Does Gun Control Reduce Crime or Does Crime Increase Gun Control?

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Advocates argue that gun control laws reduce the incidence of violent crimes by reducing the prevalence of firearms. Gun laws control the types of firearms that may be purchased, designate the qualifications of those who may purchase and own a firearm, and restrict the safe storage and use of firearms. On this view, fewer guns mean less crime. Thus, there is a two-step linkage between gun control and crime rates: (1) the impact of gun control on the availability and accessibility of firearms, particularly handguns, and (2) the effect of the prevalence of guns on the commission of crimes. The direction of the effect runs from gun control to crime rates.

Conversely, because high crime rates are often cited as justifying more stringent gun control laws, high rates may generate political support for gun regulations. This suggests a causal effect running from crime rates to more stringent gun laws. But because both relationships between gun control and crime rates unfold over time, they are not simultaneously determined in the usual econometric sense. For example, crime rates in the early 1990s could be expected, ceteris paribus, to influence the stringency of gun control measures in the late 1990s. In turn, more stringent gun control in the late 1990s could be expected, ceteris paribus, to affect crime rates several years later. Using state-level data, this article provides estimates of these twin relationships between gun control and crime rates.

Measuring the Degree of Gun Control

Researchers attempting to estimate the effect of gun control on crime rates face two problems. First, how is gun control to be

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measured? What is the empirical counterpart to gun control? Gun control is an umbrella term covering everything from laws prohibiting the ownership of defined classes of firearms to mandating the inclusion of gun locks with every firearm sold. These measures represent discrete legislative acts passed on different dates by different governing bodies. How do they interact to control the availability of firearms? Are the various measures complements or substitutes?

Second, the effectiveness of a particular gun control statute depends not only on its being on the books but the degree to which the law is enforced. Two jurisdictions may have the same gun control statute but experience very different effects, because in one of the jurisdictions little effort is devoted to enforcing the regulation. Enforcement of gun laws must be taken into account in order to accurately assess gun control.

One contribution of this study is that it addresses these problems by using a comprehensive index of gun control laws for the 50 states and the District of Columbia. The index includes those laws in place in 1998. Normalized to take on values of 0 to 100, the index is based on 30 weighted criteria applied to six categories of gun control regulations. The index was constructed as a project of the Open Society Institute's Center on Crime, Communities and Culture.[1] The index "concentrates on states because most gun laws are state laws, though federal law also plays an important role" (Open Society Institute 2000: 1). Because our study uses cross-sectional data by state, to match up with the index, federal laws are treated as a constant across all states and the District of Columbia.[2] Another reason for focusing on states is that 40 states prohibit or restrict local governments from enacting gun control ordinances.

Although there are literally thousands of state and local gun control statutes, the authors of the index group specific gun control measures into the following six categories. (1) Registration of firearms including purchase permits and gun registration of handguns and long guns (rifles and shotguns). (2) Safety training required before purchase. (3) Regulation of firearm sales including background checks,

[1]The Open Society Institute (OSI) is part of the George Soros Foundations Network. Though the OSI advocates gun control, there is no reason to assume that the index is biased. Systematic bias, one way or the other, in construction of the index would not serve the OSI's purpose. OSI experts have done no rigorous empirical studies of the effects of gun control of which we are aware. The OSI report states: "The relationship between particular regulatory measures and violence lies outside the scope of this survey, whose purpose is to analyze and compare the laws themselves" (Open Society Institute 2000: 7).

[2]For a discussion of the econometric factors favoring cross-section data over time series data for estimating the effects of gun control on crime rates, see Kleck (1991:387–88).

minimum age requirements for purchasing a firearm, a waiting period before a sale can be completed, one-gun-a-month limitation on purchases, all applied to long guns and/or handguns, plus a ban on "Saturday night specials," junk guns, and assault weapons. (4) Safe storage laws including child access prevention law. (5) Owner licensing for possession of handguns and/or long guns and minimum age restrictions for gun possession. (6) The presence of more restrictive municipal and county ordinances.

In addition, the index takes into account whether or not a law is effectively enforced. For example, while 32 states require background checks going beyond federal requirements, a number have no mechanism for ensuring that checks are made.[3] Thus, the index distinguishes among states with no law, those with unenforced provisions, and those where the law is enforced. Furthermore, "In general, more points were assigned to 'upstream' measures [e.g., gun registration] than to 'downstream' measures [e.g., safe storage laws], to restrictions on handguns than to long guns, and to measures that facilitate the enforcement of the laws" (Open Society Institute 2000: 12). Each of the 30 criteria was weighted from 0 to 7. For example, gun registration receives a maximum of 7 points down to 0 for no state registration. A waiting period of more than three days for handgun purchases receives 6 points, while having no waiting period is scored 0. Information used in constructing the index was gathered in three stages: analysis of primary sources, cross-checking with the principal secondary sources, and verification with law enforcement and state agencies (Open Society Institute 2000: 14–16).

