A comparison of US gun legislation and respective mortality rates in 2020

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INTRODUCTION**:**
The United States has experienced an alarming rate of firearm mortality compared to the rest of the developed world . For 2020, the CDC reported an average of 13.6 firearm deaths per 100,000. It was a 14 percent increase compared to 2018, and a figure not seen since the 1990s. In comparison, Switzerland's firearm death rate is about 4 times smaller, ie. less than 3 per 100,000. There also hasn't been a mass shooting there since 2001 (GunPolicy, 2015). Gun ownership in both countries exceeds millions. Israel is another nation that is often compared with American gun culture. For a government that constantly faces the threat of terrorism, their security protocol and implementation is superlative. But why is the US so much more susceptible to weaponized violence, when it's clearly not the only population to privatize firearms? Owing to the fact that several states have yet to implement common sense legislation to require federal background checks on all gun show transactions. Where most countries are meticulous, some outright draconian with their gun policy, some states in the US seem pretty lax on the matter.

LIT REVIEW:
Israel is a common model used as an example by conservatives However, this interpretation is often misconstrued. Ultimately, the US has the constitution engraved into its identity, with a long standing bill of rights. Some would consider even the smallest impediment as a violation of these rights. Other nations, such as Israel, might beg to differ. Consequently, according to the website of the Ministry of Public Security, Israeli law "does not recognize a right to bear arms, and anyone wanting to do so must meet a number of requirements". It is basically a privilege granted by the federal government. Some Americans would be seldom-willing to give up their constitutional rights in such a manner. Unlike a lot of US states, all gun-related processes are strictly monitored by the Israeli government. Any and all applicants are forwarded to the police for further authorization. 40% of applicants fail this screening process, where those who pass are restricted to a single firearm. Similarly, despite having some of the highest ownership in the world, gun murders are almost non-existent in Switzerland. In 2016 the nation had 47 attempted murders with a gun, out of 8 million people, putting the homicide rate near zero (Brueck, 2019). It is worth noting that more than 2 million people, roughly ¼ the population, had private access to firearms. In comparison, the US averaged around 12 gun-related murders per 100,000 people (CDC, 2017), ie. more than 4x higher than the Swiss at the time. Since then that figure

has only gone up . Similarly, 30% of US citizens had access to firearms in 2017 (Pew Research Center). Why are the numbers so disportionate? To start, one can look at the military of Switzerland, and its recent history of conscription. Currently, all male citizens (18 or older) are required to serve in the military until the age of 44 (Bieri, 2015). Those who refuse can either opt for civilian service or an exemption tax. Like Switzerland, the majority of Israelis are required by law for military conscription the moment they turn 18. Soldiers receive at least basic training, and a good amount of the population knows how to handle a firearm (Kershner, 2018). Dr. Arye Rattner, a criminologist from the University of Haifa, had this to say (NYT, 2018):

“I would say that for many males, especially, military service serves as a kind of catharsis for their aggressive emotions, therefore much less of it is being expressed in civilian circles.”

Outside of a potential draft, the US government has no such requirement. Any sort of military experience is completely voluntary. The comradery, identity, and overall training that comes with compulsory service is often non-existent within the American civilian population, where there is a clear discord with the military. Additionally, Switzerland’s militia is under constant mitigation from laws and restrictions. Background checks are mandated by the federal government. Concealed carry is often barred outside of law enforcement. Most military style weapons are also banned. Similar conditions apply to Israeli citizens. In comparison, the US passed the Gun Control Act of 1968, which required businesses to have firearms licenses, as well as a kept record of sales. There is currently no law that bans military-style rifles or concealed carry in the US. According to the Coalition to Stop Gun Violence, the bill from 1968 has a massive loophole regarding the private sale of firearms, which aren’t subject to background checks. In other words, if a seller is showcasing from their personal collection at a gun show, they are technically “not engaged in business” therefore no background check is required (CSGV). So far, 33 out of 50 states have passed zero laws that address the gun show loophole. Out of 31,672 gun deaths in the US from 2010, it was concluded that more than half of them could’ve been avoided with the implementation of universal background checks (Kaleson et al. 2016). In other words, the gun death rate could’ve been as low as 4.4 per 100000 in 2010, but thanks to the loophole it was 10.1 instead. In another study, a group of researchers discussed the evidence on the true effect of firearm laws and policies (Morral et al., 2018):

