The Relationship Between NRA Extremism and Gun Sales

Examining 2010-2018

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Abstract

This study explores the relationship between National Rifle Association (NRA) extremism expressed through Twitter and total gun sales in the United States during 2010-2018. A large sample quantitative analysis using archival data, and primary data obtained through content analysis, were used to show that NRA extremism is associated with gun sales. Results show that a strong, positive relationship exists between the NRA extremism and gun sales. Also, economic conditions (GDP, Producer Price, and Disposable Personal Income) are positively correlated with gun sales. It cannot be inferred from this study that NRA extremism has caused gun violence to increase. The data demonstrate that the NRA's support of violent acts to achieve its political, ideological, social, and economic goals, is associated with gun sales.

KEYWORDS: (Consumer Behavior, Economics, Extremism, Guns, Gun Sales, National Rifle Association, NRA, Twitter)

JEL CODES: (A10, A12, A14, B41, C12, C13, C20, C43, C51, D11 D31, D71, D84, D91, E01, E30, I31, K23, Y1,)

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ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED UNAUTHORIZED AID ON THIS THESIS

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I. Introduction

1.1 Guns in Society

The United States has the highest rate of firearm related homicides amongst higher income countries (healthdata.org, 2023) and the highest rate of gun ownership amongst all other countries (bbc.com, 2023). Decreasing gun violence would seem to be in the interest of all Americans. However, political organizations have suggested discrepant strategies to achieve that goal.

Gun rights groups have advocated for Second Amendment absolutism–the philosophy that citizens' Constitutional right to keep and bear arms should not be infringed. They have claimed that "the solution to bad people with guns is good people with guns" (Gundlach, A., 2014). As gun violence increases, it follows, based on gun rights groups' claims, that gun sales will continue to rise.

1.2 The National Rifle Association

The National Rifle Association (NRA) is a well-known gun rights group in the United States. In 2022, the self-proclaimed "leading gun rights advocacy group" (NRA. Twitter, 2022) spent upwards of $5.6 million dollars in Congressional campaign contributions (Opensecrets, 2022). The NRA devoted at least $13.2 million dollars to outside spending (Opensecrets, 2022). It has contributed primarily to Republican candidates (Opensecrets, 2022), but also to Supreme Court nominees, who are theoretically non-partisan (Giffords, 2022). The NRA has disseminated fliers, tweets, and

emails to promote gun rights (Edgar, R., 2020; Benton et al., 2016). It has used propaganda to promote an ideological, economic, and political agenda (Gundlach, A., 2014). The NRA has encouraged gun sales through deception (Bhatia, R., 2019).

1.3 Prompting Gun Sales Through Fear

Psychological and social scientific studies have tried to explain why gun sales spike following major mass shooting events (Jones, M. & Stone, G., 2015; Callcut, R. et al., 2019) and immediately before gubernatorial and presidential elections (Gundlach, A., 2014; Jones, M. & Stone, G., 2015). Research has found that fear—of gun legislation (Jones, M. & Stone, G., 2015), victimization (Stroebe et al., 2017), uncertainty (Becker, G. & Rubinstein, Y., 2011; Turvey et al., 2010), and a dangerous world at large (Stroebe et al., 2017)—is a major driver. Propaganda studies have shown that the NRA has incited fear through rhetoric used online (Edgar, R., 2020; Gundlach, A., 2014). Economic theory informs my analysis.

1.4 Research Aim

This paper strives to fill a gap in the literature regarding the observation that "threats of government action to limit perceived Second Amendment rights, particularly from a Democratic administration," seem to be positively correlated with gun sales (Jones, M. & Stone, G., 2015).

I argue that the National Rifle Association has become more extreme in recent years. I propose that the NRA's manipulation of fear and construction of incompatible social identities (gun owners and non-gun owners) could help explain the discrepancy.

Gun owners' identity and shared ideology resemble 'extremism'—loosely defined as "[t]he belief that an in-group's success or survival can never be separated from the need for hostile action against an out-group" (Berger, J., 2018). This study examines the relationship between the NRA's extreme rhetoric and gun sales. Content analysis produces monthly scores of the NRA's Twitter content to measure extremism throughout the 2010-2018 period. Linear regression, controlling for economic conditions (real disposable income per capita) and mass shooting events, relates yearly extremism scores to gun sales in the United States.

I expect to show that the NRA's extremism has changed over time. This change should be associated with a like change in gun sales.

Chapter One situated guns in society, introduced the NRA, and provided an aim for the research. Chapter Two identifies existing scholarly work in this area of study. Chapter Three describes the data and methodology. Chapter Four provides results. Chapter Five discusses implications, limitations, and areas for future research.

II. The Multifaceted Nature of Gun Sales

This section, "The Multifaceted Nature of Gun Sales," explains the factors that could be associated with gun sales. Economic variables, including macroeconomic conditions, disposable personal income and sales price, as well as psychological and ideological factors, including political party control, mass shooting events, and the anticipation and implementation of restrictive gun laws, are considered. The idea that the NRA may utilize extremism to increase its influence is introduced.

I. 2.1 Economic Variables

2.1.1 Macroeconomic Conditions

Economic theory expects a positive relationship between gun sales and economic conditions.[2] Because guns are a durable good (goods that are useful for more than three years (Encyclopædia Britannica, 2022)), gun sales should decrease when economic conditions are poor and increase when economic conditions improve (The Core Team, 2019).

When individuals obtain higher incomes, gun sales should increase.[3] It has been shown that gun ownership is correlated with income (Safehome.org, 2022). Most gun owners cite self-defense as their primary reason for keeping a gun (Safehome.org, 2022; Stroebe et al., 2017). Individuals with higher incomes are more likely to invest in every type of home security system, including a gun (Safehome.org, 2022). Thus, income should affect gun sales.

2.1.2 Sales Price of Guns

Fundamental economic theory suggests that goods will be in greater demand when prices are lower.[4] Bice, D. & Hemley, D. (2002) found a negative correlation between gun sales and price, but the result was statistically insignificant. It is unclear whether price influences gun sales.[5]

[2] Real Gross Domestic Product (GDP) is used to reflect macroeconomic conditions.
[3] Real Disposable Income Per Capita is used to reflect income.

[4] The Producer Price Index for Small Arms and Accessories is used to reflect the sales price of guns.
[5] Evidence supporting this relationship is limited to the antique/collectible gun market, which is neither the focus of this study nor a major portion of total gun sales (FBI., 2022).

II. 2.2 Psychological and Ideological Variables

Non-economic factors, including the political party in power in the House, Senate, and Presidency, mass shootings, and the anticipation and implementation of restrictive gun laws, could impact gun sales.

2.2.1 Crafting the Ideology

Understanding the "meaning" of guns can help explain how non-economic factors may affect gun sales. Psychological and social scientific studies have reexamined common understandings of guns as a tool for self-defense (Hoffner et al., 2012; Warner, T. & Ratcliff, S., 2021). Hoffner et al. (2021) employ 'Social Identity Theory' to show that individuals develop a sense of belonging and self-esteem by identifying as a gun owner. Warner, T. & Ratcliff, S. (2021) posit that guns are important to one's "sense of freedom…personal identity," and moral and emotional empowerment. Utility extends beyond guns' value as weapons.