Finally, if one wishes to study the effects of state gun control laws, using a carefully constructed index of gun control laws has several advantages. First, the effectiveness of a state's gun control laws may not be independent of the gun control regime of neighboring states. If the citizens of state A can readily purchase guns in state B, then a spill-in effect may exist. Using an index provides a straightforward way of controlling for an adjacent state's gun control regime and estimating any spill-in effect.

Second, using an index also offers several statistical advantages. The obvious substitute for an index is a vector of dummy variables representing specific state statutes and for each the degree of enforcement. Unfortunately, the latter approach uses too many degrees

[3]Though all gun dealers must conform to federal law requiring a background check through the National Instant Check System (NICS), states with background checks but no mechanism for enforcing the provision means that the State Police databank is not routinely accessed as part of a background check.

of freedom given the sample size and the other control variables included in the analysis. Moreover, an index avoids the problem of collinearity among gun control measures (Kleck 1991: 401). Arguably, using dummy variables does permit analysts to be more specific in their assessment of the effectiveness of individual gun control regulations. An index confines analysts to commenting on the efficacy of a gun control regime as a whole.

Literature Review of Gun Control Studies Using State Data

In 1993, Kleck and Patterson surveyed the then contemporary literature on the effects of gun controls on crime rates. As part of this larger survey, the authors review 13 studies that use state data. They observe that two studies find that gun controls reduce violent crimes, two have mixed results, and nine find no reduction in crime because of gun control (Kleck and Patterson 1993: 254).

A conspicuous characteristic of early studies is the failure to include relevant control variables. For example, Newton and Zimring (1970) conclude on the basis of a positive zero-order correlation between gun ownership and firearm-related violence that gun control reduces violent crimes. They specify no ceteris paribus conditions. Seitz (1972) provides one of the more outlandish examples of an empirical study suffering from omitted variables. He begins by observing that "Today, few would deny that some relationship exists between firearms and violent death and crime" (Seitz 1972: 595). Using state observations, his evidence of the relationship between guns and crime is a 0.98 simple correlation coefficient between firearm homicides and total homicides. Seitz (1972: 597) displays the data on a scatter diagram with firearm homicides measured on the vertical axis and total homicides on the horizontal axis. He concludes, from the correlation, that a reduction in the prevalence of guns would reduce the number of homicides. This, of course, is no evidence for or against the efficacy of gun control. That the two measures of homicide are highly correlated is not surprising given that firearm homicides constitute more than 60 percent of all homicides in the United States (Jacobs 2002: 8). Seitz controls for no other variables that influence the number of homicides. Likewise, Phillips, Votey, and Howell (1976) using time series data, find a significant positive relationship between the stock of handguns per capita and the homicide rate. They include none of the usual social and economic variables thought to influence homicide.

Using state data and controlling for several social and economic variables, Sommers (1980) estimates the impact of two forms of gun control on seven categories of crime. GUN1 is a dummy variable taking on a value of 1 for states having a concealed weapons law and 0 otherwise. GUN2 takes on a value of 1 if the state has a licensing provision and 0 otherwise. Of the 14 estimated gun control coefficients, only 3 are statistically significant. In no case, is the concealment law found to have an effect. Commenting on Sommers' study, Magaddino and Medoff (1982: 50) argue that Sommers fails to take into account other forms of state control guns and misspecifies his model by neglecting to include the "effectiveness of law enforcement agencies, the judicial system, and other factors in the criminal justice system." When they estimate the regressions with dummy variables representing seven different forms of gun control and additional demographic, economic, and law enforcement variables, they find that gun control has no impact on crime rates.

A number of studies from the 1970s and 1980s that do control for social and economic factors find no evidence of gun control reducing violent crime rates. Using regression analysis, state data, and a vector of social and economic variables, Murray (1975: 81) concludes that "gun control laws have no significant effect on rates of violence beyond what can be attributed to background social conditions." In addition, he observes that "controlling for basic social factors, the data show that gun laws have no significant effect on access to firearms" and "differing rates of access to handguns had no significant effect on violent acts" (Murray 1975: 91). Lester and Murrell (1982: 131) did find that "states with stricter handgun laws in 1968 were shown to have lower suicide rates by firearms both in 1960 and 1970. These states also had higher suicide rates by 'other means'." According to the authors, their finding for 1960, well before the 1968 law, is troublesome because it castes doubt on any simple interpretation of the post-law 1970 results and suggests the desirability of constructing a more complete model that includes additional variables for explaining the variation in suicide rates across states. Finally, they observe, "No such effect of strict gun control laws was found for mortality from homicides by firearms" (Lester and Murrell 1982: 139).

