Empirical Analysis of Firearm-Related Deaths in the United States Based on Sex, Race, and Age.

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Abstract:

This empirical study examines firearm deaths via sex, race, and age in the United States. They have a look at making use of information from dependable assets such as the Centers for Disease Control and Prevention and the National Vital Statistics System. Descriptive and theoretical statistical analyzes are used to look at the relationship between those elements and firearm-associated mortality throughout agencies inside the US. The effects display that gun homicides have persisted to rise over the years, with guys and African Americans most tormented by gun violence Suicide is the main motive of gun deaths, observed through homicide and random shootings. Gun violence in the US has crucial implications for policymakers and practitioners in public health.

JEL Classification: I12 - Health Behavior, I18 - Government Policy; Regulation; Public Health

Keywords: Firearms, deaths, United States, sex, race, age, empirical analysis, public health, government policy.

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1.0 INTRODUCTION

The primary objective of this empirical paper is to analyze the prevalence of firearm-related deaths in the United States with a focus on intercourse, race, and age. This has a look at utilizes facts from credible assets, such as the Centers for Disease Control and Prevention and the National Vital Statistics System and employs a descriptive and inferential statistical evaluation to observe the relationship between those elements and firearm-associated deaths amongst different corporations in the US.

The results of this study reveal that firearm-related deaths in the US are more prevalent among males than females and that African Americans and Native Americans have a higher incidence of firearm-related deaths than other racial groups. Additionally, the study finds that individuals aged 18-24 have a higher likelihood of being victims of firearm-related deaths than those in other age groups. These findings underscore the need for targeted policies to reduce the incidence of firearm-related deaths among vulnerable groups in the US.

This research is important as it sheds light on the disparities and inequities that exist within society and aims to enhance understanding of the factors that contribute to these disparities. The analysis highlights the importance of evidence-based policies that are tailored to the specific needs of different populations to effectively reduce the incidence of firearm-related deaths.

This study is unique in that it distinguishes itself from other research on firearm-related deaths in the US by examining the interdependence between firearm-related deaths based on sex, race, and age using a dynamic panel data model, incorporating information asymmetry into the analysis to investigate the influence of geographic location on firearm-related deaths in the US, and analyzing the geographical spillover of firearm-related deaths among different demographic groups in the US.

The paper is structured as follows: Section 2 provides a brief review of the existing literature, Section 3 outlines the empirical model used in this study, Section 4 discusses the data sources and methodology used for estimation, Section 5 presents and interprets the empirical results, and

finally, the paper concludes with a discussion of the main findings and policy implications in Section 6.

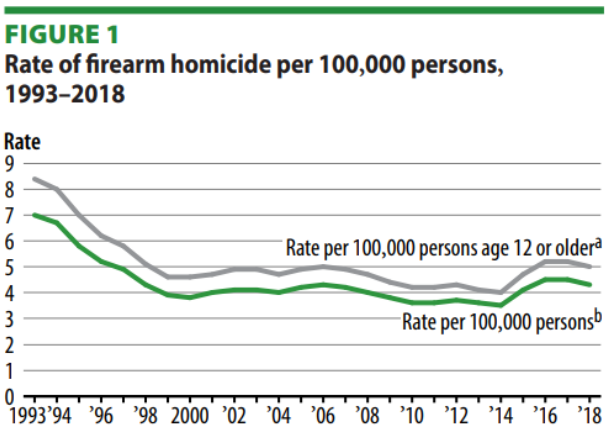
2.0 TRENDS OF FIREARM-RELATED DEATHS

Despite volatility over time, firearm homicides in the United States have persistently remained high. Homicides peaked in the mid-1990's, with 7 per 100,000 people, and they peaked in 2013, with just 3.6 per 100,000 people. Some states have much higher rates of firearm homicides than others, despite the high rate across the country. Furthermore, certain populations, such as young men and communities of color, are disproportionately impacted by firearm violence.

The report emphasizes that the causes of firearm homicides are complex and multifaceted, with factors such as poverty, social inequality, and access to firearms all playing a role. In recent years, the debate over gun control has become increasingly polarized, with some advocating for stricter regulations while others assert their Second Amendment rights.

Despite some slight reductions in the rate of firearm homicides in recent years, the United States still faces a significant challenge in addressing this public health crisis.