Emotional attachment to assets is common (Hoffner et al., 2012). However, the allegiance to guns, and the level of anxiety, fear, and anger accompanying gun ownership, is unique (Warner, T. & Ratcliff, S., 2021).

2.2.2 Political Partisanship

Considering which political party is in power could help explain why gun sales often spike when Democrats are elected but fall when Democrats take office (Jones, M. & Stone, G., 2015).[6]

Political Polarization: Trusting Government

Trust in public protection and the sense that one is safe in society go hand-in-hand. Investments in public protection have been shown to be complementary to investments in private protection (Bice, D. & Hemley, D., 2002). Increased spending on police has been associated with decreased demand for guns.[7]

Likewise, feelings of security and freedom might be elevated when trust in government is greater. Between 1958 and 2022, trust was greatest at the onset of a Republican presidency (Nadeem, R., 2022).[8] Gun sales should be inversely related to trust in government (Bice, D. & Hemley, D., 2002).

2.2.3 Framing The Political Left

Trust in government can be influenced by NRA messages that frame Democrats as a threat to gun owners' security and freedom. Edgar, R. (2020) and

[6] Party control data for the House, Senate, and Presidency are used to reflect the political party in power and, in addition to mass shootings data, the anticipation of restrictive gun laws.
[7] This is explained by the fact that guns are most often acquired for personal protection (Bice, D. & Hemley, D., 2002). Gun sales should be inversely related to perceived police effectiveness. Perceptions of police effectiveness in "protecting people from crime" vary by party affiliation (Atske, S., 2021). In the period 2016- 2022, Republicans reported higher evaluations of police effectiveness than Democrats (Atske, S., 2021).
[8] Republicans reported greater trust in government during Republican administrations (Nadeem, R., 2022). Because most gun owners identify as Republican (Kruis et al., 2021), gun sales are predicted to be lower during Republican administrations (Bice, D. & Hemley, D., 2002).

Gundlach, A. (2014) find that the NRA often equates Democrats and left-leaning ideological groups, with threats to security and freedom.

Studies have shown that the NRA propagates false equivalences through media communication (Edgar, R., 2020; Gundlach, A., 2014). False equivalences enable a messenger to deceive their audience by asserting that a known fact is inextricably intertwined with a narrative that exists only to benefit the messenger's interests (Gundlach, A., 2014). Typically, an individual, action or group is wrongly associated with another individual, action or group (Edgar, R., 2020). For example, President Biden may state that gun control is a priority. The NRA may purport that any attempt to restrict gun rights will threaten the lives and livelihoods of gun owners. The NRA may falsely equate Biden's statement with the NRA's belief by tweeting, "Biden wants to revoke gun owners' Constitutional rights."

By framing messages in this way, the NRA establishes that Democratic beliefs are incompatible with American ideals, specifically, security and freedom. Guns are needed to compensate for Democrats' inherent inability to protect the public.

Political polarization likely moderates framing effects—Republicans are increasingly prone to dislike and/or distrust Democrats. NRA messages can have greater influence. Gun control sentiments can face pushback, such as gun rights activism, when they are delivered by a source who is seen as biased or not credible (Callaghan, K., & Schnell, F., 2009). Politically conservative gun owners, who are typically Republican (Kruis et al., 2021; Moore, J., 2015), are more likely to view

Democrats as biased or not credible in light of political polarization (Barber, M., McCarty, N., 2015).[9]

2.2.4 Mass Shootings and Restrictive Gun Laws

Anticipation and implementation of restrictive gun laws may affect gun sales.

Anticipation of restrictive gun laws can increase gun sales (Jones, M. & Stone, G., 2015). When Democrats are elected, gun owners may fear that gun control laws will be passed. In order to obtain guns before restrictions are implemented, gun sales should spike around election time.

Mass shootings can also incite fear of gun safety legislation. Following broadly televised mass-shooting events, such as Columbine (1999) and Sandy Hook (2012), gun sales spiked (Callcut, R. et al, 2019; Jones, M. & Stone, G., 2015).[12] Personal protection was secondary to fear of legislation as a driving force for gun sales (Jones, M. and Stone, G., 2015).

Implementation of restrictive gun laws can decrease gun sales.[13] Gun sales may be lower when Congress shifts to Democratic control. Democratic-majority

[9] The NRA predominantly backs Republican candidates (*Giffords Law Center*, 2022) and is more strongly aligned with the Republican party. Calls for gun reform by Democrats in power will predictably be associated with increasing gun rights activism.
[12] Sales often surpassed historical records after mass-shootings (Callcut, R. et al, 2019; Jones, M. & Stone, G., 2015).
[13] The yearly total number of gun laws passed across the United States is used to reflect the implementation of restrictive gun laws.

Congresses tend to pass more restrictive gun laws (Callcut, R. et al., 2019). Callcut, R. et al (2019) observed a decrease in gun sales coinciding with shifts to Democratic control.[14]

In the same way that businesses enhance advertising efforts come holiday season to capitalize on consumer buying habits, I expect the NRA to post more extreme tweets come election season. The NRA's activism—"advertising"—can encourage gun ownership and promote pro-gun candidates who can help block restrictive gun laws.

2.2.5 Social Identity Variables

The Gun Owner Group

The NRA's credibility (Edgar, R., 2020) suggests that its calls to purchase guns may influence gun sales.[15]

The NRA has leveraged traditional American values and ideals, particularly the desire for freedom and security, to assert a shared interest between gun manufacturers and citizens (Edgar, R., 2020). Through this frame, the NRA is not only understood as a friend, but also as a trustee (Gundlach, A., 2014). It has equated gun safety legislation with the out-group's (non-gun owners') ongoing efforts to undermine individuals' constitutional rights (Gundlach, A., 2014). This 'attack', or 'crisis' as Weldes (1999) calls it, lends the NRA credibility.[16]

[14] Restrictive gun laws may inhibit individuals' ability to purchase guns (Callcut, R. et al., 2019).
[15] Credibility is necessary for a group's messages to be considered (Heath et al., 1997; De Figueiredo, J. & Richter, B., 2014; Callaghan, K. & Schnell, F., 2009).
[16] Edgar, R. (2020) argues that "the credibility of the National Rifle Association should be considered low to moderate. However, after studying the ultimate audience and the potential target audience, it is believed that their perception of the NRA's credibility is high."

The National Rifle Association has championed the role, 'defender of freedom' (Edgar, R., 2020). In the interest of economic gain, it has claimed that politicians and groups who support gun regulation—a potential barrier to gun sales—are against freedom and security (Edgar, R., 2020). The NRA communicates that non-gun owners are against "us", fortunately, gun ownership will restore "our" control (Gundlach, A., 2014).

2.2.6 Perception of Targeted Violence

Assessing individuals' ability to control emotions without purchasing a gun helps explain why engendering fear is in the NRA's interest.

Consumers may overcome fear without buying a gun. Turvey et al. (2010) assert that "fear may diminish rapidly." When fear can be easily overcome, gun sales are unlikely to increase.

