

The diffusion of punitive firearm preemption laws across US states

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Abstract

Introduction: Firearm violence is a public health crisis. The majority of states prohibit local firearm laws but some states have laws which allow for lawsuits and other penalties against local governments and lawmakers who pass firearm laws deemed preempted. These punitive firearm preemptive laws may reduce firearm policy innovation, discussion and adoption beyond preemption alone. Yet, it is unknown how these laws spread from state to state.

Methods: In 2022, using an event history analysis framework with state dyads, logistic regression models estimate factors associated with adoption and diffusion of firearm punitive preemption laws, including state-level demographic, economic, legal, political, population and state-neighbor factors.

Results: As of 2021, 15 states had punitive firearm preemption laws. Higher numbers of background checks (AOR =1.50; 95% CI 1.15, 2.04), more conservative government ideology (AOR 7.79; 95% CI 2.05, 35.02), lower per capita income (AOR 0.16; 95% CI 0.05, 0.44), a higher number of permissive state firearm laws (AOR 2.75; 95% CI 1.57, 5.30) and neighboring state passage of the law (AOR 3.97; 95% CI 1.52, 11.51) were associated with law adoption.

Conclusions: Both internal and external state factors predict the adoption of punitive firearm preemption. This study may provide insight into which states are susceptible to adoption in the future. Advocates, especially in neighboring states without such laws, may want to focus their firearm safety policy efforts on opposing passage of punitive firearm preemption.

Introduction

In 2021, more than 45,000 people died of firearm related injuries. Firearm-related deaths varied widely across the states, with the highest firearm-related death rates in Mississippi (28.6 per 100,000 people) and Louisiana (26.3), and the lowest rates in Hawaii (3.4) and Massachusetts (3.7).¹ These differences may be partially attributed to state law variation, among other factors.²

In light of the increase in firearm violence nationally, attention to firearm access, use, and regulation has risen to the top of the federal, state and local policy agendas.

In the US, states are the primary regulators of firearms. Most states have a variety of firearm-related laws, with the majority having laws that, on balance, support a gun-rights framework (that is, facilitating gun acquisition, carry and use).³ In addition to these substantive firearm laws (that is, laws governing the rights and obligations of individuals such as requiring background checks, allowing carrying of concealed firearms), 45 states preempt or prohibit local governments from enacting their own firearm-related laws.³ Preemption, or ceiling preemption, occurs when a higher level of government removes the authority of a lower level of government to enact laws on a specific topic. Preemption thus limits the ability of local governments to respond to demands from their constituents to pass policies on such topics, which may discourage local innovation and forestall “bottom-up diffusion,” the process by which successful local initiatives may lead to state uptake.⁴

In theory, states can preempt local control over any type of firearm-related law, but in practice preemption has almost universally been used to block municipalities from enacting laws that restrict firearm acquisition, carry and use. Moreover, states have passed an even more extreme

form of preemption, “punitive firearm preemption laws”.³ In this paper, punitive firearm preemption laws (hereafter, “punitive preemption”) are defined as laws that provide standing to individuals or membership organizations to sue local governments or officials for passing firearm-related laws that the plaintiff deems preempted or that they believe are preempted and adversely effects them.⁵ Punitive preemption laws also include laws that specifically authorize the state attorney general to sue (or individuals or membership organizations to petition the state attorney general to sue) local governments or officials for passing firearm-related laws that the aggrieved entity considers to have been preempted, or for legislators to strip or deny funding from local governments should they pass laws deemed preempted.⁵ Some of these statutes also include specific measures such as fines, legal liability, and even removal of the elected official from office.⁵ Punitive preemption thus enhances the effect of state preemption and actually started the modern trend of state governments’ support of private litigation to enforce their most controversial laws.^{6, 7}

Scores of policy diffusion studies have yielded evidence explaining why public policies spread across states.⁸ The main theories of policy diffusion include emulation (where one state simply follows the actions of a nearby state), policy learning (where one state sees the impact or benefits of a policy enacted in another state) and interstate competition (particularly when spillover effects lead to positive or negative consequences for nearby states). Typically, studies of policy diffusion have focused on internal factors (preferences, capacities, legislative professionalism, and needs within a state), external factors (macroeconomic, federal, or regional developments) and go-betweens (factors that act across multiple governments levels).⁹ These studies have identified a number of common factors frequently associated with the diffusion of policies across

states, including characteristics of the state population, political orientation and governmental context, presence of other laws within the same policy domain, and whether neighboring states have adopted such policies.⁹ However, no study has investigated the diffusion of laws specifically designed to discourage within-state policy adoption. Thus, this study investigates the diffusion of punitive firearm preemption laws across states during the period of rapid expansion of such laws, utilizing a new legal dataset.

