State Background Check Laws and Gun Violence: Identifying the Most Effective Measures

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Abstract

This study investigates the relationship between individual components of state background check laws and firearm homicide rates across the 50 US states and the District of Columbia. Using cross-sectional data for 2023 and ordinary least squares regression analysis, the study examines whether specific background check provisions are associated with firearm homicide rates while controlling for socioeconomic, demographic, and public health factors, including drug abuse risk, mental illness prevalence, alcohol consumption, urbanization, and unemployment. The results indicate that laws requiring criminal background checks for firearm sales conducted by unlicensed sellers are significantly associated with lower firearm homicide rates. In contrast, permit-to-purchase requirements and waiting periods do not exhibit statistically significant associations after accounting for other factors. The analysis also identifies a significant positive relationship between drug abuse risk and firearm homicide rates, suggesting that broader social and public health conditions contribute to firearm violence alongside firearm regulations. These findings suggest that extending background check requirements to private and unlicensed firearm sales may represent one of the most impactful components of state background check policies. At the same time, the results highlight the importance of integrating firearm violence prevention efforts with substance abuse prevention and treatment strategies.

1. Introduction

Gun violence ranks among the foremost preventable causes of death and injury in the United States (US), with its incidence steadily increasing (Sauaia et al. 2022). In 2023 alone, nearly 50,000 people in the US lost their lives to gun violence (Gramlich 2023). In response, legislators at both the federal and state levels have enacted a range of bills aimed at curbing gun-related violence. However, such measures are often approached with caution due to the constraints of the Second Amendment and the politically polarized, highly contentious nature of gun regulation in the Unites States (Lemieux 2014). As a result, legislation must strike a careful balance between society's need to regulate firearms and individuals' rights to own them. Within this framework, each state has developed its own background check laws (BCL) aimed at preventing high-risk individuals from obtaining firearms. These statutes vary in their specific components and scope. Accordingly, this study empirically investigates which specific components of state BCL are the most consequential in affecting firearm homicide rates across US states. In doing so, this research contributes to the literature and equips policymakers with the evidence needed to prioritize the most impactful regulatory elements when designing or revising BCL.

2. Background

Gun purchases in the US are regulated by laws at both the federal and state levels. At the federal level, purchases from licensed dealers are subject to regulation. The primary federal framework begins with the National Firearms Act of 1934 (NFA) (Gifford Law Center, n.d.), which imposes a tax on the manufacture and transfer of certain firearms, including shotguns and rifles with barrels less than 18 inches in length, machine guns, firearm mufflers, and silencers. Additionally, the NFA requires that all covered firearms be registered with the Secretary of the Treasury.

On the other hand, the US Supreme Court in *Haynes v. United States* (1968) held that requiring individuals to register firearms under the NFA violated the Fifth Amendment because the registration requirement could be used in future prosecutions and therefore compelled individuals to incriminate themselves. The Court's decision in *Haynes* rendered portions of the NFA unenforceable (Bureau of Alcohol, Tobacco, Firearms and Explosives 2025).

In response to the constitutional concerns identified in the Supreme Court's decision in *Haynes v. United States* (1968), as well as high-profile assassinations, including those of President John F. Kennedy and civil rights leader Martin Luther King Jr., Congress enacted the Gun Control Act (GCA) in late 1968. The GCA addresses the constitutional issues associated with the National Firearms Act (NFA) and regulates both the firearms industry and firearm owners. First, the GCA eliminates the requirement that individuals register previously unregistered NFA firearms already in their possession and prohibits the use of information obtained through NFA registration or application processes as evidence in criminal proceedings for violations occurring before or at the time of registration. Second, the GCA requires individuals engaged in the business of manufacturing, importing, dealing in, or collecting firearms and ammunition to obtain a federal license. Third, the GCA prohibits certain categories of individuals, including persons convicted of crimes punishable by imprisonment for more than one year, fugitives from justice, unlawful drug users, and individuals adjudicated as mentally ill, from possessing or acquiring firearms and ammunition. Fourth, the GCA prohibits the sale of long guns to individuals under the age of 18 and handguns to individuals under the age of 21, as well as sales to persons who are not residents of the state in which the transaction occurs (Gun Control Act, 1968).

While the GCA prohibits certain individuals from purchasing or possessing firearms, it originally lacked an effective enforcement mechanism at the point of sale. There was no standardized or immediate background check system in place to verify a buyer's eligibility before completing a firearm purchase. To address this enforcement loophole, Congress enacted the Brady Handgun Violence Prevention Act (Brady Act) in 1993. The Brady Act established the National Instant Criminal Background Check System (NICS) and requires federally licensed firearms dealers to conduct background checks on prospective buyers to determine whether they are legally eligible to purchase firearms. Additionally, the Brady Act expanded the scope of the GCA by adding new categories of prohibited persons, including individuals unlawfully present in the United States, persons dishonorably discharged from the Armed Forces, individuals convicted of domestic violence offenses, and those subject to qualifying restraining orders, thereby substantially broadening the original set of disqualifying conditions (Brady Handgun Control 1993).

