state level data from 2019. Data on firearm mortality rates was gathered from CDC. Data on stand your ground laws was gathered from FindLaw. Data on household income was gathered from the National Center for Education Statistics. Data on unemployment was gathered from US Bureau of Labor Statistics. Data on education, divorce rate, and race was gathered from census data. The data is cross sectional data since it looks at multiple states at one point in time. OLS regression is used to determine the significance of the x variables on the rate of firearm mortality, and since all p values were less than the 10% confidence level, all x variables were determined to be significant. Thus, they all have a significant impact on rates of firearm mortality which means that all x variables are likely attributable to higher rates of firearm mortality. Thus, the model is good, and all x variables do have a significant impact on the y variable. Tests were conducted to detect if heteroscedasticity, multicollinearity, and serial correlation were present. The correlation coefficient between each pair of x variables was calculated to evaluate for multicollinearity. Since there are six x variables, fifteen correlation coefficients were calculated. Since each r was less than .8, there was no multicollinearity between any pairs of x variables, so no pairs of x variables have the same explaining power. Additionally, the Park test was used to test for heteroscedasticity. LAW is a dummy variable, so no test was performed. None of the other x variables were determined to be a source of heteroscedasticity. That is, the variance of the error term for each x variable is constant. Finally, the Durbin Watson test was used to determine if serial correlation is present, and since the test statistic was 1.54, the test result was inconclusive. Thus, no corrective measures were needed since there is no correlation between the error terms.

CONCLUSION

We may conclude that stand ground laws, income, education, unemployment, divorce, and race all have a significant impact on the rate of firearm mortality. Since the coefficient of INCOME is negative, income and firearm mortality rates are negatively correlated. That is, as income increases, firearm mortality decreases. All the other variables are positively correlated, so as they increase, firearm mortality increase. This information is important because knowing what leads to higher rates of firearm mortality can help reduce it. Lawmakers can help create laws and policies that will help decrease firearm mortality. We can focus on firearm mortality more in low-income areas than high income areas. States can remove stand your ground laws. We can encourage more people to graduate high school and help unemployed people get jobs. This paper should be read because it can help save lives from gun violence.

Table 1 Descriptive Statistics		
Variable	Mean	Standard Deviation
LAW	.5	.5051
INCOME	64978	10602.01
DIPLOMA	89.6	2.726
UNEMPLOYMENT	3.538	.7793
DIVORCE	7.9	1.388
RACE	10.6	9.516

Table 2		
Regression Results		
Variable	Coefficient	Test Statistic
LAW	1.89	1.699
INCOME	-.0002	-3.939
DIPLOMA	.6364	2.644
UNEMPLOYMENT	1.99	2.871
DIVORCE	1.433	3.662
RACE	.1241	2.066
Notes:		
N = 50		
$R^2 = .632$		
F = 15.01		

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