Methods

Study Population

This is a longitudinal analysis of U.S. states from 2009-2018.

Measures

Data on punitive firearm preemption laws were sourced from statutes collated by the Giffords Law Center to Prevent Gun Violence in 2019.^{10, 11} One author with legal training retrieved sourced statutes and all others within the same code sections from Lexis+ that were in effect 2009-2018. Relevant to the current study, preemptive laws were coded for the presence of both ceiling and punitive preemption.^{3, 11} Statutes were coded per the standard in the field, by capturing laws in effect 2009-2018 and identifying the effective date for each law in each state, as well as other features of the laws (e.g., who could be sued, whether fines could be assessed).¹² In 2022, the same author revisited the legal statutes and confirmed that no additional punitive firearm preemption laws were enacted through December 31, 2021.

Publicly available data were obtained for state characteristics for every state and every year, 2009-2018, the period when these laws rapidly diffused. Consistent with prior work on policy diffusion, our dataset includes state political, demographic and economic characteristics hypothesized to be associated with policy adoption, collected for each year.^{8, 9} First, validated measures of state government and citizen political ideology (using state policy scales ranging from 0 to 100, where higher values indicate a more liberal orientation) were included because different ideological orientations may behave affect state law adoption behaviors.^{13, 14} Legislative professionalism is measured using the Squire index, which is derived from variables including length of time in session, payment for legislators, and presence of professional staff and is included as a measure of state legislative volume and capacity.¹⁵ State resources are operationalized by income per capita and overall population size (both from the U.S. Census Bureau). The unemployment rate (from the Census Bureau) has been associated with crime rates in some studies ^{16, 17} and homicides per 100,000 (from the Federal Bureau of Investigation) represent highly visible crimes. Both are theorized to be linked to citizen desires for greater (or lesser, depending on the state) firearm ownership¹⁸. Background checks per capita (also from the FBI) serve as a proxy measure for the number of (legal) firearms in the state.^{19, 20} A measure was created to capture the number of neighbors (states with contiguous borders) each state has that have already adopted punitive preemption, given evidence that firearm laws (much like other types of laws) are more likely to be adopted by a state if their neighbors have already adopted the law.²¹ Finally, to capture the prevailing state legal environment regarding firearms, a measure of the total number of firearm laws (out of a possible total of 60) that are considered to be permissive (that is laws that make it easier to obtain, carry and use a firearm) was developed for

each state in each year, 2009-2018. These data were obtained from the RAND corporation's online repository of state firearm laws.²²

This study has no human subjects.

Statistical analysis

Event history analysis (EHA) was used to model predictors of adoption of punitive preemption laws in each state. In this approach, at the beginning of the period (2009) states without the law are considered “at risk” for adopting the law and are classified as “sending” states once they have adopted it.²³ Event history models with time-varying covariates can be estimated via logistic regression once the dataset has been appropriately ordered.²⁴ The data were further modified to contain directed dyads, which consist of a panel of state pairs for each year. This allows each state to be compared to every other state, rather than simply to the grand mean as in standard regression analysis.²⁵ Dyadic EHA analysis was then performed to obtain parameter estimates for covariates by creating dyads, or state pairs, based on whether the state's relationship in each dyad is that of a “sender” meaning that it has already adopted punitive preemption and can now diffuse it to the other state in its pair, or a “receiver” meaning that the state has not yet adopted punitive preemption, but could do so if exposed to a “sending” state. Each state that has adopted punitive firearm preemption is thus paired with every state that has not done so, while dyads where both states have the law or where neither state does are dropped for each year that this occurs. This approach, termed “conditional dyadic EHA”,²⁶ allows for better understanding of whether the effect of the covariates identified above differ based on the role of the state in the dyad. The model is estimated using standard errors that are clustered on the receiver state to account any particular dyad being observed over multiple years²⁶ and duration dependence is modeled through inclusion of linear and quadratic terms for time.²⁷ Multicollinearity was

assessed using the Variance Inflation Factor (VIF) and was found to be within acceptable limits (<2.0). Overall model fit is assessed by the Akaike Information Criterion (AIC) statistic, where lower values indicate better model fit and the Area Under the Curve (AUC), where higher values indicate better fit.

