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The Association Between State Minimum Wage and Firearm Homicides, 2000−2020

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Abstract

Introduction: Recent research has indicated an association between both poverty and income inequality and firearm homicides. Increased minimum wages may serve as a strategy for reducing firearm violence by increasing economic security among workers earning low wages and reducing the number of families living in poverty. This study aimed to examine the association between state minimum wage and firearm homicides in the U.S. between 2000 and 2020.

Methods: State minimum wage, obtained from Temple's Law Atlas and augmented by legal research, was conceptualized using the Kaitz Index. State-level homicide counts were obtained from 2000 to 2020 multiple-cause-of death mortality data from the National Vital Statistics System. Log-linear regressions were conducted to model the associations between state minimum wage and firearm homicides, stratifying by demographic groups. Analyses were conducted in 2023.

Results: A 1% point increase in a state's Kaitz Index was associated with a 1.3% (95% CI: −2.1% to −0.5%) decrease in a state's firearm homicide rate. When interacted with quartile of firearm ownership, the Kaitz Index was associated with decreases in firearm homicide in all except the lowest quartile. These findings were largely consistent across stratifications.

Conclusions: Changing a state's minimum wage, whereby a full-time minimum wage worker's salary is closer to a state's median income, may be an option for reducing firearm homicides.

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CREDIT AUTHOR STATEMENT

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SUPPLEMENTAL MATERIAL

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INTRODUCTION

Firearm homicides are an urgent public health concern in the U.S. Between 2019 and 2020, the firearm homicide rate increased from 4.6 to 6.1 per 100,000 people, nearly a 35% increase.[1] While firearm homicides affect all communities, studies consistently report inequities in firearm homicide rates, with the greatest burden among males, youth and young adults who are non-Hispanic Black, American Indian/Alaskan Native and Hispanic.[1,2] These documented inequities indicate a need to identify strategies to reduce firearm homicides, including strategies addressing the structural conditions contributing to them.

Policies that reduce poverty and income inequality may be a strategy for reducing firearm homicides. Recent research has highlighted the importance of both poverty and income inequality as community-level drivers of firearm homicides.[1,3–5] In a recent scoping review of income support policies and firearm violence, 4 studies were identified that examined the efficacy of different income support policies in preventing firearm violence.[6] In all identified studies, the policy examined was associated with reductions in firearm violence. The theoretical mechanisms for the association between both poverty and income inequality and firearm violence include factors such as exposure to stress, lack of access to resources (e.g., quality healthcare), and reduced community efficacy.[6] However, research is needed to continue building this evidence-base to advance understanding of underexplored income support policies, such as minimum wage (MW) laws as identified in this recent scoping review.[6]

MW laws set the lowest hourly wage most employers must pay their employees. These laws can be at the local, state, or federal levels. If the state does not have a MW or it is below the federal level, the federal MW applies. Federal MW increased annually between 2007 and 2009 to the current rate of $7.25 per hour. The highest state MW in 2022 was $14.49 in Washington state. Higher MW laws are associated with decreases in community-level poverty rates[7] and income inequality.[8,9] Higher MW laws may serve as a strategy for reducing firearm violence by increasing economic security among workers earning low wages and reducing the number of families living in poverty. Additionally, MW laws may decrease income inequality between some racial/ethnic groups[10] which may in turn reduce inequities in firearm homicides across groups.

Prior studies examining the association between MW level and violence outcomes had mixed findings. Higher MW was associated with decreases in overall and specific types of crime including property, vehicle, and violent crime,[11] and child neglect.[12] However, a few studies found no effect of MW laws on preventing some forms of family violence including child maltreatment[13] and intimate partner violence.[14] To the authors' knowledge, no study to date has examined the potential impact of state MW on firearm homicides.

To expand on prior scoping review findings,[6] this study examined the association between state MW and firearm homicides between 2000 and 2020 in the 50 states using data from the National Vital Statistics System (NVSS). Analyses were further stratified by decedent characteristics to examine whether state-level MW may have group-specific associations with firearm homicide rates and to explore the potential impact of state MW on reducing existing inequities among some groups disproportionately impacted by violence. This study also examined how estimates of state-level firearm ownership impacted these associations. Findings may increase understanding of potential policy approaches for reducing firearm homicides and addressing underlying socioeconomic conditions that contribute to inequities in firearm homicide rates.

