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The Impact of the Protection of Lawful Commerce in Arms Act of 2005 on Gun Sales

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Abstract

The purpose of the present study is to determine if the Protection of Lawful Commerce in Arms Act (PLCAA) of 2005 had a statistically significant effect on gun sales. Using a two-way fixed effects model with state-level annual data for the period 1999-2016, results of the present study suggest that the PLCAA had a significant and positive impact on overall gun sales as measured by background checks. However, this act had no statistically significant effects on long gun (rifle and shotgun) sales. These results suggest that this federal law limiting gun manufacturers' liability greatly increased handgun sales but had minimal effects on long gun sales. This result suggests that the PLCAA contributed to an increase in the supply of handguns. Since the majority of firearm homicides and suicides are committed using handguns, it is reasonable to assume that this increase in handguns may have resulted in an increase in firearm homicides and suicides.

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Introduction

After a shooting occurs, there is typically a desire on the part of the victims' families to have those responsible for the tragedy punished. Although the shooter may be convicted and even found liable in a wrongful death suit, the aggrieved may seek to sue other parties who were negligent and whose behavior may have, to a certain extent, facilitated the shooting.

Prior to 2005, gun manufacturers were routinely sued for negligence in shootings on the grounds that they should have foreseen that their products may be used in criminal activities. In addition to the victims, various cities and states sued gun makers, claiming that their products were used in crimes and thus were creating a public nuisance and imposed undue burdens on local and state governments. Some cities and states even used the threat of litigation to compel gun manufacturers to implement weapon design modifications and certain gun control measures.

In response to this ever-growing threat of litigation, gun manufacturers and gun rights activists lobbied

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lawmakers in Congress to pass "An Act to Prohibit Civil Liability Actions from Being Brought Against Manufacturers, Distributors, Dealers, or Importers of Firearms or Ammunition for Damages, Injunctive or Other Relief from the Misuse of Their Products by Others," or more commonly known as the "Protection of Lawful Commerce in Arms Act of 2005" (PLCAA). As the title states, this act shielded gun manufacturers and other entities involved in the gun trade from civil liability, although manufacturers may still be held liable for damages resulting from defective products, breach of contract and other actions for which they are directly responsible. Few other manufacturers or businesses are afforded this degree of civil immunity.

Anecdotal evidence suggests that, once gun manufacturers were no longer liable for the actions of others, the marketing of firearms became much more aggressive and resulted in greatly increased sales of firearms, especially assault weapons and semiautomatic handguns. Given that the majority of homicides and suicides committed in the United States are firearm related, an increase in the supply of firearms may result in an increase in both homicides and suicides. Hence, the purpose of the present study is to determine if passage of the PLCAA resulted in an increase in firearm sales. If evidence suggests that this law increased the overall supply of firearms, then it is reasonable to assume that passage of the PLCAA also resulted in an increase in homicides and suicides. No prior study has examined this topic.

The present study will also investigate the effects that other variables, such as socioeconomic factors, cultural characteristics, and gun ownership rates, have on the demand for guns. These drivers of demand are important because guns are durable goods and any temporary increase in gun sales permanently increases the overall stock of firearms in the United States. As noted previously, the impact of any potential increase in firearm supply is important to study because most murders and suicides are committed using guns. Factors that may increase the overall supply of firearms may also increase the number of gun-related homicides and suicides.

Literature Review

In addition to the PLCAA, variables such as socioeconomic factors, presidential elections, and gun ownership rates may affect the overall demand for firearms. Regarding the impact of presidential elections on gun sales, (Depetris *et al*., 2015) examined the effect of President Obama's election in 2008 on gun sales. Using federal background check data as a proxy for gun sales, the author found that the election of Obama in 2008 resulted in a 25% increase in gun sales. Other research that examined the impact of presidential elections on the demand for guns include the following: (Gius *et al*.,2018), (Wallace, 2015), (Banjo, 2012). Most of this prior research has found that gun sales increase when a Democrat is elected President and fall when a Republican is elected President. The primary reason for this result is because gun owners fear that increased regulation of firearms under a Democratic administration will make it more difficult to purchase firearms.