The most recent major revision to federal firearms legislation came with the Bipartisan Safer Communities Act of 2022. The Act expanded background-check requirements for purchasers under the age of 21 and provided funding to states to implement red-flag laws that allow courts to temporarily remove firearms from individuals deemed to pose a danger to themselves or others (Bipartisan Safer Communities Act 2022). The Act also increased penalties for firearms trafficking and straw purchasing, which occurs when an individual purchases a firearm on behalf of a person prohibited from possessing one. In sum, federal laws provide the foundation for nationwide standards in areas such as background checks, prohibited persons, and dealer licensing.

While federal legislation establishes the basic framework for firearm regulation, it leaves major gaps because it does not require background checks for firearms purchased at gun shows or through private, unlicensed sellers, transactions that make up a significant share of gun sales in the US (Siegel 2024; Zeoli et al. 2022). The gun-show loophole, and the private sales gap in the federal laws make it easier for individuals who are prohibited from owning firearms to acquire them without undergoing a background check. Additionally, federal background check system, NICS, has been criticized for not being comprehensive or up-to-date (Price and Norris 2008). The system relies on state and local agencies to submit records of prohibited individuals, but not all agencies consistently report this information (Price and Norris 2008). This can result in incomplete background checks, allowing prohibited individuals to pass checks and purchase firearms. To mitigate this gap, states have enacted BCLs, as the US federal system grants them substantial regulatory authority (McCourt 2024).

The landscape of state BCL is diverse, as each state has legislated different sets of background check requirements that include criminal background checks for gun sales and transactions by unlicensed dealers, background checks at the point of sale, permit-to-purchase requirements, keeping the sale records, waiting periods after the background check but before completing the sale, and penalties for a buyer or seller who fails to follow the BCL(Everytown Research & Policy 2024). Some state laws require background checks for all firearms purchases to close the "gun show loophole," while some others go further to require background checks for ammunition purchases. Additionally, some states enforce waiting periods between the purchase and delivery of a firearm, allowing time for background checks and potential buyers to

reconsider their purchase. The diversity in the state laws led to the uneven and complex landscape of firearm policy in the US (Siegel et al. 2020)

3. Literature Review

A substantial body of literature explores the relationship between gun laws and gun violence in general, and BCL and gun violence in particular across different US states. While the specific findings can vary, there are some general trends that emerge from this research. They show that gun ownership is correlated with gun violence (Altheimer and Boswell 2012; Cummings et al. 1997; Hemenway and Miller 2000; Hepburn and Hemenway 2004; Knopov et al. 2019), and stringent background check policies correlate with lower rates of firearm homicides and suicides at states (Ashworth and Kozinetz 2021; Bhullar et al. 2024; Kalesan et al. 2016; Knopov et al. 2019; Lemieux 2014; Schell et al. 2024; Sen and Panjamapirom 2012), and urban areas (Crifasi et al. 2018). Furthermore, the effect of background checks on gun violence is consistent across different races (Knopov et al. 2019), while it varies across the age groups. In fact, a recent study reports that stricter BCL leads to a significant reduction in the number of shooters under the age of 21 (Bhullar et al. 2024). The researchers, after examining the monthly data for 3-year period before and after the enactment of BCL in state of Washington found that the number of incidents dropped from 4,091 to 1,881, and number of shooters under the age of 21 was dropped from 11 to one (Bhullar et al. 2024).

Regarding which components of BCL are effective, the research found that restricting access to firearms for offenders, particularly violent or felonious offenders, seemingly reduces gun violence (Knopov et al. 2019; Lemieux 2014; Sen and Panjamapirom 2012). Additionally, BCL restricting the gun access for the people with restraining orders, fugitive status, and possible mental illness had a significant impact on reducing gun violence (Sen and Panjamapirom 2012). The research by Kalesan et al. (2016) goes even further into suggesting that since universal background checks on firearms reduce gun violence, implementing these checks on all firearm-related purchases (i.e., ammunition), not just firearm-specific purchases, would further reduce firearm violence.

On the other hand, the effectiveness of background checks can be substantially reduced by internal factors, such as incomplete or unshared databases and inconsistent enforcement of

existing laws (Cook and Pollack 2017), as well as external factors, including illegal firearm purchases, lenient BCL in neighboring jurisdictions (Cook and Pollack 2017), and pro-gun laws such as "shall issue" rules (Knopov et al. 2019) and stand-your-ground statutes (Blau et al. 2016).