DeZee (1983: 367) writes, "While controlling for several standard social phenomena and using two different statistical techniques, it appears that laws governing use of handguns in the various states have little effect on the rate of gun crime." Using demographic, economic, and enforcement variables as well as dummy variables for seven forms of firearm control, Magaddino and Medoff (1984: 235) conclude, "Finally, not one of the seven state firearm control law

variables is found to be significantly different from zero in any of the three crime equations for either 1960 or 1970." In 1988, Lester (1988: 18) published another empirical study in which he concludes, "Gun ownership, rather than strictness of gun control, was found to be the strongest correlate of the rates of suicide and homicide by guns."

More recently, Kwon et al. (1997: 41) published a study the purpose of which is "to statistically and empirically evaluate the effectiveness of gun control laws that have been adopted by state and municipalities." They conclude that "the multivariate regression results indicate that gun control laws and regulations do appear to have some impact on reducing the number of deaths associated with firearms" (Kwon et al. 1997: 47). The evidence they offer, however, is rather weak. They find that only about 3 deaths per 100,000 are avoided when the types of gun control included in the study are in effect. In commenting on the original study, Kovandzic (1998) and Kahane (1999) argue that it has a number of serious problems including the way the gun control variable is defined, omitted variables, model specification errors, and the interpretation of their statistical findings. Furthermore, in spite of the study's stated purpose, no information about municipal laws is included (Kahane 1999: 524).

Kwon et al. (1997) construct an index for gun control combining state laws covering waiting periods, background checks, and licensing requirements. The dummy variable is coded 1 if a state has one or more of these three provisions and 0 if it has none. Thus a state with a three-day waiting period is treated the same as a state with all three provisions including a five-day waiting period. This approach not only biases the index, it also throws away potentially useful information. The authors provide no rationale for the arbitrary procedure. More astounding, as Kovandzic (1998: 365) observes, "They found no statistically significant negative relationship between gun control laws and firearm related deaths, but they continually refer to their findings as if they did." In their reply, Kwon et al. (1998) simply quibble about the desirability of evaluating the effects of public policy measures on the basis of statistical significance tests. Their reply is all the more puzzling because the core of their original article is the presentation and interpretation of multivariable regressions.

In one of the more comprehensive and widely cited studies, Lott and Mustard (1997) focus on state right-to-carry laws. Using cross-section and time series data from more than 3,000 U.S. counties for the period 1977 to 1992, the authors estimate the effect of concealed weapon laws on crime rates. The study covers nine categories of crime and controls for state and local trends in crime rates, arrest rates, per capita real income, measures of income distribution,

population density, and the age, gender, and racial composition of the population by county. The policy of interest is the adoption of a nondiscretionary law for issuing concealed weapon permits.

The authors find that right-to-carry laws reduce violent crime rates, the reductions are greater in counties with proportionally higher urban populations, and the laws afford relatively greater protection to minorities and women. The latter groups are precisely those that are disproportionately victimized by violent crimes. Furthermore, Lott and Mustard find that criminals substitute nonconfrontational crimes such as burglary, auto theft, and larceny for robbery and assault. Under concealed weapons laws, the latter crimes involve an increased probability of confronting an armed private citizen. Thus, right-to-carry laws increase the risk to criminals of being injured or killed during a crime and thus generate a deterrent effect. Indeed, casual evidence suggests that merely brandishing a gun deters criminals. Examining alternative data sets, Lott and Mustard reestimate their model using state data. The results are consistent with those found using their more disaggregated county data. In *More Guns, Less Crime*, Lott (1998a) updated and expanded his earlier work. In the second edition, Lott (2000) answers his media and academic critics at length. (For an example of responsible academic criticism see Black and Nagin 1998.)

Returning to the discussion of those studies that use state data, a conundrum remains. To date those studies that use state data and find that gun control reduces crime rates appear to be seriously flawed. On the other hand, while the majority of studies using state data do not find a deterrent effect for gun control, failure to find a statistically significant relationship is not necessarily compelling evidence that none exists. Negative findings are persuasive only if the analysis is done carefully. Among others things, careful analysis requires the use of an appropriate vector of control variables. Not only does the present study control for other factors that influence crime rates, it also uses the most detailed and sophisticated index of state gun control laws extant. This approach not only allows estimating the direct effects of a state's gun control laws on crime rates within the state but also the effect of "lax gun laws" in neighboring states.

Model One: Gun Control and Crime

The comprehensive index of state gun control, used in this study, is for 1998. To test the effectiveness of gun control in reducing crime, state crime rates for 10 categories of crime along with demographic, economic, and law enforcement data are collected for 1999 and 2001.

Thus, the test is whether or not gun control, as measured by the 1998 index, has an effect on crime rates one and three years later. All crime rates are regressed against the same vector of explanatory variables including the index of gun control and a spill-in effect variable. The latter variable is included because as the Open Society Institute (2000: 7–8) argues, "Very strict gun laws in one state can be undermined by permissive laws in neighboring states. When adjacent jurisdictions have different levels of gun control, the weaker law becomes the common standard."