METHODS

Study Population

Data on the number of firearm homicides and the number of total homicides were obtained from 2000 to 2020 multiple cause-of-death mortality data from the restricted-use NVSS of the CDC's National Center for Health Statistics and aggregated to the 50 state-level. NVSS compiles death certificate data and codes the mechanism and cause of fatal injury using the *International Classification of Disease – 10th Revision* (ICD-10). Firearm homicides; defined as an ICD-10 code of X93-X95 or U01.4; and total homicides; defined as an ICD-10 code of X85-Y09, Y87.1, or U01-U0; were coded from the underlying cause of death field. State-level nonfirearm homicide estimates were the difference between total homicides and firearm homicides.

Measures

Data on state MW laws were obtained from Temple's Law Atlas[15] and augmented with legal research using Thomson Reuters Westlaw.[16] A weighted state-year MW was conceptualized as a modified Kaitz Index (KI).[17] The modified KI is the ratio of the state's median income provided by a full-time full-year MW income. A unique attribute of the KI is its relative nature. Thus, the KI may measure the relative livability of a full-time MW worker, whereas other MW conceptualizations (such as dichotomous MW changes) capture direct changes to MW laws. This study focused on the relative livability provided by a state's MW in alignment with prior research linking poverty and income inequality to firearm homicides.[1,3–5] As such, conceptualizing MW through the KI may more accurately capture this association. Furthermore, variation in the KI over time can arise from stagnant minimum wages and increasing median income, which is difficult to capture using other MW conceptualizations. See the appendix for additional details on the KI.

Data on state firearm policies were obtained from the Johns Hopkins Center for Gun Violence Prevention. These policies were laws requiring a permit to purchase a handgun, laws requiring a background check for private firearm purchases, stand your ground laws (i.e., laws that remove an individual's duty to retreat when acting in self-defense), laws mandating safe storage in homes with children, and laws governing the process for issuing permits to carry a concealed handgun in public. These laws were identified through state- and year-specific searches in the Thomson Reuters Westlaw database[16] and state legislature websites and verified through comparison to existing policy databases.[18–20] Individual policy variables were constructed from these data based on the state-year a particular policy was in effect, with a "1" representing ≥ 6 months and a "0" representing <6 months.

State-level data on household firearm ownership rates, obtained from RAND Corporation, were derived from a statistical model using a range of data sources to estimate household firearm ownership rates.[21] A state-level variable was constructed indicating each state's average firearm ownership rate from 2000 to 2016 by quartile (latest year available). This variable was used to construct 4 firearm ownership dummy variables that indicated the quartile for each state from 2000 to 2016 and was then applied for the entire study period. Additional data on the demographic and socioeconomic makeup of states from 2000 to 2020 were obtained from IPUMS USA,[22] including percent of population comprised of each racial/ethnic group, age group, educational attainment, and marital status. Finally, state-by-year population estimates for each subgroup were obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS).[23]

Statistical Analysis

The association between state MW, as measured through the modified KI, and number of firearm homicides was examined using a negative binomial regression model with a final state-year panel dataset comprising all 50 states for the years 2000–2020, selected for data availability. Negative binomial regressions were chosen due to substantial overdispersion in the dependent variables.

The main model included two-way fixed effects (i.e., state fixed effects and year fixed effects) and regressed the number of firearm homicides on the KI, controlling for firearm policies in effect, and state demographic and socioeconomic characteristics (appendix includes additional detail). The state-year population was used as the model offset. Additional negative binomial regressions were estimated that modelled firearm homicide counts by decedent demographic characteristics, including whether decedents were residents of a metropolitan statistical area (MSA) as defined by the U.S. Census Bureau,[24] race/ethnicity (non-Hispanic Black, non-Hispanic White, and Hispanic), sex (male and female), and age (< 25 years and ≥ 25 years in alignment with CDC's youth violence definition). Offset variables for these models corresponded to the population estimates for the demographic group being analyzed.