Individuals might recognize the specific context in which a shooting took place (Stroebe et al., 2017). Evaluating risk though an identity lens –the shooting took place at a synagogue, but I am not Jewish, therefore I will be safe—is a useful and efficient means to overcome fear (Stroebe et al., 2017). Contextualizing violence may benefit individuals, but it works against the NRA's goal of increasing gun ownership.

Research suggests that 'randomizing violence'—framing attacks as though there was no intended target—might compromise individuals' ability to overcome fear (Stroebe et al., 2017).[17] The NRA has sought to randomize violence to create a need for more guns. NRA messages have alluded to the idea that individual criminal acts are not

[17] Randomizing violence implies that anyone could be a victim (Stroebe et al., 2017).

responsible for most violence, rather, they reflect the reality of "a dangerous world" (Stroebe et al., 2017; Gundlach, A., 2014). The NRA has cited guns as the solution (Edgar, R., 2020). Randomizing violence may increase gun sales.

2.2.7 Fear

NRA extremism lies at the intersection of non-economic and economic variables. The NRA uses propaganda, a non-economic factor, to achieve its economic goal: creating a consumer base that demands guns.

Understanding the role of fear in NRA messaging and gun consumption can help explain their interrelationship.

Research on consumer behavior has shown that fear can be a powerful predictor of consumption (Becker, G. & Rubinstein, Y., 2011). The utility of any good or service typically decreases when consumers are exposed to terrorizing stimuli (Becker, G. & Rubinstein, Y., 2011). Consumers react in two predictable ways. Some consumers will find an alternative source of utility. They would not be expected to put effort into repressing fear because a comparable activity exists. Other consumers will believe that they can achieve satisfaction if, and only if, they consume the initial good or service. The latter group would be expected to inhibit fear.

In order to capitalize on consumers' desire to overcome fear, the NRA has propagated the idea that guns provide a sense of control–control over unanticipated violence, constitutional rights, animals, and one's self-esteem (Hoffner et al., 2012;

Stroebe et al., 2017).[18] It has championed the phrase, "the solution to bad people with guns is good people with guns" (Gundlach, A., 2014). Although the fact is that guns are a poor self-defense mechanism, the common knowledge is that guns are helpful (Gundlach, A., 2014; Stroebe et al., 2017). [19] Gun sales may spike following terrorizing events.

2.3 Proposing A Relationship Between NRA Extremism and Gun Ownership

This section, "**Proposing A Relationship Between NRA Extremism and Gun Ownership**," defines 'extremism'; explains how psychological factors associated with gun ownership can be attributed to the NRA; describes the ways in which the NRA has used extremism, and suggests that NRA extremism might affect gun sales.

2.3.1 The NRA Wants to Increase Its Influence

The definition of extremism employed in this study combines that of Berger, J. (2018) and the FBI (FBI, 2020): "The belief that an in-group's success or survival can never be separated from the need for hostile action against an out-group; the commission of violent acts can be supported, condoned, encouraged or justified to achieve the in-group's political, ideological, religious, social, or economic goals." Rather than labeling the NRA "extremist," my objective is to show that the NRA has used extremism to construct an identity–an in-group—that it compels to purchase guns in order to increase its influence. The NRA's ongoing efforts to "put and keep more guns in the hands of law-abiding citizens" may increase the risk of violent acts, such as mass shootings (Gundlach,

[18] The NRA recognizes that fearful consumers represent prospective gun owners.
[19] When confronted with fear, individuals utilize availability heuristics (Turvey et al., 2010; Edgar, R., 2020). Availability heuristics are a mental shortcut that help people evaluate the costs and benefits of consumption. They lead individuals to make decisions based on existing knowledge, however factual or false it may be, rather than with reference to evidence.

A., 2014). Gun safety advocates comprise the out-group. Gun owners believe firearms are necessary to protect society from bad people (Stroebe et al., 2017). Gun legislation presents a threat to the in-group's philosophy and survival.

Labeling the NRA 'extremist' could increase its influence. The NRA, in addition to other gun rights and gun safety organizations, has been labeled "extremist" (Williford, A., 2019). Coleman, P. & Bartoli, A. (2015) and Berger, J. (2018) have recognized that a belief, person, activity, or group can only be "extremist" in relation to "what is 'ordinary'." Labeling people or groups as "extremist" asserts that they are different or separate from the dominant group, and/or their beliefs diverge from the prevailing belief system (Coleman, P. & Bartoli, A., 2015). While it may be true that self-proclaimed 'gun rights absolutists' (Edgar, R., 2020) differ from most Americans, who believe gun safety legislation is important (Burton, A. et al., 2021), the extremist label can have the unintended consequence of encouraging membership in that group (Williford, A., 2019).

Individuals who visit the NRA website tend to possess a gun (Gundlach, A., 2014) and feel unsafe or insecure (Gundlach, A., 2014).[21] They may be willing to engage in extreme action because they feel threatened. They consult the website for advice.[22] This places the NRA in a position of power.[23] In-group membership can offer

[21]Most viewers also identify as Republican (Stroebe et al., 2017).
[22] The number of unique visitors to the NRA website increased dramatically following violent attacks, such as the Sandy Hook mass shooting (Gundlach, A., 2014).
[23] "When in conflict, the activities of members of low power groups tend to be viewed as more extreme than similar activities committed by members of groups advocating the status quo. In addition, extreme acts are more likely to be employed by marginalized people and groups who view more normative forms of conflict engagement as blocked for them or biased" (Coleman, P. & Bartoli, A., 2015). Labeling the non-specific group—including some combination of NRA members, gun-owners, and gun rights advocates—'extremist' can marginalize individuals.

psychological relief (Williford, A., 2019). The NRA can expect that its advice, no matter how extreme it may be, will be heeded.

2.3.2 Media Can Provide an Ideal Mechanism

Media has provided an ideal mechanism to propagate extremism. While a comprehensive review of the NRA's media interaction must be reserved for another paper, it is worth noting that it has used propaganda, defined as "a systematic form of purposeful persuasion that attempts to influence the emotions, attitudes, opinions, and actions of specified target audiences for ideological, political, or commercial purposes through the controlled transmission of one-sided messages," (Nelson, R., 1996 c.r. Edgar, R., 2020) to promote Second Amendment absolutism (Gundlach, A., 2014).

2.3.3 Fear Can Be Easy to Incite

Stroebe et al. (2017) theorize that news coverage is becoming more negative (Stroebe et al., 2017). This is coupled with viewers' belief that the world is an increasingly dangerous place (Stroebe et al., 2017)[24]. Negative news media has helped the NRA promote its pro-gun ideology by exacerbating fear (McCluskey et al., 2016). "[A] diffuse threat of a dangerous world…[and] that society is at the brink of collapse"

[24] Stroebe et al. (2017) highlight that these phenomena may be mutually reinforcing.

are common perceptions amongst gun owners and non-gun owners (Stroebe et al., 2017).[25]

2.3.4 Fear Can Drive Gun Sales

Extremism condones violence. Violence incites fear. Fear increases gun sales. It has been shown that "supporting the commission of violent acts to achieve the in-group's [gun rights' advocates'] ideological...and economic goals" (from the extremism definition employed in this study) is in the NRA's interest—violent acts incite fear, and fear incites a willingness to purchase a gun.

