

An Analysis of Mass Shootings in the U.S. from 2013-2021

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Abstract

We used the mass shootings data from Gun Violence Archive (GVA) to explore how incidents of mass shootings changed between 2013-2021 and where most shootings occurred. We further applied a Poisson regression model to investigate how gun law permissiveness affects the incidents and fatalities of mass shootings. The results from the Poisson regression showed that gun law permissiveness was significantly correlated with the fatalities of mass shootings.

Introduction

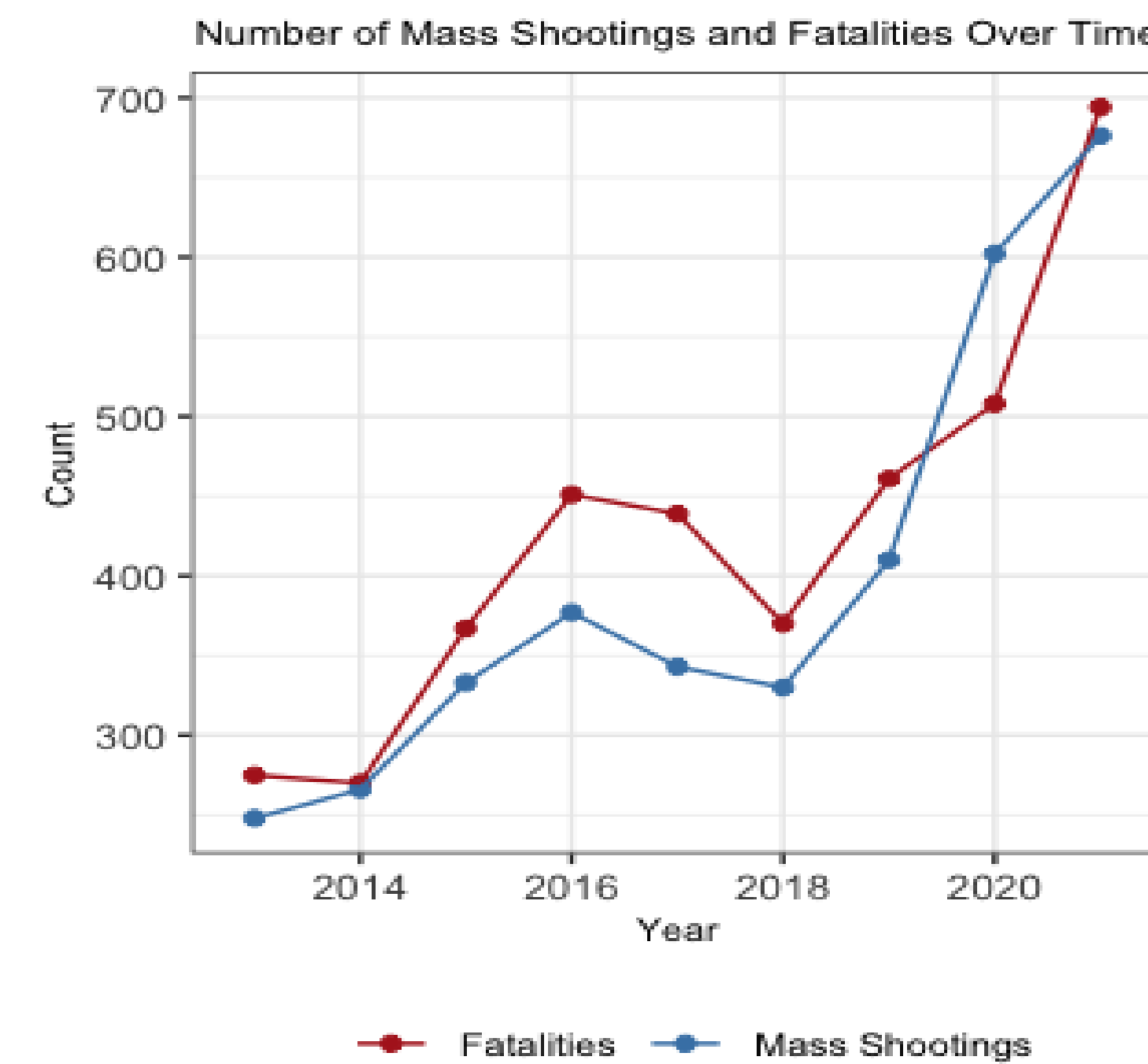
- Mass shootings in America have become increasingly more prevalent, an issue seemingly unique to the U.S.
- Mass shootings, as defined by the GVA, are shootings in which 4 or more people are injured, excluding the perpetrator.
- We aim to answer the following questions:
 - Are mass shootings increasing over time?
 - Where are most mass shootings occurring?
 - How does the permissiveness of gun legislation affect mass shootings?