To further explore associations between state MW and firearm homicides, additional models were analyzed by regressing firearm homicides on the KI interacted with the four firearm ownership quartile dummy variables on the baseline models. Finally, to explore potential substitution effects, or changes in firearm homicides being offset with changes in nonfirearm homicides, these models were estimated with nonfirearm homicides as the dependent variable.

Sensitivity analyses were conducted omitting the 2020 increase in firearm homicides during the COVID-19 pandemic.[1] Robust standard errors were estimated and clustered at the state-level. Data were analyzed in 2023 using Stata/MP 17.0. This exempt activity was conducted consistent with applicable federal law and CDC policy (45 CFR §46).

RESULTS

State KIs, varied between 17.0 and 42.5 over the study period. The average KI throughout the study period was 28.2 ± 4.6, signifying that a full-time, full-year MW income based on state MW laws is approximately a quarter of the state's median income (Figure 1).

An increase in the KI was associated with a decrease in firearm homicides (Table 1). A 1% point increase in a state's KI was associated with a 1.3% (95% CI: −2.1% to −0.5%) decrease in a state's firearm homicides. These findings were robust across model specifications. A sensitivity analysis of the main model through 2019 found a similar decrease in firearm homicides associated with the KI.

For decedent characteristic-specific models, this decrease was statistically significant across characteristics, except for among homicides of decedents who resided outside of an MSA.

An increased KI was associated with decreased firearm homicides among all quartiles of firearm ownership except for states with the lowest ownership quartile (Table 2). Higher KIs were generally associated with decreased firearm homicides in the 3 higher quartiles among groups disproportionately impacted by firearm homicide: MSA resident, non-Hispanic Black decedents, Hispanic decedents, male decedents, and decedents <25 years. A higher KI was associated with decreased firearm homicides in the 3 highest ownership quartiles. This was consistent across all decedent-specific models with the exception of Hispanic decedents (−1.0%, 95% CI: −4.2% to +2.4%) and decedents

An increased KI was not associated with firearm homicides among non-MSA residents in any ownership stratification and significant in the 2 highest ownership levels among non-Hispanic White decedents (second highest: −1.0%, 95% CI: −1.7% to −0.3%; highest: −0.9%, 95% CI: −1.7% to −0.1%) and in the second lowest (−1.4%, 95% CI: −2.5% to −0.3%) and highest ownership quartiles among female decedents (−1.1%, 95% CI: −2.0% to −0.3%).

An increased KI was not associated with nonfirearm homicides (−0.2%, 95% CI: −0.7% to +0.3%) (Table 3). There were no associations across any model stratifications.

DISCUSSION

Increasing the MW to be closer to a state's median income may be an option when considering potential policy levers to reduce firearm homicides. A 1 percentage point increase in a state's KI, or about a $0.25 increase in MW, was associated with a 1.3% decrease in firearm homicides, or 252 fewer firearm homicides nationally in 2020. These results support prior findings that income support policies are associated with decreases in firearm violence.[6] In addition, these findings are consistent with some studies that found similar associations between minimum wage and violence outcomes[11,12] but not others.[13,14] A number of factors may have contributed to these differences across studies, including differences in conceptualizations of minimum wage, study periods, populations, statistical approaches, or types of violence outcomes examined.

Although potential mechanisms could not be examined in this study, prior research indicates higher MW may decrease income inequality[8,10] and community-level poverty rates,[7] both of which are associated with reductions in firearm homicides.[3,6] There is mixed evidence regarding unemployment effects associated with MW,[25–28] which may impact violence outcomes; however, these findings support prior research that MW has a net positive population impact.[29] Future studies could explore potential causal mechanisms for the association and unintended outcomes.

In addition to reducing overall rates of firearm homicides, increasing state MW to align a full-time minimum wage worker's annual income closer to a state's median income may decrease firearm homicides among populations disproportionately impacted by firearm violence. When stratified by decedent characteristics, increased modified KI was associated with a decrease in firearm homicides among decedents who were MSA residents, non-Hispanic Black, Hispanic, male, and <25 years. This supports literature indicating policies that address social determinants of health, such as economic policies, may have a greater population-level impact on health outcomes and may be less likely to increase health inequities compared to policies that do not.[30,31]

Future studies could explore the equity implications of state MW laws and how they may impact inequities in firearm homicides. Policies that reduce economic inequities may not necessarily reduce other types of inequities, like racial inequities, in violence outcomes.[30] Although research suggests that MW contributed to decreasing the Black and White worker wage gap,[10] some individuals do not reap equal benefits of an increased state MW. Wages that are adequate for 1 group may not be sufficient for another because some communities pay higher costs for similar resources, such as food, due to inequities in access to infrastructure like supermarkets or public transit.[32] Additionally, MW laws only directly benefit individuals who are employed and employed in work protected by MW. Historical and on-going segregation of communities has resulted in reduced employment opportunities[33] and employment not protected by MW[10] among people from some racial and ethnic groups.

