The Influencing Factors of Gun Deaths: A Regression Analysis

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Abstract

This paper examines the relationship between gun deaths and the number of NICS background checks (per 100,000 people) from FBI.gov, median household income from American Community Surveys 1 Year Estimates, percent of high school graduates and lower from American Community Surveys 1 Year Estimates, and the legality of private transactions. All of the data is on a by-state basis, covering all 50 states for the year 2017 because that is the most recent year where all of the data in the model is available.

Theory

$$GUNDEATHS_i = B_0 + B_1(NICS) + B_2(INC) + B_3(ED) + B_4(PDUM) + \varepsilon_i$$

The dependent variable "GUNDEATHS" measures the number of deaths by firearms per state, yearly, for every 100,000 people. As seen above, the estimated population regression model was created using ordinary least squares. The term "NICS" is defined as the number of NICS background checks done by state, per year, for every 100,000 people. An NICS check is a background check that citizens must undergo if they buy a firearm from a federally licensed dealer. To test the significance of this variable, an upper 1-tailed t-test with a 5% level of significance will be used. This variable was chosen because although it doesn't capture every single firearm sale in the United States, the majority of firearms transactions are done through federally licensed dealers, and it can be a good measure for number of guns sold per year. If the number of guns sold per year is increasing, it can be predicted that it is more likely that a criminally motivated person can get ahold of a gun since there are more in circulation which could be attained through illegal means (such as strawman sales, or theft), or a private sale. The predicted sign on this variable is positive.

Some states do not require NICS checks when sales are done privately, between two individual parties. To capture that effect, included is a dummy variable called PDUM, which is the private sales dummy. Only 15 states require an NICS check for private sales on top of sales from federally licensed dealers. If the dummy equals 1, then the state allows private sales without an NICS check. If else, then the dummy will equal 0. To test the significance of PDUM, an upper 1-tailed t test with a 5 percent level of significance will be used. The private sales dummy is included because it will help separate states that allow private transactions and states that don't. What can be predicted from has been stated previously, if a state allows private sales it could be predicted that there is a higher probability of a "bad person" getting their hands on a firearm because the opportunity cost of selling a firearm to a person that is not allowed to buy one, is lowered significantly because it's no longer the responsibility of the private seller to verify the buyers status. The predicted sign on this variable is positive.

Median household income in 2017 inflation adjusted dollars by state represents the "INCOME" variable. It is included as a variable because it is expected that areas with higher incomes will have less gun deaths because crime is correlated with poverty. So it can be inferred that the "richer" the area, the less crime will be expected whether it is because they are able to afford private security or are able to successfully fund local police departments. To test the significance of the income variable, a lower 1 tailed test with a 5% level of significance will be used. The predicted sign on this variable is negative.

Finally, an education variable "ED" is included. It is specifically the percentage of the population per state that are high school graduates (or equivalent such as GED) and lower, ages 25 and up. It is expected that areas that are less educated will have a higher probability of greater occurrences of crime. This is similar to the income variable, but it better measures the effects of what happens when states have less funding for schooling compared to more funding. To test the significance of this variable, a lower 1 tailed t test with a 5% level of significance will be used. The predicted sign on this variable is negative because as the percent of the population that are high school graduates grow, it could be expected to see a decrease in crime.

Data & Empirical Methodology

The base year for all of the data is 2017. The data used to measure the number of gun deaths is from the CDC/National Center for Health Statistics which utilizes the CDC WONDER database, the table is called "Firearm Mortality by State-1". The data is by state for all 50 states, on a yearly basis, and is pre-adjusted & measured in deaths per 100,000 people. There are 50 observations for this death by firearm variable.

NICS checks are measured in number of checks per 100,000 people, per state for all 50 states (50 observations), on a monthly & early basis. This data can be found on FBI.gov, and the table is called NICS Firearm Background Checks: Month/Year by state Year 2017. For this study, only yearly data was used, and in order to find how many checks were done per 100,000 people, the total number of checks per state per year were divided by the population, then 100,000 was divided by that number in order to find the number of background checks per capita. The specific data can be found later in this study.