Finally, to illustrate the substantive meaning of our final regression models, predicted probabilities, calculated as marginal effects with other covariates held at their means, were computed from the logistic regression results and graphically displayed.

Analyses were conducted using R (version 4.05) with a significance level set to 0.05 and below.

Results

Fifteen punitive firearm preemption laws were identified from legal statutes. See Appendix Table 1 for a summary of the laws. Thirteen laws became effective between 2011 and 2017, a period of rapid diffusion. Of the total, 11 state laws permitted lawsuits by membership organizations or individuals against local governments and 4 permitted lawsuits by membership organizations or individuals against local officials themselves. Two states' laws provided liability for local governments and 2 different states' laws provided liability to local officials for specific monetary fines or penalties. Further, 2 state laws expressly permitted local officials to be removed from office. One state's law permitted individuals and membership organizations to petition the state attorney general to sue local governments and officials for violating the state's firearm preemption statutes. See Figure 1 for a map of all identified state firearm punitive preemption laws and the year in which each state's law became effective.

Table 1 presents average state characteristics for the beginning and end of the time period. Between 2009 and 2018, the unemployment rate across states fell significantly ($p<0.001$) from 8.45% to 3.73%. Median income per capita rose significantly ($p<0.001$) from \$49,791 to \$63,984. The number of firearm preemption laws grew from 0 in 2009 to 1.44 on average across these states ($p<0.0001$). Notably, significant changes were not observed in either citizen or government ideology, the average number of permissive gun laws, background checks per capita, or the homicide rate across states.

Table 2 presents EHA models that estimate the effects of covariates on states being either a sender or receiver of punitive preemption laws. More liberal government ideology is negatively associated with being a sending state (adjusted Odds Ratio (OR)=0.61; 95% Confidence Interval (CI)=0.24, 0.96), but not with being a receiving state, once other factors are controlled. Having a neighbor that has already enacted punitive preemption increases the odds (OR=3.97; CI=1.52, 11.51) that a receiving state will adopt this policy. Income per capita is negatively associated with being a receiving and a sending state (OR=0.16, 0.24, respectively). The Squire Index was not significantly associated with being either a sending or receiving state. Similar null findings were identified for homicides, population size and unemployment. Background checks per capita are positively associated (OR=1.50; CI=1.15, 2.04) with being a sending and receiving state, except in the final model where background checks for receiving states are no longer statistically significant. More liberal citizen ideology is negatively associated with being a sending state (OR=7.79; CI=2.05, 35.02), while it is positively associated with being a receiving state (OR=0.39; CI=.065, 0.87). The number of previously adopted permissive firearm laws in the state is positively associated (OR=2.75; CI=1.57, 5.30) with being a receiving state.

Figure 2 displays predicted probabilities from the best-fitting model (model 4) from Table 2. Probabilities are stratified by the number of a state's neighbors that have adopted the law as well by the number of permissive firearms laws that the state has already adopted. The left panel shows that there is an overall low likelihood of adopting punitive preemption laws if the state has no permissive firearm laws in place and no other neighboring states have already adopted this law. The middle panel shows the predicted probability of adopting punitive preemption laws when the state has three permissive firearm laws already in place. The predicted probability of adoption increases as the number of background checks per capita and the number of neighboring states with the law increases. In the right-hand panel, we see that in states with five or more permissive firearm laws the predicted probability of passing punitive preemption laws increases as a function of both background checks per capita and the number of neighbors with the law. For states that have the highest number of background checks per capita the likelihood of adopting punitive preemption is 21% if two neighbors also have the law. This probability is reduced to only 5% if only one neighbor has the law and approximately 1% if no neighboring states have previously adopted punitive preemption laws.

Discussion

This study finds that both internal and external factors were associated with the diffusion of punitive firearm preemption laws. Results suggest that punitive preemption is being adopted by states that already have a more permissive approach to firearm regulation and where guns are plentiful. The number of permissive firearm laws a state had already adopted and the number of guns in the state increased the odds of being an early adopter of punitive preemption (that is,

being a “sender” state). Notably, even when models controlled for the number of permissive gun laws in the state, along with the other covariates, the number of guns within the state increased the odds of adopting punitive preemption.

Several internal political and economic factors also were significant predictors of policy adoption: more conservative states, whether measured by government or citizen ideology, had higher odds of having adopted punitive preemption, as did poorer states, consistent with other health policy diffusion studies²⁸. Greater numbers of background checks in the state (a measure of demand or support for firearms) were found to be positively associated with punitive preemption law adoption.