BCLs do not have impact on illegal firearm purchases, as they occur outside the legal market and bypass background check requirements. A study notes that a significant portion of guns used in violent incidents are obtained through illegal means including straw purchases or passive transactions involving purchases through a transaction initiated by another person (Cook and Pollack 2017). On the other hand, this does not reduce the significance of the legally purchased firearms used in violent incidents. In fact, the legal purchase of handguns increases the risk of violent deaths (Cummings et al. 1997). Accordingly, a longitudinal study on the movement of legally purchased firearms reported that stricter gun laws and their consistent enforcement can reduce firearm violence involving weapons obtained both legally (Robinson et al. 2024), and illegally (Lemieux 2014; Sen and Panjamapirom 2012). This highlights the importance of enforcing stronger gun laws to prevent illegal purchases, thereby reducing gun violence.

Lenient BCL in neighboring states is another factor diminishing the effectiveness of BCL. The existing state autonomy in legislating and enforcing gun laws in the US allows individuals prohibited from obtaining firearms in one state to cross into neighboring states with more lenient laws. Extant research highlights how illegal firearm transactions and interstate trafficking undermine state-level gun laws, with higher gun violence rates observed in jurisdictions near state borders with differing BCL(Ashworth and Kozinetz 2021; Cook and Pollack 2017). Despite the aforementioned displacement effect caused by lenient laws in neighboring states, substantial research reports that stricter gun laws, particularly background checks, are correlated with lower rates of gun violence (Braga 2017; Braga et al. 2021; Collins et al. 2018; Gobaud et al. 2022)

Pro-gun laws such as “shall-issue” and “stand-your-ground” laws diminish the effectiveness of BCL (Degli Esposti et al. 2022; Yakubovich et al. 2021). Shall-issue laws that prohibiting the officers to use discretion in issuing a concealed carry permit is linked to higher homicide rates (Fridel 2021; Knopov et al. 2019). Stand-your-ground laws which allow people to

use deadly force in self-defense if they are lawfully present and reasonably believe they are in imminent danger is correlated with higher levels of gun violence. In fact, a study examining the 41 states finds that stand your ground laws are associated with eight to 11 percent increase in firearm homicides (Degli Esposti et al. 2022). Similarly, another study indicates that states with stand-your-ground laws are more likely to experience active shooter incidents involving assault weapons (Blau et al. 2016).

While a substantial portion of the extant literature provides strong evidence supporting the effectiveness of background checks in reducing gun violence, few studies have analyzed how specific components of state BCL influence the frequency of gun violence. This study contributes to the literature by examining the impact of distinct BCL components on gun violence, providing evidence that can guide policymakers in prioritizing the most consequential regulatory elements when designing or revising BCL

4. Research Design and Data

This study employs quantitative analysis to examine the relationship between BCLs and state-level firearm homicide rates in the US The firearm homicide rate is measured as number of victims per 100,000 population in year 2023, killed in assaults by discharge of firearms. The data was obtained from the Centers for Disease Control and Prevention's Wide-ranging Online Data for Epidemiologic Research (CDC WONDER) database[4]. The descriptive statistics are presented in Table 1.

Table 1. Descriptive statistics

Firearm Homicide Rate	
Minimum	1
Maximum	31.08
Mean	5.60
Standard Deviation	5.05
Sample Variance	25.55
Skewness	3.02
Count	51

[4] The dataset used in this study, including the firearm homicide data and all other variables employed in the analysis, is publicly available through the Mendeley Data repository at: https://data.mendeley.com/preview/z3c9fwh7xy?a=57a3840f-0571-45ca-aa11-a7c934df1607

The dependent variable (i.e. firearm homicide rate) is a continuous variable; therefore, using count models such as Poisson, or binomial may potentially bias the estimates. The descriptive statistics in Table 1 shows that the data is moderately spread. Although the firearm homicide rate exhibits positive skewness, ordinary least square remains appropriate because the dependent variable is continuous and residual diagnostics indicate acceptable model performance.

In this study, we use dummy variables to indicate which components of background check laws have been adopted by each US state. The data were obtained from the Gun Law Navigator webpage of Everytown Research & Policy, an independent, non-partisan organization dedicated to researching, understanding, and preventing gun violence in the US The organization maintains detailed surveys of firearm laws across all 50 states and the District of Columbia, providing valuable insights into the scope and effectiveness of gun legislation nationwide. The background check dummy variables and their descriptions, obtained from Everytown Research & Policy's webpage, are presented in Table 2.

Table 2. Background check variables

Variable	Description
BCL1	Whether a state law requires criminal background checks for gun sales by unlicensed sellers.
BCL2	Whether a state law requires background check at the point of sale.
BCL3	Whether a state law requires a permit to purchase a gun.
BCL4	Whether a state law requires unlicensed sellers to keep records of gun sales.
BCL5	Whether a state law requires a waiting period after the background check and before completing the gun sale.
BCL6	Whether a state law punishes buyers who fail to comply with the BCL
BCL7	Whether a state law punishes sellers who fail to comply with the BCL.

