Evaluating Gun Policy

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Evaluating Gun Policy

Effects on Crime and Violence

Jens Ludwig
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editors

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Contents

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1 *Pragmatic Gun Policy*

There is no lack of opinions on policies to regulate gun commerce, possession, and use, with most policy proposals engendering intense controversy. For example, should most adults be allowed to carry a concealed gun? Some assert that a gun-carrying public will serve as an extension of the police in deterring crime, while others believe more guns on the street will inevitably lead to more shootings. Another example: Should people who keep guns at home be required to store them safely? Advocates point to the risk that unlocked guns pose to children, while opponents assert that the more important concern is preserving householders' immediate access to a gun in the event of an intruder. More generally, some advocates insist that "an armed society is a polite society," while others insist that widespread private armament only serves to fill the morgues with homicide and suicide victims.

The clash in opinion results in divergent policy approaches across jurisdictions. More than twenty years ago, Washington, D.C., and Chicago responded to the crime problems in their cities by banning handguns. Kennesaw, Georgia, however, enacted an ordinance that *required* every home to contain a gun. And while the New York City Police Department made it a priority during the 1990s to keep guns off the street, a majority of states now let almost any adult obtain a permit to legally carry a concealed handgun in public. Differing beliefs are also reflected in private behavior. About 36 percent of American households own a gun, while the rest tend to be uncomfortable with guns or see little or no reason

to have one. For many of those who do keep a gun, the paramount reason is self-protection—one member of the Second Amendment Sisters argued that without a gun, "You might as well be wearing a T-shirt that says 'I'm unarmed, please don't hurt me.' "[1] But a more common belief, especially among women, is that guns are hazardous.

Differences in opinion flourish partly because of the lack of sound evidence that might help cut through conflicting assertions. Improving the quality of evidence on what works in reducing gun violence requires sound research by scholars who maintain an open mind on the relevant issues.

Our inspiration, then, is the pragmatic belief that there is an important role for dispassionate analysis of the evidence. As philosopher William James argued in 1904, "a pragmatist turns away—from bad *a priori* reasons, from fixed principles . . . [and from] dogma, artificiality, and the pretence of finality in truth"—and turns "towards facts." Pragmatism, James noted, "does not stand for any special results. It is a method only . . . an attitude of orientation."[2] Applied to gun policy this approach is a potential challenge to both pro- and anti-gun-control dogmas, both of which may incorporate flawed assertions about matters that are ultimately factual. Of course we would not go so far as to assert that facts trump values, and in particular the value of freedom from unwarranted government intrusion into private lives. Policymakers, voters, and the courts must in the end decide the appropriate trade-off between safety, on the one hand, and public expenditure and imposition, on the other. But good evidence, rather than preconceived notions, should be the basis for assessing the consequences of available policy options.

The research presented here is of course not the first to examine the consequences of gun possession and policies regarding gun commerce and use. But we believe that these articles deserve consideration as exceptionally thorough, open, careful, and technically sound. The comments of the discussants add further balance and perspective.

The results of this research do not conform neatly to the claims of any one political position. For example, those who oppose gun control often advocate the alternative of tougher law enforcement, an approach that gets mixed support in what follows: policing against illegal gun carrying appears to reduce gun violence, but the threat of longer prison terms for "felons in possession," as in Richmond's Project Exile, does not stand up as well to empirical test. Several of the contributions challenge flawed conclusions that have been offered by other researchers: Expanded gun carrying does *not* save lives. Widespread ownership

1. Phil Garber, "Gun Control Advocates Lock Horns with Handgun Users; Smart Gun Technology Is Latest Issue." *Morris (NJ) News Bee,* March 5, 2002.