Ten regressions are estimated for 1999 and for 2001. The endogenous variables are the overall crime rate (CR_T) and rates for nine specific categories of felonies labeled: Violent, Property, Murder, Rape, Robbery, Assault, Burglary, Larceny, and Vehicle. Gun control is not expected to have the same degree of influence on each of these categories of crime. For example, firearms are rarely employed in cases of larceny, burglary, or, until recently, vehicular theft. However, all the major categories of felonies are included in the study so that the results for crimes in which firearms are typically used and those in which they are not can be compared.

The exogenous variables are defined below. The gun control index (GCI) is the index constructed by the Open Society Institute and discussed earlier. The effect of neighboring state laws is captured by (SPILLIN). The variable is measured by the lowest GCI score for a neighboring state or the state's own index score, if the latter is lower than for any bordering state.[4] Because of the way it is measured, higher values for SPILLIN are expected to reduce crime rates. Population density, people per square mile in a state, (PD) is an environmental variable that captures the overall degree of crowding. The crime rate is expected to be positively related to PD. State population is not used as an explanatory variable in these regressions because the endogenous variables—crime rates—are defined as the number of crimes in a category per 100,000 population. Using population could give rise to spurious negative correlation.

While PD measures the degree of overall crowding, the distribution of population within a state is captured by METRO, the proportion of the population living in metropolitan statistical areas. Crime rates are expected to be positively related to METRO. Holding the distribution of income constant, per capita income (PCI), in current dollars, proxies for demand and supply factors in labor markets,

[4]Averaging the index scores of all neighboring states was also used as a measure of SPILLIN. The average measure is not statistically significant and is not reported here.

including education, productivity, and employment opportunities. Thus, the higher PCI the lower the crime rate. Poverty (POV) is defined as the percentage of families in each state living at or below the federally defined poverty level. Holding PCI constant, the higher POV the greater is income inequality and the higher the crime rate. The high school dropout rate (DROPOUT) proxies for low skills and productivity, poor employment prospects, and low opportunity costs of time. Crime rates are expected to be positively related to the dropout rate. The proportion of a state's population that is black (BLACK) is meant to proxy for a complex of social and economic problems that contribute to crime. For the same reason, the proportion of Hispanic residents in a state's population (HISPANIC) is included. Finally, the GCI takes into account both the relative stringency of local gun laws and the enforcement of gun laws by state. Nevertheless, the effectiveness of gun control must be measured in the context of the deterrent effects of general law enforcement and the severity of punishment. The former is measured by the number of criminal arrests per 100,000 state inhabitants (ARREST) and the latter by the average prison sentence served, in 1997, within a state (AVSENT). All observations are for the 50 states plus the District of Columbia for 1999 and 2001. The exceptions are METRO and POV, available only for 1998 and 2000, DROPOUT available for 1998 and 2000, and AVSENT available only for 1997. Data sources are provided in the Appendix. Table 1 presents the cross-section regressions for 1999.

Empirical Findings

In the 1999 regressions, the coefficient of PD is positive and statistically significant in 4 of the 10 regressions. The results are consistent with the findings of Kleck and Patterson (1993, 267–71). METRO has the expected positive sign and is significant in four regressions, those for the overall crime rate, property crimes, robbery, and vehicular theft. An explanation of the latter results is that METRO serves as a proxy for the anonymity and the proximity of potential victims in an urban environment. METRO is not significant in violent crimes including murder, assault, and rape. Per capita income (PCI) is significant in 6 of 10 regressions. Its estimated coefficient has the expected negative sign. The proportion of the state population living in poverty (POV) is significant in only one regression, that for MURDER, and has an unexpected negative sign. Presumably POV is not in fact a good proxy for income inequality and, thus, does not

TABLE 1

Gun Control and Crime Rates by State, 1999

	Dependent Variables				
Explanatory Variables	CR_T	Violent	Property	Murder	Rape
Constant	6187	373.9	5813	3.24	87.73
	(3.75)***	(1.14)	(3.84)***	(2.32)**	(3.25)***
GCI	4.48	0.86	3.62	−0.003	−0.10
	(0.61)	(0.59)	(0.54)	(−0.15)	(−0.88)
SPILLIN	7.28	−2.51	9.79	−0.004	0.16
	(0.28)	(−0.48)	(0.41)	(−0.06)	(0.38)
PD	0.22	0.07	0.15	0.004	0.001
	(1.05)	(1.76)*	(0.77)	(8.25)***	(0.09)
METRO	16.68	1.81	14.88	−0.02	−0.12
	(1.94)*	(1.06)	(1.89)*	(−0.96)	(−0.88)
PCI	−0.13	−0.005	−0.12	−0.001	2.16E-06
	(−2.71)***	(−0.57)	(−2.82)***	(−2.05)**	(0.003)
POV	−48.41	−0.77	−47.63	−0.22	−1.12
	(−0.97)	(−0.08)	(−1.04)	(−1.80)*	(−1.41)
DROPOUT	240.80	19.40	221.40	0.79	1.16
	(2.74)***	(1.11)	(2.74)***	(3.67)***	(0.83)
BLACK	3063	1112	1951	15.72	29.14
	(2.18)**	(3.99)***	(1.51)	(4.59)***	(1.30)