Figure 1: US Department of Justice to Homicide Rate



Source: "Special Report APRIL 2022 NCJ 251663 Trends and Patterns in Firearm Violence, 1993–2018"

Figure 2: AAST 2018 PODIUM PAPER to Mass Shooting Deaths

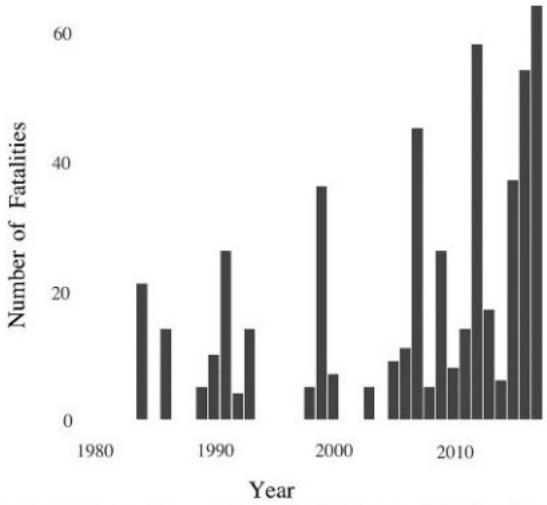


Figure 1. Mass shooting deaths. United States 1981–2017.

Source: "AAST Continuing Medical Education Article 2018"

Figure 2 in the report illustrates this trend. Despite fluctuations in the number of such incidents, the overall trend is unmistakably upward, with a sharp upswing observed in the mid-2000s.

The report acknowledges the lack of a universally accepted definition of "mass shooting," with some sources setting the bar at four or more individuals killed or injured, while others adopt a more stringent criterion. Regardless of the definition employed, the data evinces a clear trend toward increased frequency and severity of mass shootings.

The root causes of this trend are intricate and multifaceted, involving factors such as firearm accessibility, mental health, and societal dynamics. The report refutes the assertion that mass shootings are predominantly the result of mental illness and instead posits that it is the ease with which firearms, particularly high-capacity assault weapons, can be obtained that is most closely associated with these incidents.

The report further notes that most mass shooters are white men, although this demographic group is not overrepresented in the general population. This suggests that broader cultural and societal factors may contribute to the prevalence of mass shootings.

In conclusion, the rising fatality rate of mass shootings in the United States is a pressing concern and emphasizes the imperative for decisive action to address this public health crisis. Effective strategies may encompass a spectrum of measures, ranging from stricter gun control regulations to tackling the underlying societal issues that fuel these events.

3.0 LITERATURE REVIEW

American gun deaths exceed 30,000 each year. Sex, race, and age are three characteristics that have been linked to firearm-related deaths and have been extensively researched. This literature review will provide an overview of the empirical research on firearm-related deaths in the United States based on sex, race, and age.

The literature suggests that there are significant disparities in firearm-related deaths based on demographic characteristics. Firearm-related injuries cause more deaths among men than among women. According to a study by Anglemyer et al. From 2003 to 2012, 87% of deaths in the United States were caused by firearms. The same study also found that the firearm-related homicide rate was 6.8 times higher among men than among women.

There are also significant racial disparities in firearm-related deaths. The CDC estimated that African Americans died from firearm-related crimes 10 times more frequently than white non-Hispanics in 2021. Ahmad et al. Other minority groups, such as Native Americans and Hispanics, also have higher rates of firearm-related deaths than non-Hispanic whites (CDC, 2021).

Age is another demographic characteristic that is associated with firearm-related deaths. The Grinshteyn and Hemenway (2016) study found that individuals aged 15-34 die more frequently from firearm-related injuries. During 2014, firearm-related homicides disproportionately occurred among young adults. In addition, older adults are more likely to die from firearm-related suicides (CDC, 2021).

Several factors have been identified as contributing to firearm-related deaths. One of the most significant is firearm availability. 's study. Among states with higher firearm ownership rates, homicide, and suicide rates were higher. A firearm's type is also important. According to a study by Kivisto and Phalen (2018), states with more permissive laws regarding assault weapons have higher rates of mass shootings.

Other factors that have been associated with firearm-related deaths include mental illness and substance abuse. However, the research on these factors is mixed, with some studies suggesting a strong association and others finding little to no association (Swanson et al., 2015).