2. James (1904).

does *not* deter home-intrusion burglaries. The dramatic policy experiments in Australia and Britain to reduce gun ownership clearly did *not* result in an upsurge of violence but also may not have done much to further widen the homicide gap between these countries and the United States. A chapter on suicide provides support for both those who warn that the positive correlation between gun ownership and suicide may be partly spurious (reflecting the influence of one or more factors that influence both suicide and gun-ownership rates) *and* those who believe that widespread gun ownership does nonetheless increase the suicide rate. Another chapter provides an encouraging positive finding, offering evidence that restricting gun ownership by people with histories of domestic violence, as required by recent federal law (currently under constitutional challenge in the federal courts), may be somewhat effective, despite problems with the relevant criminal-record data. America's problem with gun violence is not hopeless, although progress may require a flexible approach that focuses on proven measures—regardless of their ideological flavor.

Guns and Violence

Compared with other developed nations, the United States is unique in its high rates of both gun ownership and murder.[3] Although widespread gun ownership does not have much effect on the overall crime rate, gun use does make criminal violence more lethal and has a unique capacity to terrorize the public. But that is not the whole story. Guns also provide recreational benefits and sometimes are used virtuously in fending off or forestalling criminal attacks.

Gun Ownership

America has at least 200 million firearms in private circulation, enough for every adult to have one.[4] But only one-quarter of all adults own a gun, the great majority of them men. Most people who have guns own many: three-quarters of all guns are owned by those who own four or more guns, amounting to just 10 percent of adults.

Around 65 million of America's 200 million privately held firearms are handguns, which are more likely than long guns to be kept for defense against crime.[5] In the 1970s one-third of new guns were handguns (pistols or revolvers), a

3. Zimring and Hawkins (1997).
4. Cook and Ludwig (1996).
5. Cook and Ludwig (1996).

figure that grew to nearly half by the early 1990s and then fell back to around 40 percent.[6] Despite the long-term increase in the relative importance of handgun sales, a mere 20 percent of gun-owning individuals have only handguns; 44 percent have both handguns and long guns, reflecting the fact that most people who have acquired guns for self-protection are also hunters and target shooters. Less than half of gun owners say that their primary motivation for having a gun is self-protection against crime.

Given the importance of hunting and sport shooting it is not surprising that gun ownership is concentrated in rural areas and small towns, and among middle-aged, middle-income households.[7] These attributes are associated with relatively low involvement in criminal violence, and it is reasonable to suppose that most guns are in the hands of people who are unlikely to misuse them. Some support for this view comes from the fact that most of the people arrested for gun homicides, unlike most gun owners, have prior criminal records.[8]

Most of the guns in circulation were obtained by their owners directly from a federally licensed firearm dealer (FFL). However, the 30 to 40 percent of all gun transfers that do not involve licensed dealers, the so-called secondary market,[9] account for most guns used in crime.[10] Despite the prominence of gun shows in current policy debates, the best available evidence suggests that such shows account for only a small share of all secondary market sales.[11] Another important source of crime guns is theft—more than 500,000 guns are stolen each year.[12]

Gun Use

Including homicide, suicide, and accident, 28,874 Americans died by gunfire in 1999, a mortality rate of 10.6 deaths per 100,000 people.[13] This figure is down substantially from 1990 (14.9 per 100,000) but is still much higher than

6. ATF (2000a).

7. Cook and Ludwig (1996).

8. Don Kates and Daniel Polsby note that around three-quarters of those arrested for murder in urban counties have prior adult criminal histories; some additional unknown fraction presumably have juvenile criminal records that are sealed in most states; Kates and Polsby (2000). By comparison they note that around 15 percent of the general population has a criminal record of any kind. A national survey of gun owners in 1994 suggests that around a third have ever been arrested for a nontraffic offense, although the proportion of these arrests that result in a criminal record is not known; Cook and Ludwig (1996).

9. Cook, Molliconi, and Cole (1995)

10. See Wright and Rossi (1994); Beck and Gilliard (1993); Sheley and Wright (1995); Cook and Braga (2001).

11. Cook and Ludwig (1996).

12. Cook and Ludwig (1996).

13. NCHS (2001, p. 10).

what was observed in the United States in, say, 1950.[14] Intentional violence is the major exception to the secular decline in deaths from injury during the past fifty years.[15]

Guns are not the only consumer products that are involved in large numbers of deaths; more Americans die in motor vehicle crashes each year than by gunshot injuries. But, as one local district attorney notes, "Gun violence is what makes people afraid to go to the corner store at night."[16] The threat of being shot causes private citizens and public institutions to undertake a variety of costly measures to reduce this risk, and all of us must live with the anxiety caused by the lingering chance that we or a loved one could be shot. All told, gun violence imposes costs on our society on the order of $100 billion a year, most of which is accounted for by criminal assault.[17] While more Americans die each year by gun suicide than homicide, suicide seems more of a private concern than a public risk. The number of fatal gun accidents is an order of magnitude lower than for homicides or suicides.