Another factor that may affect the demand for guns is the level of existing gun ownership. Given the nature of the product, it is reasonable to assume that existing gun owners are more likely to purchase firearms than are non-gun owners (Gius *et al*., 2018). Therefore, it is expected that states with higher levels of gun ownership will also have significantly higher gun sales. The inclusion of this variable is important because, if significant and positive, it may suggest that at least some of the increase in the demand for guns is due to additional purchases by existing gun owners rather than sales to new gun owners. Although sales to existing gun owners would still increase the overall stock of firearms, this result may also imply that the percentage of persons who are gun owners is not significantly increasing. Gius and Paulson (2018) found that states with higher levels of gun ownership have more gun sales.

Regarding the impact of age on gun demand, previous research provides mixed results. (Whitehead *et al*., 1989) reported a negative relationship between age and gun ownership. Other research has found that gun ownership is higher among the middle aged (Hepburn *et al*., 2007); (Smith, 2001, 2000, 1997). (Smith, 1997) attributes this to the greater proportion

of women among the elderly and an overall decline in hunting, especially among younger individuals. For purposes of the present study, we would expect that states with larger percentage of young people will have lower gun sales.

Regarding the link between educational attainment and gun ownership, most prior research has found that gun ownership is negatively related to educational attainment (Smith, 2001, 2000, 1997). Other gun-related research (Smith and Uchida, 1998; (Whitehead *et al*., 1989); (Lizotte *et al*., 1980); (Wright *et al*., 1975) validates this negative relationship between educational attainment and gun ownership. Hence, we would expect that the higher the percentage of college graduates in a state, the lower are gun sales.

Regarding income, prior research has found that gun ownership increases with household income (Gius *et al*, 2018); (Smith, 1997). This positive association between gun ownership and income may be due to the following reasons: First, people with higher levels of income may believe they need higher levels of property protection; thus, they are more likely to purchase a gun. Second, higher-income individuals can afford to buy a gun. This hypothesis is corroborated by (Whitehead *et al*., 1989).

Unfortunately, there is very limited evidence on the role that unemployment plays in determining gun ownership (Gius and Paulson, 2018). It is reasonable to assume that unemployment may be negatively related to gun ownership because unemployed persons have less income to spend on nonessentials, such as guns. (Gius *et al*., 2018) found that states with higher unemployment rates had more gun sales.

Regarding area of residence, it is reasonable to assume that urban residents buy and own fewer guns because there are more stringent gun control laws in urban areas. In addition, we would also expect gun ownership to be higher in rural areas because hunting is more common in rural areas, and hunting cultures are more likely to be associated with gun ownership. Previous studies (Gius *et al*., 2018); (Bordua *et al*., 2005); (Bankston *et al*., 1990); (Dixon *et al*., 1987); (Young, 1987); (O'Connor *et al*., 1978) confirm that people in rural areas have higher rates of gun ownership.

Empirical Technique and Data

To determine the impact of the PLCAA on gun sales, a data set consisting of annual data for all fifty states for the period 1999 to 2016 was used. State-level monthly data on federal background checks were obtained from the National Instant Criminal Background Check System (NICS). This data was aggregated to an annual timeframe. State-level data on firearm-related suicides and total suicides were obtained from the National Center for Injury Prevention and Control, the Centers for Disease Control (CDC). The WISQARS system was used to extract the necessary data from the CDC website. All other state-level data were obtained from relevant Census Bureau reports. The sample size is 900.

In keeping with the methodology used in prior studies, federal firearm background checks will serve as a proxy for the demand for guns (Gius *et al*., 2018); (Wallace, 2015); (Lang, 2013). Background checks indicate that there is an intent to purchase a firearm. The reason for using a proxy is because there is no data available at either the state or national level on firearm purchases. Hence, to estimate the demand for guns, data were obtained from the federal firearms background check system. Beginning in February of 1994, the U.S. government required all purchasers of handguns to undergo a background check to determine if they are permitted to own a gun. This condition was part of the Brady Handgun Violence Prevention Act (Brady Act) of 1993. Potential reasons why a person may not be approved for handgun ownership include felony convictions, felony indictments, domestic violence misdemeanors, restraining orders, fugitive status, illegal alien status, mental illness or disability, drug addiction, and local or state prohibition. From February of 1994 to November of 1998, the act only applied to handgun sales. In November of 1998, the permanent provisions of the Brady Act took effect. These provisions established the National Instant Criminal Background Check System (NICS) and extended the act to buyers of long guns and to individuals who redeemed pawned firearms.