Higher modified KI was not associated with decreases in firearm homicides among non-MSA residents. Future research may consider location as important context for determining the efficacy of policies and the extent to which implementation is consistent across a jurisdiction. For example, some types of farm workers are exempt from federal MW laws[34] which may decrease the association between MW and firearm homicides in agricultural communities. Finally, it is possible this association is impacted by the higher rates of firearm ownership in rural areas.[35]

Higher modified KI was associated with lower firearm homicides among groups most impacted by MW laws. Higher modified KI was associated with lower firearm homicide among individuals ≥25 years old and women. While individuals <25 years old are overrepresented in MW workers, most MW workers are >25 years old.[36] This highlights the potential benefits of MW laws for workers who may have aged out of other economic supports. Women are overrepresented among MW workers.[36] However, the association between state MW and firearm homicides among women decedents was less robust across quartiles of firearm ownership compared to groups disproportionately impacted by firearm homicides. Future studies may consider the population-level impact of increased state MW policies on women to better understand these associations.

Higher modified KIs were associated with reductions in firearm homicides among all quartiles of firearm ownership except for states with the lowest estimates. Across decedent characteristics, higher modified KI was associated with decreases in firearm homicide among Non-Hispanic Black decedents, and MSA residents in all but the lowest quartile and in the highest quartile among Hispanic decedents and decedents <25 years old. Potential reasons for these findings include high rates of firearm ownership are associated with high rates of firearm homicide.[37] Additionally, some states in the lowest quartile of firearm ownership have lower percentages of MW workers nationally.[36] As a result, higher MW may not impact as many workers in states with lower rates of firearm ownership which may limit any potential associations. Future research could explore patterns of association across quartiles of firearm ownership.

There was no evidence to suggest that the decrease in firearm homicides was offset by an increase in nonfirearm homicides. There was no evidence of an association between modified KI and nonfirearm homicides. The lack of association could indicate different causal mechanisms in firearm and nonfirearm homicides. This idea is supported by differences in the trends in rates. Age-adjusted rates of nonfirearm homicides have remained relatively stable with some declines, in contrast to an overall increase in firearm homicides during the same period, primarily since 2015.[23] The absence of an association could also be caused by a lack of power as the majority of homicides in the U.S. are by firearm (81% in 2021).[23] Future research could explore these differences in association.

Limitations

States with higher KIs may be different than states with lower KIs in ways that may also impact firearm homicide rates. State fixed effects were used to account for time invariant differences between states, however there may be other time-varying confounders. This study employed a2-way fixed effects approach, which has had recent methodological advancements.[38–40,] Applications of these advancements with continuous "treatment" variables are not currently applicable to modeling variables with the properties of the KI.[41]

This study additionally did not consider local MW ordinances, thus inferences drawn apply only to applicable state and federal MW. State-level firearm ownership quartile variables were produced with data only available through 2016 and applied through 2020, which could result in some measurement error. However, examination of these estimates suggest the state quartile variables were relatively stable over time. This study also could not assess spillover effects, whereby MW changes in nearby states could impact firearm homicides in a given state. Additionally, this study was unableto explore the effects for other groups disproportionately impacted by firearm homicide, such as Indigenous populations, due to data availability and limitations. Two large events happened in this period, the federal MW increase between 2007 and 2009 and the beginning of the COVID-19 pandemic within the U.S. in 2020. The increase in federal MW was accounted for by the KI. A sensitivity analysis that excluded the 2020 spike in the firearm homicide rate found similar associations as the main model. This ecological study cannot determine causality and is unable to examine the various mechanisms by which MW may be associated with firearm homicides or be interpreted at the individual level. Future studies may continue to explore these relationships and consider factors that modify these associations.