Even though everyone shares in the costs of gun violence, the shooters and victims are not a representative slice of the population. The gun-homicide-victimization rate in 1996 for Hispanic men, 18 to 29 years old, was seven times the rate for non-Hispanic white men of the same age; the gun homicide rate for black men, 18 to 29 years old, was 133 per 100,000, twenty-five times the rate for white males in that age group.[18] There seems to be considerable overlap between the populations of potential offenders and victims: the large majority of both groups have prior criminal records.[19] The demographics of gun suicide look somewhat different: while suicides and homicides occur disproportionately to those with low incomes or educational attainment, gun suicides are more common among whites than blacks and among the old than among young or middle-aged adults.[20] Men are vastly overrepresented in all categories.

Instrumentality

Since both guns and homicides are unusually common in the United States compared with their prevalence in other developed nations, it is natural to won-

14. Cook and Ludwig (2000).

15. Cook and Ludwig (2000).

16. J. M. Kalil, "A New Approach: Prosecutors Take Aim at Gun Crimes." *Las Vegas Review-Journal,* March 9, 2002, p. 1B.

17. Cook and Ludwig (2000).

18. Cook and Ludwig (2000).

19. See Kennedy, Piehl, and Braga (1996); McGonigal and others (1993); Schwab and others (1999); Kates and Polsby (2000).

20. Cook and Ludwig (2000).

der whether the two are linked. In the 1950s and 1960s criminologists generally ignored the issue of weapon choice as a determinant of homicide, preferring to focus on more "fundamental" issues. One exception was Marvin Wolfgang,[21] although he argued that the gun itself had little effect on the outcome of a violent encounter—a judgment that he later retracted.[22]

In a seminal article, Franklin Zimring provided systematic evidence that the weapon type matters independent of motivation.[23] Zimring drew on crime data from Chicago to show that case-fatality rates in gun attacks are a multiple of those in knife attacks, despite the fact that the circumstances are generally similar. Many criminal assailants were inebriated at the time and thus unlikely to be acting in a calculating fashion, and few attackers administered more than one or two wounds to the victim—even in fatal cases. Similarly, robberies are far more likely to result in the victim's death if a gun is involved, even though gun robbers are less likely to attack their victim than those armed with another weapon.[24] Inflicting a fatal wound with a gun requires less effort, determination, involvement, or strength than with other common weapons.

A gun also provides a quick and reliable exit for suicidal people. But in suicide, unlike assault, there are other highly lethal means available to anyone who takes the time to plan, including hanging and jumping from a high building or bridge. Nonetheless there is some evidence that gun access does affect suicide rates.[25]

Self-Defense and Deterrence

The same features of guns that make them valuable to criminals may also make guns useful in self-defense. Just how often guns are used in defense against criminal attack has been hotly debated and remains unclear. Estimates from the National Crime Victimization Survey, a large government-sponsored in-person survey that is generally considered the most reliable source of information on predatory crime, suggests that guns are used in defense against criminal predation around 100,000 times a year.[26] In contrast are the results of several smaller one-time telephone surveys, which provide a basis for asserting that there are millions of defensive gun uses per year.[27]

21. Wolfgang (1958).
22. Wolfgang (1995).
23. Zimring (1968).
24. See Cook (1976, 1980, 1987).
25. Miller and Hemenway (1999); Brent (2001); Miller and Hemenway (2001).
26. Cook, Ludwig, and Hemenway (1997).
27. Kleck and Gertz (1995).