The process for conducting a background check is initiated by a federally licensed firearm dealer (FFL). The gun buyer must complete a Federal Firearm Transaction Record and must provide a government-issued photo identification card. The FFL then contacts the FBI to determine if the

purchaser is allowed to own a firearm. The FFL is notified whether the sale may proceed or if the sale is delayed pending further investigation. If the FFL is not notified within three business days, then the sale may be completed; this type of sale is known as a default proceed. In most states, sales conducted through private parties (private sales) do not require background checks.

After the background check is performed, the gun buyer may decide to purchase multiple firearms or none at all. Therefore, one background check does not necessarily indicate that one firearm was purchased. In addition, some states, such as Hawaii, require permits to purchase, thus making it difficult to determine the type of firearm (long gun or handgun) that was purchased. Finally, background check data does not segregate long guns from handguns. Therefore, it is not possible to determine from this data if the PLCAA had any effect on the sales of semi-automatic rifles or assault weapons.

Despite these drawbacks, background checks are still the most reliable measures of gun sales at the state level. Three prior studies (Gius *et al*., 2018); (Wallace 2015); (Depetris *et al*., 2015); (Lang, 2013) used background checks as a proxy for gun purchases. In the present study, the following dependent variables will be used: the total number of federal background checks per 1,000 persons; the number of federal background checks for long guns per 1,000 persons; and the number of federal background checks for handguns per 1,000 persons. Given the research discussed previously, it is assumed that the following variables will also have an effect on gun sales: per capita real income (Gius *et al*., 2018); (Smith, 1997); (Whitehead *et al*., 1989), percentage of population that is college educated (Gius *et al*., 2018); (Smith, 2001, 2000, 1997), unemployment rate (Gius *et al*., 2018), percentage of population aged 18 and older (Gius *et al*., 2018); (Hepburn *et al*., 2007); Smith 2001, 2000, 1997; (Whitehead *et al*., 1989), population density (Gius *et al*., 2018), per capita number of hunting licenses (Gius *et al*., 2018); (Kalesan *et al*., 2016); (Hepburn *et al*., 2007); (Smith, 2002); (Cao, *et al*. 1997), the political party of the U.S. President (Gius *et al*., 2018), the ratio of firearm suicides to total suicides (Gius *et al*., 2018); (Lang, 2013), and a dummy variable denoting when the PLCAA was in effect. Descriptive statistics are presented on Table 1.

Table 1; Descriptive Statistics

Variable	Mean	Standard Deviation
Handgun Background Checks per 1,000 persons	45.25	81.3
Long Gun Background Checks per 1,000 persons	30.7	31.45
Total Firearm Background Checks per 1,000 persons	75.94	96.0
Real Per Capita Median Income	$17,549	$2,732
Percent College Educated	0.27	0.05
Population Density	191.44	256.0
Firearm Suicides/Total Suicides	0.528	0.126
Democratic President	0.56	0.49
Percent Aged 18 or Older	0.754	0.02
PLCAA in Effect	0.67	0.47
Hunting Licenses per 1,000 persons	234.5	352.7
Unemployment Rate	0.057	0.02

The ratio of firearm suicides to total suicides is used as a proxy for state-level gun ownership rates. It is expected that states with higher levels of gun ownership may have significantly higher rates of gun purchases (Gius *et al*., 2018); (Lang, 2013). The inclusion of this variable is important because, if significant and positive, it may suggest that the increase in the demand for guns is primarily due to additional purchases by existing gun owners rather than sales to new gun owners. Although sales to existing gun owners would still increase the overall stock of firearms, this result may imply that the

percentage of persons who are gun owners is not significantly increasing. If that is the case, then the probability that a mass shooting or other crime will be deterred by an armed citizen is not increasing even though more guns are being sold.

To ascertain the determinants of gun sales, a fixed effects model that controls for both state-level and year-specific fixed effects was used. All observations were weighted using state-level population, and standard errors were corrected using a clustering method (clustering is done at the state-level). Weighting observations is done to correct for potential heteroscedasticity. Clustering standard errors is necessary to account for potentially nonrandom variations within certain groups.