“Of more than 100 combinations of policies and outcomes, we found that surprisingly few were the subject of methodologically rigorous investigation . . . The modest growth in knowledge about the effects of gun policy over the past dozen years reflects, in part, the reluctance of the U.S. government to sponsor work in this area at levels comparable to its investment in other areas of public safety and health, such as transportation safety.”

While it is important to address the nature of Swiss and Israeli armed forces, US lawmakers seem rather unconcerned with common gun sense laws, as made evident by 30 odd states that have yet to implement them. Until the legal loopholes that allow sellers to duck background checks are addressed by congress, it might seem redundant to even bring up other countries.

RESEARCH DESIGN

In order to highlight the separation of power between the state and federal level, I ran a model strictly from the United States. I also wanted the appropriate setting, as gun violence in Israel or Switzerland probably wouldn't correlate with gun violence in the US. Overall, my goal here was to highlight the relationship between gun deaths per 100000 by state (Y), and the level of gun control by state (X; ranges from 1-50). For the data, the CDC provided firearm mortality rates by state in 2020. The Giffords Law Center ranked 50 states by their level of gun control (this variable doesn't need to be ranked in the context of the study, therefore it was not considered ordinal). To complete the dataset, I added 7 control variables: income, alcohol consumption, substance abuse, shortages in affordable housing, public education funding, violent crime, or percentage of African-Americans. These variables are often associated with varying levels of gun violence, so it was important to account for them. The dependent, main independent, and all of the control variables were continuous, so I used multiple linear regression for the analysis.

MODEL IMPLEMENTATION AND RESULTS

Linear regression 1 without control variables:

```
> R1 = lm(GunDeathsPerCapita ~ GunLawRanking, data = USGunData)
> summary(R1)

Call:
lm(formula = GunDeathsPerCapita ~ GunLawRanking, data = USGunData)

Residuals:
   Min     1Q Median     3Q    Max
-7.338 -3.739  0.427  2.706  9.563

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)    7.2075     1.2167   5.924 3.28e-07 ***
GunLawRanking  0.3121     0.0417   7.483 1.34e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.233 on 48 degrees of freedom
Multiple R-squared:  0.5384,    Adjusted R-squared:  0.5288
F-statistic: 55.99 on 1 and 48 DF,  p-value: 1.343e-09
```

Table 1:

	Dependent variable:
	GunDeathsPerCapita
GunLawRanking	0.312***
	(0.042)
Constant	7.207***
	(1.217)
Observations	50
R^2	0.538
Adjusted R^2	0.529
Residual Std. Error	4.233 (df = 48)
F Statistic	55.994*** (df = 1; 48)
Note:	*p<0.1; **p<0.05; ***p<0.01

Linear regression 2 with control variables:

```
> #Regression2 with control variables#
> R2 = lm(GunDeathsPerCapita ~ GunLawRanking + EthanolConsumptionPerCapita
+         + OpoidsPrescribedPerCapita + AffordableHousingShortage
+         + SpendingPerStudent + ViolentCrimeRate
+         + PercentageAA + GDPPerCapita, data = USGunData)
> summary(R2)

Call:
lm(formula = GunDeathsPerCapita ~ GunLawRanking + EthanolConsumptionPerCapita +
    OpoidsPrescribedPerCapita + AffordableHousingShortage + SpendingPerStudent +
    ViolentCrimeRate + PercentageAA + GDPPerCapita, data = USGunData)

Residuals:
   Min     1Q Median     3Q    Max
-5.088 -2.185 -0.611  1.874  9.122

Coefficients:
                           Estimate Std. Error t value Pr(>|t|)
(Intercept)                1.548e+01  6.263e+00   2.472 0.017697 *
GunLawRanking              2.125e-01  5.354e-02   3.970 0.000283 ***
EthanolConsumptionPerCapita 5.798e-01  1.026e+00   0.565 0.574968
OpoidsPrescribedPerCapita  4.986e-02  4.931e-02   1.011 0.317876
AffordableHousingShortage -6.688e-07  3.274e-06  -0.204 0.839161
SpendingPerStudent        -4.881e-05  2.247e-04  -0.217 0.829085
ViolentCrimeRate           1.600e-03  3.185e-03   0.503 0.617999
PercentageAA               1.996e-01  6.182e-02   3.229 0.002446 **
GDPPerCapita              -2.000e-04  1.129e-04  -1.772 0.083821 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 3.484 on 41 degrees of freedom
Multiple R-squared:  0.7329,    Adjusted R-squared:  0.6808
F-statistic: 14.07 on 8 and 41 DF,  p-value: 1.381e-09
```