Whatever the actual number of defensive gun uses, the mere threat of encountering an armed victim may exert a deterrent effect on the behavior of criminals. A growing body of research within criminology and economics supports the notion that some criminals are sensitive to the threat of punishment.[28] It is therefore not surprising that the threat of armed victim response may also figure in a criminal's decision: around 40 percent of prisoners in one survey indicated that they had decided against committing a crime at least once because they feared that the potential victim was carrying a gun.[29]

Given that guns may be used for both good and ill, the goal of gun policy in the United States has been to reduce the flow of guns to the highest-risk groups while preserving access for most people. Whether the current system achieves the proper balance between preserving access and preventing misuse remains the subject of considerable debate.

Policy Response

Federal law affords most people access to most types of guns; the law is permissive but with delineated exceptions, specifying certain categories of people that are prohibited from possession, and certain categories of guns that are banned or tightly regulated. Federal law also establishes a licensing system for gun dealers and regulates transactions and record keeping by these dealers. States and localities may supplement federal regulations on firearms commerce and use. In some cases state laws supplement the federal restrictions regarding "who" and "what" is prohibited or impose additional requirements on transactions. Almost all states regulate gun carrying more closely than guns in the home and also specify penalties for misuse. Federal regulations on gun commerce are intended to help insulate states with more stringent regulations from those with lax regulation.

Gun Design

Efforts to regulate gun design began in earnest with the National Firearms Act of 1934 (NFA), which required the registration of machine guns and sawed-off shotguns and imposed a confiscatory tax on transactions involving these weapons. The goal of the NFA was to strictly regulate a class of weapons that is of particular value to criminals but has little value for hunting or other sporting uses. Ex-

28. See Nagin (1998); Levitt (2001).
29. Wright and Rossi (1994).

isting regulations of gun design are also targeted at the other end of the weapons market: the Gun Control Act of 1968 banned the importation of cheap, easily concealed handguns ("Saturday night specials"), and some states have banned such handguns altogether.[30] A federal ban on sale of new military-style "assault" weapons and large-capacity magazines was enacted in 1994.[31]

Recent design proposals have focused on reducing gun accidents by adding new safety features to handguns, including mechanisms to indicate whether the weapon is loaded.[32] Because firearms are exempt from regulation by the Consumer Product Safety Commission (CPSC), new legislation would be required for the federal government to mandate design changes, although Massachusetts is now regulating the design of guns sold in that state on the same basis as other consumer products. The potential effect of such regulation on the overall number of gunshot injuries is likely to be relatively small since most gun injuries are inflicted intentionally. But for other products it is common for the CPSC to negotiate or impose costly design requirements on products that are associated with only a few dozen injuries per year.[33]

More sweeping proposals to change the design of firearms call for "personalized guns," which prevent the weapon from being fired by someone other than the owner by means of a lock that is controlled by a standard key, a magnetic ring worn by the shooter, or more advanced biometric methods. Each of these personalization schemes would help prevent accidental discharges or suicides by unauthorized users and could make the guns inoperable if they were stolen. Technologies such as fingerprint recognition that required specialized equipment to transfer the weapon from one person to another would have the additional effect of facilitating regulation of voluntary exchanges in the secondary market.[34]

Interestingly, personalized guns have come under attack from both the left and the right. The National Rifle Association (NRA) opposes any requirement that new guns be personalized, arguing that any such device would be unreliable, that owners might be induced by a false sense of confidence to store the gun unsafely, and that the requirement would make guns more expensive.[35] Some pro-control groups oppose personalized guns in part because the technology does nothing about existing guns and may increase the number of guns in circula-

30. Webster, Vernick, and Hepburn (2002).
31. Koper and Roth (2001).
32. See Vernick and Teret (2000); Vernick and others (1999).
33. Tengs and Wallace (2000).
34. Cook and Leitzel (2002).
35. NRA (2002); see also Leonardatos, Blackman, and Kopel (2001).

tion.[36] In any event, the federal government is continuing to invest in developing new safety devices of this sort.

