I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12784

Greater US Gun Ownership, Lethality and Murder Rates: Analysis and Policy Proposals

Maurice Schiff

NOVEMBER 2019

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 12784

Greater US Gun Ownership, Lethality and Murder Rates: Analysis and Policy Proposals

Maurice Schiff
IZA Research Fellow

NOVEMBER 2019

ISSN: 2365-9793

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Greater US Gun Ownership, Lethality and Murder Rates: Analysis and Policy Proposals

This paper examines the US gun-related murder (GM) rate and places it in an international context. The US GM rate is 27 times the average rate for 22 other developed countries (ODC). Its gun ownership rate is 5.4 times that of ODC and the murder rate per gun is 5 times that of ODC. Thus, as is done in the paper, an effective reduction of the US GM rate requires an analysis of both the high gun ownership rate and the high murder rate per gun. The paper examines about fifteen gun-related policy reforms – their impact, cost and structure for maximum benefit – and other policies affecting the GM rate. Among the latter is immigration policy and its impact on violent crime where the claims of the pro- and anti-immigration groups are examined. The paper also looks at the GM impact of programs that provide alternative life pursuits for young men at risk. It further presents a number of policy implications and some new proposals designed to reduce the GM rate. Four appendices provide i) results from two recent opinion polls on gun-policy reforms, ii) a detailed analysis of the relationship between gun ownership and the GM rate, iii) calculations of gun buyback costs, and iv) a correction of results in the literature on the Brady Bill's impact on gun ownership.

JEL Classification: F22, H20, K14

Keywords: US vs. other developed countries' gun-related murder rate, gun ownership and lethality, gun-control policies, immigration, new policy proposals

Corresponding author:
Maurice Schiff
3299 K St, NW, #501
Washington, DC 20007
USA
E-mail: schiffmauricewilly@gmail.com

Table of Contents

4. Impact of Brady Bill on gun murders

This report places the analysis of the US gun-related murder rate in an international context. It examines a number of gun policy reforms, including their impact and cost, derives policy implications and presents some new proposals. The analysis draws on academic papers, government reports, and more.

Introduction

The gun lobby claims the solution to the high gun-related murder (GM) rate is to deny access to guns by people suffering from mental health issues. However, evidence shows that:

i) While the US rate of mental illness is not significantly higher than the average rate in the other 22 developed countries, its GM rate is 27 times that of other developed countries: 4.6 (per 100,000) in the US vs 0.171 in the latter – and over 50 times for males 15 to 24.

ii) Mentally ill people only cause 3 percent of all GMs.[1] Given that they are often associated with mass shootings, 3 percent may seem low. However, note that mass shootings typically account for no more than 1 percent of all GMs (see Section I.3).

This has led gun-control advocates and various analysts to claim that the explanation lies with the high gun-ownership rate relative to other developed countries.

But the high US gun-ownership rate is only part the story. That the US GM rate is 27 times that of other developed countries is due to:

1. A gun-ownership rate that is 5.4 times that of other developed countries; and
2. A number of murders per gun – or gun lethality rate – that is 5.0 times that of other developed countries.

1 According to the American Psychological Association (APA), people with serious mental illness commit only about 3 percent of violent crimes (Sullivan 2019). And in her *Statement of APA President in Response to Mass Shootings in Texas, Ohio* of August 4, 2019, Rosie Phillips Davis, President of the APA, said that "Research has shown that only a very small percentage of violent acts are committed by people who are diagnosed with, or in treatment for, mental illness. The rates of mental illness are roughly the same around the world, yet other countries are not experiencing these traumatic events as often as we face them. One critical factor is access to, and the lethality of, the weapons that are being used in these crimes." Note that the meaning of 'lethality' in this statement differs from – though it may affect – the meaning of gun lethality used in this report, namely the number of murders per gun.

The latter is due to stricter gun-control measures in the other countries.
Thus, in order to reduce GMs effectively, *both* gun ownership and gun lethality need to be addressed (A more detailed definition of 'gun lethality' is given in Section II).

Some considerations regarding the question "*Why is it so hard to reduce the high US GM rate*?" are offered at the end of Section V (Conclusion). Results of two recent opinion polls about gun-policy reforms that are discussed in the paper are presented in Appendix 1.

Guiding Principle

Gun laws (and their implementation) should, to the extent possible, be universal because differences in states' gun laws – or reforms that strengthen them in some states but not or less in others – results in a cross-state movement of parallel-market (including illegal) guns, thereby undermining the gun laws' effectiveness. Moreover, gun laws should apply not only to official sales by licensed dealers but to *all* gun sales. Thus, sufficient resources must be allocated to ensure that the laws apply and are fully enforced in the case of straw sales and for sales at gun shows, online and between individuals. If not, restrictive laws that are limited to official sales will raise the share of illegal gun sales and may end up raising the GM rate.

I. Buyback Programs to Reduce Gun Ownership

1. ***Conditions for success***: National buyback programs, together with some gun restrictions, have been implemented in both developed and developing countries (e.g., Argentina, Australia, Brazil, Great Britain, South Africa) and have led to fewer mass shootings and GMs. In Australia, mass shootings vanished and the GM rate fell 42 percent in the years between the pre- and post-1996 reform.[2, 3] And all gun-related deaths in Australia fell from 3.4 (per 100,000) in 1990 to 1.0 in 2016 (Franklin 2018). Similar qualitative results were found for the other countries.

2 Some (e.g., Mouzos and Rushforth 1993) have challenged the finding that GM rates fell with the reform because their decline started before the 1996 reform. On the other hand, Ozanne-Smith et al. (2004) show that rates were steady prior to 1988, the year the state of Victoria reformed its gun laws. This led to a decline in rates, with a further decline after the 1996 reform. Moreover, Hemenway and Vrionitis (2011), who reviewed the literature available at the time, find that i) while 13 gun-massacres occurred in the 18 pre-reform years, none occurred in the post-reform period; ii) the annual GM rate fell from .43 to .25 per 100,000 (or by 42 percent) during the same period; and iii) the decline in gun deaths was largest among the type of firearms most affected by the buyback. (The annual gun-suicide death rate fell from 2.6 per 100,000 in the 7 pre-reform years to 1.1 in the 7 post-reform years).