All components of BCLs share the same broad policy goal: restricting access to firearms by certain individuals. Because the different components of BCLs address interrelated aspects of this common objective, some states exhibit similar patterns in the components they have adopted. For example, 18 of the 21 states that require criminal background checks for firearm sales conducted by unlicensed sellers (BCL1) also require that such checks be conducted at the

point of sale (BCL2), that records of the transactions be maintained (BCL4), and that penalties be imposed on buyers who violate the law (BCL6). Furthermore, all states that require criminal background checks for firearm sales by unlicensed sellers (BCL1) also impose penalties on sellers who violate the law (BCL7). The similarities among states in adopting BCLs have resulted in multicollinearity concerns between the BCL variables. As shown in Table 3, several background-check provisions exhibit substantial pairwise correlations, suggesting potential multicollinearity. To assess this issue more formally, Variance Inflation Factors (V.I.F.s) were calculated for all seven BCL variables. The results indicated substantial overlap among BCL1, BCL2, BCL4, BCL6, and BCL7. Consequently, BCL1, BCL3, and BCL5 were retained because they represent three conceptually distinct mechanisms through which firearm regulations may reduce access to firearms among individuals who are prohibited from possessing them or who may be at elevated risk of engaging in violence.

Table 3. Correlation matrix for the BCL variables

	BCL1	*BCL2*	*BCL3*	*BCL4*	*BCL5*	*BCL6*	*BCL7*
BCL1	1.00						
BCL2	0.81	1.00					
BCL3	0.64	0.29	1.00				
BCL4	0.88	0.75	0.53	1.00			
BCL5	0.57	0.59	0.31	0.54	1.00		
BCL6	0.88	0.66	0.72	0.75	0.54	1.00	
BCL7	1.00	0.81	0.64	0.88	0.57	0.88	1.00

First, requiring criminal background checks for firearm sales conducted by unlicensed sellers (BCL1) represents the central policy mechanism underlying background check laws. Prior research has identified private sales and the so-called "gun show loophole" as important avenues through which prohibited individuals may circumvent federal background check requirements (Cook and Pollack 2017; Gobaud et al. 2022; Siegel 2024; Zeoli et al. 2022). By extending screening requirements beyond federally licensed dealers, BCL1 addresses a key gap in the federal regulatory framework and reduces opportunities for prohibited individuals to acquire firearms through private transactions. Consistent with deterrence and access-restriction theories, limiting firearm access among high-risk individuals should reduce firearm-related violence. Therefore, the first hypothesis (i.e., H1) is as follows:

H1: States that require criminal background checks for gun sales by unlicensed sellers will experience lower firearm homicide rates, ceteris paribus.

Second, permit-to-purchase requirements (BCL3) represent a distinct purchaser-screening and licensing approach that requires prospective firearm purchasers to obtain official authorization before acquiring a firearm. By imposing an additional administrative layer prior to the transfer of a firearm, permit requirements increase scrutiny, accountability, and compliance with eligibility requirements while creating additional opportunities to identify prohibited purchasers. From a situational crime prevention perspective, permit-to-purchase laws increase the effort associated with firearm acquisition and create barriers to impulsive or unlawful purchases. Consistent with this mechanism, prior research has found that purchaser licensing laws combined with background checks are associated with lower rates of firearm violence (McCourt et al. 2020). Consequently, the second hypothesis (i.e., H2) is as follows:

H2: States that require a permit to purchase a firearm will experience lower firearm homicide rates, ceteris paribus.

Third, waiting periods between the completion of a background check and the transfer of a firearm (BCL5) represent a temporal regulatory mechanism designed to delay firearm access. Unlike background checks or purchaser licensing requirements, waiting periods do not primarily seek to identify prohibited individuals but instead create a cooling-off period between the decision to acquire a firearm and possession of the weapon. Consistent with theories of impulsivity and routine activities, such delays may reduce acts of violence committed during periods of acute emotional distress while also providing additional time for disqualifying information that may not be immediately available during the screening process to be identified. By delaying firearm access and increasing opportunities for effective screening, waiting periods may reduce firearm-related homicides. Accordingly, the third hypothesis (i.e., H3) is as follows:

H3: States that require a waiting period between the background check and the completion of the firearm sale will experience lower firearm homicide rates, ceteris paribus.

Taken together, BCL1, BCL3, and BCL5 represent theoretically distinct dimensions of firearm regulation: expanding background-check coverage, strengthening purchaser screening,

and delaying firearm access. Retaining these variables therefore preserves the major policy mechanisms identified in the literature while minimizing multicollinearity among the explanatory variables. Subsequent V.I.F. analysis of the final model, shown in Table 6, indicated no problematic multicollinearity among the retained predictors, supporting the stability and interpretability of the estimated coefficients.