III. Data and Methods

3.1 Overview

This section, "**Data and Methods**," describes the two main modes of data collection used in this study: conducting large sample quantitative analysis using (1) primary data obtained through content analysis and (2) archival data (Christina Rader, 2022-2023 Thesis Syllabus).

3.1.1 Time Period

[25] Conservative Republicans, who represent a greater proportion of gun owners than any other ideological group, are most likely to hold these views (Stroebe et al., 2017). I suggest that this is due in part to the NRA's extremism.

The 2010-2018 period was observed for three reasons. First, data were available for all months within the period. Second, the limited time frame allotted for Senior Thesis required me to focus on a shorter study period. Analyzing Twitter content for additional years would not have been feasible. Third, the 2010-2018 period enabled me to assess political changes, specifically, how the party affiliation of the president, and the majority of the House and Senate, might affect gun sales.[26]

Regression-based Approach

3.2 Data: Dependent Variable: Gun Sales

Gun sales is defined as the monthly, total number of legal gun sale transactions. The following data set was tested:

(1) Estimated Minimum Sales Volume (EMSV) data represent the estimated monthly total number of legal gun sale transactions in the United States. Data cover the period 2010-2018. Data were provided by the Federal Bureau of Investigation and the Bureau of Alcohol, Tobacco, Firearms, and Explosives.

Gun sales estimates were used because a federal database containing all legal gun sales does not exist (Giffords, 2022). Some states publish actual yearly sales numbers. However, sales reporting requirement vary according to state law (Giffords, 2022).

National Instant Criminal Background Check System (NICS) data are often used as a proxy for gun sales. NICS background checks do not show any variation between

[26] Due to multicollinearity issues, this third reason became insignificant.

transactions where one gun is sold and those where multiple guns are sold. EMSV data are more accurate. EMSV data considers these differential transactions by using sales codes embedded in NICS background checks. Every few years, the Bureau of Alcohol, Tobacco, Firearms and Explosives publishes a minimum baseline number of gun sales per background check (atf.gov, 2020). EMSV data used in this study were based on the value published in 2020.

Illegal gun sales and transactions occurring between family members or friends were not included**.**

3.3 Data: Control Variables

3.3.1 Economic Conditions: Real Disposable Personal Income Per Capita

The following economic condition was tested:

Real Disposable Income Per Capita, defined as "the income available after paying taxes and receiving transfers from the government" divided by the total U.S. population (The Core Team, 2019). Data represent the monthly, real disposable income for United States' citizens. Data were provided by the Federal Reserve for Economic Data (FRED). Data cover the period 2010-2018.

Real disposable personal income was considered because research has shown that personal income is positively associated with gun sales (Safehome.org, 2022).

3.3.2 Mass Shooting Incidents

Mass shooting incidents are defined as occurrences where four or more people are shot and killed by a party on a single day.[27] Data were provided by data.world, a data site operated by the Associated Press. Data included the dates and number of people shot and killed for each incident. Incidents with fewer than four deaths were removed. Data were cleaned so that the monthly, total number of mass shootings in the United States could be analyzed. Data cover the period 2010-2018.

It is unclear whether the total number of mass shootings can predict gun sales. Researchers have found that "major" mass shootings, including Columbine (1999) and Sandy Hook (2012) were associated with a dramatic increase in gun sales (Jones, M. A., & Stone, G. W., 2015; Callcut et al., 2019; Gundlach, A., 2014). Media coverage may help distinguish between the two types of mass shootings. Callcut et al. (2019) and Jones and Stone (2015) argue that the events at Columbine and Sandy Hook were well-known. Consumers may have purchased guns in response.[28] Mass shootings often occur without public knowledge.[29] Therefore, the total number of mass shootings might have little effect on gun sales.

Additional Control Variables

[27] Callcut et al. (2019) defined mass shooting incidents as "[a]ll events with a minimum of four victims (not including the perpetrators)... [including] those sustaining either fatal or nonfatal injuries." Data availability led me to exclude occurrences where fewer than four or more people were killed.
[28] This is based on Stroebe et al. (2017) finding that guns can help people overcome fear, coupled with and Jones and Stone's (2015) finding that fear of legislation resulting from a mass shooting can prompt gun sales.
[29] In the United States, there have been roughly 185 mass shootings between 1966-2022. Only a small proportion of which received substantial media coverage (TheViolenceProject, 2022).

A variety of other control variables were considered (gun laws, political party in power, GDP, and a producer price index), but excluded due to problems with multicollinearity. Appendices D and E detail those variables.

3.4 Data: Key Independent Variable: NRA Extremism

3.4.1 Measure of NRA Extremism

Twitter content within the 2010-2018 period was analyzed. I reviewed five National Rifle Association tweets per month, totaling 60 tweets per year. Within each month, tweets were randomly selected.

A variation of Oz et al. (2018) content analysis was employed to measure extremism. Oz et al. (2018) examined online discussion forums to reveal attitudes expressed by Facebook and Twitter users toward White House posts. Rather than observing users' responses, this study centers on the NRA's original tweets.

Oz et al. (2018) created three separate three-point tests for incivility, impoliteness and deliberation based on the existing literature. Test questions included yes/no responses and were weighted identically (yes=1, no=0). I adapted their tests to help quantify my data.

My analysis used four tests to evaluate Threats to Democracy and Individual Rights, Evidence-Based Argument, Support for Gun Owners and the NRA as the In-Group, and Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group. The tests were used to produce monthly 'extremism' scores. Monthly, as opposed to composite,

scores were obtained to ensure the data had variation. This was necessary for the linear regression to work.

Threats to Democracy and Individual Rights deals with divergence from social norms specifically as they relate to social group identities and personal freedoms. The test evaluates threats, such as an intent to commit a violent act or undermine individuals' rights, and the acknowledgement of a real or fictional threat to democracy. The test assesses whether "violent acts [are] supported, condoned, encouraged, or justified to achieve the in-group's political, ideological, religious, social or economic goals" (derived from my extremism definition).

Evidence-Based Argument deals with divergence from social norms as they relate to truthful and accurate communication. The test evaluates the tone of users' rhetoric by considering the use of capitalized letters,[31] curse words, and insults. It may help detect faulty reasoning. For example, a tweet may state that "THE DEMOCRATS WANT TO TAKE AWAY YOUR GUNS!" The test can help reveal that a bill intended to expand background checks was the underlying fact. The tweet thereby falsely equates gun safety legislation with gun confiscation. Such "false equivalences" are a propaganda tactic that is frequently used by the NRA, presumably to incite fear.

Evidence-Based Argument also measures the soundness of a user's arguments. It evaluates whether claims are reasonable, evidence-based, and logical.

[31] All-capitalized letters are generally understood as yelling.

Support for Gun Owners and the NRA as the In-Group and *Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group* underscore the in-group versus out-group dynamic contained in my extremism definition.