3 Australia's buyback was essentially mandatory, while the US one would most likely have to be voluntary.

US buyback programs have been ineffective as i) they were conducted at local levels and attracted guns from other areas on which the town or city's buyback funds were wasted, and ii) buyback programs often paid for non-functioning, old guns rather than for the types of guns used in crimes.

For a buyback program to succeed in reducing gun ownership, it i) must be universal, i.e., it must be conducted at the national level (or, possibly, at the state level in the case of the largest states),[4] and ii) must specify the gun types and characteristics the buyback programs would accept.

Support for this policy seems massive, as shown in a September 5-8, 2019 NBC News-Wall Street Journal poll. It finds that 75 percent of Americans support a voluntary national buyback program (see Appendix 1).

2. ***Mass shootings*** (defined by the FBI as four or more gun murders in a public place) are responsible for a tiny fraction of all gun murders – i.e., 0.1 percent over the 1997-2016 period (FBI 2017) and about 1 percent in 2018 – but their emotional impact on the population is much greater as they are heavily reported, tend to involve highly destructive weapons, and their unpredictability and the fact that they occur in places where people are especially vulnerable (schools, theatres, outdoor concerts, places of worship, etc.) generates a sense of helplessness, of being unable to protect oneself or one's loved ones, especially one's children.[5] Also, Lankford's (2016) study of mass shootings in 171 countries for 1966-2012 shows that they increase with gun availability. Thus, buying back assault-type (and other) weapons typically used in mass shootings makes sense.

3. ***Ongoing debate on gun ownership's impact on gun murders (GMs).*** Some studies claim an increase in GMs raises gun ownership, which then reduces GMs, so that reducing gun ownership would be a mistake. More studies show the opposite. This issue is examined in Appendix 2, which concludes that an increase in gun ownership raises GM.

4 This recommendation accords with Volsky (2019)
5 In an NBC News - Wall Street Journal survey of August 2019, 68% of adults said they were worried the US would experience another mass shooting or an attack by white nationalists.

4. ***Buyback cost.*** A buyback that reduced GMs by 10 percent would cost less than 0.4 percent of the impact of the 2017 "Tax Cut and Jobs Act" on the national debt, and would have a much higher social rate of return than the tax cut. The issue is examined in detail in Appendix 3.

II. Gun Control Measures to Reduce Gun Lethality

Gun lethality, or the gun lethality rate, is defined here as 'the number of GMs per gun' or, equivalently, as 'the total number of GMs divided by the total number of guns.' This definition differs from what people typically associate with this term, such as the size of the magazine used, whether it is an assault weapon or not, etc.

I consider here two types of gun-control measures to reduce gun lethality: restrictions on access to guns, and reduction in the ability of gunowners to commit murder.

A. Restrictions on access and use

1. *Universal background checks* are designed to prevent gun sales to felons and people with domestic violence records, or suffering from alcoholism, drug addiction or mental problems. Campbell et al. (2003) found that having a gun in the home raised women's risk of murder from domestic violence by 500 percent, and that over 50 percent of women murdered with a gun were victims of family members or intimate partners. Thus, background checks to prevent people with domestic violence records access to guns would be very useful.

However, for background checks to be effective, it is crucial that loopholes be closed – such as states exempting background checks for unlicensed dealers' sales or for all private sales (including online ones), giving background-check holidays (some lasting years), or giving too little time to complete background checks before approving a sale.[6]

Such measures are supported by a vast majority of the population. Appendix 1 presents results of two polls, a July 2019 Marist poll that found that 89 percent of Americans support expanding background checks to private and gun show sales, with a figure of 83 percent in a September 2019 NBC News–Wall Street Journal poll.

6 For instance, current law enabled the August 31, 2019 Texas mass shooter to buy an AR-15 rifle legally, even though he had been flagged for mental illness. And Miller et al. (2017) found that 22 percent of gunowners bought their last gun without background check.

The Brady Bill, which requires background checks and a five-day waiting period, became law in 1994 and lasted till 2004 when it was allowed to lapse. In a well-known study, Ludwig and Cook (2000) concluded there was no evidence the Brady Law was associated with a reduction in GMs. Though their empirical analysis is solid, the authors misinterpreted the law's impact on cross-state flows of illegal guns and thus its impact on GMs. A brief explanation of this issue is provided in Appendix 4, suggesting a significant impact of the Brady Bill.

2. ***Licensing and registration of gun owners and gun dealers*** help reduce criminals' access to guns, thereby helping to reduce GMs. Webster et al. (2014) found that Missouri's 2007 repeal of its licensing law (permit-to-purchase handgun law) through 2010 was associated with a 23 percent rise in the GM rate. Conversely, when Connecticut passed a licensing law, its GM rate fell by 40 percent (Rudolph et al. 2015), and the Massachusetts gun licensing law was also associated with a decline in GMs. And though these laws worked, their impact was weakened by out-of-state guns (Webster et al. 2001).[7] This could be minimized if the laws were universal and applied uniformly (see "Guiding Principle"). A September 2019 Marist-PBS-NPR poll found that a licensing law is supported by 72 percent of Americans (see Appendix 1).

Five percent of gun dealers provide close to 90 percent of guns used in GM. In addition to canceling their license for selling illegal guns, the authorities should pass tough laws that would severely punish them directly, including sufficiently large fines that would threaten to put them out of business and/or jail time.

Obtaining a gun license entails passing a background check but generally *not* a gun safety test. Car drivers *a*) must have a driver's license, and *b*) must pass both a written and a safe use (i.e., driving) test to obtain it. The same safety tests should be required for gun purchases, including private ones.