Study results also support the neighbor state hypothesis: whether because of emulation, learning, or competition, the behavior of neighboring states influences state policy choices. Here, having two or more neighboring states with punitive firearm preemption increased the odds of a state adopting the law more than four-fold. It may be that localities in neighboring states that pass restrictive laws create pressures for surrounding states to also pass punitive preemption laws to forestall such action, but this is an area for future research.

Previous research found that the majority of state gun laws included in this study have been in place for decades, and relatively few new permissive, restrictive or preemption laws were passed during the study period with the major exception of punitive preemption.³ While evidence is still emerging, a few studies have found negative associations between the number of restrictive gun

laws and firearm mortality²⁹⁻³². Despite this evidence, in passing these laws state governments may be signaling their commitment to gun rights or responding to actual efforts by localities to pass gun control measures.

The National Rifle Association (NRA), a membership organization with standing to sue under punitive preemption laws, vigorously supports both preemption and punitive preemption. The NRA has argued that punitive preemption is necessary “to strengthen existing state firearms preemption statutes”, counter defiant localities and “provide a much-needed check on the radical impulses of local politicians... by providing a clear avenue” to enforce firearm preemption laws, while awarding the plaintiff damages.³³ Thus, punitive preemption seeks to prevent localities from considering or attempting to enact laws that may be perceived to weaken a state’s gun rights framework, and deter local officials from discussing such policy options with their constituents. Reports suggest punitive preemption has accomplished both goals.³⁴ Gun control advocates, especially in neighboring states without such laws, should focus their efforts on opposing passage of punitive preemption, as bills are still being proposed³⁵ and new protective laws may be out of reach after the Supreme Court’s decision striking down a New York State gun control law as unconstitutional.³⁶

Limitations

This study has several strengths, including the use of a new legal dataset and event history analysis (EHA) using state dyads to elucidate characteristics of both sending and receiving states. One limitation is that these models rely on assumptions of statistical independence. While the models controlled for state-level clustering, we cannot discount the possibility that the dependent

nature of interstate dynamics may have affected the results. Temporal autocorrelation was controlled by clustering standard errors on each state-state dyad, but models did not address possible geospatial autocorrelation. This study was also unable to directly assess the effects of punitive preemption laws or state-level differences in their effectiveness or enforcement. Finally, while not a limitation, there are other laws that may be considered punitive firearm preemption laws that did not fall into the definition used in this paper. States have passed laws that seek to punish state and local officials and government entities for restricting firearms during a state of emergency³⁷ or for implementing federal law (in essence seeking to nullify federal law)³⁸; the constitutionality of these latter laws are being evaluated by the courts.³⁹ Thus, because this study was limited to the laws that met our definition's inclusion criteria, future research may be warranted to evaluate the diffusion of additional punitive laws as well.

Conclusions

States' enactment of punitive firearm preemption laws is likely driven by both internal and external factors, among these the number of neighboring states that have enacted such laws. In light of the recent Supreme Court decision striking down a state's restrictive firearm law, state laws may move towards being more permissive, possibly increasing the likelihood of continued adoption of punitive preemption. As such, the room for innovative policymaking to address firearm safety at the local level may be imperiled.