Support for Gun Owners and the NRA as the In-Group examines whether in-group membership is encouraged. Questions measure the effectiveness of NRA tweets toward achieving political, ideological, and social influence. Topics such as voting for an in-group candidate and framing the NRA as 'defender of freedom' are included. *Support for Gun Owners and the NRA as the In-Group* also assesses whether gun ownership is encouraged. Direct and indirect advice to purchase guns are scored.

Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group considers how members of the out-group are framed. 'Extremism' necessitates "hostile action against an out-group" (Berger, J., 2018). The test evaluates whether an out-group is negatively characterized.

Appendix A includes the specific criteria for each test.

3.4.2 Regression Model

Once monthly extremism scores were determined, the data were used to run a linear regression. The following model was tested using estimated federal gun sales data (FBI, 2022; atf.gov, 2020):

$$\text{Gun Sales (EMSV) (hat)} = B_0 + B_1 * \text{Income} + B_2 * \text{MassShootings} + B_3 * \text{NRAExtremism} + e \quad \text{[equation 1]}$$

Disposable personal income per capita and mass shootings were held constant. The correlation between the NRA's extremism (independent variable) and gun sales (dependent variable) was measured.

IV. Results

This section includes content analysis (4.1) and linear regression (4.2) results.

4.1 Content Analysis Results

Content analysis of NRA tweets enabled me to observe findings that are not obvious from the regression.

4.1.1 Tweets Implicitly Advised Viewers to Purchase Guns

Theory suggested that the NRA uses propaganda to promote its political, ideological, social, and economic goals (Edgar, R., 2020; Gundlach, A., 2014). Explicit threats to democracy, individual rights, or members of outside-groups may reduce the in-group's credibility (Edgar, R., 2020). Explicit threats may face scrutiny from policymakers and business leaders associated with Twitter. Implicit threats could have negligible impact on credibility and be excused by decision-makers. Out of 540 tweets, 48 acknowledged a threat to democracy. Few of the threats were explicitly made by the NRA. Most were allegedly made by members of the out-group (such as non-gun owners, Democrats, or politicians). I observed a similar pattern regarding advice to purchase guns. Only seven tweets explicitly advised viewers to purchase guns. This is compared to 293 tweets (more than 50% of the sample) that indirectly advised viewers to obtain arms.

My hypothesis that the NRA's manipulation of fear can help explain the association between extremism and gun sales was supported by the content analysis. Specifically, the *Threats to Democracy and Individual Rights* and *Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group* tests showed that the NRA often posts tweets to create the perception that individuals are endangered. 341 tweets (almost 75% of the sample) suggested a threat to individual rights or democracy.

4.1.2 Tweets Utilized An Emotional Appeal

Numerous tweets contained links to external articles (n = 405).[32] Articles frequently contained compelling anecdotes from individuals who purportedly faced a life-or-death situation. Time and again, their gun saved their (or a loved one's or a stranger's) life. Other articles highlighted the injustices faced by individuals who had used a gun for self-defense and were subsequently punished. In each case, gun-owners were framed as good (n=157), or even heroic, and non-gun owners, gun safety advocates, or ambiguous outside forces, were framed as bad (n=279).

4.1.3 Tweets Referred to Out-Group Members By Name

Occasionally, specific politicians were blamed for the injustices against "law-abiding citizens". Several tweets contained a link to the National Rifle Association Political Victory Fund (NRA-PVF) website, where viewers were encouraged to vote for particular, NRA-endorsed candidates. A few tweets explicitly supported U.S. Supreme

[32] Some links navigated to websites, giveaways, or Youtube.

Court nominees. It was clear that the theoretical non-partisanship of the Supreme Court (Giffords, 2022) was ignored.

Appendix B includes the total scores for each test question.

4.2 Linear Regression Results

Table 1 presents linear regression results.

Table 1:
Linear Regression Results

Regression Statistics	
Multiple R	0.716582
R Square	0.51349
Adj. R Square	0.499456
Standard Error	339199.7
Observations	108

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1.26E+13	4.21E+2	36.5891	3.17E-16
Residual	104	1.2E+13	1.15E+1		
Total	107	2.46E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-3525752	826241.4	-4.26722	4.38E-05	-5164220	-1887285
disposableincome	119.4935	21.95005	5.44388	3.5E-07	75.96571	163.021
massshootings	-222.72	28161.62	-0.00791	0.99370	-56068.3	55622.8
extremism	16872.74	4097.089	4.11822	7.68E-0	8748.058	24997.4

The y-intercept (labeled ‘Intercept’) merely serves as a placeholder for the regression line. It should not be interpreted.

R-squared ($R^2 = .513$) indicates that the model accounts for 51.3% of the variance in gun sales between 2010-2018.

Extremism

The data suggest that NRA extremism is positively correlated with gun sales. This result supports my hypothesis. The regression results show that a one-point increase in the NRA's monthly extremism score should be associated with 16,872 additional gun sales, $t = 4.12$, $p < .001$. Further, the probability of obtaining a result that is this extreme due to chance alone is less than one percent.

It should not be concluded that NRA extremism is definitively associated with gun sales. Many control variables, such as gun laws and political party control, were excluded. As a result, key factors may not have been considered. Extremism scores may have captured additional factors that could have produced the observed effect. For example, extremism scores may increase over time. Gun sales may increase over time due to a growing population. A statistical correlation might conceal that time mediates the relationship between extremism and gun sales.

Income

The data demonstrate that there is a positive relationship between real disposable personal income per capita and gun sales, $t = 5.44$, $p < .001$. When all other variables are controlled for, a one dollar increase in real disposable personal income per capita should be associated with 119 additional gun sales. Findings are consistent with economic theory: the demand for guns (a durable good) should increase when individuals' income

increases (Safehome.org, 2022; Encyclopædia Britannica, inc., 2022; The Core Team, 2019).

Mass Shootings

The data could not provide evidence that the total number of mass shootings is associated with gun sales, $t = -.01$, $p > .1$. The null hypothesis must be retained.

V. Discussion

This section, "**Discussion,**" describes the study's implications (5.1) and key limitations (5.2), suggests areas for future research (5.2), and concludes (5.3).

5.1 Discussion

Regulating Twitter Content Could Reduce Extremism

Linear regression results suggest a link between extreme rhetoric used online and gun ownership. The NRA's "support of violent acts…to achieve its political, ideological, social, and economic goals" (from the extremism definition employed in this study) seems to be associated with gun sales. This finding indicates that social media may be an effective way to disseminate profoundly consequential information. Twitter executives and other social media business leaders may want to conduct further research examining users' influence.

Content analysis revealed the proportion of tweets that rely on implicit arguments and the acknowledgement of threats (such as threats to individual rights or democracy).

Policymakers who are interested in regulating extreme social media content should consider implicit advice and perceived threats.

Economic Conditions Are An Important Factor

Economic conditions, represented by Real Disposable Personal Income, may impact gun sales. Future studies should include economic conditions as a variable.

Mass Shootings vs. "Major" Mass Shootings

The total number of mass shootings could not reliably predict gun sales. The relationship between mass shootings and gun sales presents an area that is ripe for future research.