3. ***Concealed-carry laws*****.** Donohue et al. (2019) find that concealed-carry laws are associated with a 13 to 15 percent higher 'violent crime' rate ten years after adoption. Concealed-carry laws include "Shall Issue" laws, which allow individuals to carry a concealed gun (unless restricted by another statute). Rosengart et al. (2005) compared states with and without a "Shall Issue" law

7 Webster et al. (2001) found that in states with mandatory licensing and registration, 66.3 percent of all *crime guns* came from other states, with only 27.3 percent under one of the two laws, and 15.8 percent in their absence.

and found that the law raised the GM rate by 11 percent. The "May Issue" laws give law enforcement officials wide discretion over issuing concealed-carry permits or not. Comparing GM rates in "Shall-Issue" and "May-Issue" states in 1991-2015, Siegel et al. (2017) found that the difference in laws resulted in an 8.6 percent higher GM rate and a 10.6 percent higher handgun murder rate. Thus, GMs are minimized when concealed-carry laws are absent. If they are present, "May Issue" laws are preferable to "Shall Issue" ones.

4. *"Stand your ground" (SYG) law*. This law allows one to use force that would otherwise be illegal against a person perceived as posing an immediate threat of serious bodily harm, even if one has the possibility of retreating and defusing the situation. This was allowed in much of the country in the case of one's property – according to the "Castle doctrine" – but this law allows it also in public places.

The law seems to affect the relationship between the aggressor and the potential victim, with the latter likely to appreciate (the feeling of) having greater control. And SYG advocates – particularly the gun industry and the NRA – argue that the law is necessary for protection against violent criminals. What do the data show? The law has had no deterrent effect, i.e., it has not led to a decline in robberies and other crimes. On the other hand, the law has encouraged the escalation of violence in situations where it could be avoided. For instance, Humphreys et al. (2017) found that the Florida law was associated with a 32 percent increase in GM rates, with a rise in both justifiable and unlawful murders. McClellan and Tekin (2017) obtained similar results for SYG laws in general.

Stand your ground critics also point to the racial bias in the law's implementation. For instance, Ackermann et al. (2015) found that in states with SYG laws, the likelihood of a defendant being convicted is twice as high when the victim is white than when the victim is non-white. And Roman (2013) found that the odds that a white-on-black homicide is found justified is about 3 times greater than the odds that a white-on-white homicide is found justified. Giffords (2019) provides an overview of the results from these and various other studies.

Based on its impact on GMs (and gun injuries) as well as on the bias in its application, it follows that states would generally benefit from the repeal of the SYG law.

5. *Restrictions on gun use through "red-flag laws."* These state laws authorize courts to issue a protection order enabling the police to temporarily confiscate guns from people a judge deems to be a danger to themselves or to others. The request may come from the authorities but more often comes from relatives or friends concerned a loved one who owns a gun has expressed thoughts of suicide or of shooting people. As of August 2019, 17 states and DC had red-flag laws, while only 5 states had them before the February 2019 Parkland high-school mass shooting. Fies (2018) states that before the mass shootings in 2013 (DC Navy Yard) and 2014 (Isla Vista, CA), the police believed that shooters-to-be might be a threat to others but could not act as their hands were tied. Thus, it seems red-flag laws would help reduce the number of GMs.

A national red-flag law is more likely to attract bipartisan support than other proposals at this point, with 72 percent of Americans favoring it in a September 2019 Marist - PBS NewsHour - NPR poll and 76 percent in an August 2019 NBC News-Wall Street Journal poll (see Appendix 1).

6. *Restrictions on purchase frequency.* Such a law has at least two benefits. Luca et al. (2017) find that restrictions on the number of monthly gun purchases reduce GMs by 17 percent. Second, the law aimed to keep criminals from buying large numbers of handguns in a short period of time from states without such laws in order to sell them in states with them. Weil and Knox (1996) show, in the case of Virginia, that a 1-gun-per-month law is effective in disrupting the illegal interstate gun transfer by reducing the number of crime guns traced to Virginia, which is a major source of crime guns, by 30 percent for guns recovered anywhere in the country, and by 56 percent for those recovered in the Northeast corridor (the Virginia law was repealed in 2012). Thus, though enacting such a law in all states would be desirable, only a few states have it (California, Maryland, New Jersey, and NY whose restriction is 1 gun every 90 days). One problem is that the law does not apply to private sales. To be effective, the law should apply to all sales and to all types of guns.

7. *Tax gun sales like cigarettes.* Though Congress has proposed to raise the federal tax on guns following the Parkland, FL, shooting (to 20 percent for guns and 50 percent for ammunition), at this point the gun and ammunition industry is taxed at about 10 percent of the sales price (McClelland 2018). Average taxes on cigarettes, including federal and state excise

taxes, amounted to 44.3 percent of the retail price in 2016 (Cook 2018).[8] Raising the tax rate from 10 to 44.3 percent of the retail price would raise gun prices by 31 percent and would reduce the number of guns purchased and hence would reduce the number of GMs.

Given annual revenues of the gun and ammunition industry of around $17 billion, taxes are $1.7 billion. Applying the 44.3 percent tax rate to the gun industry's $17 billion amounts to $7.5 billion or an increase in taxes of $5.8 billion. From Section I.2, using the added tax revenues on a handgun buyback at the market price would reduce overall GMs by 7.65 percentage-points.

It is important that the tax also apply to private gun sales and sales at gun shows and online. If the tax does not apply to these sales, their share in total gun sales will increase, probably significantly given the 31 percent price hike on official sales. This would reduce the impact of the tax increase on tax revenues. Moreover, a number of states do not require background checks for such sales and if the tax does not apply to them, the increase in their share of total sales implies that more gun sales would fail to be subjected to background checks.

B. Restrictions on gun lethality

1. *Safety-enhancing devices* such as gun locks, access codes or biometric controls, which restrict gun use to the gunowner, should help reduce or eliminate theft and trafficking. GM would decline as i) theft-and-trafficking guns, often used in violent crime, would be useless to criminals; ii) the often violent theft-and-trafficking activities would drastically decline; iii) perpetrators would be easier to identify; iv) children playing with guns would no longer be hurt or killed accidentally; and v) biometric controls – though not gun locks or access codes – would help reduce or eliminate straw purchases if the seller had to enter the prospective buyer's biometric information in the gun before it could be sold. However, gun manufacturers, the NRA and their allies have successfully lobbied against such devices. A strategy to change gun manufacturers' behavior is presented in Section IV.