Gun Transactions

In most parts of the United States almost anyone can legally buy a handgun or long gun, except for those prohibited from acquiring firearms by the Gun Control Act (GCA) of 1968: minors; adults under indictment or having any prior felony conviction or (due to a 1996 amendment) misdemeanor conviction for domestic violence; illegal aliens; those confined by court order because of mental illness; and a few other categories. These basic restrictions enjoy almost unanimous support in debates about gun policy. More controversial is what government should do to keep guns away from people in these high-risk categories.

The GCA stipulates that licensed dealers must require buyers to show identification and complete a form attesting that they are eligible to obtain a firearm. A number of states stipulated additional requirements for a legal sale of a handgun, including a requirement of a criminal-record check on potential buyers. In 1994 background checks in handgun sales by dealers became mandatory in all states as a result of the federal Brady Handgun Violence Prevention Act, a requirement that was extended to long gun sales in 1998.

The requirements for gun sales by people who are not licensed dealers—defined by the 1968 GCA as anyone who is not "engaged in the business of selling firearms at wholesale or retail . . . engaged in the business of repairing firearms or of making or fitting special barrels, stocks, or trigger mechanisms to firearms," or a pawnbroker—are more lax: nondealers are prohibited from *knowingly* selling a gun to someone banned from possession but are not required to determine the buyer's eligibility or follow other paperwork reporting requirements. The exemption of sales by nondealers from most existing federal regulations is, of course, a huge loophole in the federal regulatory system.

States or localities may go beyond the federal regulations on gun transactions. Washington, D.C., Chicago, and a handful of other cities have banned handguns, while Massachusetts, New York City, and some other jurisdictions have highly restrictive regulations that stop short of a ban. Other states have imposed licensing and registration systems to help law enforcement solve crimes and help regulate secondary market transfers. For example, in Illinois all gun owners are required to obtain a Firearm Owners Identification (FOID) card. Gun owners are required to report thefts to the police and are only allowed to resell their guns to those with a FOID. An owner whose weapon turns up at a crime scene

36. Violence Policy Center (2002).

is at risk for being visited by the police and held legally liable if the gun was transferred inappropriately to an ineligible buyer. The Illinois system thus provides gun owners with an incentive to verify a buyer's eligibility status and to resist requests to serve as a straw purchaser for friends and family who are ineligible.

Most states, however, have chosen not to expand federal regulations on gun transactions or possession and have pre-empted localities from doing so. States with lax controls serve as an attractive source for gun traffickers who seek to supply the black markets in tight-control states. The 1968 GCA was intended to insulate states from one another by prohibiting interstate transfers of handguns or long guns except to licensed gun dealers. Before 1994, however, trafficking of this sort had been an important source of guns to criminals in tight-control states; the Brady requirements appear to have reduced this type of interstate "arbitrage."[37]

Gun Carrying

While keeping a gun in the home is in most states regarded as a private matter, taking guns out into public spaces is viewed as a public concern. As a result government regulations of gun carrying have traditionally been more restrictive than those regarding gun acquisitions: all but one state (Vermont) require people to obtain a special permit to legally carry a concealed gun, or the state bans the practice entirely.

In recent years a growing number of states have liberalized the requirements to obtain a concealed gun-carrying permit. These new laws limit or even eliminate the discretion about whether to issue permits invested in local law enforcement authorities, who in many areas were often reluctant to grant such permits. As Jon S. Vernick and Lisa Hepburn note in chapter 9, more than thirty states currently have permissive concealed-carry laws on the books. A number of other states are currently considering following suit.

Justification for any of the regulations regarding gun design, acquisition, and carrying rests in part on beliefs about their consequences. One fundamental assumption crucial to a variety of regulations concerns whether reducing the number of guns in private hands would lead to more or less violence and crime.

The Prevalence of Gun Ownership

If guns are more lethal than other means of violence, then keeping guns away from those at high risk of criminal activity may save lives. The number of guns

37. See Cook and Braga (2001); Webster, Vernick and Hepburn (2001).

in circulation is then of direct policy interest, since more guns in private hands may increase availability to violent criminals through theft or voluntary transfers in secondary markets. Of course an increase in the prevalence of guns could also serve as a deterrent to robbery, assault, and burglary. On balance, the available empirical evidence supports the conclusion that the net effect of guns on the volume of crime is strongly positive, in the case of homicide, and more-or-less neutral with respect to other common crimes. There is also some evidence that gun availability is associated with increased suicide rates.

