

The Effects of Gun Ownership Rates and Gun Control Laws on Suicide Rates

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Abstract

The purpose of the present study is to determine the effects of gun control laws and gun ownership rates on state-level suicide rates. Using the most recent data on suicide rates, gun control measures, and gun ownership rates, the results of the present study suggest that states that require handgun permits have lower gun-related suicide rates, and states that have higher gun ownership rates have higher gun-related suicide rates. Regarding non-gun suicides, results suggest that stricter gun control laws may result in higher non-firearm suicides, and higher rates of gun ownership result in lower non-gun suicide rates. These results suggest that stricter gun control laws may actually induce potential suicide victims to alter the method by which they commit suicide. Hence, the overall effects of firearm availability on suicides may be muted due to the fact that while reduced firearm availability reduces firearm suicides, it also increases non-firearm suicides.

Introduction

In 2006, 33,300 suicides were committed; over 17,000 of those were by firearm. For men, the percentage of suicides committed with a firearm was 56 percent; for women, it was 31 percent. Although many factors affect an individual's decision about whether or not to commit suicide, the availability of firearms is especially pertinent since this is one factor over which a state has some degree of control. Even though gun control laws vary from state to state, most jurisdictions place some restrictions on the use and ownership of firearms. An important question then is if there is a direct correlation between availability of firearms and suicide rates. If a gun is easier to obtain, will an individual be more likely to commit suicide by firearm? Or if guns are harder to obtain, will an individual be more likely to commit suicide by another method?

Gun control advocates insist that the easy availability of firearms increases the overall suicide rate. They contend that gun control measures should be implemented in order to reduce the suicide rate, regardless of any potential constitutional issues that gun control measures may entail. Opponents of gun control measures, however, point out that a person may commit suicide using many different methods. Restricting access to firearms would only force potential victims to seek alternative methods. In addition, gun control opponents argue that gun control measures trample on the constitutional liberties of law-abiding Americans.

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Prior research on this topic generally supports the assertions of gun control advocates; restrictions on firearms or limited availability of firearms reduce the overall level of suicides and the suicide rate (Conner and Zhong, 2003; Ludwig and Cook, 2000; Cummings et al., 1997; Carrington and Moyer, 1994; Kellerman et al., 1992; Yang and Lester, 1991; Lester, 1988; Sommers, 1984; Lester and Murrell, 1982). Few prior studies suggest that gun control laws or gun ownership do not have effects on the suicide rate; one of the few articles to come to this conclusion is Duggan (2003).

The purpose of the present study is to determine the effects of gun control laws and gun ownership rates on state-level suicide rates. This paper is different from prior research in this area since estimates of gun ownership rates are used as a measure of gun availability. In most prior studies, gun control laws, and not gun ownership rates, were used as proxies of gun availability. In addition, the present study will attempt to determine if restrictive gun control laws cause individuals with suicidal tendencies to alter the method by which they kill themselves; if guns are hard to obtain, then a person who wants to commit suicide may opt for another method. Most prior studies examining the relationship between suicides and firearm availability did not consider the effects of reduced gun availability on non-gun suicides.

Literature Review

One of the first studies on this topic was Lester and Murrell (1982). The authors examined the effects of gun control laws on state-level suicide rates. In order to conduct their study, Lester and Murrell first constructed an index of gun control laws, with a zero indicating no controls and a seven indicating maximum control. Looking at data from 1960 and 1970, a principal component analysis was used to determine the correlation between gun control laws and suicide rates. The results of the study suggested that states with stricter gun control laws had lower suicide rates; however, these states also had higher suicide rates by means other than firearms. This result indicated that suicide victims may be using alternative methods when obtaining a firearm becomes difficult.

Sommers (1984) looked at state-level data for 1970 and attempted to determine the effect of several gun control laws on suicide rates. Estimating suicide rates by both race and sex, the author found that most of the gun control measures were negatively related to suicide. Of all the equations that he estimated, the one that had the most statistically-significant gun control variables was the female regression. This is an interesting result since most suicides by firearm are committed by men and not women. In addition to the gun control variables, Sommers only used two other explanatory variables in his regressions: the unemployment rate and the divorce rate; hence, the results of his study may be biased due to the misspecification of the model.