CONCLUSIONS

Aligning state MW closer to a state's median income may be a potential policy lever for policymakers to consider when exploring options for reducing firearm homicides. Future studies may continue to examine how MW is associated with firearm homicides and other forms of violence, as well as the equity implications.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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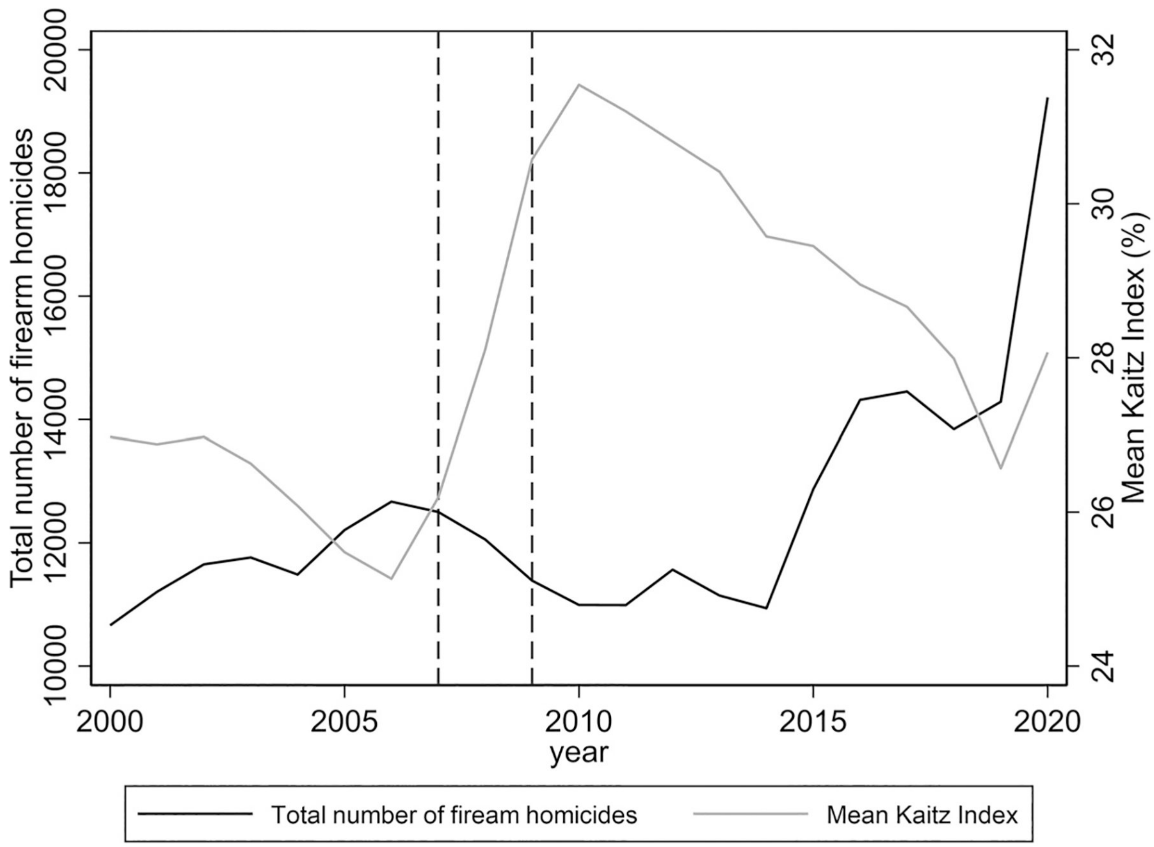

Figure 1.
Number of firearm homicides and the mean state-level Kaitz Index in the 50 states, 2000–2020.

Table 1.

Association Between State-Level Kaitz Index and the Number of Firearm Homicides[a], 2000–2020.