Methods

- Mass shooting data were obtained from GVA, a non-profit research organization.
- Gun law permissiveness was measured by the number of state gun laws, which was collected from the State Firearms Laws Database.
- A Poisson regression model was applied to assess the association between the incidents and fatalities of mass shootings and the number of gun laws at the state level.

Results

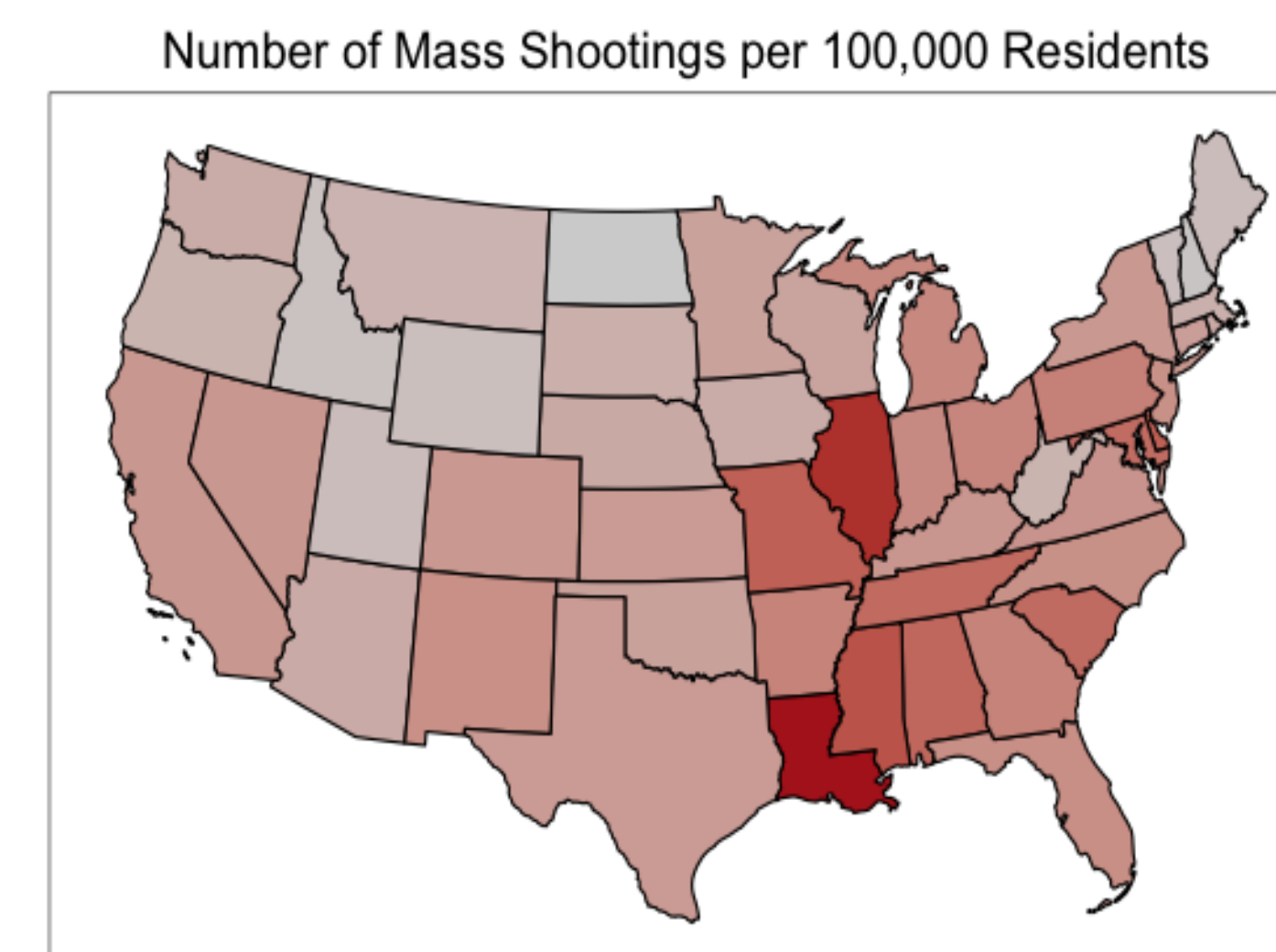
Number of Mass Shootings and Fatalities Over Time