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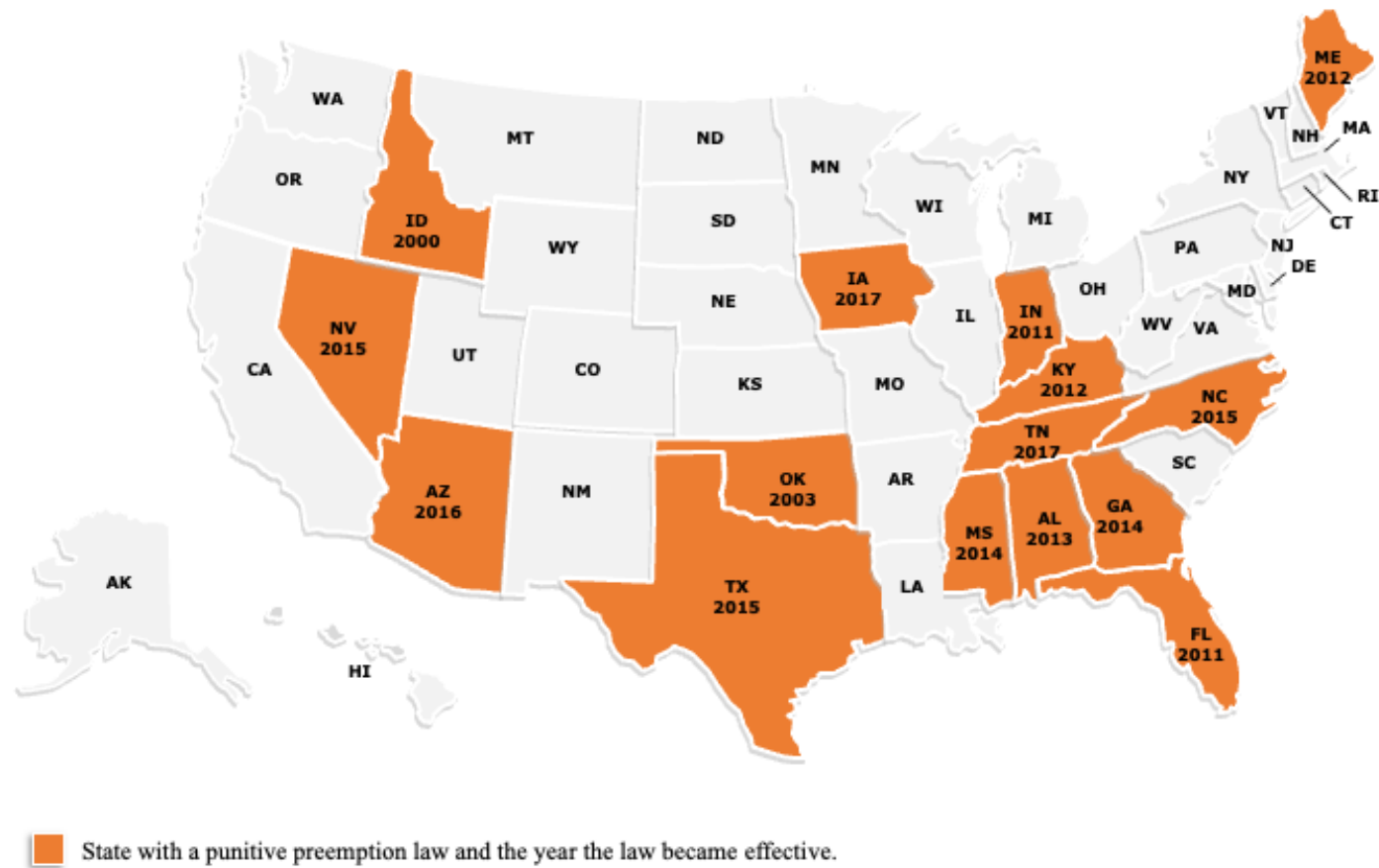
References

1. US Centers for Disease Control and Prevention. Firearm mortality by state. In; 2020.
2. Rand Corporation. Gun Policy Research Review: Research Review Methodology. April 22, 2020 July 22, 2022]; Available from: <https://www.rand.org/research/gun-policy/methodology.html>
3. Pomeranz JL, Silver D, Lieff SA. State Gun-Control, Gun-Rights, and Preemptive Firearm-Related Laws Across 50 US States for 2009-2018. *Am J Public Health* 2021;111(7):1273-1280.
4. Shipan CR, Volden C. Bottom-up Federalism: The Diffusion of Antismoking Policies from U.S. Cities to States. *American Journal of Political Science* 2006;50(4):825-843.
5. Briffault R. The challenge of the new preemption. *Stanford Law Rev* 2018;70:1995–2027.
6. Klibanoff E. Six months in, “no end in sight” for Texas’ new abortion law. *The Texas Tribune* March 1, 2022.
7. Wiley H. Newsom signs gun law modeled after Texas abortion ban, setting up Supreme Court fight. *Los Angeles Times* July 22, 2022.
8. Mallinson DJ. Growth and gaps: a meta-review of policy diffusion studies in the American states. *Policy & Politics* 2021;49(3):369-389.
9. Graham ER, Shipan CR, Volden C. The Diffusion of Policy Diffusion Research in Political Science. *British Journal of Political Science* 2013;43(3):673-701.
10. Giffords Law Center to Prevent Gun Violence. Preemption of Local Laws. In; 2020.
11. Silver D, Akiya K, Pagan J, Pomeranz JL. Selected State Preemption Laws Dataset 2009-2018. In. Ann Arbor, MI: Inter-university Consortium for Political and Social Research; 2022.
12. Presley D, Reinstein T, Webb-Barr D, Burris S. Creating legal data for public health monitoring and evaluation: delphi standards for policy surveillance. *J Law Med Ethics* 2015;43 Suppl 1:27-31.
13. Berry WD, Fording R, Ringquist E, Hanson R, Klarner C. Measuring Citizen and Government Ideology in the U.S. States: A Re-appraisal. *State Politics & Policy Quarterly* 2010;10(2):117-135.
14. Fording R. Updated & revised citizen and government ideology measures through 2016/2017 (6/19/2018). In; 2018.