Gun Availability and Violent Crime

Perhaps the question of primary interest to individual citizens is whether guns make the owners and members of their household more or less safe. One type of evidence in support of the claim that guns increase the risk of homicide victimization comes from comparing gun ownership rates of homicide victims with those of neighbors who share similar sociodemographic characteristics.[38] While this case-control evidence is suggestive, it is not entirely persuasive. One problem in interpreting it is the possibility that the decision to keep a gun is confounded in some way with the risk of criminal victimization. Statistical controls for such observable qualities as age, sex, alcohol and drug use, and prior criminal record help alleviate this concern but do not resolve it entirely.

A deeper concern with case-control studies is that they ignore the possibility that individual gun ownership affects other people in the community. These external effects could be salutary if widespread gun ownership deters criminals, or negative if widespread ownership facilitates diversion to criminal use through theft and secondary sales. Hence it is important to assess the effects of overall rates of gun ownership within a community.

One way to learn about the effects of community gun prevalence on crime is to compare crime rates at a point in time across jurisdictions that have different rates of gun ownership. However, there are no administrative data on gun-ownership rates, so small-area estimates must be based on some proxy. The best generally available proxy for gun prevalence is the fraction of suicides involving a firearm, which is highly correlated with survey-based measures of gun ownership rates in cross-section data (at both the state and county level) and also tracks movements over time at the regional level.[39] That proxy reveals

38. Kellermann and others (1993).
39. Azrael, Cook, and Miller (2001).

a strong positive relationship across counties between gun prevalence and the homicide rate.[40]

The fundamental problem with cross-sectional studies is that gun-rich jurisdictions like Mississippi are systematically different in various ways from jurisdictions with relatively few guns, such as Massachusetts. The usual approach for addressing this "apples and oranges" problem has been to statistically control for the handful of local characteristics that are readily available in standard data sources, such as population density, poverty, and the age and racial composition of the population. But these variables never explain very much of the cross-sectional variation in crime rates, suggesting that the list of control variables is inadequate to the task.[41] Also unclear is whether widespread gun ownership is the cause or effect of an area's crime problem, since high crime rates may induce residents to buy guns for self-protection. These same concerns are arguably even more severe with cross-sectional comparisons across countries.

Some of the problems with cross-section studies can be overcome by using panel data—repeated cross-sections of city, county, or state data measured at multiple points in time—to compare *changes* in gun ownership with *changes* in crime. Compared with Massachusetts, the state of Mississippi may have much higher homicide rates year after year for reasons that cannot be fully explained by standard sociodemographic or other variables. But by comparing changes across areas we implicitly control for any unmeasured differences across areas that are relatively fixed over time, such as a "Southern culture of violence."[42] The reverse causation problem, in which crime may be both cause and effect of gun ownership, can be at least partially addressed within this "fixed effects" frame-

40. Cook and Ludwig (2002); Miller, Azrael and Hemenway (2002d). Kleck and Patterson (1993) use a similar proxy with city-level data and find no statistically significant cross-section relationship between gun ownership rates and homicide or other crime rates. However, rather than relying on a simple cross-section regression-adjusted comparison of crime rates across areas with different rates of gun ownership, they attempt to isolate variation in gun ownership rates that will be arguably unrelated to the unmeasured determinants of local crime rates. Their choice of "instrumental variable" to explain variation in gun prevalence—per capita rates of hunting licenses and subscriptions to gun magazines—are, as we argue in chapter 3 in the present volume, likely to be biased in the direction of overstating the net deterrent effect of guns on crime. It should also be noted that Lott (2000) reports that homicide rates are inversely related to gun prevalence across states; however, his measure of gun ownership seems problematic. He makes use of voter-exit surveys for 1988 and 1996, which among other problems suggest that gun ownership greatly increased during this period—in fact, there was little change in ownership rates. Kleck (1997, pp. 98–99).