The following equation was estimated in the present study:

$$y_{i,t} = \alpha_0 + \alpha_i + \gamma_t + \beta'X + \varepsilon_{i,t} \quad ...(1)$$

In the above equation, y denotes the number of federal background checks per 1,000 persons which is used as a proxy for gun sales, αi denotes the state-level effects, γ_t denotes year effects, and X denotes the vector of explanatory variables which includes the PLCAA dummy variable. This model is very similar to those used by other studies in this area (Gius *et al*., 2018); (Depetris *et al*., 2015); (Wallace, 2015).

Results

Results are presented on Tables 2, 3, and 4. These results suggest that the PLCAA had inconsistent effects on the demand for guns. While the PLCAA is associated with a significant increase in overall gun sales and handgun sales, it had no statistically significant effect on long gun sales. In looking at sales data both before and after the PLCAA was passed, this result appears reasonable. The average number of total background checks conducted prior (1999 – 2005) to the passage of the PLCAA was 8,636,300; after the law was passed (2006-2016), the average total number of background checks was 17,279,236, a very significant increase. However, for long guns, prior to the PLCAA, there were an average of 4,687,781 background checks; after the PLCAA, there were an average of 5,501,363 background checks. In addition, one can see from Charts 1 through 3 that, while handgun and total firearm background checks increased substantially, long gun background checks remained relatively stable.

Table 2; Fixed Effects Results Total Firearm Background Checks per 1,000 Persons

Variable	Coefficient	Test Statistic
Intercept	1766.84	5.76***
Real Per Capita Median Income	-0.003	-0.95
Percent College Educated	-131.49	-1.12
Population Density	-0.59	-3.10***
Firearm Suicides/Total Suicides	103.39	1.52
Democratic President	72.9	7.08***
Percent Aged 18 or Older	-2119.19	-5.28***
PLCAA in Effect	40.94	3.96***
Hunting Licenses per 1,000 persons	0.018	0.86
Unemployment Rate	-13.38	-0.06

Notes: $R^2 = 0.636$
"***" = 1% Significance

Regarding the effects of presidential elections on gun sales, gun sales increased significantly when a Democrat was President. The per capita number of hunting licenses were positively associated with long gun sales but were not significantly related to overall gun sales or handgun sales. This result is also reasonable given that most hunters use long guns. Interestingly, higher rates of gun ownership (as measured by the ratio of firearm suicides to total

suicides) were not significantly related to overall gun sales, long gun sales, or handgun sales. This result suggests that prior gun ownership does not necessarily imply increased gun sales.

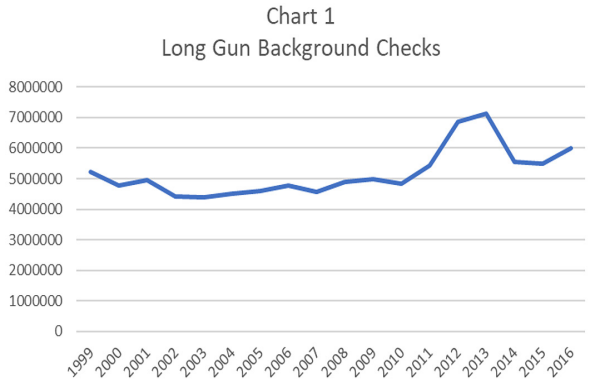


Table 3; Fixed Effects Results Long Gun Background Checks Per 1,000 Persons

Variable	Coefficient	Test Statistic
Intercept	-82.36	-1.96**
Real Per Capita Median Income	0.00073	1.64
Percent College Educated	-30.48	-1.89*
Population Density	0.0647	2.48**
Firearm Suicides/Total Suicides	2.416	0.26
Democratic President	3.18	2.25**
Percent Aged 18 or Older	110.13	2.00**
PLCAA in Effect	-1.243	-0.88
Hunting Licenses per 1,000 persons	0.0166	5.67***
Unemployment Rate	-39.36	-1.23

Notes: $R^2 = 0.834$
"*" = 10% Significance; "**" = 5% Significance; "***" = 1% Significance