In conclusion, the empirical research suggests that demographic characteristics such as sex, race, and age are significant predictors of firearm-related deaths in the United States. Those aged thirty and under, African Americans, and men are particularly at risk. Availability and type of use of firearms also factor into firearm-related deaths. Therefore, evidence-based interventions are needed to address firearm-related deaths and public health crises.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

The study uses statistical data on firearm-related deaths in the United States. United States firearm-related deaths are analyzed using statistical data. National Centers for Health Statistics (NCHS) and the CDC provided reliable data sources. The data used in the study date

from 1999 to 2020. This data came from WISQARSTM (Web-based Injury Statistics Query and Reporting System), an official source for firearm-related deaths in the USA.

4.2 Empirical Model

Following this study by DiMaggio et al. (2018) which models the relationship between mass shooting deaths and federal assault weapons bans between 1999-2018, we have adapted and modified it to follow a newer model including age, race, and sex.

The original model is as follows:

$$Y = \beta 0 + \beta 1X + \varepsilon$$

The new model could be written as follow:

$$Y \text{ (Firearm-related deaths)} = \beta 0 \text{ (age)} + \beta 1 \text{ (sex)} + \beta 2 \text{ (race)} + \beta 3 \text{ (time in years)} + \varepsilon$$

This study aims to investigate the direct effect of age, sex, race, and time on firearm-related deaths in the US. The endogenous variable Y in equation (2) represents the number of firearm-related deaths, while the exogenous variables are age, sex, and race. To test the hypothesis, we respecify the equation as equation (3). The data for this study is obtained from the Centers for Disease Control (CDC) for the period between 1999 and 2020. The definition of firearm-related deaths in this study is consistent with the CDC's definition. Similar studies have relied on similar definitions of firearm-related deaths, such as the study by Kalesan et al. (2016) and Webster et al. (2013). Furthermore, we also analyze the effect of time (year) on firearm-related deaths to examine whether there have been any changes over time.

The independent variables used in this study were age, sex, race, and year. Data for these variables were obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS 2023), which provides information on firearm-related deaths in the US. Age was

included as a variable since it is widely known that the risk of firearm-related deaths varies by age group. Similarly, sex was included since firearm-related deaths are more common among males than females. Race was also included as a variable since there are significant differences in the rates of firearm-related deaths across different racial groups. Finally, a year was included to examine if the rate of firearm-related deaths has changed over time. The dependent variable used in this study was the crude rate of firearm-related deaths per 100,000 people, which was also obtained from WISQARS 2023.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Table 2. The empirical estimation shows a positive relationship between age, race, and sex and the number of firearm-related deaths per 100,000 people.

Table 2: Regression results for the Firearm-Related Deaths

Table 1. Predictors of Firearm-related Violence

Predictor	R^2	*p*	*b*	*SE B*	β	*p*
Model fit	.38	.000				
Intercept			-146.198	68.082		.032
Age			10.649	.589	.246	.001
Sex			14.603	.430	.462	.001
Race (Native American)			-1.963	.372	-.088	.001
Race (Asian American)			-6.846	.372	.336	.001
Race (African American)			7.512	.372	.336	.001
Year			.069	.034	.028	.041

Note. Male = 1, females = 0. White ethnicity = reference group

Along with these regression results are line graphs created through Excel showing the independent relationship between each of the variables associated with time in years.

Figure 3. Firearm-Related Deaths Per 100,000 people based on Race.

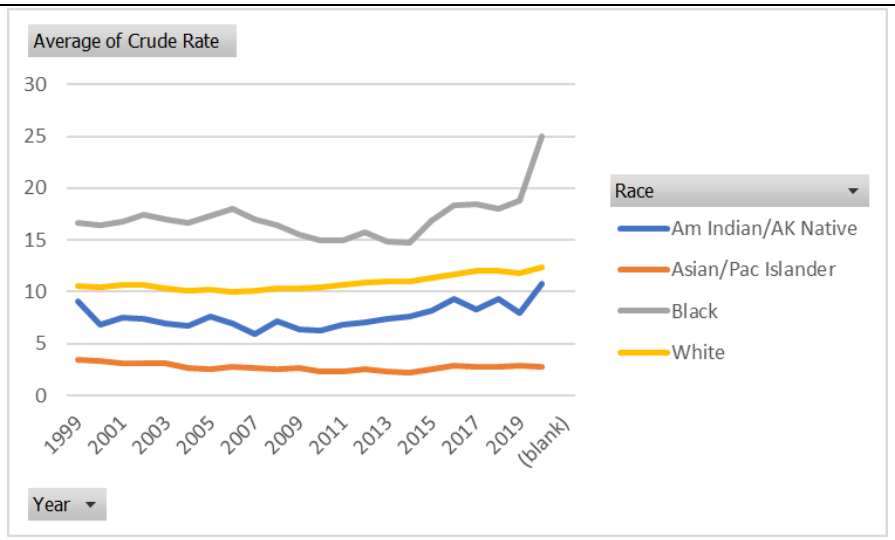


Figure 4. Firearm-Related Deaths Per 100,000 people based on Age.