41. Glaeser, Sacerdote, and Scheinkman (1996).

42. See Butterfield (1996); Loftin and others (1991).

work by relating changes in gun ownership *this* year with changes in crime rates *next* year.

The best available evidence on the relationship between gun prevalence and crime comes from a recent paper by Mark Duggan, which reports that more guns lead to more homicides.[43] Duggan's measure of local gun ownership rates—gun magazine subscriptions per capita—is highly correlated with survey-based estimates of gun ownership.[44] He finds that a 10 percent increase in gun prevalence in one year increases a county or state's homicide rate the next year by around 2 percent but has little effect on other types of crime. This result accords with the belief that while guns do not contribute much to the overall volume of crime, they do make it more lethal.[45]

Gun Availability and Suicide

Do guns also increase the lethality or frequency of suicide attempts? There is surprisingly little reliable evidence on this point. Case-control studies have typically either compared gun ownership rates of suicide victims with other people in the community or compared suicide rates between those who do and do not own guns.[46] These comparisons, however, suffer the same general problem found with similar studies of homicide: people who choose to obtain guns are likely to be systematically different from those who do not and in fact may purchase guns with suicide in mind. Similarly, simple cross-sectional comparisons of suicide rates in high- versus low-gun ownership areas at a point in time are likely to confound the effects of gun prevalence with those of hard-to-measure attributes of the local population that are related to the propensity to both acquire guns and contemplate suicide.[47]

Mark Duggan's analysis in chapter 2 presents important new evidence on the relationship between guns and suicide. He argues that if access to guns causes some people to attempt suicide who otherwise would have used other means, or perhaps would not have attempted suicide at all, one would expect local gun prevalence to be positively related with gun suicide rates and have a negative (or at least null) relationship with nongun suicides. However, Duggan finds that, at least for young and middle-aged people, gun prevalence is positively related

43. Duggan (2001).

44. Azrael, Cook, and Miller (2001).

45. Zimring and Hawkins (1997).

46. Wintemute and others (1999); Cummings and others (1997); Kellermann and others (1992); Brent and others (1991).

47. For a review of this literature, see Miller and Hemenway (1999).

to both gun *and* nongun suicides.[48] Because there is no obvious reason why gun availability should increase nongun suicides (other than perhaps the possibility of suicide clusters), these findings suggest that the propensity to attempt suicide might be higher in gun-rich areas for reasons unrelated to gun availability. Put differently, at least part of the relationship between guns and suicide that has been identified in earlier research may occur because of something other than the causal effect of guns.[49]

Although previous studies may overstate the relationship between guns and suicide, Duggan's analysis still finds that guns may exert some causal effect on the lethality of suicide attempts. His strategy for identifying the causal effect of guns on suicide rests on the fact that men are far more likely than women to own guns and to use a gun in a suicide attempt.[50] If guns increase the lethality of suicide attempts, then states with a relatively high gun-ownership rate should also have a higher ratio of male to female suicides compared with states with fewer guns. Duggan finds that increased gun prevalence increases the ratio of male to female suicides, confirmatory evidence that gun availability has a direct effect on the suicide rate.

Policy Experiments

An alternative approach for learning about the effects of gun availability on public health and safety is to examine the effects of policy changes that influence overall gun ownership rates. The effects of these policy experiments are, of course, of direct interest in their own right as well.

One widely cited policy change is Washington, D.C.'s 1976 ban on handgun acquisitions. By the late 1980s the notion that Washington's handgun ban had achieved anything useful seemed hard to believe, given common references to the

48. This result is contradicted by other recent studies. Using the fraction of suicides that involve a firearm as their proxy for gun prevalence, Miller, Azrael, and Hemenway (2002a, b, c, d) find that gun prevalence is negatively associated with nongun suicide across states. It is not obvious which proxy provides more reliable results in this context. As Duggan notes in chapter 2, the fact that the nongun suicide rate is a component of the denominator (overall suicide) may impart a negative bias to the estimated coefficient. But Duggan's estimated coefficient on his proxy measure will also be biased owing to measurement error. Without further study the direction of that bias remains unknown (since the measurement error is likely to be correlated with state characteristics) but may be substantial. In any event, there is a positive estimated effect of gun prevalence on overall suicide using either of the two proxies.