Lester (1988), in an attempt to corroborate the findings of his 1982 study, looked at not only gun control laws but also gun ownership rates. The author estimated regional gun ownership rates from data presented in an earlier study (Wright et al., 1983). His results suggested that gun control laws were not significantly related to suicide rates, but that gun ownership rates were related to suicide

rates. He concluded that limiting the availability of firearms may reduce the suicide rate for a given region.

Yang and Lester (1991) attempted to correct some perceived shortcomings in Sommers' 1984 study and attempted to determine if suicide rates by means other than firearms increased in states with restrictive gun control laws. Using a model very similar to that employed by Sommers (1984), the authors estimated equations for the total suicide rate and for various types of suicide (i.e., by firearm, by jumping, etc.). Their results indicated that the gun control variables were significant and negative only for the total suicide equation and the firearm suicide equation. For the jumping suicide regression, the gun control variables were positive. For all other types of suicide, the gun control laws were insignificant. According to the authors, these results suggested that gun control laws do not make suicide victims switch to another type of suicide. Concerning the result for suicide by jumping, Yang and Lester contended that, because suicide by jumping is so rare, this result does not significantly affect their conclusion that gun control laws do not result in suicide switching. Hence, they concluded that gun control laws are significant deterrents to suicide.

Duggan (2003) examined the correlation between gun ownership and suicide rates. His primary objective was to determine if the direction of causation is from guns to suicides or from suicides to guns. Using estimated gun ownership rates, he found that states with higher suicide rates had higher gun ownership rates. However, he noted that a significant part of this relationship between gun availability and suicides can be explained by the correlation between guns and suicidal tendencies. Duggan believed that a primary reason why most prior studies found positive relationships between guns and suicide is because individuals who own guns are more likely to have suicidal tendencies. Finally, the author found that while both gun ownership and suicide rates have declined over a twenty year period, the decline in gun ownership cannot explain a significant part of the decline in suicides during the same period. It is important to note, however, that Duggan did not use any other explanatory variables besides gun ownership rates in his regressions, and his R^2 s were all less than ten percent.

Finally, Connor and Zhong (2003) used a methodology similar to that employed by Lester and Murrell (1982) and attempted to determine if more restrictive gun control laws resulted in lower suicide rates. Using state-level data, the authors found that states with more restrictive laws had lower overall suicide rates.

The present study differs from this prior research in several ways. First, the present study uses the most recent data available regarding suicide rates, gun control measures, and gun ownership rates. Second, state-level gun ownership rates are estimated using the Behavioral Risk Factor Surveillance System (BRFSS), a data set used in only two other studies for the purposes of estimating gun ownership rates (Gius, 2009; Gius, 2008). Third, two measures of gun availability are examined in the present study: state-level gun ownership rates and state-level gun control laws. Fourth, panel data estimation techniques are used to estimate the effects of gun availability on suicide rates. Most

prior studies used only cross-sectional data, which may not be able to capture the effects of any unobserved state-level factors on suicide rates. Finally, the present study examines the effects of gun availability on not only gun-related suicides but on non-gun suicides as well. By examining both types of suicides, it will be possible to obtain a better understanding of the true effects of gun availability on the overall suicide rate and ascertain whether or not method switching is occurring due to gun availability.

Empirical Technique and Data

It is assumed in the present study that if guns are readily available then suicides are much more likely to happen, holding all else constant. Hence, gun control laws and gun ownership rates, both of which are indicators of the availability of firearms, are included as explanatory variables in the regressions estimated in the present study.

Regarding gun ownership rates, this variable is very difficult to obtain or estimate. Few states require permits for handguns and even fewer require permits for long guns. In addition, guns are durable goods; they may stay operational for years after their initial purchase. Hence, gun control laws today will only affect gun purchases today, not gun purchases made years ago. In addition, very few states regulate the sale and purchase of guns at gun shows or the private transfer of guns; such exchanges typically go undocumented. Hence, any estimate of gun ownership rates in the United States is subject to varying degrees of error.