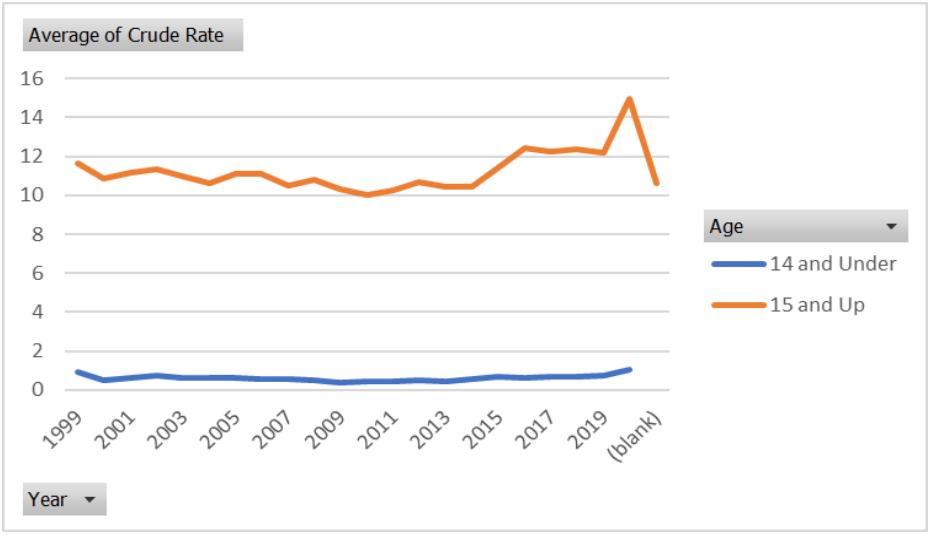
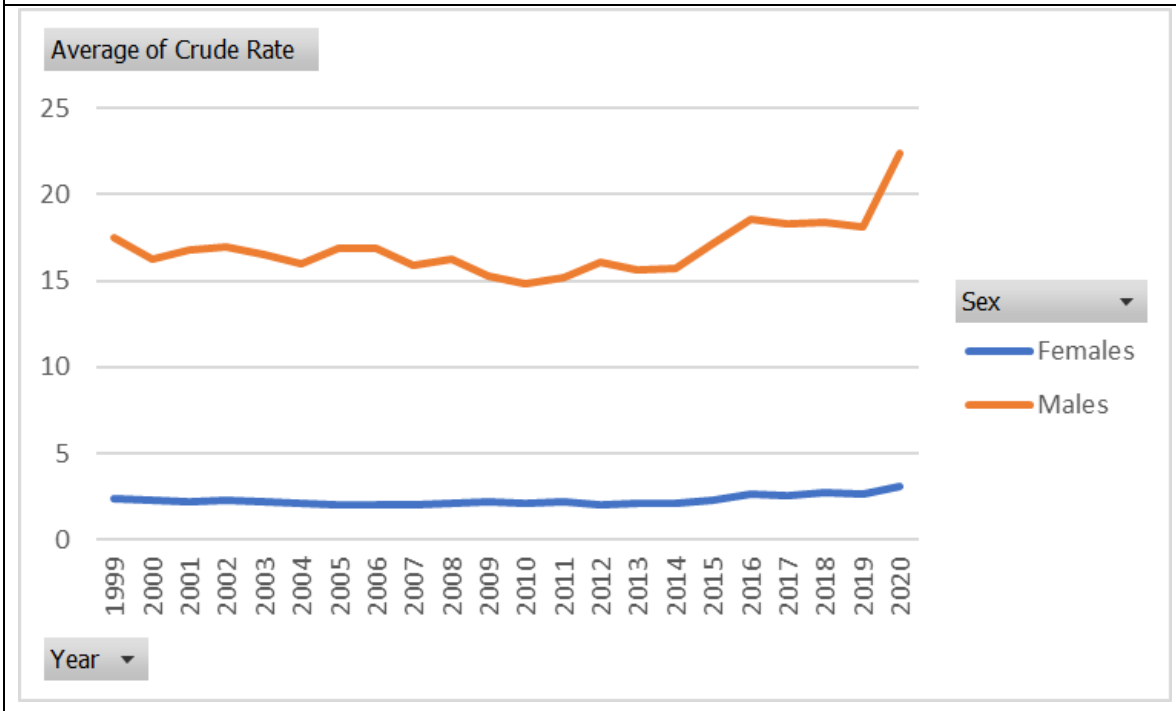