Income is measured as median household income in the past 12 months in 2017 inflation adjusted dollars. The data is on a by-state basis and measured yearly. However, the base year used is 2017. The data is pulled from the US Census Bureau, American Community Surveys 1-year estimates, specifically it is table number S1901.

Education is measured as the percent of the population of high school graduates (includes equivalency), people with less than 9th grade education, and 9th-12th grade education with no diploma for the population of each state, aged 25 years and up. People with 9th grade and below, 9th-12th grade with no diploma, and a high school diploma or equivalent was summed up for use in this study. This data is pulled from the US Census Bureau, American Community Surveys 1-year estimates, table number S1501.

The private sales dummy variable is measured as if the state allows private sales with no NICS check, the value equals 1. If else, the value equals 0. The data was pulled from Giffords Law Center To Prevent Gun Violence website, universal background checks by state.

The scale variable used is total population estimates by state for the year 2017, from the US Census Bureau, American Community Surveys 1-year estimates, table number B01003. This variable is not estimated in the regression, it is only used for scaling purposes.

Findings

$$GUNDEATHS_i = 35.7 + .00001155(NICS) - .0003492(INCOME) - .0636(ED) + 1.5(PDUM) + \varepsilon_i$$

Standard Errors (11.23) (.00004415) (.00009069) (.16625381) (1.43687557)

$R^2 = .4486$
Adjusted $R^2 = .3996$

The model above was estimated using ordinary least squares. Corresponding descriptive statistics data and correlation data can be found on the charts on the next page. As predicted previously in data and empirical methodology section of this research paper, all of the signs that were estimated, came out exactly as predicted by theory. According to R^2, 44.86% of the variation of gun deaths per capita, around its mean is explained by the regression. Since R^2 values of .4-.6 are expected for cross sectional state data, it can be interpreted as a well-fitting regression. According to adjusted R^2, 39.96% of the variation of gun deaths per capita around its mean is explained by the regression, adjusted for degrees of freedom. According to the special case of F test, the model has a good overall fit because the null hypothesis was able to be rejected with a 5% level of significance. 4 T-tests were conducted, for NICS (upper 1 tailed test) and PDUM (upper 1 tailed test), the result was to not reject the null hypothesis. Those results are against the initial beliefs for those variables, despite the estimated equation having the correctly signed beta values. Unlike INCOME (lower 1 tailed test) and ED (lower 1 tailed test), the result was to reject the null hypothesis, which was conducive with the previously predicted relationship stated previously in the paper.

Descriptive Statistics for All Data Used

The state with the highest rate of gun deaths per capita is Alaska! This is counterintuitive because one would expect states with large city populations would have higher gun deaths per capita! The state with the lowest rate of gun deaths per capita is Hawaii. Which could probably be predicted from their strict gun control regulation and a reasonably wealthy population. An interesting statistic is that Kentucky had over 104,000 background checks for every 100,000 people! Kentucky bought more guns than they had people!

	Mean	STDev	Min	Max
GUNDEATHS	13.552	5.37	2.5	24.5
NICS	9183.414	14049.103	892.586	104204.828
INCOME	59792.6	9854.763	43469	80776
ED	38.944	5.067	29.7	54.1
PDUM	0.72	0.454	0	1
POP	6500504.12	7345269.897	579315	39536653

Pairwise Correlation Table for All Data Used

As seen, there is not a single pairwise correlation value that is above .80. That is the first clue that there is no evidence of multicollinearity. Since there is no evidence of multicollinearity, there is a very small possibility of increased standard errors which lowers t scores, which can negatively affect hypothesis testing. In the appendix, VIF (Variable Inflationary Factors) were calculated, and no values over 5 were found, therefore the probability of multicollinearity in this experiment is next to 0.