2. *Gun caliber.* A study by Braga and Cook (2018) shows that the intrinsic power of the weapon used in a criminal shooting affects the victims' likelihood of death, and that in the Boston case, replacing high-caliber with small-caliber guns (and no change in any other variable)

8 This abstracts from any local taxes that cities and counties can levy in addition to federal and state taxes.

would have reduced the GM rate by 39.5 percent in the period 2010-2014. In other words, the GM rate was 65 percent higher than if small-caliber guns had been used in all criminal shootings. This constitutes an additional reason for buying back high-caliber guns and regulating them.

3. ***Ammunition magazines*****.** The number of deaths in mass shootings could be substantially lowered by limiting the capacity of magazines, but this has been resisted by manufacturers. Note that a ban on the sale of high capacity magazines is supported by 61 percent of Americans (see Appendix 1).

4. ***Liability, insurance and incentive to improve safety.*** The "Protection of Lawful Commerce in Arms Act" (PLCAA, 2005) gives the gun industry immunity from liability. Studies (in Vernick et al. 2007) show that under the PLCAA most people are not compensated for gun-related injuries, eliminating manufacturers' incentive to improve product safety (see B.1 above).

On the other hand, *a*) the car industry is subject to safety regulations of both the manufacturing process and the product; *b*) car drivers must buy insurance; and *c*) as mentioned in A.2 above, car drivers must obtain a driver's license and must pass both a written and a driving test to obtain it.

The gun industry and gun owners should be subject to the same conditions as the car industry and drivers. As a start, the immunity of liability (under the PLCAA) should be abolished.

5. ***Family, acquaintances and intimate partners.*** Studies have shown that 59 percent of all GMs are committed by a family member or by an acquaintance, and 16 percent are committed by an intimate friend. Thus, 75 percent of all GMs are committed by someone known to the victim. Many of the GMs are committed impulsively and these could be reduced with tighter storage regulations, such as storing the gun and the bullets separately and keeping both of them under lock. Obviously, whether or not such regulations succeed depends on gunowners implementing them.

It seems that these types of GMs are not receiving a level of attention commensurate with their relative importance, with much of the literature dealing with the remaining 25 percent, or with the overall GM rate.

Note that a great majority of gun-related accidents where children are killed (or hurt) occur inside the home and involve family-owned guns that are left unlocked, with shooters being family members, friends/acquaintances or the child victims themselves (Faulkenberry and Schaechter 2015).[9] This could be prevented if adults ensured child access was minimized, including by securing the storage of their guns (see above), whether freely or due to tighter regulations.

6. *Impact of immigrants.* An important segment of the population believes that immigrants commit more violent crimes than those born here (i.e., natives) and therefore raise the country's violent crime rate. A number of studies have investigated this issue and most of them find (e.g., Butcher and Piehl 2008) that, on the contrary, immigrants are less likely to commit crimes and be incarcerated than similar natives. And studies (e.g., Nowrasteh, 2018) also find that undocumented immigrants have lower arrest and conviction rates. Studies on local violent crime rates also find that immigration reduces them (Chalfin 2015) and find no evidence that undocumented immigrants are associated with higher crime (Light and Miller, 2018).

Overall, the literature finds that the association between immigrants and violent crime is negative or nil. Thus, expulsing immigrants is unlikely to reduce the country's violent crime rate, a result obtained by Hines and Peri (2019). They find that violent crime rates did not decline as deportation rates increased. Those who favor immigration point to these results to challenge the argument that immigrants raise the violent crime rate.

However, the views of those who favor and those against immigration are not necessarily contradictory as they refer to different population groups. The former's argument refers to the country's entire population while the latter's argument refers only to natives (and possibly only to part of them). And it is possible that immigrants reduce the country's violent crime rate, while also raising violent crime *against* natives. On the other hand, immigrants reduce violent crime against natives (and the overall violent crime rate) if a decline in the native population's change is associated with an equal increase in the immigrant population's change.

III. Providing Alternative Life Pursuits

9 The authors find that 80 percent of the victims are male, with 25% below age 7 and 50% below age 13.

Much of the gun violence in cities occurs in a limited geographic area and among a small group of high-risk people. Cities can help break the cycle of violence and retaliation by running programs (e.g., "Ceasefire") that focus on places and people most likely to be affected. Programs have been developed where police and community leaders identify young men at risk of shooting someone or being shot, discuss risks involved, alternative pursuits and how to reach them, promise a tough crackdown on groups that continue to shoot, and more. Some leaders have the same background as the participants and did jail time. For example, Boston's Ceasefire program led to a 63 percent decline in youth GMs and a 25 percent decline in citywide assaults in 1991-1998 (Braga et al. 2001). In Chicago, the program led to a decline in shootings (of 16 to 34 percent, depending on the area) and in gang GMs and retaliatory killings, but lack of funding led to the closing of most sites by 2007. Oakland's program led to a decline in gang violence of over 30 percent vs. other cities in California, and in program areas vs. non-program areas in the city.

In 2007, following the success in Richmond, Sacramento started "Advance Peace" which built on Ceasefire and similar programs. It relies less on police for leadership, helps fellows with education (e.g., obtain a GED), addiction, employment, offers financial support as an incentive to stick with the program and, if successful, takes them on 'enrichment' trips (Lowery and Rich 2018). The programs significantly reduced GMs, overall shootings, and arrests. A Cincinnati program showed similar results.

Given their success, it would make sense to expand these programs to other high-crime cities.

IV. New Proposals

The two proposals below may not be implemented anytime soon, but with changing attitudes about gun violence and the rising influence of those favoring gun control, they may be worth considering for the future.