HISPANIC	2766	823.30	1943	12.34	32.33
	(1.60)*	(2.39)**	(1.22)	(2.92)***	(1.17)
ARREST	−227.90	−60.30	−167.60	−0.84	−10.60
	(−1.03)	(−1.37)	(−0.82)	(−1.55)	(−2.99)***
AVSENT	−13.45	−1.67	−11.78	0.005	−0.45
	(−1.36)	(−0.85)	(−1.30)	(0.22)	(−2.81)***
Adj. R^2	.61	.72	.51	.93	.23
	Robbery	Assault	Burglary	Larceny	Vehicle
Constant	−25.05	303.90	1103	4347	363.5
	(−0.34)	(1.10)	(2.95)***	(3.64)***	(1.63)
GCI	−0.04	1.00	1.34	1.73	0.55
	(−0.12)	(0.82)	(0.81)	(0.33)	(0.56)
SPILLIN	−0.40	−2.27	5.68	0.59	3.52
	(−0.34)	(−0.52)	(0.96)	(0.03)	(1.00)
PD	0.04	0.03	−0.07	0.15	0.06
	(3.79)***	(0.93)	(−1.38)	(1.02)	(2.05)**
METRO	0.97	0.98	2.73	8.49	3.65
	(2.50)**	(0.68)	(1.40)	(1.37)	(3.15)***
PCI	0.002	−0.007	−0.03	−0.08	−0.01
	(0.77)	(−0.86)	(−2.78)***	(−2.37)**	(−1.82)*
POV	−1.13	1.70	0.41	−39.79	−8.26
	(−0.50)	(0.20)	(0.04)	(−1.10)	(−1.23)
DROPOUT	4.72	12.73	40.10	143.10	38.20
	(1.19)	(0.87)	(2.01)*	(2.25)**	(3.21)***

(*continued*)

TABLE 1 (*continued*)

Gun Control and Crime Rates by State, 1999

	Dependent Variables				
Explanatory Variables	Robbery	Assault	Burglary	Larceny	Vehicle
BLACK	375.60	691.90	980.30	694.80	275.50
	(5.91)***	(2.94)***	(3.08)***	(0.68)	(1.45)
HISPANIC	225.60	552.90	633.40	847.60	462.60
	(2.88)***	(1.91)*	(1.61)	(0.68)	(1.98)*
ARREST	–23.30	–25.60	–20.80	–74.70	–72.10
	(–2.32)**	(–0.69)	(–0.41)	(–0.46)	(–2.40)**
AVSENT	–0.07	–1.16	–2.19	–9.26	–0.33
	(–0.15)	(–0.70)	(–0.98)	(–1.29)	(–0.25)
Adj. R^2	.90	.52	.53	.30	.77

Notes: n = 51; t scores in parentheses; significance level, two-tail test, designated *** –1 percent, ** –5 percent, and * –10 percent.

perform well here. DROPOUT is statistically significant with the expected positive sign in six regressions across an array of violent and property crimes. In 6 of the 10 regressions, BLACK is significant and positive. The variable proxies for a host of complex social and economic factors favorable to high crime rates. Likewise HISPANIC is significant and positive in 6 of 10 regressions using 1999 data. The arrest rate (ARREST) has the expected negative sign, but is significant in only 3 of the regressions. AVSENT does not perform well. It is significant in only one regression, that for RAPE. It does have the expected negative sign. Expected punishment is not well captured by ARREST and AVSENT which represent state averages across all categories of crime.

Does gun control, as measured by a dated comprehensive index, affect crime rates the following year? In none of the regressions is GCI or SPILLIN significant. Thus, the statistical analysis of the 1999 state data provides no evidence that gun control reduces crime rates. Nor is there any evidence that lax gun laws in neighboring states contribute to higher crime rates. The adjusted R^2s for the regressions are reasonably high for cross-section work employing 51 observations and, with one exception, range from .30 to .93. The exception is the regression for rape. The estimated equation explains little about that crime.

Table 2 presents the 2001 regressions for 10 categories of crime. Three years out, the findings are largely the same. Estimates using the 2001 data, reported in Table 2, are similar to those for 1999. With minor differences, the statistical significance, signs, and magnitudes of the estimated coefficients are the same in the 2001 equations as in the 1999 equations.[5] Again, none of the 10 coefficients for GCI or the 10 coefficients for SPILLIN are statistically significant. The R^2s are similar for the two sets of equations. The equation for state rape rates in 2001 explains little. Thus, the 2001 equations provide no evidence that gun control reduces crime rates three years after the date for which the comprehensive index of gun laws is defined. Furthermore, there is no evidence that lax gun laws in neighboring states influences a state's crime rates.