	GUNDEATHS	NICS	INCOME	ED	PDUM	POP (scale)
GUNDEATHS	1.0000	0.2003	-0.6556	0.4175	0.3673	-0.2531
NICS	0.2003	1.0000	-0.2523	0.2404	0.1762	-0.0972
INCOME	-0.6556	-0.2523	1.0000	-0.6981	-0.3800	0.1306
ED	0.4175	0.2404	-0.6981	1.0000	0.1769	0.0408
PDUM	0.3673	0.1762	-0.3800	0.1769	1.0000	-0.1514
POP (scale)	-0.2531	-0.0972	0.1306	0.0408	-0.1514	1.0000

GLS model is depicted below. (Not needed in this study due to no evidence of heteroskedasticity from low VIF's and no pairwise correlation values over .80)

$$GUNDEATHS_i = 33.4 + .0001(NICS) - .0003(INCOME) - .023(ED) + 1.85(PDUM) + \varepsilon_i$$

Standard Errors (11.64) (.00002) (.0001) (.1936) (2.004)

Conclusion

The purpose of the paper was to examine the relationship between gun deaths by state per 100,000 people, the number of NICS checks per capita (per 100,000 people) by state, the median household income by state, the percent of the population that are high school graduates (or equivalent such as GED) and lower, ages 25 and up, and whether the state being measured allows private gun sales without an NICS check. To summarize the findings, the estimated model had no evidence of heteroskedasticity (due to the Park Test), no evidence of multicollinearity (due to VIF's under 5, and no pairwise correlation above .80). The model also had a good overall fit due to the results of the special case of F test. The model also had an R^2 that would be expected for cross sectional state data, and the adjusted R^2 still showed that after adjusting for degrees of freedom, the model still explained almost 40% of the variation of gun deaths around its mean. Despite not being able to reject two of the four T tests, upon further thought, had the two variables been signed differently, all four of the T tests would have resulted in rejecting the null. As found in the pairwise correlation tables, a strong negative correlation of -.66 was found between income and gun deaths, and a slightly less strong, but still statistically significant correlation of .42 between percent of the population with a high school diploma or lower and gun deaths. The number of background checks completed per capita had a slight positive correlation with gun deaths, as well as whether a state allows private sales without NICS checks.

References

NICS checks

"NICS Firearm Checks: Month/Year by State." FBI, FBI, 4 June 2016, https://www.fbi.gov/file-repository/nics_firearm_checks_-_month_year_by_state.pdf/view.

Gun Deaths (CDC content from wonder.cdc.gov)

"Stats of the States - Firearm Mortality." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 10 Jan. 2019, https://www.cdc.gov/nchs/pressroom/sosmap/firearm_mortality/firearm.htm.

Income

U.S Census Bureau, 2017 American Community Survey 1-Year Estimates MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2017 INFLATION-ADJUSTED DOLLARS) Table Number: S1901

Education

U.S Census Bureau, 2017 American Community Survey 1-Year Estimates Table Number: S1501

Private Sales

"Universal Background Checks." Giffords Law Center to Prevent Gun Violence, https://lawcenter.giffords.org/gun-laws/policy-areas/background-checks/universal-background-checks/#state.

Population by state (scale variable)

U.S. Census Bureau, 2017 American Community Survey 1-Year Estimates Measured in total number of people per state Table number: B01003

Gun Deaths

Firearm Mortality by State-1

YEAR	STATE	RATE	DEATHS	URL
2017	AL	22.9	1,124	/nchs/pressroom/states/alabama/alabama.htm
2017	AK	24.5	180	/nchs/pressroom/states/alaska/alaska.htm
2017	AZ	15.8	1,134	/nchs/pressroom/states/arizona/arizona.htm
2017	AR	20.3	613	/nchs/pressroom/states/arkansas/arkansas.htm
2017	CA	7.9	3,184	/nchs/pressroom/states/california/california.htm
2017	CO	13.4	779	/nchs/pressroom/states/colorado/colorado.htm
2017	CT	5.1	188	/nchs/pressroom/states/connecticut/connecticut.htm
2017	DE	11.7	111	/nchs/pressroom/states/delaware/delaware.htm
2017	FL	12.4	2,724	/nchs/pressroom/states/florida/florida.htm
2017	GA	15.4	1,623	/nchs/pressroom/states/georgia/georgia.htm
2017	HI	2.5	39	/nchs/pressroom/states/hawaii/hawaii.htm
2017	ID	16.4	280	/nchs/pressroom/states/idaho/idaho.htm
2017	IL	12.1	1,543	/nchs/pressroom/states/illinois/illinois.htm
2017	IN	15.3	1,016	/nchs/pressroom/states/indiana/indiana.htm
2017	IA	9	293	/nchs/pressroom/states/iowa/iowa.htm
2017	KS	16	466	/nchs/pressroom/states/kansas/kansas.htm
2017	KY	16.2	730	/nchs/pressroom/states/kentucky/kentucky.htm
2017	LA	21.7	1,008	/nchs/pressroom/states/louisiana/louisiana.htm
2017	ME	11.7	172	/nchs/pressroom/states/maine/maine.htm
2017	MD	12.3	742	/nchs/pressroom/states/maryland/maryland.htm
2017	MA	3.7	262	/nchs/pressroom/states/massachusetts/massachusetts.htm
2017	MI	11.3	1,138	/nchs/pressroom/states/michigan/michigan.htm