1. ***Divestment from the gun industry*****.** People interested in reducing accidents and incentives for gun theft (with gun locks, access codes or biometric controls), as well as the size of magazines and bullets' caliber, could organize a social media-based campaign giving institutional investors (insurance companies, pension funds, etc.) and others an 'incentive' (shame) to divest themselves from the gun and ammunition industries' stocks they own. This could be complemented by demonstrations in front of the large investors' headquarters. The idea would be

to make it costly from a public relations viewpoint to hold stocks in gun and ammunition manufacturing companies. This would hopefully convince them to improve gun safety and reduce the size of the magazines and the bullets' impact, thereby reducing the cost for society (see Section II.B.1).

A related idea is to convince banks to reduce or stop their lending to the gun industry (see Volsky 2019). I understand Igor Volsky is currently working on turning the idea into reality.

2. ***Rubber bullets and other non-lethal devices***. Rubber bullets are rubber or rubber-coated "less than lethal" devices designed to deliver a stinging blow that incapacitates but, contrary to metal bullets, does not kill or penetrate the flesh. Though criminals who use guns are likely to prefer metal bullets, the only legitimate gun use where metal bullets may be justified is hunting. Rubber bullets should suffice for other activities or objectives, including as a sport, leisure (e.g., going to a shooting club/range), protection, etc. This would certainly reduce the number of accidental deaths, domestic abuse-related deaths, killings by the police, and successful suicides.

A number of companies – like Micron Products, Alternative Ballistics, and Bruzer Less Lethal International – offer less-lethal weapons, including bullets that do not penetrate the skin to devices that slow bullets down, with some more promising than others. Hager (2015) provides detailed information on several less-lethal devices, including the pros and cons of each, and costs involved.

V. Conclusion

I first provide some conclusions based on the analysis provided, and second take a broader view of the high GM rate in the US.

Achieving a significant reduction in gun-related murder (GM) rates will require a combination of measures. One such measure is a universal buyback program to reduce gun ownership. Whether to conduct such a program and whether to do so before or together with other measures requires further analysis. I argue here that the social rate of return on this investment is likely to be high.

GMs also decline with i) universal background checks, though closing the various loopholes is crucial (and with massive approval by Democrats and Republicans, this policy might be feasible in a not-too-distant future); ii) prohibiting gun possession by those with a history of violent

misdemeanor, who have threatened violence, committed serious alcohol-related crime, or are subject to a domestic violence restraining order; iii) red-flag laws; iv) restrictions on purchasing frequency (say 1 a month), to be applied in all states and to all gun sales to raise their effectiveness and reduce gun trafficking; v) safety-enhancing devices; vi) gunowners' licensing and registration; vii) higher taxes on guns and ammunition; and viii) programs that help young men move away from crime and make alternative life choices. All these measures are worth implementing, if possible, and those that only exist in some states should become universal.

Cars, guns and cigarettes are dangerous both for the users and for others, and the gun (and ammunition) industry should not be treated more favorably than the automobile and tobacco industries, and the same goes for gun users vs. drivers and smokers. The gun industry has immunity from liability and that should be abolished. And gun users should be treated just like car drivers, i.e., they should pass a written as well as a practical test to obtain a license, and they should have to register their gun(s) and buy gun insurance. Moreover, there is no reason to tax guns less than cigarettes as both are the source of public health problems.

- *Why is it so hard to reduce the high US GM rate*? I divide this question into two sub-questions.

a) Why is there a huge gap in GM rates between the US and other developed countries?

One possible reason for the large gap with European countries is as follows (Schiff 2017). Government intervention in many areas of people's life has existed throughout Europe's history, where people were serfs and subjects before they became citizens. US history is dramatically different. Early immigrants, who came here to escape oppressive circumstances, mistrusted central authority and favored local government. Thus, imposing government controls, whether on guns, work time or other, is much harder in the US.

A related reason is that guns in the US have strong cultural values attached to them (viz., the Second Amendment) and symbolize individualism and freedom (e.g., from government control) for many gunowners. Thus, proposed gun control measures are viewed as a threat to (some important aspects of) their identity. This makes it much harder to reach a compromise and pass gun control laws, including universal background checks.

b) Why is the majority unable to get gun laws they support enacted by Congress?

According to Dionne et al. (2017*a*, 2017*b*), the problem is that the US has become a "non-majoritarian democracy" which vastly overrepresents the interests of rural areas and small states. For instance, after the 2012 Sandy Hook mass shooting (including 20 six and seven-year old children), the Senate voted 54 to 46 in favor of background checks. And though the 54 votes represented 63 percent of the population, they were unable to overcome a filibuster (which requires 60 votes). And this problem is only expected to get worse. By 2040, 70 percent of Americans are expected to live in 15 states and to be represented by 30 rather than 70 senators. Thus, the problem with passing gun legislation that the vast majority wants seems to be part of a deeper problem the country will have to face at some point in order to remain a functioning democracy.

On the other hand, the number of recent mass shootings has led many people to reexamine their views on gun control – with, for instance, 89 percent favoring expanded background checks for sales at gun shows, online and privately (Marist-PBS-NPR poll; see Appendix), and with high but somewhat lower percentages for several other gun control measures. Thus, the share of the population (including Republicans and NRA members) favoring some types of gun control – especially universal background checks and red-flag laws – seems to be close to reaching a level where the hurdles associated with some of the Senate rules (and the gerrymandering of Congressional districts) can be overcome.

References

Ackermann, N., M.S. Goodman, K.L. Gilbert, C. Arroyo-Johnson and M. Pagano. 2015. "Race, Law, and Health: Examination of 'Stand Your Ground 'and Defendant Convictions in Florida." *Social Science & Medicine* 142: 194–201.

Anglemyer Andrew, Tara Horvath and George Rutherford. 2014. "The Accessibility of Firearms and Risk for Suicide and Homicide Victimization Among Household Members: A Systematic Review and Meta-analysis." *Annals of Internal Medicine* 160 (2), January.

Bangalore, S. and F.H. Messerli. 2013. "Gun ownership and firearm-related deaths." *American Journal of Medicine* 126 (10): 873-876.

Braga, A.A., D.M. Kennedy, E.J. Waring and A.M. Piehl. 2001. "Problem-Oriented Policing, Deterrence and Youth Violence: An Evaluation of Boston's Operation Ceasefire." *Journal of Research in Crime and Delinquency* 38(3):195–225.