- 326 15. Squire P. Measuring State Legislative Professionalism: The Squire Index Revisited. *State*
327 *Politics & Policy Quarterly* 2007;7(2):211-227.
- 328 16. Shihadeh ES, Barranco RE. Latino Immigration, Economic Deprivation, and Violence:
329 Regional Differences in the Effect of Linguistic Isolation. *Homicide Studies* 2010;14(3):336-
330 355.
- 331 17. Jones-Webb R, Wall M. Neighborhood Racial/Ethnic Concentration, Social
332 Disadvantage, and Homicide Risk: An Ecological Analysis of 10 U.S. Cities. *Journal of Urban*
333 *Health* 2008;85(5):662-676.
- 334 18. Porfiri M, Barak-Ventura R, Marín MR. Self-Protection versus Fear of Stricter Firearm
335 Regulations: Examining the Drivers of Firearm Acquisitions in the Aftermath of a Mass
336 Shooting. *Patterns* 2020;1(6):100082.
- 337 19. Kravitz-Wirtz N, Pallin R, Miller M, Azrael D, Wintemute GJ. Firearm ownership and
338 acquisition in California: findings from the 2018 California Safety and Well-being Survey. *Inj*
339 *Prev* 2020;26(6):516-523.
- 340 20. Ruddell R, Mays GL. State background checks and firearms homicides. *Journal of*
341 *criminal justice* 2005;33(2):127-136.
- 342 21. Clark DA, Macinko J, Porfiri M. What factors drive state firearm law adoption? An
343 application of exponential-family random graph models. *Soc Sci Med* 2022;305:115103.
- 344 22. Cherney S, Morral AR, Schell TL, Smucker S. Development of the RAND State Firearm
345 Law Database and Supporting Materials. Version 1.4, January 11, 2019.: RAND Corporation;
346 2019.
- 347 23. Berry FS, Berry W. Innovation and diffusion models in policy research. In: Sabatier P,
348 editor. *Theories of the policy process*, 2nd edition. Boulder, CO: Westview Press; 2007.
- 349 24. Box-Steffensmeier JM, Zorn CJW. Duration Models and Proportional Hazards in
350 *Political Science*. *American Journal of Political Science* 2001;45(October):951-67.
- 351 25. Volden C. States as Policy Laboratories: Emulating Success in the Children's Health
352 Insurance Program. *American Journal of Political Science* 2006;50(2):294-312.
- 353 26. Boehmke FJ. Policy Emulation or Policy Convergence? Potential Ambiguities in the
354 Dyadic Event History Approach to State Policy Emulation. *The Journal of Politics*
355 2009;71(3):1125-1140.

27. Box-Steffensmeier JM, Jones BS. Time is of the Essence: Event History Models in Political Science. *American Journal of Political Science* 1997;41(4):1414-1461.
28. Shipan CR, Volden C. Policy Diffusion: Seven Lessons for Scholars and Practitioners. *Public Administration Review* 2012;72(6):788-796.
29. Gunn JF, Boxer P, Andrews T, Ostermann M, Bonne SL, Gusmano M, et al. The Impact of Firearm Legislation on Firearm Deaths, 1991-2017. *J Public Health (Oxf)* 2022;44(3):614-624.
30. Kalesan B, Mobily ME, Keiser O, Fagan JA, Galea S. Firearm legislation and firearm mortality in the USA: a cross-sectional, state-level study. *Lancet* 2016;387(10030):1847-55.
31. Madhavan S, Taylor JS, Chandler JM, Staudenmayer KL, Chao SD. Firearm Legislation Stringency and Firearm-Related Fatalities among Children in the US. *Journal of the American College of Surgeons* 2019;229(2):150-157.
32. Choi KR, Saadi A, Takada S, Easterlin MC, Buchbinder LS, Johnson DC, et al. Longitudinal Associations Between Healthcare Resources, Policy, and Firearm-Related Suicide and Homicide from 2012 to 2016. *Journal of General Internal Medicine* 2020;35(7):2043-2049.
33. Blocher J. The Biggest Legal Obstacle to Gun Regulation: State Preemption Laws, Not the Second Amendment. *Am J Public Health* 2021;111(7):1192-1193.
34. Spies M. The N.R.A. Lobbyist Behind Florida's Pro-Gun Policies *The New Yorker* March 5, 2018.
35. Alaska State Legislature. AK H.B. 179. An Act relating to firearms and other weapons restrictions. In; 2021.
36. U.S Supreme Court. *New York State Rifle & Pistol Association, Inc. v. Bruen*, 597 In; 2022.
37. W. Va. Code § 15-5-19a. In.
38. Mo. Rev. Stat. §§ 1.410 — 1.485.
39. Thrush G. Justice Department Sues Missouri Over Expansive Gun-Rights Law. *The New York Times* February 16, 2022.