Educational Attainment

View Geography Notes | View Table Notes

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Versions of this table are available for the following years:
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005

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Alabama

Subject	Total Estimate	Total Margin of Error	Percent Estimate	Percent Margin of Error	Male Estimate	Male Margin of Error	Percent Male Estimate	Percent Male Margin of Error	Female Estimate	Female Margin of Error	Percent Female Estimate	Percent Female Margin of Error
Population 18 to 24 years	471,079	+/-5,556	(X)	(X)	234,658	+/-3,611	(X)	(X)	236,421	+/-4,089	(X)	(X)
Less than high school graduate	63,810	+/-5,003	13.5%	+/-1.0	37,085	+/-3,295	15.8%	+/-1.3	26,725	+/-3,693	11.3%	+/-1.5
High school graduate (includes equivalency)	161,311	+/-6,371	34.2%	+/-1.4	90,367	+/-4,298	38.5%	+/-2.0	70,944	+/-4,495	30.0%	+/-1.9
Some college or associate's degree	214,751	+/-6,848	45.6%	+/-1.3	95,174	+/-5,328	40.6%	+/-2.0	119,577	+/-4,508	50.6%	+/-1.7
Bachelor's degree or higher	31,207	+/-3,445	6.6%	+/-0.7	12,032	+/-1,872	5.1%	+/-0.8	19,175	+/-2,533	8.1%	+/-1.1
Population 25 years and over	3,309,607	+/-5,907	(X)	(X)	1,565,244	+/-3,842	(X)	(X)	1,744,363	+/-4,468	(X)	(X)
Less than 9th grade	137,386	+/-6,439	4.2%	+/-0.2	71,748	+/-4,430	4.6%	+/-0.3	65,638	+/-4,095	3.8%	+/-0.2
9th to 12th grade, no diploma	309,557	+/-10,261	9.4%	+/-0.3	155,237	+/-7,434	9.9%	+/-0.5	154,320	+/-6,766	8.8%	+/-0.4
High school graduate (includes equivalency)	1,029,982	+/-16,141	31.1%	+/-0.5	509,811	+/-10,820	32.6%	+/-0.7	520,171	+/-10,710	29.8%	+/-0.6
Some college, no degree	709,100	+/-12,029	21.4%	+/-0.4	327,801	+/-9,219	20.9%	+/-0.6	381,299	+/-8,241	21.9%	+/-0.5
Associate's degree	278,878	+/-8,974	8.4%	+/-0.3	111,785	+/-5,091	7.1%	+/-0.3	167,093	+/-7,255	9.6%	+/-0.4
Bachelor's degree	528,019	+/-10,136	16.0%	+/-0.3	242,582	+/-6,751	15.5%	+/-0.4	285,437	+/-7,602	16.4%	+/-0.4
Graduate or professional degree	316,685	+/-8,377	9.6%	+/-0.3	146,280	+/-5,657	9.3%	+/-0.4	170,405	+/-5,602	9.8%	+/-0.3
Percent high school graduate or higher	(X)	(X)	86.5%	+/-0.3	(X)	(X)	85.5%	+/-0.5	(X)	(X)	87.4%	+/-0.4
Percent bachelor's degree or higher	(X)	(X)	25.5%	+/-0.4	(X)	(X)	24.8%	+/-0.5	(X)	(X)	26.1%	+/-0.5