Table 2:

	Dependent variable:
	GunDeathsPerCapita
GunLawRanking	0.213***
	(0.054)
EthanolConsumptionPerCapita	0.580
	(1.026)
OpoidPrescriptionsPerCapita	0.050
	(0.049)
AffordableHousingShortage	−0.00000
	(0.00000)
SpendingPerStudent	−0.00005
	(0.0002)
ViolentCrimeRate	0.002
	(0.003)
PercentageAA	0.200***
	(0.062)
GDPPerCapita	−0.0002*
	(0.0001)
Constant	15.479**
	(6.263)
Observations	50
R^2	0.733
Adjusted R^2	0.681
Residual Std. Error	3.484 (df = 41)
F Statistic	14.066*** (df = 8; 41)
Note:	*p<0.1; **p<0.05; ***p<0.01

INTERPRETATION

Initially, I performed a bivariate regression, just to test the relationship between the main DV and IV. The latter is denoted by “GunLawRanking” in the model; 1 = best, 50= worst. According to the model, for every unit increase in GunLawRanking, GunDeathsPerCapita increased 0.312. In other words, the stricter the gun laws, the lower the mortality rate. The first model yielded a p-value of 1.34e-09(<0.01), which more than met the requirement for statistical significance. As I mentioned, I controlled for several factors that are often associated with varying levels of gun violences. Even after including them in the linear regression, the nature of the relationship between X and Y didn’t change. A unit increase in GunLawRanking was associated with a 0.213 increase in GunDeathsPerCapita. The p-value (=1.38e-09<0.01) still remained well within co

CONCLUSION

I wanted to show there was some kind of relationship between gun legislation and mortality. Even when isolating the US as a single actor, and controlling for factors such as crime, the results of this study definitely indicated a negative correlation between the two main variables. Despite this, the US is still behind the rest of the world when it comes to common sense gun legislation. This was clearly shown in the data, where some states were approaching the 20s in firearm mortality rates. No doubt, these numbers can be directly attributed towards the failure to implement proper background checks, which currently have loopholes in most states. Congressional incompetence isn't the only issue, however. Civilian actors are often faced with the constant dilemma between their rights and public safety. Is the 2nd amendment so far gone, that a few mass shootings is simply the price for political freedom? People from other countries could be more than willing to give up these same rights, as they never had them in the first place. It is worth noting, that although Switzerland experienced far less gun violence than the US, the former was still linked to lower rates of gun mortality following firearm restriction in the 2000s. According to several authors (Reish et al., 2013):

"The restriction of firearm availability in Switzerland resulting from the Army XXI reform was followed by an enduring decrease in the general suicide rate."

This study tried to highlight the relationship between firearm control. It is worth noting that even in states with low crime and higher income, stricter gun control was correlated with lower firearm mortality. Subsequently, even countries like Switzerland experienced decreased death rates following a period of restrictive legislation. This reality should detract any gun lobbyists who constantly boast about countries like Israel. Such conservative Americans would never forfeit their rights in such a way, so whenever they try to make this comparison it truly sounds redundant.

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