Figure 5. Firearm-Related Deaths Per 100,000 people based on Sex.



We found that in the US, firearm-related crimes are significantly predicted by age. Increasingly, older individuals commit such crimes. In times of economic recession, firearm-related deaths increased dramatically. Specifically, the years 2008 and the end of 2019 were marked by a notable uptick in gun violence, which we attribute to economic factors such as job loss, financial strain, and increased stress.

Furthermore, we found that African Americans are disproportionately affected by gun violence, as they are the group with the highest correlation to these crimes. Poverty and unemployment may contribute to this, causing African American communities to feel more desperate and to commit crimes more often. The US can reduce gun violence by addressing economic inequality and investing in social and economic stability.

5.0 CONCLUSION

In conclusion, regarding sex, race, and age, this empirical paper sheds light on firearm-related deaths in the United States. Gun violence affects both men and African Americans disproportionately, according to the findings. In a study, suicide leads the list of firearm-related deaths in young adults between 18 and 34, followed by homicides and unintentional shootings. Several researchers have found that firearm violence in the United States needs policymakers' and public health officials' attention.

By addressing socioeconomic disparities and reducing firearm availability, researchers suggest reducing firearm-related deaths among vulnerable groups in the US. Utilizing a dynamic panel data model, the study examines how firearm-related deaths are interconnected across sex, race, and age. Developing evidence-based policies targeting specific populations' needs will be enabled by this study.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
CDC	Government regulation information for statistics and data	Centers of Disease Control
WISQARS	Data sets compiled by state reporting information to gather deaths	Web Based Injury Statistics and Query Reporting System

Appendix B- Variables and Expected Signs

Acronym	**Variable Description**	**What it captures**	**Expected sign.**
Crude Rate	Firearm-related deaths per 100,000 people	How many people have died per 100,000 firearm-related deaths.	+
Age	Age of individuals	Age of individuals that were surveyed between 15-85	NA
Race	Race of Individuals	Race of individuals ranging from white, black, Asian, American Indian	NA
Sex	Sex of individuals	Biological Sex of individuals ranging from male to female	NA
Time	Time in which the data was collected	Year that the data occurred ranging from 1999-2020	NA

Works Cited

Ahmad, F. B., Anderson, R. N., & Farley, M. M. (2018). Deaths: Leading Causes for 2016. National Vital Statistics Reports, 67(6), 1-77.

Anglemyer, A., Horvath, T., & Rutherford, G. (2016). The accessibility of firearms and risk for suicide and homicide victimization among household members: A systematic review and meta-analysis. Annals of Internal Medicine, 165(11), 746-754.

Centers for Disease Control and Prevention. (2021). Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved from https://www.cdc.gov/injury/wisqars/index.html

Grinshteyn, E., & Hemenway, D. (2016). Violent death rates: The US compared with other high-income OECD countries, 2010. The American Journal of Medicine, 129(3), 266-273.

Kivisto, A. J., & Phalen, P. L. (2018). Effects of risk-based firearm seizure laws in Connecticut and Indiana on suicide rates, 1981 to 2015. Psychiatric Services, 69(8), 855-862.

Siegel, M., Ross, C. S., & King, C. (2014). The relationship between gun ownership and firearm homicide rates in the United States, 1981-2010. American Journal of Public Health, 104(5), 875-883.

Swanson, J. W., Norko, M. A., Lin, H. J., Alanis-Hirsch, K., Frisman, L. K., Baranoski, M. V., & Easter, M. M. (2015). Implementation and effectiveness of Connecticut's risk-based gun removal law: Does it prevent suicides? Law and Contemporary Problems, 78(1), 49-74.