[5]In comparing the statistical significance of the exogenous variables in the 2001 and 1999 equations, several minor differences exist (see Tables 1 and 2). In the 1999 equations, PD is significant in 4 and for 2001 in 8 equations; for METRO the comparison is 4 (1999) and 5 (2001); for DROPOUT 6 and 7; for BLACK 6 and 5; HISPANIC 6 and 7, and for ARREST 3 and 1.

TABLE 2

Gun Control and Crime Rates by State, 2001

	Dependent Variables				
Explanatory Variables	CR_T	Violent	Property	Murder	Rape
Constant	6743	254.50	6492	6.71	71.76
	(4.50)***	(0.85)	(4.65)***	(1.92)*	(2.98)***
GCI	6.49	–0.007	6.35	–0.013	–0.13
	(0.99)	(–0.006)	(1.04)	(–0.81)	(–1.23)
SPILLIN	–8.22	–4.81	–3.97	–0.05	–0.43
	(–0.38)	(–1.10)	(–0.20)	(–0.94)	(–1.21)
PD	0.42	0.11	0.31	0.004	0.004
	(2.54)**	(3.43)***	(2.03)**	(9.10)***	(1.49)
METRO	16.03	1.55	14.57	0.01	–0.03
	(2.08)**	(1.01)	(2.03)**	(0.71)	(0.21)
PCI	–0.13	–0.001	–0.13	0.001	–0.001
	(–3.15)***	(–0.08)	(–3.36)***	(–1.97)*	(–0.23)
POV	–67.62	2.29	–70.22	–0.11	–1.54
	(–1.31)	(0.22)	(–1.45)	(–0.88)	(–1.85)*
DROPOUT	225.8	16.19	207.9	0.45	2.22
	(3.49)***	(1.25)	(3.44)***	(2.98)***	(2.14)**
BLACK	20.09	8.78	11.00	0.18	0.09
	(1.51)	(3.31)***	(0.89)	(5.62)***	(0.44)

HISPANIC	‘22.27	7.67	19.76	0.07	0.19
	(1.76)*	(2.48)**	(1.37)	(2.04)**	(0.75)
ARREST	–251.90	–43.60	–210.10	–0.41	–1.80
	(–1.59)	(–1.38)	(–1.43)	(–1.11)	(–0.71)
AVSENT	–8.96	–1.47	–7.35	0.001	–0.38
	(–0.99)	(–0.82)	(–0.87)	(0.02)	(2.60)**
Adj. R^2	.63	.76	.54	.93	.14
	Robbery	Assault	Burglary	Larceny	Vehicle
Constant	–5.09	179.20	1255	4840	397.30
	(–0.07)	(0.70)	(3.70)***	(4.50)***	(1.70)*
GCI	–0.15	0.42	1.98	3.25	1.13
	(–0.48)	(0.38)	(1.34)	(0.69)	(1.10
SPILLIN	–1.07	–2.56	0.86	–4.75	–0.09
	(–1.06)	(–0.69)	(0.18)	(–0.30)	(–0.03)
PD	0.05	0.05	–0.02	0.22	0.11
	(6.44)***	(1.79)*	(–0.51)	(1.90)*	(4.10)***
METRO	1.17	0.19	3.08	6.35	5.14
	(3.28)***	(0.14)	(1.77)*	(1.15)	(4.28)***
PCI	–0.001	1.31E-05	–0.03	–0.08	–0.02
	(–0.09)	(0.002)	(–3.61)***	(–2.64)**	(–2.70)**
POV	–1.69	5.89	–5.75	–49.71	–14.76
	(–0.70)	(0.67)	(–0.49)	(–1.34)	(–1.83)*
DROPOUT	4.03	10.61	37.72	120.92	49.24
	(1.34)	(0.96)	(2.57)**	(2.60)**	(4.87)***

(*continued*)

TABLE 2 (*continued*)

Gun Control and Crime Rates by State, 2001

	Dependent Variables				
Explanatory Variables	Robbery	Assault	Burglary	Larceny	Vehicle
BLACK	3.13	5.57	9.47	1.11	0.42
	(5.08)***	(2.46)**	(3.15)***	(0.12)	(0.20)
HISPANIC	2.46	4.87	5.87	9.36	4.51
	(3.43)***	(1.85)*	(1.68)*	(0.84)	(1.87)*
ARREST	−11.30	−30.45	−10.40	−190.40	−9.32
	(−1.54)	(−1.13)	(−0.29)	(−1.68)*	(−0.38)
AVSENT	0.26	−1.35	−1.23	−6.10	−0.02
	(−0.63)	(−0.88)	(−0.60)	(−0.94)	(−0.01)
Adj. R^2	.91	.56	.57	.34	.78

Notes: n = 51; t scores in parentheses; significance level, two-tail test, designated *** −1 percent, ** −5 percent, and * −10 percent.