Table 4; Fixed Effects Results Handgun Background Checks per 1,000 Persons

Variable	Coefficient	Test Statistic
Intercept	1849.2	6.03***
Real Per Capita Median Income	-0.00378	-1.17
Percent College Educated	-101.009	-0.86
Population Density	-0.655	-3.44***
Firearm Suicides/Total Suicides	100.97	1.48
Democratic President	69.72	6.77***
Percent Aged 18 or Older	-2229.32	-5.55***
PLCAA in Effect	42.185	4.08***
Hunting Licenses per 1,000 persons	0.00174	0.08
Unemployment Rate	25.98	0.11

Notes: $R^2 = 0.593$
"***" = 1% Significance

Chart 2
Handgun Background Checks

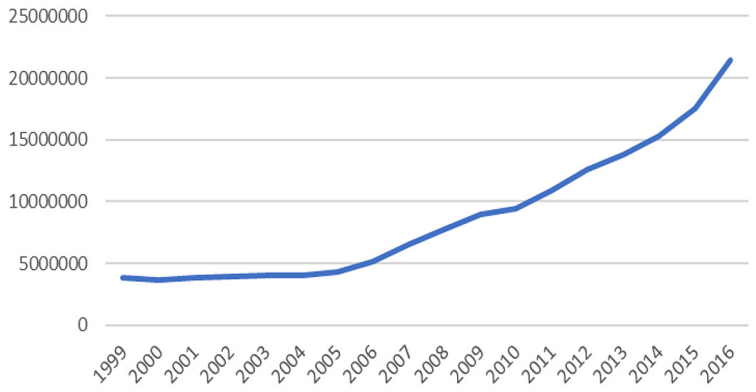
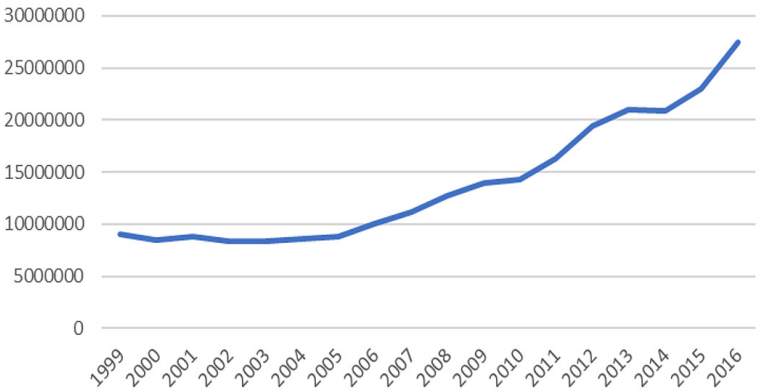


Chart 3
Total Firearm Background Checks



Regarding the other explanatory variables, population density is negatively related to total gun sales and handgun sales but positively related to long gun sales. The percentage of population of population that is 18 or older is negatively related to total gun sales and handgun sales but positively related to long gun sales. Both results contradict the findings of prior research. All other explanatory variables are statistically insignificant.

Conclusion

In 2021, over 38.5 million firearm background checks were conducted. This is 30 million greater than the number of background checks conducted in 2005. However, as previously noted, federal background check data does not indicate precisely how many firearms were purchased in a given year. There is no available data on annual firearm sales. Nonetheless, using background checks as a proxy for gun sales, results from the present study indicate that the PLCAA greatly increased gun sales. This result suggests that limiting the liability of gun manufacturers, distributors, and dealers resulted in greatly increased firearm sales. The method by which sales were increased is uncertain. It may have been due to more aggressive marketing, an increase in production, or some other factors. It is important to note, however, that most of the increase in sales was due to an increase in the sale of handguns and not long guns. Thus, the expiration of the federal assault weapons ban in 2004 probably had minimal effects on this increase in background checks primarily because most assault weapons are classified as long guns.

The primary limitation of this study is the use of background checks as a proxy variable for gun sales. While background checks data is one of the most reliable measures of gun sales at the state level, one background check does not necessarily equate to one firearm purchased. Unfortunately, there is no information about the type of firearm purchased or the motivation for the purchase. Given that firearms are the primary means by which homicides and suicides are committed, the findings of the present study suggest that passage of the PLCAA may have resulted in an increase in both homicides and suicides due to limitations on gun manufacturers' liability. This finding suggests that more research is warranted in this area.

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This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Informed Consent Statement
This study did not involve human participants, and therefore, informed consent was not required.

Clinical Trial Registration
This research does not involve any clinical trials.

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