The body of literature on gun violence highlights the relevance of several social, socioeconomic, demographic, and health variables. Specifically, existing research reports that higher levels of gun violence are associated with higher levels of drug abuse (Banks et al. 2017; Chen and Wu 2016), mental illness rate (Blau et al. 2016; Vars et al. 2022), alcohol consumption per capita (Sen and Panjamapirom 2012; Siegel et al. 2020; Wintemute 2011), urban population rate (Lemieux 2014; McMillan et al. 2024), and unemployment rate (Sen and Panjamapirom 2012; Siegel et al. 2020). The control variables presented in Table 4 are included to isolate the effect of BCLs on gun violence. The full model with the inclusion of the control variables is as follows:

$$Y = \beta0 + \beta1 \cdot (BCL1) + \beta2 \cdot (BCL3) + \beta3 \cdot (BCL5) + \beta4 \cdot (\text{Drug Abuse Index}) + \beta5 \cdot (\text{Mental Health}) + \beta6 \cdot (\text{Ethanol Consumption}) + \beta7 \cdot (\text{Urban Population Rate}) + \beta8 \cdot (\text{Unemployment})$$

Table 4. Control variables included in the models and their sources

Variable	Explanation	Source
Drug Abuse Index	The index consists of 20 measures grouped into three categories: Drug Use and Addiction, Law Enforcement, and Drug Health Issues and Rehabilitation Services. Higher scores reflect more severe conditions.	Wallethub.com
Mental Illness rate	This variable represents the percentage of adults reporting any mental illnesses.	Mental Health America
Ethanol Consumption per capita	This variable measures per capita ethanol consumption, expressed in gallons, among individuals aged 14 years and older.	National Institute of Health
Urban population rate (Urban Popln.)	This variable represents the percentage of a state's population living in urban areas, defined as those with a minimum population of 5,000 people or at least 2,000 housing units.	US Census
Unemployment Rate	This variable represents the number of unemployed people as a percentage of the labor force.	Federal Reserve Bank of St. Louis

The correlation matrix shown in Table 5 shows no significant correlation between the variables in the full model.

Table 5. Correlation matrix for all variables in the full model

	BCL1	BCL3	BCL5	Drug Abuse	Mental Illness	Ethanol Consumption	Urban Popln.	Unemployment
BCL1	1.00							
BCL3	0.64	1.00						
BCL5	0.57	0.31	1.00					
Drug Abuse	-0.08	-0.33	-0.15	1.00				
Mental Illness	-0.16	-0.21	-0.11	0.22	1.00			
Ethanol Consumption	0.19	-0.06	0.07	0.04	-0.16	1.00		
Urban Popln.	0.52	0.39	0.32	-0.26	-0.21	0.01	1.00	
Unemployment	0.28	0.12	0.10	0.36	-0.13	0.01	0.44	1.00

4.1.Robustness of the Model

The OLS regression findings and model summary are seen in Table 6.

Table 6. Results of the analysis

Independent Variable	Coefficient	Standard Error	p-value	VIF
BCL1	-5.30**	2.11	0.02	2.70
BCL3	3.30	2.08	0.12	1.94
BCL5	2.98	1.97	0.14	1.53
Drug Abuse Risk Index	0.29***	0.10	0.01	1.94
Mental Illness Rate	-0.18	0.34	0.59	1.33
Ethanol Consumption per Capita	0.82	1.10	0.46	1.09
Urban Population Rate	0.07	0.06	0.24	2.10
Unemployment Rate	0.39	1.25	0.76	2.16
Intercept	-10.37	9.89	0.30	

N=51, F=2.53, R^2=32.48 %, Adj. R^2=19.62 %.

**: $p < .05$, ***: $p < .01$.

The OLS regression model, based on 51 observations, yielded an F-statistic of 2.53, indicating that the set of predictors collectively explains a statistically meaningful portion of the variation in the dependent variable. The model's R^2 value of 32.48% shows that nearly one-third of the variance in firearm homicide rate is accounted for by the predictors.

The model's robustness was assessed by examining the VIF values for all predictors, analyzing residual plots, and rerunning the regression after removing certain variables. The VIF results shown in Table 6 indicate that for all predictors in the model were well below the commonly accepted threshold of 5, indicating minimal multicollinearity. This suggests that the independent variables are not excessively correlated with one another, reducing the risk of inflated standard errors or unstable coefficient estimates. Consequently, the model's parameter estimates are reliable, and the statistical inferences drawn from the analysis are robust.