5.2 Limitations and Future Research

Interrater Reliability

The study lacks interrater reliability. Interrater reliability is achieved when more than one coder codes the data in order to improve a study's accuracy. Multiple-point tests were comprehensive and strived to be unambiguous so that coder accuracy could be attained, and the study could be replicated. Nonetheless, the accuracy of this research was compromised by the fact that I was the sole coder.

Future research search should employ more than one coder to analyze data.

[35] Jones, M. A., & Stone, G. W., 2015; Callcut et al., 2019; and Gundlach, A., 2014 each considered Sandy Hook and Columbine to be "major".

NRA-ILA Lobbying

My model did not consider the potential effect of NRA-ILA lobbying. Lobbying efforts can bolster political candidates' campaigns (Giffords.org, 2022) and help garner support for certain bills or types of bills (Smith, S., Roberts, J., Vander Wielen, R., 2009). Lobbyists may try to publicize gun rights issues. Through correspondence with legislators, lobbyists may promote the idea that guns make America safer, or that gun regulations should only apply to the mentally ill. These messages could impact gun sales.

Future models might include lobbying measures, such as NRA-ILA spending or NRA endorsements, to better predict gun sales.

U.S. Supreme Court Decisions

My model did not consider the potential effect of U.S. Supreme Court Decisions on gun sales. Research on anticipatory fear of restrictive gun laws may help inform Court decisions' impact. For example, the *District of Columbia v. Heller* (2008) case significantly influenced gun legislation in the United States. Justice Scalia acknowledged that, *"'*[l]ike most rights, the right secured by the Second Amendment is not unlimited. [It is] not a right to keep and carry any weapon whatsoever in any manner whatsoever and for whatever purpose'" (Giffords.org, 2022). Based on findings that anticipatory fear of restrictive gun laws can be associated with an increase in gun sales (Jones, M. & Stone, G., 2015), we might expect that the Court's decision would inspire anticipatory fear, subsequently relating to an increase in gun sales.

A study that explores the association between Supreme Court decisions and gun sales would be fascinating.[36]

Additional Variables

Additional variables that could be considered in future research might include; party control for the House, Senate, and Executive; gun laws, and major mass shootings.

5.3 Conclusion

This study strived to explain why "threats of government action to limit perceived Second Amendment rights, particularly from a Democratic administration," seem to be positively correlated with gun sales (Jones, M. & Stone, G., 2015). I proposed that the National Rifle Association's manipulation of fear and construction of incompatible social identities (gun owners and non-gun owners) could help explain the discrepancy. The NRA's actions fit Berger (2018) and the FBI's (2020) definition of extremism.

I conducted a Twitter content analysis to measure the NRA's extremism. I subsequently tested a linear regression model, controlling for real disposable personal income per capita and mass shootings. Results suggested that a positive relationship exists between NRA extremism and gun sales.

Social media may profoundly influence viewers' attitudes and actions. Content analysis results revealed that NRA messaging is dependent on implicit advice-giving and

[36] It would also be interesting to analyze the relationship between NRA tweets about the Supreme Court and the Court's ideological composition.

acknowledging perceived threats. Policymakers and business leaders who are interested in reducing extremism should emphasize those two persuasion tactics.

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Appendix A: Multiple-Point Test Criteria

Tests were adapted from Oz's et al. (2017) study. I modified tests based on academic literature (Anzovino et al., 2018; Lanza et al., 2006). "Each comment scored a point for positive response to each of these questions, and the scores were totaled with a possible value of 0 to [14]" (Oz et al., 2017).

Threats to Democracy and Individual Rights

- "Was there a verbalized threat to democracy, such as a proposal to overthrow democratic government" or interfere with government function (e.g., "Today, we are on the cusp of losing our Founders' vision forever. Anti-gun, anti-freedom politicians are shamelessly and illegally using the awesome power of government to trample our rights")?
- Is there a threat or perceived threat to people's individual rights or personal choice (e.g. "ICYMI: 'I'm proud to sign the Campus Self-Defense Act which will strengthen 2nd Amendment protections in West Virginia.' #2A")?
- Did the comment incite, encourage, condone, or support an act of physical violence* (e.g., "A 67yo Florida woman awoke at 3 AM to the sound of the door handle rattling. A home invader forced his way and raised his gun at the woman. She drew her gun and shot & killed the assailant. Thank God for #2A")?

Evidence-Based Argument

- "Did the comment contain a link to supporting or external materials (e.g., "Cities are safer with guns: There is abundant evidence that our cities are safer with guns. One of the most remark... http://bit.ly/8pNIDb")?
- Did the comment provide a comprehensive argument or counterargument (e.g., "'Roll the calendar back to 1791. Was that type of restriction in existence in 1791?' If it wasn't, then it can't be now.' -NRA President Charles Cotton")?
- Did the comment provide numbers or statistics to support an argument, regardless of whether the facts were accurate (e.g., "FACT: 2,676 people have been murdered in Chicago since Mayor Lori Lightfoot assumed office on 5/20/19")?"

- Did the tone suggest hostility or anger, rather than discourse, such as name-calling, blame, or profanity (e.g. “GREAT NEWS: Chicago Ousts Gun-Hating Mayor Lori Lightfoot. Don’t let the door hit you on the way out”)?

Support for Gun Owners and the NRA as the In-Group

- Does the tweet support, or encourage support of, a particular political party or candidate (e.g., “#TENNESSEE: ‘Just to be clear, a lot has changed in 16 years. Marsha Blackburn (@VoteMarsha) has earned her ‘A’ rating, and @PhilBredesen worked really hard to earn his ‘D’ rating. … he turned his back on law-abiding gun owners’”)?

- Did the comment positively characterize an in-group ideology (e.g. “President Joe Biden just made another push for a ban of America's most popular rifle in his State of the Union speech last night. But these female gun owners and mothers aren’t buying what Joe is peddling: “Tell that to the pregnant mother who saved her kids with an AR-15”)?
- Does the tweet encourage membership in the in-group (e.g. “’Thank God I had my gun, or I’d probably be dead right now.’ —Chicago Carjacking Victim”)?
- Does the tweet directly advise people to purchase guns (e.g. “Step 1: Buy a stock 9mm double stack pistol Step 2: Install all manner of "upgrades" for added performance Step 3: Realize all that wasted time and energy could have been avoided if you had just bought a @WilsonCombat SFT9 at the very beginning”)?

- Does the tweet indirectly advise people to purchase guns (e.g., “In honor of President's Day, here's a look at a Colt New Frontier presented to President John F.

Kennedy, who, like so many other U.S. Presidents, was a Life Member of the NRA")?

Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group

- Are names used in a derogatory way (e.g. "Trigger warning for all the Second Amendment-hating leftists out there...")?
- Did the comment negatively characterize an out-group ideology (e.g. "That a government agency would bury data from a major study on defensive gun use is shocking, but, it is also illustrative. After all, an honest discussion is not what gun controllers seek")?

Tweets containing images were scored in whole. Tweets that provided links were scored based on the content within the tweet and part of the content within the link. The first minute of each available video was considered and included in the extremism score. The title and first two paragraphs of each available article was considered and included in the extremism score. This approach was based on traditional journalistic style. The most important content is typically provided in the first few paragraphs.