In order to estimate gun availability, the Behavioral Risk Factor Surveillance System (BRFSS) is used in the present study. The BRFSS is a data collection program administered by the Center for Disease Control and the US states and territories. This program, which began in 1984, measures and collects data on behavioral risk factors of adults who live in households. In the BRFSS, there are several questions dealing with gun ownership; the most pertinent question is "Are any firearms kept in or around your home?" This question was asked of all respondents in all states for the years 2001, 2002, and 2004. For all other years examined in this study, this question, which the BRFSS started asking in 1995, was asked of respondents in only select states. In order to have a balanced panel data set, any missing observations for gun ownership were linearly interpolated from the observed data. The last year the gun ownership question was asked was in 2004. Hence, the data used in the present study spans from 1995 to 2004.

From this data, the percentage of state residents that own guns was estimated by determining the percentage of individuals in the BRFSS sample from a given state that have guns in their houses. This percentage is used in the present study as a proxy for the state-level gun ownership rate.

Information on gun control laws was obtained from various sources including the Brady Campaign to Prevent Gun Violence, the Legal Community Against Violence, and Vernick and Hepburn (2003). In determining which gun control measures to include in the regression, it was decided that the focus would be on any measure that may deter suicide. Hence, a concealed weapons law, which may

potentially deter armed robbers or muggers, would probably not be a deterrent to suicide. In addition, in order for a gun control measure to have a statistically-significant effect on suicide rates, a sizeable minority of the states would have to have this gun restriction. For example, until recently, handguns were banned only in the District of Columbia. Hence, including this measure would not have contributed to the model in any statistically-significant manner. Finally, since the vast majority of suicide victims using guns opt for handguns instead of long guns, only those gun control statutes that attempt to restrict access to handguns were included in the present study.

Given the above, the following gun control measures were examined: requiring permits for handgun purchases; requiring registration for handguns; and requiring waiting periods for handgun purchases. Each of these gun control measures variables is expressed as a dummy variable which takes the value of one if the state has the law in question and zero otherwise. Although dummy variables are not precise measures of gun control laws since laws typically differ from state to state, it is reasonable to assume that if a state has any type of law requiring a permit to purchase a handgun, for example, then gun ownership is more restricted in that state than in a state that has no such law. It is important to note that, for these three gun control measures, states changed their statutes very little over the ten year period (1995-2004) examined in the present study.

Regarding other factors that may affect the suicide rate, variables that proxy for potentially depressing events that may serve as catalysts for the possible contemplation of suicide are also used in the regressions estimated in the present study. In ascertaining which variables to include in the estimating equations, guidance was obtained from several studies that have investigated the risk factors associated with suicide and suicidal behavior (Nock et al., 2008; Bridge, Goldstein, and Brent, 2006; and Mann, 2002). These studies suggest that adolescent and young adult men who are white, unemployed, unmarried, and have lower educational attainment are more likely to commit suicide.

The presence of psychiatric disorders is also one of the most consistently reported risk factors for both suicide and suicidal behavior. The range of disorders that may precipitate a suicide is rather broad, and most typically, multiple disorders are usually associated with an elevated risk of suicide. Unfortunately, little data is available on the state-level prevalence of psychiatric disorders. Hence, it is not feasible to incorporate measures of the prevalence of these disorders into the estimating equations employed in the present study. In addition, given that many individuals who attempt or commit suicide have undiagnosed psychiatric disorders, any data that would be available would be highly unreliable.

Hence, the above-mentioned factors are included in order to capture the degree to which a state's population may be depressed and thus more likely to contemplate suicide. Of course, most individuals who are depressed because they are divorced or unemployed do not commit suicide. However, it is reasonable to assume that states that have more depressing environments, such as high unemployment, are more likely to have more people in a suicidal frame of mind than other, less depressing states. Descriptive statistics for all variables are presented in Table 1.

Table 1 Descriptive Statistics			
Variable	Mean	Minimum	Maximum
Gun-Related Suicide rate (per 1000,000 persons)	7.26	1.12	16.76
Non-Gun Related Suicide Rate (per 100,000 persons)	5.29	2.37	9.7
GUN	0.368	0.073	0.672
PERMIT	0.24	0	1
REGISTER	0.15	0	1
WAIT	0.34	0	1
AGE	0.254	0.212	0.335
WHITE	0.80	0.24	0.98
RURAL	0.318	0	0.725
COLLEGE	0.244	0.142	0.387
INCOME	27233	16743	45398
UNEMP	4.82	2.30	8.100
ALCOHOL	2.245	1.20	4.13
DIVORCE (per 100,000 persons)	4.32	2.2	10.4