Model Two: Crime and Gun Control

In the political debate about gun control, high crime rates provide a powerful rationale for passing more restrictive gun laws. Moreover, as between the two major political parties, advocates of gun control have gotten a more sympathetic hearing from Democrats. To test the twin hypotheses that high crime rates contribute to a political climate conducive to the adoption of more stringent gun laws and that the higher the proportion of Democrats in the state delegation the more likely gun control measures will pass, a regression is estimated that seeks to explain the variation across states of the 1998 gun control index (GCI). The exogenous variables are the aggregate crime rate (CR_T), state population (POP), the size of the state in square miles (SIZE), the proportion of the state population living in metropolitan areas (METRO), per capita income (PCI), and the proportion of Democrats in the state legislature (DEMOCRAT). In addition, the 17 southern states are identified with a dummy variable (SOUTH). The expected sign of the estimated coefficient on SOUTH is negative, because the South has a long tradition of hunting and firearm ownership. All the data are for 1995 except that METRO is for 1994, and DEMOCRAT is for 1996. For the purpose of estimating Model Two, observations for the District of Columbia and Nebraska are excluded, the latter because its legislators are elected without party designation. Table 3 contains the estimated coefficients of the Model Two regression.

Empirical Findings

The estimated coefficients on POP and SIZE are significant at the 1 percent level for a two-tail test and that for METRO at the 5 percent level. POP has the expected positive sign and, holding POP constant, SIZE has the expected negative sign. However, METRO has an unexpected negative sign. Urban residents, who are less likely to share the hunting, target shooting, and gun ownership traditions of rural areas, were expected to be more supportive of gun control than rural residents. With population density constant, no such effect is found. The coefficients on CR_T, PCI, and DEMOCRAT have the expected signs and are significant at the 1 percent level. As expected, the degree of gun control is found to be positively related to PCI. This result suggests that more affluent, better educated citizens favor more stringent gun control laws. The analysis also finds that high crime rates generate support for the passage of gun control laws and that the higher the proportion of Democrats in the state legislature the greater the degree of gun control. The dummy variable for the South has the

TABLE 3

Determinants of State Gun Control, 1998

	Explanatory Variables						
Constant	CR	POP	SIZE	METRO	PCI	DEMOCRAT	SOUTH
−111.50	0.005	0.001	−0.07	−0.45	5.14	0.492	−6.24
(−5.57)***	(2.78)***	(2.82)***	(−3.11)***	(−2.56)**	(5.13)***	(3.82)***	(−1.24)
Adj. R^2 = .62							

Notes: n = 49; t scores in parentheses; significance level, two-tail test, designated *** −1 percent, ** −5 percent, and * −10 percent.

expected negative sign, but is not statistically significant. Finally, the adjusted R^2 for the equation is .62.

Conclusion

Using state-level data and that for the District of Columbia, this study estimates both the impact of gun control on crime rates and the influence of crime rates on gun control. The measure of gun control adopted here is a comprehensive index, published by the Open Society Institute, covering 30 different facets of state gun laws, enforcement effort, and the stringency of local gun ordinances. The index weights upstream measures such as gun registration more heavily than downstream measures such as safe storage laws. It also weights regulations governing handguns more heavily than those on long guns.

Using a vector of demographic, economic, and law enforcement control variables, the empirical analysis presented here provides no support for the contention that gun control reduces crime rates. In none of the regressions for the 10 categories of crime rates in 1999 and the 10 for 2001 is the measure of gun control statistically significant. The article tests another hypothesis, namely, that lax gun control laws in neighboring states undermine the effectiveness of state gun laws. It finds no support for this hypothesis. The proxy for neighboring state gun control is never significant in any of the 20 regressions estimated.

By contrast, the article provides empirical support for the idea that high crime rates generate political support for the adoption on more stringent gun controls. Moreover, there is empirical evidence that the probability of adopting more gun regulations is positively related to the proportion of Democrats in the state legislature.

The findings of this study that gun control is ineffective in reducing crime rates are consistent with the vast majority of other studies that use state data. Nevertheless questions remain. As DeZee (1983: 367) observes, "We need to concentrate our efforts on determining why existing laws are not effective." The failure to find a statistically significant negative relationship between gun control and crime rates may be because gun control is ineffective or because, as Kleck (1993: 253) argues, the aggregation problems attendant the use of state data could mask the potential relationship.[6] However, several statistical results from this study argue against the latter interpretation. Many of the control variable coefficients in the 1999 and 2001 crime equations

[6]Kleck (1993), using municipal data, finds no evidence supporting the effectiveness of gun control in reducing crime rates.

are statistically significant and have the expected sign. State data do not hide the expected relationships for these variables. The regressions using cross-section data explain a reasonably high degree of variation in crime rates across states. Moreover, state data do not mask the relationship flowing from high crime rates to the subsequent adoption of gun laws. The fact remains that no careful empirical study, regardless of the type of data used, has found a negative relationship between gun control measures and crime rates.