*Tweets that mention "assault" in the strict sense of naming an *assault* rifle did not receive a score for encouraging violence if no other act of physical violence was mentioned.

Appendix B: Multiple-Point Test Scores

Table 1: Multiple-Point Test Scores	Total (Max. = 540)
Threats to Democracy and Individual Rights	
Was there a verbalized threat to democracy, such as a proposal to overthrow democratic government or interfere with government function?	48
Is there a threat or perceived threat to people's individual rights or personal choice?	344
Did the comment incite, encourage, condone, or support an act of physical violence?	381
Evidence-Based Argument	
Did the comment contain a link to supporting or external materials?	405
Did the comment provide a comprehensive argument or counterargument?	157
Did the comment provide numbers or statistics to support an argument, regardless of whether the facts were accurate?	59
Did the tone suggest hostility or anger, rather than discourse, such as name-calling, blame, or profanity?	161
Support for Gun Owners and the NRA as the In-Group	
Does the tweet support, or encourage support of, a particular political party or candidate?	100
Did the comment positively characterize an in-group ideology?	390
Does the tweet encourage membership in the in-group?	390
Does the tweet directly advise people to purchase guns?	7
Does the tweet indirectly advise people to purchase guns?	293

Criticism of Non-Gun Owners and Gun Control Advocates as the Out-Group	
Are names used in a derogatory way?	120
Did the comment negatively characterize an out-group ideology?	279

Appendix C: Alternative Methods

Extremism has been defined in various ways. Researchers have sought to measure extremism in ways suitable to each definition. Benigni et al. (2017) used an "Iterative Vertex Model" to detect 'online extremist communities' via Twitter. The study emphasized the expanding social group that supported ISIS, assuming ISIS was extremist. Researchers did not attempt to show that ISIS was becoming any more or less 'extremist'.

Thornburn et al. (1970) measured extremism in terms of the quantity of users associated with an assumed 'extremist' movement, specifically, the 'Unite the Right'/ 'Alt-right'.

Torregrosa et al. (2020) used Twitter's application programming interface (API) tool to detect accounts embedded in Unite the Right online advertisements. Researchers sought to understand the extremist network through retweets, based on the finding that "retweets…represent interest and trust in another one's content" (c.r. Metaxas et al., 2015). Unite the Right was assumed to be extremist, but the specific ways in which it was extremist were explicated through researchers' use of 'hashtag analysis' and 'text

categorization'. Researchers considered shifts in extremism throughout a four-month study period.

Scrivens et al. (2018) examined online discussion forums to identify 'radical' authors. Scrivens et al. (2018) used a computer program called 'SentiStrength' to develop authors' 'radical scores'. Scores were based on sentiment valuation that considered negative emotion detected within an author's tweets to be indicative of an author's radicalism. Scrivens et al. (2018) used 'radicalism' and 'extremism' interchangeably.

Appendix D: Initial Regression Model

Linear regression models seldom include all factors that contribute to a given outcome. Researchers strive to include the key factors. Based on the academic literature, my model initially included party control, federal gun laws, real GDP, real disposable personal income, a producer price index, NRA extremism, and mass shootings:

$$\text{Gun Sales (EMSV) (hat)} = B_0 + B_1*\text{GDP} + B_2*\text{Income} + B_3*\text{Price} + B_4*\text{MassShootings} + B_5*\text{TotalGunLaws} + B_6*\text{HouseControl}_{\text{Dem}} + B_7*\text{SenateControl}_{\text{Dem}} + B_8*\text{ExecControl}_{\text{Dem}} + B_{11}*\text{NRAExtremism} + e \quad \text{[Equation 4]}$$

Restrictive Gun Laws

Restrictive gun laws are defined as laws that attempt to regulate or control gun commerce. The following data set was tested:

(1) The total number of gun laws, by month, that were in place across all 50 states. Data were provided by statefirearmlaws.org, a Boston University School of Public Health project. Data span the period 2010 to 2018.

The quantity of gun laws was tested to help reveal a relationship between the anticipation and implementation of restrictive gun laws and gun sales across the United States. The quality of gun laws was not considered.

Political Party in Power

Political Party in Power is defined in two ways. First, Political Party in Power for the House and Senate is defined as the expressed political affiliation of the majority of House and Senate members in each session, respectively[37]. An indicator variable with Democrat as the reference category was included to note whether the House and Senate were independently controlled by Democrats (yes=1, no=0). House data were provided by data-planet, a published database intended for academic research. Senate data were provided by senate.gov. Second, Political Party in Power for the Executive is defined as the expressed political affiliation of the president. A binary variable with Democrat as the reference category was included to note whether the president was a Democrat (D=1) or a Republican (R=0). Executive data were provided by The Guardian. Data were manipulated to produce monthly values. Data cover the period 2010-2018.

Pairwise Correlation Matrix

The pairwise correlation matrix for my initial model is provided below.

[37] House Party in Power and Senate Party in Power were measured separately.

Table 3: Pairwise Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) gunsalesemsv	1.000									
(2) fedgunlaws	0.635	1.000								
(3) realgdp	0.666	0.964	1.000							
(4) disposableincome	0.659	0.911	0.971	1.000						
(5) producerprice	0.649	0.928	0.888	0.801	1.000					
(6) mnthlyextremism	0.611	0.572	0.618	0.580	0.581	1.000				
(7) execcontrolr0d1	-0.576	-0.756	-0.823	-0.833	-0.618	-0.489	1.000			
(8) senatecontrolr0d1	-0.609	-0.841	-0.870	-0.884	-0.690	-0.551	0.791	1.000		
(9) housecontrolr0d1	0.270	0.605	0.591	0.620	0.427	0.162	-0.500	-0.395	1.000	
(10) massshootings	0.089	0.092	0.115	0.123	0.068	0.095	-0.157	-0.124	0.062	1.000

Summary Statistics

The Summary Statistics including the number of observations, mean, standard deviation, minimum, and maximum for all data are provided below.

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
gunsalesemsv	108	1816807	479440.2	1014234.2	3361130.2
fedgunlaws	108	1315.222	57.448	1243	1413
realgdp	108	17004.021	965.289	15456.059	18733.741

realdisposableincome	108	40616.074	1839.695	37721	44814
producerpriceindex	108	115.8	2.867	110.6	119.9
extremism	108	29.019	9.826	0	51
execcontrolr0d1	108	.667	.474	0	1
senatecontrolr0d1	108	.556	.499	0	1
housecontrolr0d1	108	.111	.316	0	1
massshootings	108	1.88	1.174	0	5

Multicollinearity

Linear regression assumes that there is little to no multicollinearity. Statistical tests revealed that many of the variables included in my initial regression model were correlated with one another.[38]

To resolve the multicollinearity problem, I dropped federal gun laws and party control from my model. It is unclear why federal gun laws and each economic variable were highly correlated. I tested the model including one economic factor at a time (see

[38] Pairwise Correlation Matrix and Variance Inflation Factor (VIF) test results were analyzed. Federal Gun Laws, GDP, and Disposable Income, and Senate Control had a VIF greater than 10.[38] Thus, the VIF confirmed that multicollinearity was present.