Given the above, the following two equations are estimated in the present study:

$$\begin{aligned}
 Y_{i,t} = & a_0 + a_1 \text{WHITE}_{i,t} + a_2 \text{RURAL}_{i,t} + a_3 \text{COLLEGE}_{i,t} + a_4 \text{INCOME}_{i,t} \quad (1) \\
 & + a_5 \text{UNEMP}_{i,t} + a_6 \text{AGE}_{i,t} + a_7 \text{ALCOHOL}_{i,t} + a_8 \text{DIVORCE}_{i,t} \\
 & + a_9 \text{PERMIT}_{i,t} + a_{10} \text{REGISTER}_{i,t} + a_{11} \text{WAIT}_{i,t} + a_{12} \text{YEAR}_t
 \end{aligned}$$

$$\begin{aligned}
 Y_{i,t} = & a_0 + a_1 \text{WHITE}_{i,t} + a_2 \text{RURAL}_{i,t} + a_3 \text{COLLEGE}_{i,t} + a_4 \text{INCOME}_{i,t} \quad (2) \\
 & + a_5 \text{UNEMP}_{i,t} + a_6 \text{AGE}_{i,t} + a_7 \text{ALCOHOL}_{i,t} + a_8 \text{DIVORCE}_{i,t} \\
 & + a_9 \text{GUN}_{i,t} + a_{10} \text{YEAR}_t
 \end{aligned}$$

where Y denotes the number of suicides per 100,000 residents, WHITE is the percentage of the state's population that is white (Lester, 1988), RURAL is the percentage of the state's population that lives in rural areas, COLLEGE is the percentage of the state's population that has a four-year college degree, INCOME is per capita median income, UNEMP is the state's annual unemployment rate (Sommers, 1984; Yang and Lester, 1991), AGE is the percentage of the state's population that is under the age of 18, ALCOHOL is the per capita alcohol consumption, DIVORCE is the number of divorces per 100,000 residents (Sommers, 1984; Lester, 1988; Yang and Lester, 1991), PERMIT equals one if the state requires a permit to purchase a handgun and zero otherwise, REGISTER equals one if the state requires registration of a handgun and zero otherwise, WAIT equals one if the state requires a waiting periods for handgun purchases and zero otherwise, GUN is the estimated gun ownership rate which is defined as the percentage of households owning at least one gun, subscript i denotes the state, and subscript t denotes the year.

Two suicide rates are estimated in the presented study: the gun-related suicide rate and the non-gun-related suicide rate. It is reasonable to expect that gun availability (as measured by higher gun ownership rates or less restrictive gun laws) would be positively-related to the gun suicide rate. However, gun availability may have a negative effect on non-gun suicides. If gun control laws (which reduce gun availability) are positively related to non-gun suicides, then this may indicate that the restrictiveness of these laws is forcing some individuals to alter the method by which they commit suicide; this method switching effect of gun control laws was examined in only a few prior studies, most notable Yang and Lester (1991).

All data are state-level and were collected for the years 1995-2004. State-level socioeconomic data were obtained from the *Statistical Abstract of the United States*. Suicide rates were obtained from the Centers for Disease Control.

A panel data model is used to estimate Equations (1) and (2). This model is superior to both cross-sectional and time series models for two reasons. First, panel data models control for potentially important but unobservable state-level effects that may be correlated with other determinants. If a panel data model was not used where appropriate, state-level effects may be omitted, and omitted variable bias may result. Second, panel data greatly increases the degrees of freedom; hence, one can examine state-level data even though there are limited annual data available.

There are two ways in which a panel data model may be defined. If it is assumed that parameter estimates are independent of state-level effects, then fixed effects should be used. If it is assumed that parameter estimates vary across states, however, then a random effects model should be used. A random effects model allows for parameter estimate variation among states by utilizing a generalized regression model where the variance is dependent upon a state-level disturbance term.

A Hausman Test was used to determine if fixed effects or random effects would be more appropriate. Results of the test suggested that random effects were better suited for estimating the models in the present study. In addition, a Breusch-Pagan Test was used to determine if heteroscedasticity was present in the models, and the Ramsey Reset Test was employed to test the specification of the models. The results of the tests indicated that there was no heteroscedasticity present and that the models were properly specified.