Alaska

Subject	Total Estimate	Total Margin of Error	Percent Estimate	Percent Margin of Error	Male Estimate	Male Margin of Error
Population 18 to 24 years	73,053	+/-2,182	(X)	(X)	41,110	+/-1,635
Less than high school graduate	10,416	+/-1,619	14.3%	+/-2.3	6,421	+/-1,303
High school graduate (includes equivalency)	27,892	+/-2,497	38.2%	+/-3.3	17,448	+/-2,009
Some college or associate's degree	29,966	+/-2,588	41.0%	+/-3.2	14,835	+/-2,022
Bachelor's degree or higher	4,779	+/-1,124	6.5%	+/-1.5	2,406	+/-896
Population 25 years and over	481,561	+/-2,194	(X)	(X)	250,605	+/-1,870
Less than 9th grade	14,246	+/-1,878	3.0%	+/-0.4	6,031	+/-898
9th to 12th grade, no diploma	25,790	+/-2,449	5.4%	+/-0.5	14,647	+/-2,134
High school graduate (includes equivalency)	133,132	+/-5,152	27.6%	+/-1.1	80,671	+/-3,552
Some college, no degree	126,985	+/-4,710	26.4%	+/-1.0	65,565	+/-3,332
Associate's degree	42,724	+/-3,095	8.9%	+/-0.6	20,307	+/-2,240
Bachelor's degree	86,444	+/-4,760	18.0%	+/-1.0	39,090	+/-2,403
Graduate or professional degree	52,240	+/-3,278	10.8%	+/-0.7	24,294	+/-2,113
Percent high school graduate or higher	(X)	(X)	91.7%	+/-0.6	(X)	(X)
Percent bachelor's degree or higher	(X)	(X)	28.8%	+/-1.2	(X)	(X)

NICS checks (Before adjusted per capita)