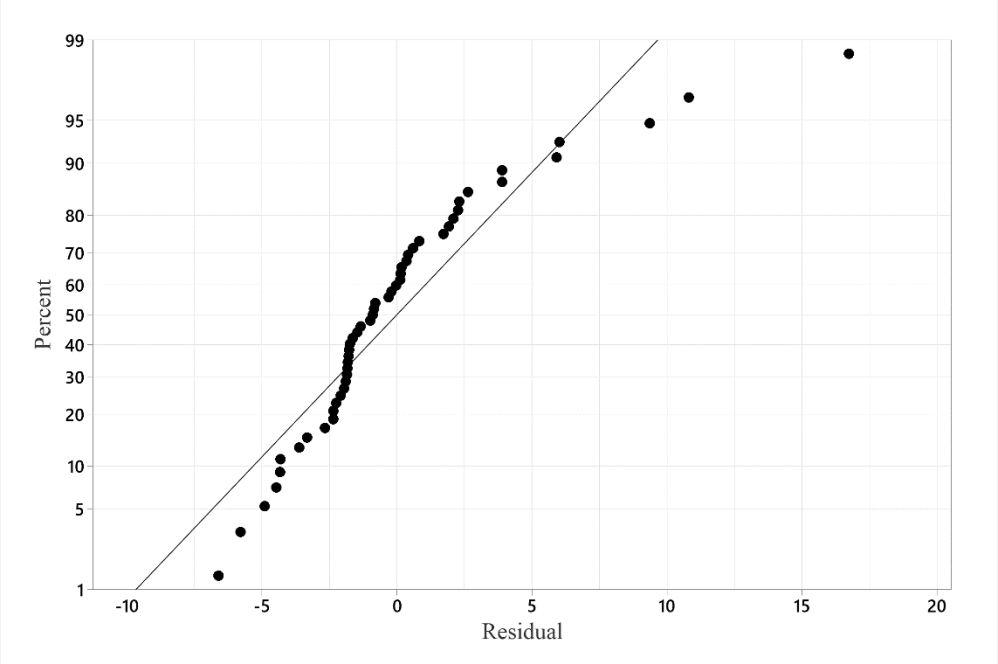


Fig. 1. Normal probability plot

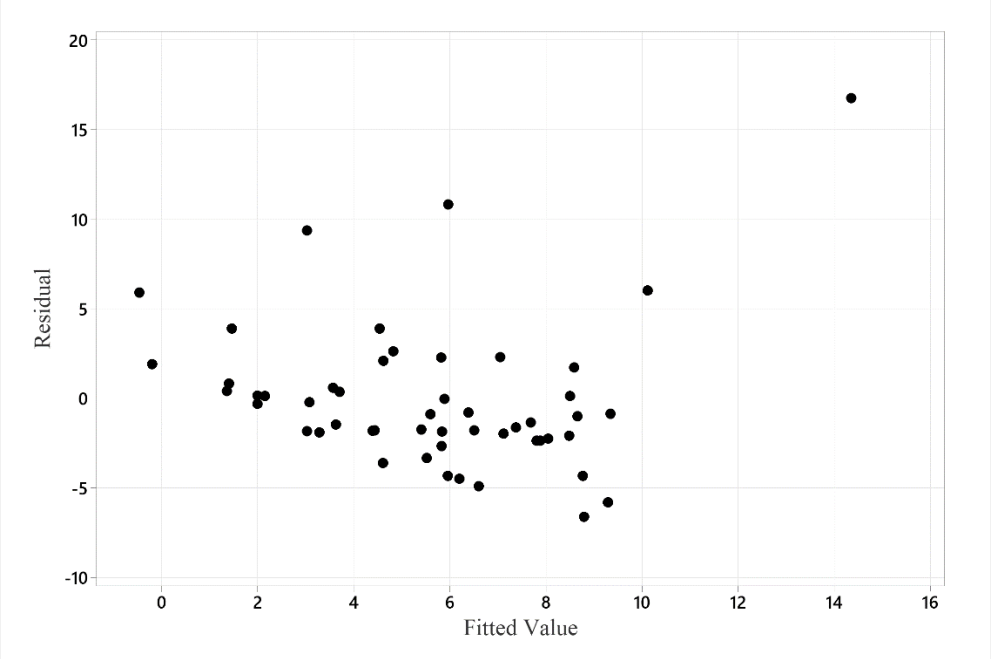


Fig. 2. Versus fits

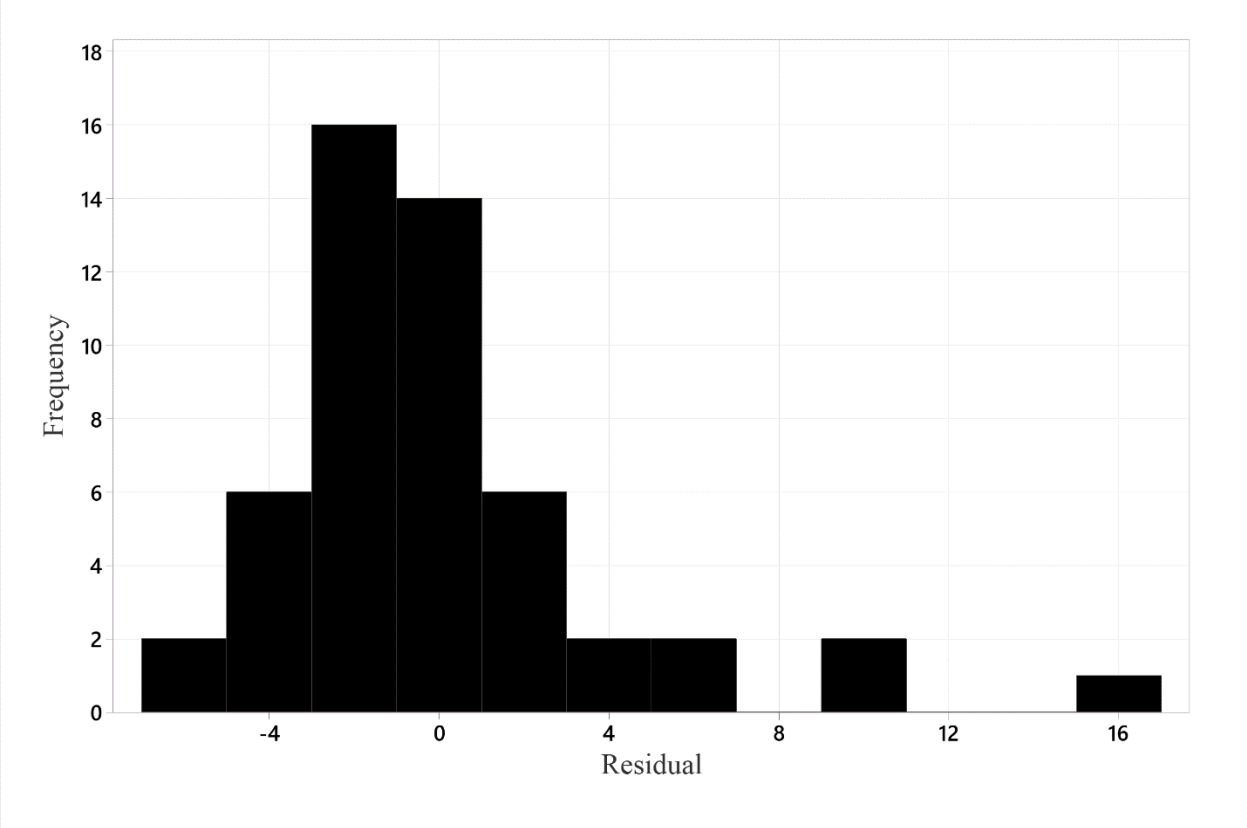


Fig. 3. Residual histogram

The residual diagnostics presented in Figures 1, 2, and 3 suggest that the key assumptions underlying the O.L.S. model are reasonably satisfied. The normal probability plot in Figure 1 shows that most residuals lie close to the reference line, supporting the assumption of normality with only minor tail deviations. The residuals versus fitted values plot in Figure 2 displays a random scatter around zero without systematic patterns, suggesting that linearity holds and there is no evidence of heteroscedasticity. Finally, the residual histogram in Figure 3 is approximately symmetric and bell-shaped, centered near zero, further confirming normality. Together, these results support the robustness and validity of the regression model.

To further assess the robustness of the model, we reran the regression analyses after systematically removing certain variables. The results across these different model specifications, as presented in Table 7, consistently show that the same variables (i.e., BCL1, and the Drug Abuse Risk Index) remain statistically significant. This consistency reinforces the reliability and stability of the key predictors in the model.