Results

The gun control law regression results are presented in Tables 2 and 3. Gun ownership regression results are presented in Tables 4 and 5. The results of the gun law regression for gun-related suicides indicate that only one of the three laws examined in the present study had a statistically-significant effect on gun-related suicide rates; PERMIT was significant and negative. Hence, requiring a permit for purchase of a handgun raises a substantial barrier to suicide by firearm. In fact, states that do not require permits for the purchase of a handgun have a suicide rate that is 2.31 per 100,000 residents greater than states that do require permits, holding all other factors constant. This result suggests

Table 2 Gun Control Laws Regression Results Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	146.93	42.33	3.47***
PERMIT	-2.31	0.49	-4.72***
REGISTER	-0.112	0.275	-0.407
WAIT	0.109	0.183	0.595
AGE	-1.59	5.72	-0.279
WHITE	1.44	0.889	1.614
RURAL	4.88	1.029	4.74***
COLLEGE	-5.075	2.405	-2.11**
INCOME	-0.000039	0.000046	-0.852
UNEMP	0.118	0.045	2.56***
ALCOHOL	0.639	0.301	2.122**
DIVORCE	0.415	0.0945	4.398***
YEAR	-0.0716	0.0211	-3.389***
Notes: Adjusted R ² = 0.927 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

that, if all states required permits for the purchase of a handgun, then there would be about 5,000 fewer suicides annually in the United States. The other two gun control measures had no statistically-significant effects on the gun-related suicide rate.

Table 3 Gun Control Laws Regression Results Non-Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	-64.77	32.49	-1.993**
PERMIT	-0.384	0.405	-0.946
REGISTER	0.458	0.209	2.189**
WAIT	0.063	0.138	0.455
AGE	-11.24	4.422	-2.541**
WHITE	-0.315	0.687	-0.459
RURAL	-0.096	0.853	-0.113
COLLEGE	-0.713	1.834	-0.389
INCOME	-0.0000058	0.000035	-0.167
UNEMP	0.043	0.034	1.257
ALCOHOL	0.37	0.238	1.555
DIVORCE	0.016	0.072	0.224
YEAR	0.0361	0.0162	2.229**
Notes: Adjusted R ² = 0.822 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

For the non-gun-related suicide rate, only one of the gun control measures was statistically significant, and it had a positive sign. This result is expected since a person who commits suicide using some means other than a gun would not, of course, be deterred by any type of gun control law. However, there may be some method switching occurring because REGISTER is significant and positive for non-gun related suicides. Hence, requiring registration for handguns may create enough of a barrier to obtaining a gun that individuals who want to commit suicide in these states may be forced to seek another method. It is important to note, however, that this effect is rather minor; states that require handgun registration have a non-gun suicide rate that is only 0.458 greater than a state that does not have such a law. Hence, although there is potentially some degree of method switching that is occurring, if a state requires handgun permits and handgun registration, holding all other factors constant, then that state's overall suicide rate is on average 14.8 percent less than a state that does not have these gun control measures. Thus, although the effects of gun control laws on overall suicides are somewhat muted, they are still significant and negative.

Regarding the other statistically-significant variables in the gun suicide regression, RURAL, UNEMP, ALCOHOL, and DIVORCE all had positive effects on suicide. Hence, those states that have more rural populations, higher unemployment, higher alcohol consumption rates, and higher divorce rates all have higher gun-related suicide rates. These results are reasonable since all of these variables are indicators of depressing events which may cause an individual to contemplate suicide. The variables YEAR and COLLEGE were negatively related to gun-related suicides. For the non-gun suicide regression, YEAR had a positive effect on suicide, while AGE had a negative effect.

For the gun ownership regressions, it was found that gun ownership has a statistically-significant and positive effect on the gun-related suicide rate. Access to firearms is thus an important determinant of gun-related suicide. For every one percentage point decrease in the gun ownership rate, the gun-related suicide rate falls by 0.087 out of an average total rate of 7.26. This drop in the gun-related suicide rate translates into over 260 lives saved annually nationwide.