NICS Firearm Background Checks:
Month/Year by State

Year 2017

January 1, 2017 - December 31, 2017

State / Territory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Alabama	41,542	46,251	48,769	32,652	33,331	35,687	31,474	35,038	32,019	36,619	47,418	56,545	477,345
Alaska	4,500	5,917	6,971	6,983	6,442	6,353	6,487	6,946	6,303	8,080	7,527	8,330	80,839
Arizona	31,366	37,388	38,170	32,052	28,734	28,359	25,714	29,376	28,394	29,277	34,541	41,559	384,930
Arkansas	16,762	22,548	23,290	16,452	16,749	16,614	14,015	17,517	17,747	20,327	26,049	29,559	237,629
California	130,365	129,885	146,592	132,190	129,307	130,187	114,595	130,901	123,506	119,395	140,695	142,492	1,570,110
Colorado	37,047	43,577	45,645	39,989	36,008	36,459	33,811	37,150	35,873	40,163	51,473	59,800	496,995
Connecticut	15,073	15,209	18,787	16,406	16,149	16,504	14,525	14,019	12,117	13,201	14,334	15,455	181,779
Delaware	4,299	5,066	5,527	4,296	4,012	3,634	2,981	3,509	3,502	3,692	4,577	5,544	50,639
District of Columbia	81	93	111	104	82	74	68	80	61	217	365	204	1,540
Florida	104,576	117,892	122,716	103,641	96,556	100,508	92,822	96,664	77,390	103,032	123,397	137,355	1,276,549
Georgia	44,615	53,177	57,235	37,829	36,905	39,874	35,085	38,830	35,371	43,293	54,950	64,491	541,655
Guam	205	132	136	147	157	156	145	159	135	135	127	181	1,815
Hawaii	866	1,037	1,090	888	1,117	1,083	1,109	1,079	948	1,235	1,171	1,119	12,742
Idaho	11,146	14,936	16,675	15,234	13,065	20,241	11,871	13,341	14,938	15,130	15,772	19,750	182,099
Illinois	138,008	139,697	163,728	135,507	121,746	113,889	108,000	126,921	116,449	122,798	150,588	163,756	1,601,087
Indiana	80,412	136,193	79,624	63,298	54,347	49,689	47,145	47,649	48,524	55,336	75,879	92,261	830,357
Iowa	15,707	15,025	20,026	13,017	10,232	8,352	8,801	9,416	9,975	14,012	17,182	19,236	160,981
Kansas	15,049	19,211	17,891	15,139	12,337	13,485	13,775	13,097	12,856	15,018	20,460	23,133	191,451
Kentucky	345,924	313,748	397,959	392,685	391,740	392,002	390,494	394,718	398,706	401,155	404,508	417,841	4,641,480
Louisiana	27,709	27,684	29,310	22,065	21,311	23,497	20,454	24,694	27,821	27,436	35,485	41,735	329,201
Maine	6,865	7,731	9,632	8,115	7,200	6,474	5,837	7,751	8,715	10,328	8,578	9,364	96,590
Mariana Islands	2	0	11	13	12	12	13	27	16	9	21	23	159
Maryland	13,368	14,852	15,769	13,182	11,660	10,945	10,088	11,561	11,255	13,651	16,266	16,062	158,659
Massachusetts	19,996	18,130	21,059	17,866	16,651	15,841	12,900	16,258	15,460	16,842	17,548	17,941	206,492
Michigan	39,067	48,382	54,452	41,939	38,548	37,088	33,378	39,255	36,944	44,262	54,350	45,578	513,243
Minnesota	85,322	62,051	77,749	71,484	55,570	44,775	41,186	46,613	44,552	55,012	48,087	51,143	683,544
Mississippi	17,113	24,043	24,421	16,803	15,680	17,154	14,388	21,963	17,491	19,080	28,188	35,528	251,852
Missouri	39,098	50,850	52,928	40,019	34,965	36,752	32,415	37,449	37,571	43,987	56,129	62,810	524,973
Montana	7,994	10,386	12,396	10,293	9,418	9,901	7,890	9,618	10,283	11,673	11,107	12,979	123,938
Nebraska	6,205	7,122	7,337	5,745	5,025	4,265	4,266	5,209	5,345	6,543	8,303	8,953	74,318
Nevada	10,013	11,765	14,158	10,588	9,803	10,602	8,310	9,035	9,460	10,198	12,064	13,626	129,622
New Hampshire	12,067	12,282	13,529	10,792	8,868	9,184	8,333	9,313	10,689	10,371	11,627	12,035	129,090
New Jersey	9,274	9,601	10,993	9,119	8,694	7,790	7,034	7,443	7,165	7,852	9,433	9,341	103,739
New Mexico	10,966	15,364	14,963	12,748	11,291	11,398	10,580	11,690	12,491	13,543	16,110	18,635	159,779
New York	31,567	31,910	35,608	33,113	31,294	27,677	25,576	28,779	30,703	32,615	37,306	36,347	382,495
North Carolina	46,548	51,627	55,574	39,992	39,413	39,169	34,784	41,122	37,325	43,211	51,839	57,209	537,813
North Dakota	4,933	6,193	6,461	6,504	4,654	4,939	4,136	4,874	5,212	6,209	6,334	6,528	66,977
Ohio	58,574	74,257	81,153	66,800	56,229	53,164	49,432	51,103	49,942	56,960	76,732	78,726	753,072
Oklahoma	24,547	30,840	30,518	27,478	22,693	24,632	20,738	24,061	23,371	25,822	38,406	41,245	334,351
Oregon	22,210	29,183	32,423	27,936	26,466	27,103	23,239	24,904	27,277	27,786	34,103	38,537	341,167
Pennsylvania	85,948	95,585	110,334	85,908	79,725	76,201	73,654	79,020	77,003	87,064	104,479	107,730	1,062,651
Puerto Rico	1,332	1,259	1,560	1,387	1,600	1,631	1,381	1,490	791	1,306	2,307	2,767	18,811
Rhode Island	2,147	2,354	2,553	2,133	1,883	1,899	1,646	1,718	1,799	2,103	2,173	2,269	24,677
South Carolina	31,829	41,969	43,113	30,218	31,248	32,995	26,567	31,663	25,930	28,996	34,132	38,260	396,920
South Dakota	7,614	9,754	9,770	7,857	7,004	6,704	6,068	6,686	7,457	9,244	9,908	10,507	98,573
Tennessee	83,613	69,264	74,655	57,852	57,763	52,959	52,643	49,945	50,945	55,531	74,800	87,983	767,953
Texas	117,903	137,470	144,270	109,961	109,732	118,091	98,338	110,946	128,260	129,869	163,358	181,236	1,549,434
Utah	18,314	24,889	26,941	23,177	23,844	22,138	17,925	22,010	20,041	19,619	24,359	27,220	270,477
Vermont	2,691	3,594	4,051	3,818	2,577	2,382	2,275	2,676	3,084	3,463	3,240	3,759	37,610
Virgin Islands	88	106	96	111	79	153	151	132	9	68	86	131	1,210
Virginia	37,369	47,038	49,368	48,631	36,007	36,838	36,183	39,114	36,446	40,293	53,142	60,398	520,827
Washington	46,027	52,154	58,069	47,895	45,816	46,023	38,369	42,120	43,049	48,147	53,072	58,937	579,678
West Virginia	15,772	22,449	22,529	16,988	15,085	14,498	13,970	14,770	16,723	18,256	24,455	27,273	222,768
Wisconsin	46,775	50,720	58,739	45,872	37,888	36,267	32,846	40,924	37,506	43,183	48,683	47,120	526,523
Wyoming	3,705	4,554	5,315	4,269	4,128	3,975	3,398	4,111	4,281	4,370	5,665	6,940	54,711