Model	% Change in firearm homicides associated with 1pp change in the Kaitz Index (%) (95% CI)
Main model[b] (N=1,050)	**−1.3%** ** (−2.1% to −0.5%)
Main model without 2020[b] (N=1,000)	**−1.2%** ** (−2.1% to −0.3%)
MSA specific models	
Resident of a non-MSA (N=987)	−0.2% (−1.0% to +0.6%)
Resident of a MSA(N=1,050)	**−1.5%** ** (−2.4% to −0.5%)
Race/ethnicity specific models	
Non-Hispanic Black decedent (N=1,050)	**−1.3%** ** (−2.2% to −0.5%)
Non-Hispanic White decedent (N=1,050)	**−0.8%** * (−1.6% to −0.1%)
Hispanic decedent (N=1,050)	**−2.4%** ** (−3.6% to −1.2%)
Sex specific models	
Male decedent (N=1,050)	**−1.3%** ** (−2.1% to −0.5%)
Female decedent (N=1,050)	**−1.1%** ** (−1.9% to −0.3%)
Age specific models	
Decedent <25 years (N=1,050)	**−1.8%** ** (−2.8% to −0.7%)
Decedent ≥ 25 years (N=1,050)	**−1.0%** ** (−1.8% to −0.3%)

Note: Boldface indicates statistical significance (*p<= 0.05, **p<=0.01).

For all models, robust standard errors were estimated, clustered at the state-level. Stratified models excluded covariate that aligned with offset variable (e.g., male decedent model used male population as model offset and excluded % of population that is male in model specification).

CI = Confidence Interval; IRR = Incidence Rate Ratio; MSA = Metropolitan Statistical Area; PP = Percentage Point.

[a] Data from the 2000 to 2020 multiple-cause-of death mortality data from the National Vital Statistics System where firearm homicides were defined as an ICD-10 code of X93-X95 or U01.4 in the underlying cause of death field.

[b] Additional model covariates included Permit to Purchase Policies, Stand Your Ground Laws, Child Access Prevention Laws, Comprehensive Background Check Policies, and Concealed Carry Laws, percent of the state population in a MSA, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic White persons, non-Hispanic Black persons, and Hispanic persons, persons between the ages of 15 and 24, persons that held a bachelor’s degree, and persons that were married, year fixed effects, and state fixed effects.

Table 2.

Association Between State-Level Kaitz Index and the Number of Firearm Homicides[a] by Quartiles of Firearm Ownership, 2000–2020.

Model	Lowest ownership (%) (95% CI)	Second lowest ownership (%) (95% CI)	Second highest ownership (%) (95% CI)	Highest ownership (%) (95% CI)
Main model[b]	−0.3% (−2.0% to +1.3%)	**−1.8%** ** (−3.0% to −0.7%)	**−1.5%** ** (−2.3% to −0.6%)	**−1.1%** ** (−1.8% to −0.3%)
MSA specific models				
Resident of a non–MSA[c]	+0.9% (−0.4% to +2.3%)	+0.1% (−1.2% to +1.5%)	−0.9% (−2.0% to +0.1%)	−0.3% (−1.3% to +0.6%)
Resident of a MSA	−0.4% (−2.2% to +1.3%)	**−2.1%** ** (−3.4% to −0.7%)	**−1.5%** ** (−2.4% to −0.6%)	**−1.4%** ** (−2.3% to −0.5%)
Race/ethnicity specific models				
Non-Hispanic Black decedent	−0.0%[d] (−1.5% to +1.5%)	**−2.0%** ** (−3.2% to −0.8%)	**−1.6%** ** (−2.8% to −0.4%)	**−1.3%** * (−2.2% to −0.3%)
Non-Hispanic White decedent	−0.8% (−2.3% to +0.7%)	−0.7% (−1.9% to +0.5%)	**−1.0%** ** (−1.7% to −0.3%)	**−0.9%** * (−1.7% to −0.1%)
Hispanic decedent	−0.8% (−2.7% to +1.1%)	**−2.5%** ** (−4.1% to −0.9%)	**−5.1%** ** (−6.6% to −3.6%)	−1.0% (−4.2% to +2.4%)
Sex specific models				
Male decedent	−0.3% (−1.9% to +1.4%)	**−1.9%** ** (−3.2% to −0.6%)	**−1.5%** ** (−2.4% to −0.7%)	**−0.9%** * (−1.8% to −0.1%)
Female decedent	−0.6% (−2.2% to +1.0%)	**−1.4%** * (−2.5% to −0.3%)	−0.8% (−1.9% to +0.2%)	**−1.1%** ** (−2.0% to −0.3%)
Age specific models				
Decedent <25 years	+0.0%[d] (−2.0% to +2.1%)	**−2.7%** ** (−4.1% to −1.3%)	**−2.2%** ** (−3.4% to −1.1%)	−1.3% (−2.7% to +0.1%)
Decedent ≥ 25 years	−0.6% (−2.1% to +0.9%)	**−1.4%** * (−2.5% to −0.2%)	**−0.9%** * (−1.7% to −0.2%)	**−0.9%** ** (−1.6% to −0.3%)