For the non-gun related suicide regression, gun ownership is significant and negative, which corroborates the result in the gun law regression that suicide method switching may be occurring in states that have limited availability of firearms. However, this effect is very minor; for every one percentage point increase in the gun ownership rate, the non-gun suicide rate falls by only 0.0186 persons out of 100,000. That rate change translates into only 55 lives saved annually nationwide. Nonetheless, in those states with low rates of gun ownership, the non-gun related suicide rate is somewhat higher, indicating that potential suicide victims are just finding another way to commit suicide if guns are not readily available.

Regarding the significance of the other explanatory variables in the gun-related suicide regression, RURAL, UNEMP, ALCOHOL, and DIVORCE all had positive effects on the suicide rate while COLLEGE and YEAR had negative effects. These results are similar to those found in the gun law regression. For the non-gun suicide regression, ALCOHOL and YEAR had positive effects on suicide,

Table 4 Gun Ownership Regression Results Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	157.43	41.16	3.825***
GUN	0.087	0.012	6.934***
AGE	0.57	5.32	0.107
WHITE	1.23	0.809	1.521
RURAL	1.77	0.967	1.83
COLLEGE	-5.23	2.294	-2.279**
INCOME	-0.000052	0.000044	-1.186
UNEMP	0.0916	0.0458	2.00*
ALCOHOL	0.875	0.262	3.335***
DIVORCE	0.534	0.0866	6.16***
YEAR	-0.0788	0.0206	-3.825***
Notes: Adjusted R ² = 0.812 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

Table 5 Gun Ownership Regression Results Non-Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	-76.16	32.73	-2.327**
GUN	-0.0186	0.01	-1.788*
AGE	-10.911	4.377	-2.493**
WHITE	-0.376	0.675	-0.557
RURAL	0.589	0.927	0.636
COLLEGE	-0.78	1.82	-0.428
INCOME	-0.000019	0.000034	-0.578
UNEMP	0.0524	0.035	1.497
ALCOHOL	0.385	0.233	1.651*
DIVORCE	0.009	0.069	0.13
YEAR	0.0422	0.016	2.572**
Notes: Adjusted R ² = 0.274 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

while AGE had a negative effect. Finally, given that the results of the gun law regressions and the gun ownership regressions are very similar, the relationship between guns and suicides is statistically robust.

Concluding Remarks

The purpose of the present study was to determine if gun availability had a statistically significant effect on suicide rates, both gun-related and non-gun-related. Using data from all fifty states for a ten

year period, it was found that gun availability has a positive effect on gun-related suicides but a negative effect on non-gun-related suicides. In addition, it was found that while only one of three gun control measures examined in the present study deterred gun-related suicides, requiring the registration of handguns may actually increase the non-gun related suicide rate. Hence, these results suggest that, while the net effect of gun control laws on the overall suicide rate is negative, it may be somewhat less than previously thought.

The results of the present study are more robust than those of prior studies for two reasons. First, panel data estimation techniques are used. These techniques allow the researcher to control for potentially important but unobservable state-level effects that may be correlated with other determinants. If a panel data model was not used, then significant state-level effects would have been omitted, and omitted variable bias would have resulted. The results of the present study suggest that these unobservable, state-level effects are statistically significant and may account for much of the state-level differences in suicide rates; such effects may include the overall mental health of a state's residents, particularly traumatic events that may have affected a large proportion of the state's population, and other factors that are not readily observable but which may nonetheless play a large role in the determination of suicidal tendencies. Prior studies, since they did not use panel data, did not take account of these state-level effects and thus may have improperly attributed differences in suicides rates to differences in gun ownership rates or differences in gun control laws. By accounting for these unobserved state-level differences, the models used in the present study are more accurate predictors of suicide rates at the state level.

Second, in the present study, the determinants of both gun-related and non-gun related suicide rates are estimated. By estimating both suicide rates, it is possible to compare the relationships between gun availability and these different types of suicides. While it is reasonable to assume that there should be a positive relationship between gun availability and the gun-related suicide rate, it is rather novel to conclude that there may be a negative relationship between gun availability and the non-gun suicide rate. This negative relationship may result in method switching among suicide victims. This theory found support in the present study. Very few other studies either considered the concept of method switching or estimated separate regressions for these two types of suicide. Thus, prior studies could not ascertain the actual effects of gun availability on gun-related suicides or suicides in general. Therefore, the present study makes a significant contribution to the literature in this area by identifying method switching among suicide victims and by showing how the effects of gun availability on the overall suicide rate is muted by this phenomenon.

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