NICS checks scaled

Year	State	NICS scaled 100000/(pop/nics)	NICS total	Pop	pop/nics
2017	AL	9792.200498	477345	4874747	10.212209
2017	AK	10927.21632	80839	739795	9.1514615
2017	AZ	5486.248391	384930	7016270	18.227392
2017	AR	7909.68482	237629	3004279	12.642729
2017	CA	3971.276982	1570110	39536653	25.180817
2017	CO	8863.587481	496995	5607154	11.282114
2017	CT	5066.044551	181779	3588184	19.739266
2017	DE	5264.263119	50639	961939	18.996011
2017	FL	6083.323802	1276549	20984400	16.438382
2017	GA	5193.549875	541655	10429379	19.254653
2017	HI	892.5856965	12742	1427538	112.03406
2017	ID	10606.00148	182099	1716943	9.428624
2017	IL	12506.51557	1601087	12802023	7.9958322
2017	IN	12455.07227	830357	6666818	8.0288575
2017	IA	5117.475827	160981	3145711	19.540884
2017	KS	6572.019101	191451	2913123	15.216024
2017	KY	104204.8283	4641480	4454189	0.9596484
2017	LA	7027.70277	329201	4684333	14.229401
2017	ME	7230.293726	96590	1335907	13.830697
2017	MD	2621.519496	158659	6052177	38.145816
2017	MA	3010.166886	206492	6859819	33.220749
2017	MI	5151.846795	513243	9962311	19.410515
2017	MN	12257.34793	683544	5576606	8.1583717
2017	MS	8439.797594	251852	2984100	11.848625
2017	MO	8587.065546	524973	6113532	11.645422
2017	MT	11798.07957	123938	1050493	8.4759557
2017	NE	3870.575956	74318	1920076	25.835948
2017	NV	4323.5595	129622	2998039	23.129091
2017	NH	9613.529988	129090	1342795	10.402006
2017	NJ	1151.933165	103739	9005644	86.810593

Income

Table View

BACK TO ADVANCED SEARCH

Actions: Hide Table Tools | Add/Remove Geographies | Bookmark/Save | Print | Download | Create a Map

Table Tools: Reset Table | Show Hidden Rows/Columns | Transpose Rows/Columns

Click 'Back to Search' to select other tables or geographies

Legend: show/hide rows and columns; collapse/expand data categories; rearrange columns; rearrange rows; sort ascending/descending; filter rows

View Geography Notes | View Table Notes

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Versions of this table are available for the following years:
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005

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	Alabama		Alaska		Arizona		Arkansas		California		Colorado		Connecticut		Delaware		District of Columbia	
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Median household income in the past 12 months (in 2017 inflation-adjusted dollars)	48,123	+/-768	73,181	+/-2,628	56,581	+/-516	45,869	+/-760	71,805	+/-294	69,117	+/-780	74,168	+/-1,345	62,852	+/-2,464	82,372	+/-2,651

Source: U.S. Census Bureau, 2017 American Community Survey 1-Year Estimates

Explanation of Symbols:
An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
An '(X)' means that the estimate is not applicable or not available.