Appendix E). I determined that each economic variable produced a similar effect. I selected real disposable personal income per capita to reflect economic conditions.

Autocorrelation

A critical assumption of linear regression is that the model is not autocorrelated.[39] This means that a given independent variable cannot predict the value of that variable at a later point in time. If a similar model is tested in the future, time should be held constant so that federal gun laws and party control can be assessed.

Federal gun laws are the total number of gun laws across the United States, manipulated to produce monthly values. This may have been problematic because the yearly value was simply duplicated across all months in a given year, since the number of laws changed on a yearly, rather than monthly, basis. 104 guns laws in January *guaranteed* 104 laws in February, March, and April. Additionally, many of the laws enacted each year remained through the following year.

Party control data were manipulated to produce monthly values. A Democratic administration in 2010 ($ExecControl_{Dem} = 1$), ensured that the administration would be controlled by Democrats for all months between 2010 and 2012. Thus, the value of executive control in a given year predicted the value of executive control in subsequent years.

[39] Durbin–Watson d-statistic (10, 108) = .8551489

Appendix E: Testing Economic Variations (Real GDP and Producer Price)

Real GDP

Real GDP is defined as "the total market value of the goods and services produced by a country's economy during a specified period of time" (Encyclopædia Britannica, inc., 2022). Real GDP data represent the actual monthly, total GDP for the United States in billions of chained 2012 dollars.

Economic theory suggests that GDP should be positively associated with gun sales (Encyclopædia Britannica, inc., 2022; The Core Team, 2019). I assessed GDP in place of real disposable personal income per capita:

$$\text{Gun Sales (EMSV) (hat)} = B_0 + B_1*\text{MassShootings} + B_2*\text{NRAExtremism} + B_3*\text{RealGDP} + e \quad \text{[Equation 2]}$$

Table 3: Linear Regression Using Real GDP

Regression Statistics	
Multiple R	0.712542
R Square	0.507716
Adjusted R Square	0.493515
Standard Error	341206.8
Observations	108

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1.25E+13	4.16E+1	35.75332	5.83E-16
Residual	104	1.21E+13	1.16E+1		
Total	107	2.46E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-2571613	670571.8	-3.83496	0.000216	-3901382	-1241844
massshootings	1875.255	28301.41	0.06626	0.947298	-54247.5	57998.01
extremism	15790.38	4273.155	3.695252	0.000352	7316.555	24264.21
realgdp	230.9267	43.58794	5.297949	6.59E-07	144.4902	317.3632

Producer Price Index

Sales price of guns is defined as the monthly, mean value of all transferred guns in the United States. Because a consumer price index for guns was not available, a producer price index serves as a proxy. Data represent the indexed price to produce "small arms, ordnance, and ordnance accessories" (FRED, 2022).[40] When results are interpreted, a one-unit increase in producer price is equivalent to a .1% increase in price compared to the 2004 value. Producer price trends should resemble consumer price trends since producer costs are typically passed onto consumers.

Economic theory suggests that price should be negatively associated with gun sales (The Core Team, 2019; Britannica, inc., 2022). I tested Producer Price Index in place of real disposable personal income per capita:

Table 4: Linear Regression Using Producer Price Index

[40] The base year is 2004.

There is no evidence that the price of accessories influences gun sales.

Regression Statistics	
Multiple R	0.710414
R Square	0.504689
Adjusted R Square	0.490401
Standard Error	342254.2
Observations	108

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1.24E+13	4.14E	35.322	7.99E-16
Residual	104	1.22E+13	1.17E		
Total	107	2.46E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-7275466	1575815	-4.6169	1.12E	-1E+07	-4150566
massshootings	10246.23	28318.74	0.3618	0.7182	-45910.9	66403.3
extremism	17166.94	4147.177	4.1394	7.09E	8942.937	25390.9
producerprice	74048.83	14182.28	5.2212	9.16E	45924.84	102172

Gun Sales (EMSV) (hat) = B_0 + B_1*MassShootings + B_2*NRAExtremism +

B_3*ProducerPrice + e [Equation 3]

Appendix F: Data Search Log

Variable	Data Source	Notes
Gun Sales	1) FBI. (2022). *NICs firearm checks: Month/year by State/Type*. FBI. https://www.fbi.gov/file-repository/nics_firearm_checks_-_month_year_by_state_type.pdf/view 2) atf.gov. (2022). *Bureau of Alcohol, Tobacco, Firearms and Explosives*. National Firearms Commerce and Trafficking Assessment: Firearms in Commerce - Volume One | Bureau of Alcohol, Tobacco, Firearms and Explosives. https://www.atf.gov/firearms/docs/report/national-firearms-commerce-and-trafficking-assessment-firearms-commerce-volume	NICs firearm checks data were put into an excel spreadsheet. Monthly values were multiplied by ATF's 2020 EMSV ratio ~ 1.016.
Federal Gun Laws	1) Statefirearmlaws.org. (2018). *California firearm law data*. State Firearm Laws. https://www.statefirearmlaws.org/	Statefirearmlaws.org provided the yearly number of firearm laws by state. Data were put into an excel spreadsheet and summated to obtain yearly values across all states. Values were duplicated to obtain monthly values.
Real Gross Domestic Product (GDP)	1) FRED. (2022). *Real gross domestic product*. https://fred.stlouisfed.org/series/GDPC1	
Real Disposable Personal Income Per Capita	1) FRED. (2022). *Real disposable personal income: Per capita*. https://fred.stlouisfed.org/series/A229RX0	
Sales Price	1) FRED. (2021). *Producer price index by industry: Small arms, ordnance, and ordnance accessories manufacturing: Small Arms, 30 mm or less, or 1.18 inches or less*. https://fred.stlouisfed.org/series/PCU33299T33299T4	No consumer price index was available.
Political Party Control - Presidency	1) Rogers, S. (2009). *US presidents listed*. The Guardian. https://www.theguardian.com/news/datablog/2012/oct/15/us-presidents-listed#data	Data were coded 1 = Democrat Control or 0 = Republican Control.
Political Party Control - House	1) Data-planet.libguides.com. (2022). *US politics: Democrat vs Republican control of Congress and the presidency: Political Party overlays in Data Planet Statistical Datasets*. Data Planet LibGuides. https://data-planet.libguides.com/politicalpartycontrol	Data were coded 1 = Democrat Control or 0 = Republican Control.
Political Party Control – Senate	1) Senate.gov. (2022). *Senate Party division*. U.S. Senate: Party Division. https://www.senate.gov/pagelayout/history/one_item_and_teasers/partydiv.htm	Data were coded 1 = Democrat Control or 0 = Republican Control.

Mass Shootings	1) Data.world. (2022). *Mass killings in America, 2006 - present - dataset by associatedpress*. data.world. https://data.world/associatedpress/mass-killings-public/workspace/file?filename=mass_killing_incidents_public.csv	Data were cleaned so that stabbings, asphyxiation, and other mass killings apart from mass shootings were excluded.