Table 7. Regression results across multiple model specifications

Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
BCL1	-5.32***	-4.14*	-5.26**	-4.62**	-5.01**	-5.30**
	(2.08)	(2.24)	(2.09)	(2.04)	2.06	2.11
	p=0.01	p=0.07	p=0.02	p=0.03	p=0.02	p=0.02
BCL3	3.34	1.86	3.38	3.38	3.13	3.30
	(2.05)	(2.20)	2.06	2.09	2.06	(2.08)
	p=0.11	p=0.40	p=0.11	p=0.11	p=0.14	p=0.12
BCL5	2.99	2.44	2.89	3.16	3.05	2.98
	(1.95)	2.13	1.95	1.98	1.96	(1.97)
	p=0.13	p=0.26	p=0.15	p=0.12	p=0.13	p=0.14
Drug Abuse Risk Index	.31***		0.27***	0.24***	0.29***	0.29***
	.08		0.09	0.09	0.10	(0.10)
	p=0.00		p=0.005	p=0.01	p=0.00	p=0.01
Mental Health Rate	-.22	0.17		-0.17	-0.20	-0.18
	.31	0.34		0.34	0.33	(0.34)
	p=0.49	p=0.61		p=0.61	p=0.54	p=0.59
Ethanol Consumption per Capita	.08	1.11	0.87	0.82		0.82
	(1.09)	1.18	1.08	1.10		(1.10)
	p=0.46	p=0.36	p=0.42	p=0.46		p=0.46
Urban Population %	0.08	.002	0.07		0.07	0.07
	(0.05)	0.06	0.06		0.06	(0.06)
	p=0.11	p=0.97	p=0.24		p=0.23	p=0.24
Unemployment Rate		2.62**	0.61	1.17	0.37	0.39
		1.07	1.17	1.07	1.24	(1.25)
		p=0.02	p=0.61	p=0.28	p=0.30	p=0.76
Intercept	-9.79	-9.53	-14.76***	-6.19	-8.06	-10.37
Std error	(9.61)	(10.71)	5.74	9.30	9.34	(9.89)
p-value	p=0.31	p=0.38	p=0.01	p=0.51	p=0.39	p=0.30
N	51	51	51	51	51	51
F-value	2.93	1.42	2.89	2.65	2.84	2.53
R^2	32.32%	18.78%	32.00%	30.17%	31.59%	32.48%
Adj. R^2	21.31%	5.56%	20.93%	18.80%	20.45%	19.62%