Total Data
Adjusted for scale where applicable

ECONOMETRICS DATA

STATE	GUNDEATHS	NICS	INCOME	ED	PDUM	POP
AL	22.9	9792.200498	48123	44.7	1	4874747
AK	24.5	10927.21632	73181	36	1	739795
AZ	15.8	5486.248391	56581	36.9	1	7016270
AR	20.3	7909.68482	45869	47.3	1	3004279
CA	7.9	3971.276982	71805	37.5	0	39536653
CO	13.4	8863.587481	69117	29.7	0	5607154
CT	5.1	5066.044551	74168	36.7	0	3588184
DE	11.7	5264.263119	62852	41.9	0	961939
FL	12.4	6083.323802	52594	40.4	1	20984400
GA	15.4	5193.549875	56183	41	1	10429379
HI	2.5	892.5856965	77765	35.9	1	1427538
ID	16.4	10606.00148	52225	37.4	1	1716943
IL	12.1	12506.51557	62992	37	1	12802023
IN	15.3	12455.07227	54181	44	1	6666818
IA	9	5117.475827	58570	38.4	1	3145711
KS	16	6572.019101	56422	34.8	1	2913123
KY	16.2	104204.8283	48375	46.6	1	4454189
LA	21.7	7027.70277	46145	48.9	1	4684333
ME	11.7	7230.293726	56277	38.6	1	1335907
MD	12.3	2621.519496	80776	34.6	0	6052177
MA	3.7	3010.166886	77385	33.5	1	6859819
MI	11.3	5151.846795	54909	38	1	9962311
MN	8.2	12257.34793	68388	31.7	1	5576606
MS	21.5	8439.797594	43529	46	1	2984100
MO	21.5	8587.065546	53578	41.1	1	6113532
MT	22.5	11798.07957	53386	35.1	1	1050493

Code

```
---
title: "Q's Regression Analysis Code"
output:
  word_document: default
  html_notebook: default
---
```{r}
install.packages("pastecs")
install.packages("corrplot")
```
```{r}
library(pastecs)
library(corrplot)
```
```{r}
DATA <- read.csv("/Users/Q/Desktop/adjDATA.csv")
DATA
```
```{r}
options(scipen = 999)
```
```{r}
stat.desc(DATA)
```
```{r}
regout <- lm(DATA$GUNDEATHS ~ DATA$NICS + DATA$INCOME + DATA$ED +
DATA$PDUM)
regout
```
```{r}
GLS <- lm(DATA$GUNDEATHS ~ DATA$NICS/DATA$POP +
DATA$INCOME/DATA$POP + DATA$ED/DATA$POP +DATA$PDUM/DATA$POP)
summary(GLS)
```
```{r}
VIF1 <- lm(DATA$GUNDEATHS ~ DATA$NICS)
summary(VIF1)
```
```{r}
```
```

````
VIF2 <- lm(DATA$GUNDEATHS ~ DATA$INCOME)
summary(VIF2)
```
```{r}
VIF3 <- lm(DATA$GUNDEATHS ~ DATA$ED)
summary(VIF3)
```
```{r}
VIF4 <- lm(DATA$GUNDEATHS ~ DATA$PDUM)
summary(VIF4)
```
```{r}
summary(regout)
```
```{r}
corrs <- cor(DATA)
corrs
```
```{r}
residuals <- resid(regout)
residuals
```
```{r}
parkstats <- lm(formula = log(residuals^2) ~ log(POP), data = DATA )
parkstats
```
```{r}
summary(parkstats)
```
````
````