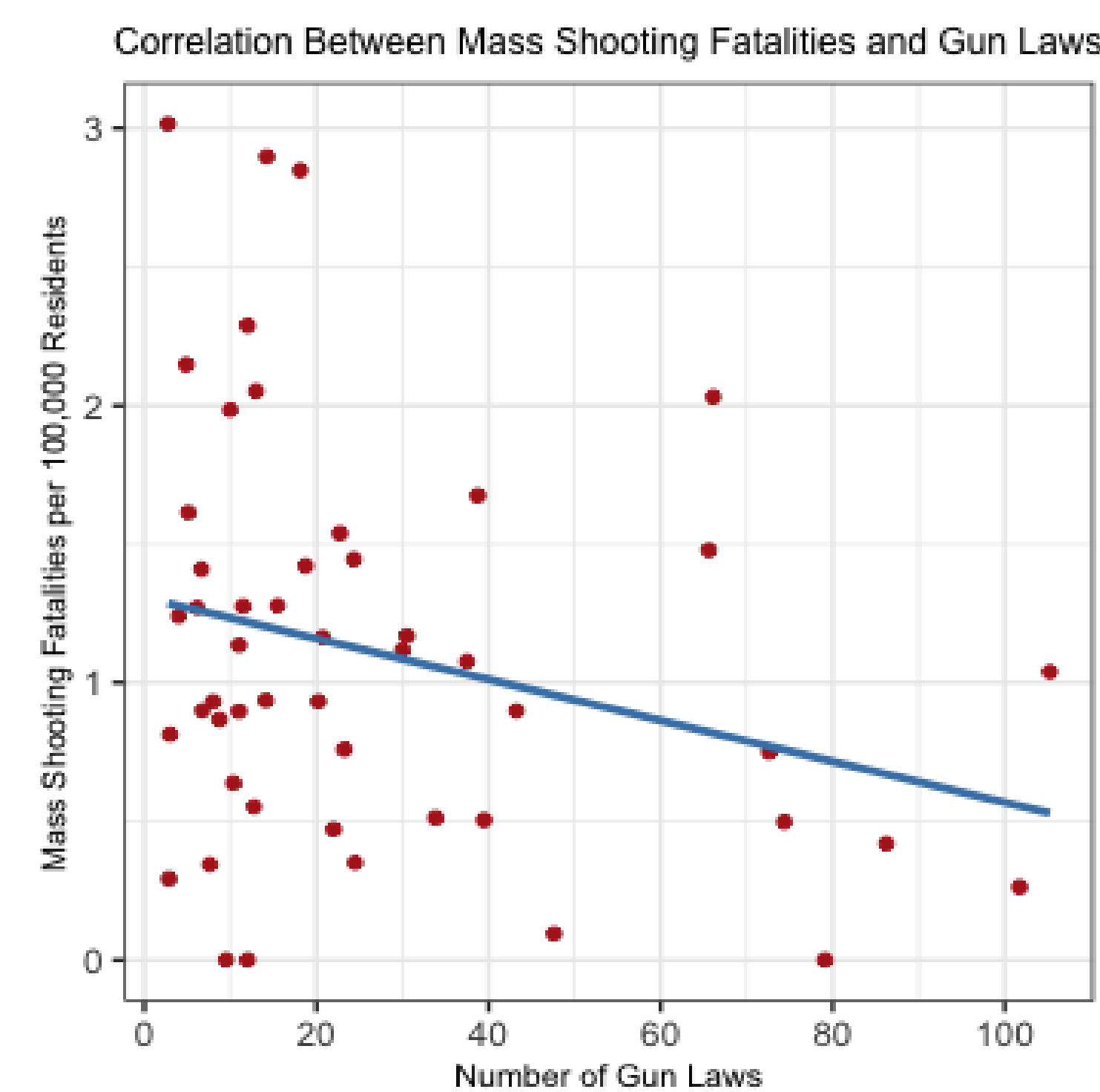
- There is an upward trend in both mass shootings and fatalities.
- 2019-2020 had the highest increase in mass shootings at 31.9%.

Mass Shootings in Each State Adjusted for Population

- States with the highest rate of mass shootings are Louisiana, Illinois, and Mississippi.
- Hawaii, North Dakota, and New Hampshire had no mass shootings in this time-period.



How Number of Gun Laws Affects Mass Shooting Fatalities in Each State



- Significant negative correlation ($p = 0.0141$).
- For every 10 new state laws enacted, the number of fatalities decreases by about 10 per 100,000 residents.

Conclusion

- Both the number of mass shootings and the number of fatalities are increasing over time.
- States with the most mass shootings (adjusted for population) are primarily in the Southeast.
- States with fewer gun laws have significantly more mass shooting fatalities than those with more gun laws.

Future Directions

- Extend the current work by including state-level socioeconomic covariates (e.g., poverty rates, incarceration rates, percent of population with higher education, etc.) in Poisson regression.
- Investigate the effects of individual gun laws on mass shooting incidents, specifically:
 - Assault weapon bans
 - Large-capacity magazine bans
 - Comprehensive background checks

References

- Gun Violence Archive. Available at: <https://www.gunviolencearchive.org/>.
- State Firearms Laws Database. Available at: <https://www.statefirearmslaws.org/>.
- United States Census Bureau. Available at: <https://www.census.gov>.

Acknowledgements:

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