Assuming that gun control is ineffective, the question remains—why? The answer may be twofold. One, it might be that gun control simply does not influence the behavior of criminals in their efforts to obtain and use firearms. Law abiding citizens can be expected to conform to the law and obtain permits, register guns, and enroll in firearm safety courses. By contrast, there would be no surprise if it were found that criminals regularly violate the law by purchasing guns on illegal black markets or by stealing them.

Two, contemporary gun control measures typically attempt to influence the process of purchasing firearms at the point of sale between licensed dealers and their customers. Federal background checks, and often state background checks, waiting periods, and registration, are part of the process. But guns are long-lived capital assets. The stock of privately owned firearms in the United States is large relative to annual sales (Kleck 1991, chap. 2). Firearms are passed down through generations of family members. They are bought and sold, traded, parted out, and given away among friends, acquaintances, and strangers. It would be difficult, if not impossible, to constrain and regulate the transfer of firearms between non-dealer private parties. Gun control, while politically attractive because it appears to "deal directly with the problem," may in fact be a blunt instrument for reducing crime. Effective gun control may entail significant unintended consequences. Government extensive and intrusive enough to regulate all private transfers of firearms would raise significant civil liberties issues.

Appendix: Data Sources

Gun Control Index—*Gun Control in the United States*, www.soros.org/crime/gunreport, March 2000, 4–5.

State Crime Rates—*FBI Uniform Crime Report 1995* (1999, 2001), Table 5, Index of Crime by State, www.fbi.gov/ucr/01.

State Population—(1995) "No. 18. Resident Population—States: 1980 to 2001," 2002, 22. *Statistical Abstract of the United States, U.S. Census Bureau*, Govt. Printing Office.

Area of State in Square Miles—"No. 359. Land and Water Areas of the States

2000," 2003, 225. Statistical Abstract of the United States, U.S. Census Bureau, Govt. Printing Office.

Population Density—(1999, 2001) "No. 21. State Population," 2000, 24 and "No. 19. State Population," 2002, 23. *Statistical Abstract of the United States, U.S. Census Bureau,* Govt. Printing Office.

Percentage of State Population in Metropolitan Areas—(1994, 1998, 2000) "No. 39. Metropolitan and Nonmetropolitan Area Population by State," 1995, 39; "No. 42. Metropolitan and Nonmetropolitan Area Population by State," 1999, 40 and "No. 30. Metropolitan and Nonmetropolitan Area Population by State," 2001, 30. *Statistical Abstract of the United States, U.S. Census Bureau,* Govt. Printing Office.

Per Capita Income—(1995, 1999, 2001) "No. 699. Personal Income Per Capita in Current and Constant (1992) Dollars by State," 1996, 453. "No. 727. Personal Income Per Capita in Current and Constant (1996) Dollars by State," 2000, 460 and "No. 643. Personal Income Per Capita in Current and Constant (1996) Dollars by State," 2002, 426. Statistical Abstract of the United States., U.S. Census Bureau, Govt. Printing Office.

Percent below Poverty Level—(1999, 2001) "No. 684. Persons below Poverty Level by State," 2001, 444 and "No. 673. Persons below Poverty Level—Number and Rate by State," 2002, 443. Statistical Abstract of the United States, U.S. Census Bureau, Govt. Printing Office.

High School Dropout Rate—*Public High School Dropout Rates and Completers from the Common Core of Data*, 2002, Table 1. National Center for Education Statistics, U.S. Department of Education.

Percent of Population Black—(1999, 2001) "No. 25. Resident Population by Race, Hispanic Origin, and State," 2000, 28 and "No. 22. Resident Population by Race and State," 2002, 27. Statistical Abstract of the United States, U.S. Census Bureau, Govt. Printing Office.

Percent of Population Hispanic—(1999, 2001) "No. 25. Resident Population by Race, Hispanic Origin, and State," 2000, 28 and "No. 23. Resident Population by Hispanic or Latino Origin by State," 2002, 28. Statistical Abstract of the United States, U.S. *Census Bureau,* Govt. Printing Office.

Arrest Rates by State—*FBI Uniform Crime Report 1999* (2001), Table 69, Index of Crime by State, www.fbi.gov/ucr/01.

Average State Prison Sentence Served—"Truth in Sentencing in State Prisons," 1999, 9, Table 8. Bureau of Justice Statistics Special Report.

Percent of Democrats in Upper and Lower Chambers of Legislature—(1996) No. 475. "Composition of State Legislatures by Political Party Affiliation" 1998, 292. *Statistical* Abstract of the United States, U.S. Census Bureau, Govt. Printing Office.

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