Figure 1: Map of States with Firearm Punitive Preemption Laws



Data source: Author's original legal research

Table 1: Descriptive characteristics of states, by year

Variable	2009	2018	p-value
Squire Index	0.19 (0.12)	0.19 (0.12)	1.0000
Unemployment rate, (%)	8.48 (1.98)	3.73 (0.79)	0.0000
Citizen ideology (0-100)	54.9 (16.10)	55.46 (15.76)	0.8606
Government Ideology (0-100)	50.14 (15.32)	50.32 (15.42)	0.9539
Mean income per capita (in US\$ 1,000s)	49.79 (7.56)	63.98 (10.01)	0.0000
Homicides per 100,000	24.79 (14.54)	24.31 (14.29)	0.8684
Population (in 1000s)	6.12 (6.79)	6.52 (7.36)	0.7803
Background checks per capita (count/1,000)	0.06 (0.07)	0.09 (0.15)	0.1310
Neighbors enacting punitive preemption laws (count)	0.00 (0.00)	1.44 (1.33)	0.0000
Permissive firearm laws (count)	3.18 (1.56)	3.6 (1.55)	0.1803

Notes: State covariate means with standard deviations in parenthesis.

P-value from paired t-test assessing if the covariate changed from 2009 to 2018. Values in bold are statistically significant ($p < 0.05$)

Table 2: Event history analysis models of punitive preemption diffusion, with sender (S) and receiver (R) covariates

Parameter	Model 1		Model 2		Model 3		Model 4	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Gov't ideology (R)	0.47*	(0.312 0.67)	0.49*	(0.33,0.19)	0.22	(0.06, 1.16)	0.32	(0.09, 1.37)
Gov't ideology (S)	0.42***	(0.27, 0.62)	0.42***	(0.27, 0.62)	0.54***	(0.22, 0.66)	0.61*	(0.24, 0.96)
Neighbor enacted (R)			2.59*	(1.58, 4.33)	2.99*	(1.26, 7.39)	3.97*	(1.52, 11.51)
Income (R)					0.23**	(0.08, 0.57)	0.16***	(0.05, 0.44)
Income (S)					0.27***	(0.09, 0.68)	0.24***	(0.08, 0.64)
Squire Index (R)					0.17	(0.02, 1.10)	0.42	(0.04, 1.80)
Squire Index (S)					1.42	(0.46,4.41)	1.84	(0.52, 6.89)
Homicides (R)					0.81	(0.28, 2.21)	0.63	(0.24, 1.72)
Homicides (S)					0.73	(0.36, 1.49)	0.68	(0.32, 1.42)
Background check(R)					1.65*	(1.28, 2.24)	1.50*	(1.15, 2.04)
Background check(S)					1.52***	(1.05, 2.16)	1.43***	(1.01, 2.14)
Population (R)					1.17	(0.30, 3.22)	0.54	(0.09, 1.77)
Population (S)					0.47	(0.06, 1.55)	0.36	(0.03, 1.40)
Citizen ideology (R)					3.43*	(1.07, 13.00)	7.79*	(2.05, 35.02)
Citizen ideology (S)					0.39**	(0.17, 0.86)	0.39*	(0.65, 0.87)
Unemployment (R)					2.295	(0.73, 6.75)	1.75	(0.48, 5.53)
Unemployment (S)					0.85	(0.34, 2.13)	0.81	(0.30, 2.11)
Permissive firearm laws (#) (R)							2.75**	(1.57, 5.30)
Permissive firearm laws (#) (S)							1.25	(0.74, 2.11)
AIC	491		479		252		242	
AUC	0.838		0.850		0.954		0.956	

Boldface indicates statistical significance *** p-value < 0.001, ** p-value < 0.01, * p-value < 0.05; Standard errors clustered on state dyad.