*: p < .1, **: p < .05, ***: p < .01

5. Findings

The regression results seen in Table 6 reveal a statistically significant negative association between states' criminal background check requirements for gun sales by unlicensed sellers (BCL1) and firearm homicide rates ($\beta = -5.30$, $p = 0.02$), providing support for Hypothesis 1 (H1). This finding is consistent with a substantial body of research indicating that stringent background check policies are associated with lower rates of firearm homicides and suicides (Ashworth and Kozinetz 2021; Bhullar et al. 2024; Braga 2017; Braga et al. 2021; Collins et al. 2018; Gobaud et al. 2022; Kalesan et al. 2016; Knopov et al. 2019; Lemieux 2014; Robinson et al. 2024; Schell et al. 2024; Sen and Panjamapirom 2012; Wintemute et al. 1999) and pairing licensing laws with background checks reduces the likelihood of firearm violence (McCourt et al., 2020). On the other hand, the coefficients for purchase permit requirements (BCL2) and waiting periods between the background check and the completion of the gun sale (BCL3) were not statistically significant when controlling for other variables such as unemployment rate, mental health rate, urban population percentage, drug abuse risk, and ethanol consumption per capita. This suggests that these measures may exert weaker independent effects on firearm homicide rates once broader socioeconomic and behavioral factors are accounted for.

The findings also show that the Drug Abuse Risk Index exhibits a statistically significant positive association, indicating that higher drug abuse prevalence is linked to higher firearm homicide rates. This finding is supported by prior studies showing that substance abuse is associated with increased firearm-related violence and homicide rates (Banks et al. 2017; Chen and Wu 2016; McGinty and Webster 2017).

6. Conclusion

In conclusion, this study underscores the critical role of strengthening background check requirements for gun sales by unlicensed sellers as a targeted and proactive strategy for reducing firearm homicides. By focusing on the most effective component of BCLs, particularly in areas where opposition to gun control is substantial, policymakers can navigate a contentious political and cultural climate in which gun owners and non-gun owners are sharply divided, and ownership is often tied to deeply held values of personal freedom, self-reliance (Barry et al.

2018; Celinska 2007), and distrust of government (Kleck 1996). In such an environment, identifying and prioritizing the most impactful policy elements allows for more strategic allocation of political capital and resources, thereby maximizing the likelihood of meaningful reform.

The findings further highlight that firearm policy reforms cannot be pursued in isolation. The significant association between drug abuse risk and firearm homicide rates suggests that efforts to reduce firearm violence should adopt a dual strategy that combines robust enforcement of background check requirements with targeted public health interventions designed to prevent and treat substance abuse. Expanding access to treatment, supporting community-based prevention initiatives, and fostering collaborative partnerships between public health agencies and law enforcement could generate synergistic effects that address both the root causes and the immediate mechanisms of firearm violence. Together, these strategies offer a pragmatic and politically viable pathway for advancing firearm violence prevention in a polarized policy landscape.

The policy insights provided are clear but not precise because of the limitations of the model tested in this study. First, the analysis is based on a cross-sectional dataset consisting of only 51 observations including the 50 US states and the District of Columbia. While this sample size reflects the complete population of US state jurisdictions and is therefore unavoidable in state-level policy research, it nevertheless limits statistical power of the analysis. Second, the cross-sectional data does not allow to account for temporality of the observed relationship. Third, while multiple socioeconomic and demographic variables were controlled for, unmeasured factors such as enforcement intensity, black-market firearm availability, non-homicide violent crime rate, state household firearm ownership rate, and differences in legislation across neighboring states may also influence firearm homicide rates. Additionally, cultural and political differences across states may moderate the effectiveness of BCL. Finally, the dataset's temporal scope, limited to a single year, restricts the ability to assess long-term policy effects. Future research should employ longitudinal and quasi-experimental designs to evaluate the sustained impacts of background check reforms.

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