Braga, A.A. and P.J. Cook. 2018. "The Association of Firearm Caliber with Likelihood of Death from Gunshot Injury in Criminal Assaults." *Journal of the American Medical Association* 1(3): 1-10 (July).

Butcher, Kristin F., and Anne Morrison Piehl. 2008. "Crime, Corrections, and California: What Does Immigration Have to Do with It?" California Counts 9 (3). Public Policy Institute of California.

Campbell, J.C., D.W. Webster, J. Koziol-McLain et al. 2003. "Risk factors for femicide within physically abusive intimate relationships: results from a multi-site case control study." *American Journal of Public Health* 93: 1089-1097.

Chalfin, Aaron. 2015. "The Long-Run Effect of Mexican Immigration on Crime in US Cities: Evidence from Variation in Mexican Fertility Rates." *American Economic Review*, 105(5): 220–225.

Dahlberg, L.L., R.M. Ikeda and M.-J. Kresnow. 2004. "Guns in the Home and Risk of a Violent Death in the Home: Findings of a National Study." *American Journal of Epidemiology* 160 (10): 929-936 (November).

DeFilippis, Evan and Devin Hughes. 2015. "The Myth Behind Defensive Gun Ownership. Guns are more likely to do harm than good." *Politico Magazine* (Jan. 14).

Dionne, E.J. Jr., Norman J. Ornstein and Thomas E. Mann. 2017*a*. *One Nation After Trump: A Guide for the Perplexed, the Disillusioned, the Desperate and the Not-Yet-Deported*. New York: St. Martin's Press.

Dionne, E.J. Jr., Norman J. Ornstein and Thomas E. Mann. 2017*b*. "Why the majority doesn't rule on guns." *The Washington Post.* October 14.

Duggan, Mark. 2001. "More Guns, More Crime." *Journal of Political Economy* 109 (5): 1086-1114.

Everytown For Gun Safety. 2016. "Strategies for Reducing Gun Violence in American States." *Everytownresearch.org* (6/16).

Everytown For Gun Safety. 2019. "Gun Violence in America." *Everytownresearch.org* (4/4).

Faulkenberry, J.G. and J. Schaechter. 2015. "Reporting on pediatric unintentional firearm injury—who's responsible." *Journal of Trauma and Acute Care Surgery* 79 (3, Suppl. 1): S2-8 (September).

FBI. 2017. *Uniform Crime Reporting Program Data: Supplementary Homicide Reports, 1997-2016.* FBI. Washington, DC.

Fies, Andy. 2018. "How a temporary restraining order for guns could help stop mass shootings." *ABC News* (Feb. 16).

Franklin, Richard. 2018. *Tough laws prevent gun deaths*. Global Report on Gun-related Homicides, Suicides and Accidents. James Cook University, Australia (October).

Giffords. 2019. *"Stand Your Ground" Laws*. Giffords Law Center.

Hager, Eli. 2015. "Alternatives to Bullets." The Marshall Project (September 23).

Hemenway, David. 1997. "Survey research and self-defense gun use: An explanation of extreme overestimates." *Journal of Criminal Law and Criminology* 87: 1430-1445.

Hemenway, David and Mary Vriniotis. 2011. "The Australian Gun Buyback." Bullet*ins* Spring Issue (No. 4). Harvard Injury Control Research Center.

Hines, Annie Laurie and Giovanni Peri. 2019. "Immigrants' Deportations, Local Crime and Police Effectiveness." *IZA Discussion Paper* No. 12413 (June).

Humphreys D.K., A. Gasparrini and D.J. Wiebe. 2017. "Evaluating the Impact of Florida's 'Stand Your Ground' Self-defense Law on Homicide and Suicide by Firearm: An Interrupted Time Series Study," *JAMA Internal Medicine* 177 (1): 44–50.

Kellermann, A.L., F.P. Rivara, N.B. Rushforth, J.G. Banton, et al. 1993. "Gun ownership as a risk factor for homicide in the home." *New England Journal of Medicine* 329: 1084–1091 (October).

Kleck, Gary. 2015. "The Impact of Gun Ownership Rates on Crime Rates: A Methodological Review of the Evidence." *Journal of Criminal Justice* 43 (1): 40-48 (Jan-Feb).

Kleck, Gary and Marc Gertz. 1995. "Armed Resistance to Crime: The Prevalence and Nature of Self-defense with a Gun." *Journal of Criminal Law & Criminology* 86 (1): 1430-1445.

Kleck, Gary and Marc Gertz. 1997. "Illegitimacy of One-Sided Speculation: Getting the Defensive Gun Use Estimate Down." *Journal of Criminal Law & Criminology* 87 (4): 1446-61.

Lankford, Adam. 2016. "Public Mass Shooters and Firearms: A Cross-National Study of 171 Countries." *Violence and Victims* 31 (2).

Light, Michael T., and Ty Miller. 2018. "Does Undocumented Immigration Increase Violent Crime?" *Criminology* 56(2): 370–401.

Lowery, Wesley and Steven Rich. 2018. "In Sacramento, trying to stop a killing before it happens." *Washington Post* (Nov. 18).

Luca, Michael, Deepak Malhotra and Christopher Poliquin. 2017. "Handgun waiting periods reduce gun deaths." *Proceedings of the National Academy of Science*. 2017 (Nov.).

Ludwig, J. 1998. "Concealed-Gun-Carrying Laws and Violent Crime: Evidence from State Panel Data". *International Review of Law and Economics* 18 (3): 239–254.

Ludwig, J. and P.J. Cook. 2000. "Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act." *Journal of the American Medical Association* 284 (5): 585-9 (Aug 2).

McClellan, Chandler and Erdal Tekin. 2017. "Stand Your Ground Laws, Homicides, and Injuries." *Journal of Human Resources* 52 (3): 621-653.

McClelland, Robert. 2018 (5/25). "New Gun and Ammo Taxes Sound Like Promising Ways to Reduce Gun Violence. But There Are Problems." *Tax Vox*. Tax Policy Center. (*taxpolicycenter.org*).