Note: Boldface indicates statistical significance *p<= 0.05, **p<=0.01.

For all models, robust standard errors were estimated, clustered at the state-level. Stratified models excluded covariate that aligned with offset variable (e.g., male decedent model used male population as model offset and excluded % of population that is male in model specification). N=1,050 unless otherwise specified.

CI = confidence interval; MSA= Metropolitan Statistical Area.

[a]Data from the 2000 to 2020 multiple-cause-of death mortality data from the National Vital Statistics System where firearm homicides were defined as an ICD-10 code of X93–X95 or U01.4 in the underlying cause of death field.

[b]Additional model covariates included Permit to Purchase Policies, Stand Your Ground Laws, Child Access Prevention Laws, Comprehensive Background Check Policies, Concealed Carry Laws, percent of the state population in an MSA, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic White persons, non-Hispanic Black persons, and Hispanic persons, persons between the ages of 15 and 24, persons that held a bachelor's degree, and persons that were married, year fixed effects, and state fixed effects.

[c]N=987, missing values reflect not all states have non-MSA areas.

[d]Due to rounding, additional digits after the 10th decimal place are not shown and appear as "0.0".

Table 3.

Association Between State-Level Kaitz Index and the Number of Nonfirearm Homicides[a,b], 2000–2020.

Model	% Change in nonfirearm Homicides Associated with 1pp change in the Kaitz Index (%) (95% CI)
Main model[d]	−0.2% (−0.7% to +0.3%)
MSA specific models	
Resident of a non-MSA[e]	−0.3% (−1.5% to +0.8%)
Resident of a MSA	+0.0[c]% (−0.4% to +0.5%)
Race/ethnicity specific models	
Non-Hispanic Black decedent	−0.2% (−0.8% to +0.4%)
Non-Hispanic White decedent	+0.1% (−0.6% to +0.8%)
Hispanic decedent	+0.3% (−0.3% to +1.0%)
Sex specific models	
Male decedent	−0.2% (−0.8% to +0.3%)
Female decedent	−0.2% (−0.9% to +0.5%)
Age specific models	
Decedent <25 years	−0.7% (−1.5% to +0.0%[c])
Decedent ≥ 25 years	+0.0%[c] (−0.5% to +0.6%)

Note: Boldface indicates statistical significance *p<= 0.05, **p<=0.01.

For all models, robust standard errors were estimated, clustered at the state-level. Stratified models excluded covariate that aligned with offset variable (e.g., male decedent model used male population as model offset and excluded % of population that is male in model specification). N=1,050 unless otherwise specified.

CI = confidence interval; MSA = Metropolitan Statistical Area; PP = percentage point.

[a]Data from the 2000 to 2020 multiple-cause-of death mortality data from the National Vital Statistics System where Firearm homicides were defined as an ICD-10 code of X93–X95 or U01.4 in the underlying cause of death field. Homicides were defined as an ICD-10 code of X85–Y09, Y87.1, or U01–U02 in the underlying cause of death field. Nonfirearm homicides were identified by subtracting firearm homicides from total homicides.

[b]New York and New Jersey in 2001 excluded due to the 9/11 terrorist attacks

[c]Due to rounding, additional digits after the 10th decimal place are not shown and appears as “0.0.”

[d]Additional model covariates included the percent of population in an MSA, percent of the state population consisting of male persons, percent of the state population consisting of non-Hispanic White persons, non-Hispanic Black persons, and Hispanic persons, persons between the ages of 15 and 24 years, persons that held a bachelor’s degree, and persons that were married, year fixed effects, and state fixed effects.

[e]N=987, missing values reflect not all states have non-MSA areas.