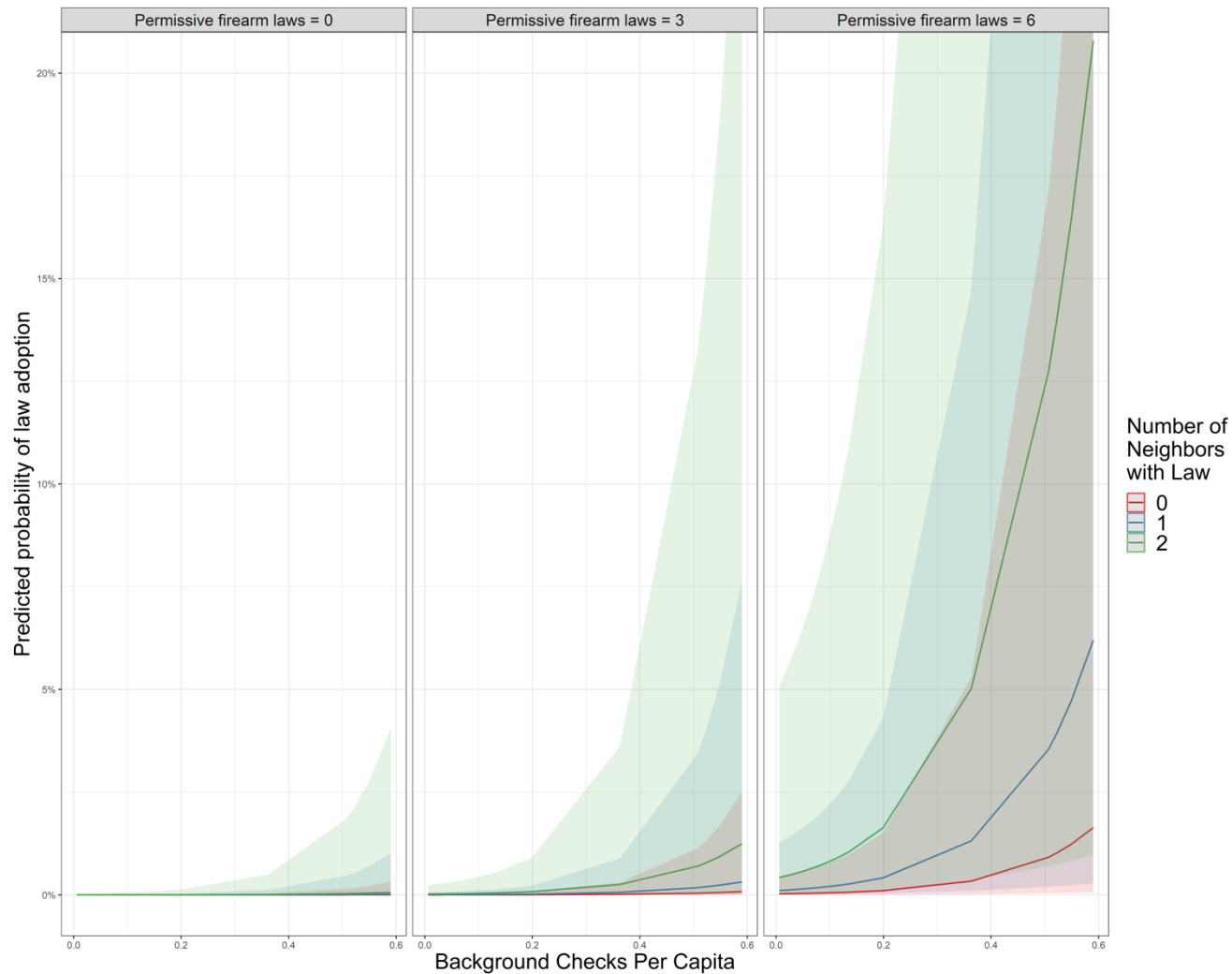
R= Receiving state (a state in the dyad/year that does not yet have the punitive preemption law); S = sending state (a state in the dyad/year that has already adopted the punitive preemption law).

Permissive laws = state laws that make it easier to obtain or use a firearm.

AIC = Akaike Information Criterion; AUC = area under the curve

Numbers are adjusted odds ratios (aOR) and their 95% confidence intervals (CI) from dyadic logistic regression event history analyses.

Figure 2: Predicted probability¹ of adoption of punitive firearm preemption laws, by state background checks, neighboring states with the law, and existing permissive firearm laws



Predicted probabilities calculated as marginal effects with all other covariates held at their mean from results of Model 4, Table 2.