Miller, Matthew, Lisa Hepburn and Deborah Azrael. 2017. "Firearm Acquisition Without Background Checks: Results of a National Survey." *Annals of Internal Medicine* 166 (4): 233-239.

Mouzos, J. and C. Rushforth. 2003. "Firearm related deaths in Australia, 1991-2001." *Trends and Issues in Crime and Criminal Justice* (No. 269). Canberra: Australian Institute of Criminology (November).

Nowrasteh, Alex. 2018. "Criminal Immigrants in Texas: Illegal Immigrant Conviction and Arrest Rates for Homicide, Sex Crimes, Larceny, and Other Crimes." Cato Institute.

Ozanne-Smith, J., K. Ashby, S. Newstead, V.Z. Stathakis, and A. Clapperton. 2004. "Firearm related deaths: the impact of regulatory reform." *Injury Prevention* 10 (5): 280-286 (Oct).

Planty, Michael and Jennifer L. Truman. 2013. *Special Report: Firearm Violence, 1993-2011*. Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice (May).

Roman, John K. 2013. "Race, Justifiable Homicide, and Stand Your Ground Laws: Analysis of FBI Supplementary Homicide Report Data." Urban Institute (July).

Rosengart, M., P. Cummings, A. Nathens, P. Heagerty, R. Maier and F.P. Rivara. 2005. "An evaluation of state firearm regulations and homicide and suicide death rates." *Injury Prevention* 11 (2): 77-83 (April).

Rudolph, Kara E., Elizabeth A. Stuart, Jon S. Vernick and Daniel W. Webster. 2015. "Association Between Connecticut's Permit-to-Purchase Handgun Law and Homicides." *American Journal of Public Health* (June).

Schiff, Maurice. 2017. "Habit, Prisoner's Dilemma and Americans' Welfare Cost of Working Much More than Europeans." *The World Economy* 40 (9): 1708-1717.

Siegel, Michael and Claire Boine. 2019. "What Are the Most Effective Policies in Reducing Gun Homicide?" *A Policy Brief*. Rockefeller Institute of Government. Regional Gun Violence Research Consortium (March).

Siegel, Michael, B. Solomon, A. Knopov, E.F. Rothman, S.W. Cronin, Z. Xuan and D. Hemenway. 2019. "The Impact of State Firearm Laws on Homicide Rates in Suburban and Rural Areas Compared to Large Cities in the United States, 1991-2016." *Journal of Rural Health* (July).

Smith, T.W. 1997. "A Call for a Truce in the DGU War." *Journal of Criminal Law and Criminology* 87 (4): 1462-1468.

Sullivan, K. 2019. "Mental illness isn't a major risk factor for gun violence, but here's what is." *NBC News* (August 6).

Tax Foundation. 2018. "How High Are Cigarette Taxes in Your State." *taxfoundation.org* (1/25).

Vernick, J. S., L. Rutkow and D.A. Salmon. 2007. "Availability of Litigation as a Public Health Tool for Firearm Injury Prevention: Comparison of Guns, Vaccines, and Motor Vehicles." *American Journal of Public Health* 97 (11): 1991-97 (November).

Volsky, Igor. 2019. *Guns Down: How to Defeat the NRA and Build a Safer Future with Fewer Guns*. New York & London: The New Press.

Webster, Daniel W., Jon S. Vernick and Lisa Hepburn. 2001. "Relationship between Licensing, Registration, and Other Gun Sales Laws and the Source State of Crime Guns." *Injury Prevention* 7 (3): 184-189.

Webster, D.W., C.K. Crifasi and J.S. Vernick. 2014. "Effects of the Repeal of Missouri's Handgun Purchaser Licensing Law on Homicides." *Journal of Urban Health* 91 (2): 293-302 (April).

Weil, D.S. and R.C. Knox. 1996. "Effects of Limiting Handgun Purchases on Interstate Transfer of Firearms." *Journal of the American Medical Association* 275(22): 1759-1761 (June).

Wiebe, D.J. 2003. "Homicide and suicide risks associated with firearms in the home: a national case-control study." *Annals of Emergency Medicine* 41 (6): 771-82 (June).

Appendix

1. ***Opinion polls on various gun policy reforms***

This appendix presents the results of two recent opinion polls on various gun policy reforms: an August 19, 2019 NBC News-Wall Street Journal poll, and a September 5-8, 2019 Marist-PBS NewsHour-NPR poll.

	Marist-PBS-NPR		**NBC-WSJ**
	Support (%)	Against (%)	Support (%)
Mental health funding	**89**	9	
Extend background checks for private and gun show sales	83	14	89
National 'red-flag' law	72	23	76
Require license before gun purchase	72	25	
Ban sale of high capacity magazines	61	34	
Ban sale of semi-automatic weapons	57	39	62
Mandatory assault weapons buyback program	45	46	
Voluntary buyback program			75
Allow school teachers to carry a gun	37	57	
Ban on handguns' sale			25

The answers are similar for the three questions that appear in both polls, with the NBC-WSJ poll obtaining slightly higher figures for support the policies. The policies that have the most support are mental health funding, extended background checks, national red-flag law, voluntary

buyback program, and license requirement. A majority of the population also favors a ban on the sale of high capacity magazines and on the sale of semi-automatic weapons.

2. Impact of gun ownership on gun murders (GMs)

A number of studies have convincingly shown that an increase in gun ownership raises GMs. These include, for instance, Duggan 2001; Bangalore and Messerli 2013; Anglemeyer et al. 2014; DeFilippis and Hughes 2015; Everytown 2016, 2019). The opposite has been found by studies such as Kleck and Gertz (1995 and 1997) and Kleck (2015) who claim that an increase in GMs raises gun ownership, with the latter subsequently reducing the number of GMs. They conclude that reducing gun ownership would be a mistake as it would raise GMs.[10]

However, a Justice Department report by Planty et al. (2013) find for 2007-2011 that crime victims used a gun in self-defense in only 0.8 percent of all gun-related violent crimes, thus challenging Kleck and Gertz's claim. In fact, rather than conferring greater protection, studies show that the GM risk is significantly higher in homes with guns – by over 100 percent for the average result of three studies, i.e., Kellermann et al. (1993), Wiebe (2003) and Dahlberg et al. (2004) – and also that the higher risk is due to actions by a family member or intimate acquaintance.

