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Firearm Availability and Police Shootings: A City-Level Analysis of Fatal and Injurious Shootings in California and Florida

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Do rates of guns lost/stolen as well as licensed gun dealers influence police shootings of citizens?

Introduction

Presence of a weapon (firearm) = one of the strongest, most consistent correlates of police shootings of citizens
-Individual- and encounter/situational-levels

Ecological (state-by-state comparison)
Rates of fatal police shootings **higher** in states with:
-greater household firearms ownership (Hemenway et al., 2018; Nagin, 2020)
-relaxed laws regulating guns, such as permitless concealed carry for citizens (Doucette et al., in press)

Rates of fatal police shootings **lower** in states with:
-laws aimed at strengthening background checks, promoting safe storage, and reducing gun trafficking (Kivisto et al., 2018)

Gaps in Prior Literature

1) Vast majority of studies focus exclusively on *fatal* police shootings of citizens
-fatalities represent a subset of deadly force: "any physical force that is capable and likely to kill"

2) Studies that use states or counties as the unit of analysis suffer from "ecological fallacy"
-more opportunity to conceal variation across geographic space that is less visible at larger levels of aggregation

3) Studies on the topic have relied on a wide variety of measures of firearm access and availability (usually proxy measures; e.g., proportion of suicides committed with a gun)
-no study has used separate measures to differentiate between legal access to guns versus illicit weapons through secondary markets

Data & Measures

253 jurisdictions in California and Florida (city = unit of analysis)

DVs: pooled rates of fatal and injurious police shootings of citizens per 100k
-California: URSUS (2016-2021)
-Florida: Tampa Bay Times' "Why Cops Shoot" database (2009-2014)

IVs: 1) Rates of guns reported lost and stolen to police per 1,000 residents
-The Trace's "Missing Pieces" (2010-2015)

2) Rates of federally-licensed gun stores (ATF) per 100k residents

Controls: concentrated disadvantage, gun homicide rate, percentage Black population, percentage Hispanic population, dummy variable for state

8/10 highest rates of police shootings in Florida (r = .32; p < .001)
10/10 highest rates of guns stores in Florida

Table 1 Summary Statistics

Variables	*Mean (SD)*	*Range*
Dependent Variables		
Citizens Shot Rate	5.08 (5.07)	0 – 41.92
Shooting Incidents Rate	4.93 (4.81)	0 – 38.11
Independent Variables		
Guns Lost or Stolen Rate	0.39 (0.33)	0.04 – 2.03
Gun Store Rate	6.37 (11.21)	0 – 89.47
(Sub-Sample of Jurisdictions with Gun Stores)		
FFL1 Per 100k	8.61 (10.44)	0 – 79.65
FFL 2 Per 100k	1.38 (3.37)	0 – 28.58
Big Box Stores Per 100k	1.00 (1.28)	0 – 10.64
Controls		
Concentrated Disadvantage	0 (1)	-2.80 – 2.71
Gun Homicide Rate	1.08 (0.91)	0 – 3.71
Percent Black	8.87 (11.83)	0 – 76.54
Percent Hispanic	33.28 (22.89)	3.02 – 98.28
State	.23 (--)	0 – 1

Analytical Plan & Findings

Series of OLS regression models (DVs = log transformed)
-Full sample followed by sub-sample of jurisdictions with gun stores

FFL1 (local gun dealers), FFL2 (pawnshops), Big Box (Walmart, Bass Pro, & Cabela's)

Table 3 – Multivariate Analyses (Full Sample)