Furthermore, data on state-level gun ownership and GM rates show that they are positively related: states with the highest gun-ownership rates in the country (Alaska, Arizona, Arkansas, Louisiana, Montana, New Mexico) also have the highest GM rates, and those with the lowest gun-ownership rates (Connecticut, New Hampshire, New Jersey, New York, Rhode Island) have the lowest GM rates. This result is unlikely to be random as none of the states with the highest gun-ownership rate has a GM rate in the lowest category, and – vice versa – none of the states with the lowest gun-ownership rate has a GM rate in the highest category.

Finally, a point that (as far as I know) has *not* been made before is as follows. When gun ownership is nil, so is the GM rate. And as the GM rate cannot be negative, it follows that starting from zero, an increase in gun ownership must (at some point) raise GMs, i.e., the impact

10 The claim that a rise in gun ownership reduces GMs presupposes a high level of 'defensive gun use' (DGU). Kleck and Gertz (1995) claim the DGU level is close to 2.55 million, while Hemenway (1997) estimates the level of DGUs to be 55,000 to 80,000 or 2.2 to 3.1 percent of Kleck and Gertz' figure. Smith (1997), examining both sets of DGU figures, concludes that the number is probably between 256,500 and 373,000, or between 10.1 and 14.6 percent (i.e., between one tenth and one seventh) of the Kleck-Gertz figure.

of gun ownership on the GM rate must be positive at low gun-ownership rates. Similarly, gun ownership's overall impact on the GM rate must also be positive. In other words, if it were true that more guns made us safer, we would necessarily be the safest country in the world.

3. Buyback cost

Given the high US gun-ownership rate, making a large dent in it may be costly, though what is costly depends on society's priorities. For instance, the CBO forecasts that by 2028, the 2017 "Tax Cut and Jobs Act" will have raised the national debt by $1.9 trillion. According to the Department of Justice report mentioned in Appendix 2, handguns were responsible for about 75 percent of GMs from 1993 to 2011, and a buyback of handguns at the average price (for those typically used in violent crimes) that reduces total GMs by 10 percent would cost $7.6 billion or less than 0.4 percent of the tax cut. A buyback of handguns that reduces total GMs by 25 percent would cost less than 1.0 percent of the tax cut. Note that the social rate of return on these two buybacks would have been much higher than those of the tax cut, whose cost is higher by over 250 times and over 100 times, respectively.[11] [12]

4. Brady Bill's impact on GMs

I examine here Ludwig and Cook's (2000) claim that there is no evidence that the Brady Bill was associated with a reduction in GMs. The Brady Bill's requirements affected 32 states (Group A) which strengthened their background-check laws, while 18 states and the District of Columbia (Group B) already had equivalent legislation in place and were not affected. GM rates were declining at the time, and the authors expected that the GM rate would decline more rapidly in Group A than in Group B following passage of the Brady Bill. However, they found no significant difference in the decline in GM rates in Groups A and B. Hence, they concluded that the Brady Bill did not significantly affect the GM rate.

---

11 Offering, as an incentive, a price above the market price, say by 31.6% (100%) cost $10 ($15.2) billion or less than 0.53% (0.8%) of the tax cut. The corresponding figure for the cost of reducing GMs by 25% is less than 1.33% (2.0%).

12 Australia's gun-ownership rate fell by substantially more than the size of the buyback, as the 1996 massacre and the ensuing buyback program changed people's views about guns and led some gunowners to turn in their guns freely. A similar reaction in the US would also reduce the buyback cost of achieving a given reduction in gun murders.

However, Ludwig and Cook's conclusion is *not* valid in the presence of a large parallel gun market. This is certainly the case here. In fact, the authors themselves estimate the parallel-market gun sales to amount to 40 percent of all gun sales.[13] And a change in the 'official market' affects the parallel market, which in turn affects the official market. For example, assume the states in Groups A and B are identical in all respects except for their background check (BC) laws.[14]

Case 1: Before passage of the Brady Bill, gun prices are identical in both groups, i.e., $P_{1B}=P_{1A}$. The reason is as follows. Before any parallel-market gun sales from A to B take place, the price is higher in Group B ($P_{1B}>P_{1A}$) because of stricter BC laws in Group B than in A. This leads to a flow of parallel-market guns from A to B, and thus to a rise in P_A and a decline in P_B. This continues until prices are equalized ($P_{1B}=P_{1A}$).[15] With identical states in A and B, the flow of parallel-market guns equalizes the number of guns and of GMs in both groups.

Case 2: After passage of the Brady Bill, the increased restrictions in A make it harder to obtain a gun. Hence, the price in A, P_A, rises and the flow of guns from A to B declines. This raises the price in B, P_B, and dampens the price increase in A, resulting in identical prices ($P_{2A}=P_{2B}$) and number of guns in both regions, and thus identical GMs. Thus, the Brady Bill raised prices in both groups, i.e., $P_{2A}=P_{2B}>¿\ P_{1A}=P_{1B}$, which resulted in a smaller number of guns and GMs in both A and B, with the increased restrictiveness in A exported (in part) to B through a reduction in the parallel-market gun flow from A to B.

The fact that Ludwig and Cook have found that the decline in GMs in A and B was not significantly different provides no information on whether the Brady Bill was effective or not. Some information is provided by the increase in both groups' prices after passage of the Brady Bill, as it implies both a lower gun ownership and fewer GMs.

---

13 Parallel-market gun sales consist of unlicensed dealers' sales, online sales, straw sales and other private gun sales.

14 The states do not need to be identical but it simplifies the analysis without affecting the conclusions.

15 Under unit cost, *c*, of moving guns from A to B and of avoiding detection, the price in B is higher than in A by *c* ($P_B=P_A+c$). This does not affect the results (unless c is so large that markets are fully disconnected, which is not the case, as recognized by Ludwig and Cook).