Variable	Model 1 Citizens Shot Rate *b* (SE) [β]	Model 2 Citizens Shot Rate *b* (SE) [β]	Model 3 Citizens Shot Rate *b* (SE) [β]	Model 4 Shooting Incident Rate *b* (SE) [β]	Model 5 Shooting Incident Rate *b* (SE) [β]	Model 6 Shooting Incident Rate *b* (SE) [β]
Guns Lost or Stolen Rate	.21 (.14) [.09]	--	.21 (.14) [.08]	.17 (.14) [.07]	--	.16(.13)[.07]
Gun Stores Rate	--	.01⁺ (.01) [.19]	.01⁺ (.01) [.17]	--	.01⁺ (.01) [.19]	.01⁺(.01)[.18]
Concentrated Disadvantage	.42*** (.07) [.50]	.40***(.07)[.47]	.36***(.07)[.43]	.44***(.07)[.53]	.41***(.07)[.49]	.37***(.07)[.45]
Gun Homicide Rate	.19** (.07) [.21]	.18**(.07) [.19]	.17⁺ (.07) [.18]	.19**(.07) [.21]	.17⁺ (.07) [.19]	.17⁺(.07)[.18]
Percent Black	-.01**(.00)[-.21]	-.01 (.01)[-.12]	-.00 (.01)[-.14]	-.01**(.00)[-.20]	-.01(.01) [-.11]	-.01(.01)[-.13]
Percent Hispanic	-.00 (.00) [-.11]	-.00 (.00)[-.05]	-.00 (.00)[-.03]	-.00 (.00) [-.13]	-.00(.00) [-.07]	-.00(.00)[-.05]
State	.38** (.13) [.20]	.15 (.15) [.08]	.24 (.15) [.12]	.32* (.13) [.17]	.10 (.15) [.05]	.18 (.14) [.09]
F-test	26.94***	28.53***	24.88***	26.38***	28.91***	24.59***
R-squared	.36	.38	.38	.35	.38	.37
N	233	242	233	233	242	233

Note: Entries include unstandardized coefficients (*b*) and standardized coefficients (β) in brackets with standard errors (SE) in parentheses.
+p < .10; *p < .05; **p < .01; ***p < .001 (two-tailed test).

Table 4 – Multivariate Analyses (Sub-Sample of Jurisdictions with Gun Stores)

Variable	Model 1 Citizens Shot Rate *b* (SE) [β]	Model 2 Citizens Shot Rate *b* (SE) [β]	Model 3 Citizens Shot Rate *b* (SE) [β]	Model 4 Shooting Incident Rate *b* (SE) [β]	Model 5 Shooting Incident Rate *b* (SE) [β]	Model 6 Shooting Incident Rate *b* (SE) [β]
Guns Lost or Stolen Rate	.24* (.12) [.12]	.32* (.14) [.16]	.24 (.15) [.11]	.19⁺ (.11) [.09]	.27⁺ (.14) [.13]	.18 (.14) [.09]
FFL1 Rate	.02* (.01) [.22]	--	--	.02* (.01) [.24]	--	--
FFL 2 Rate	--	.06**(.02) [.25]	--	--	.06**(.02) [.26]	--
Big Box Store Rate	--	--	.09* (.04) [.16]	--	--	.10* (.04) [.17]
Concentrated Disadvantage	.33***(.08)[.39]	.34***(.08)[.41]	.36***(.08)[.44]	.33***(.08) [.41]	.35***(.08)[.42]	.37*** (.08) [.45]
Gun Homicide Rate	.20* (.08) [.22]	.21**(.07) [.23]	.21**(.07) [.24]	.20* (.08) [.22]	.20**(.07) [.23]	.21** (.07) [.24]
Percent Black	-.00 (.01) [-.08]	-.01 (.01)[-.13]	-.01(.01) [-.12]	-.00 (.01) [-.06]	-.01(.01) [-.12]	-.01 (.01) [-.10]
Percent Hispanic	-.00 (.00) [-.03]	-.00 (.00)[-.07]	-.01(.00) [-.07]	-.00 (.00) [-.05]	-.00(.00) [-.09]	-.00 (.00) [-.09]
State	.08 (.14) [.05]	.01 (.14) [.01]	.18 (.13) [.11]	.03 (.13) [.02]	-.04(.14) [-.02]	.13 (.13) [.08]
F-test	18.60***	18.36***	16.89***	18.09***	17.88***	16.60***
R-squared	.46	.47	.45	.46	.47	.44
N	152	152	154	152	152	154

Note: Entries include unstandardized coefficients (*b*) and standardized coefficients (β) in brackets with standard errors (SE) in parentheses.
+p < .10; *p < .05; **p < .01; ***p < .001 (two-tailed test).

Conclusion

Rates of citizens shot by police are heightened in jurisdictions with higher rates of licensed gun stores; less evidence of connection with illicit firearms availability

*Audit licensed dealers (only 12-40% audited by ATF)

This paper is currently under review at Injury Epidemiology.

This study relied on publicly available data from: The Trace's "Missing Pieces"; the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF); California's "URSUS" system for use of force reporting; the Tampa Bay Times' "Why Cops Shoot" database; and the US Census Bureau.