49. Other recent ecological studies account for such factors as divorce, education, unemployment, urbanicity, alcohol consumption, and even lifetime major depression and serious suicidal thoughts, and still find a strong association between gun prevalence and completed suicide. Birckmayer and Hemenway (2001); Hemenway and Miller (2002); Miller, Azrael, and Hemenway (2002a, b, c, d). Of course even these detailed measures may not fully account for difficult-to-measure individual attributes that vary across areas and affect both the propensity to attempt suicide and gun ownership.

50. Cook and Ludwig (1996, 2000); Kleck (1997).

city as the "homicide capital of the world." Nevertheless the available data do suggest that homicides and suicides declined by around 25 percent around the time of the District's handgun ban, led by reductions in homicides and suicides with guns.[51]

Still controversial is the question of how much of this decline can be attributed to the handgun ban rather than other factors. In an influential article published in the *New England Journal of Medicine,* criminologist Colin Loftin and his colleagues showed that homicides and suicides declined in Washington and by more than in the city's Maryland and Virginia suburbs.[52] A challenge to the use of affluent suburbs as a control group for the city led to additional research using Baltimore data.[53] Like D.C., Baltimore also experienced a decline in firearm homicides around 1976. But unlike Washington, Baltimore experienced a reduction in nongun as well as gun homicides, suggesting some general change in Baltimore around this time that was not specific to guns. Further, Baltimore did not experience a decline in gun suicides.[54] Conclusions about the effects of big-city handgun bans would be stronger if the evidence for Washington were replicated for Chicago, which implemented a similar law in 1982. However to date there has not yet been a systematic study of Chicago's experience.

Gun "buy-back" programs may seem to offer another opportunity to learn more about the effects of gun prevalence on crime. In practice American buyback programs have had little effect on prevalence because they are brief and voluntary and leave open the possibility of owners buying new guns to replace those they turn in. Further, the sellers in these buyback programs have been shown to be people at low risk for criminal offending, and the guns that are turned in are often broken or quite different from those that are used in crime.[55]

An interesting example of a large-scale combined gun ban and buy-back program comes from Australia, which in 1996–97 banned self-loading rifles and shotguns, and during a postban grace period offered to buy them back from the citizenry at "fair value." The consequences of this intervention are examined in chapter 4 by Peter Reuter and Jenny Mouzos. The context in which this ban was imposed differs in important ways from the United States. Handguns were already strictly regulated, and rates of gun ownership and use in crime were much lower than here. In particular, while guns are used in two-thirds of all homicides

51. Loftin and others (1991).
52. Loftin and others (1991).
53. Britt, Kleck, and Burdua (1996).
54. McDowall, Loftin, and Wiersema (1996).
55. Callahan and others (1994); Rosenfeld (1996); Romero and others (1998). Gun buy-back programs also face conceptual challenges. For example, if the trade-in price is set too low, no one will participate. But a sufficiently high price can increase overall gun ownership by reducing the cost to owners of upgrading to newer weapons. Mullin (2001).

in the United States, less than a quarter of Australian homicides are committed with a firearm.

Reuter and Mouzos report that Australia's policy resulted in the destruction of a large percentage of prohibited long guns, reducing the nation's overall stock of guns by as much as 20 percent. The average homicide rate has been lower in the years following the initiation of the ban (1997–2001) than during the five years before, and the proportion of homicides with guns has continued a secular decline since the ban. Given the very small numbers involved (about fifty gun homicides a year) it is difficult to reach any firm conclusions about the effects of the ban. The trends are compatible with a conclusion that the ban and buyback saved lives, but that conclusion cannot be offered with great confidence. But there is absolutely no evidence that the Australian policy innovations had a perverse effect, as has sometimes been claimed.[56]

Even when clear-cut conclusions emerge from the evaluation of a particular policy innovation, generalizing to other jurisdictions or circumstances must be done with care. The problems of extrapolating from the Australian experience with a ban and buyback to the United States are perhaps obvious. Extrapolating from the experience with a handgun ban in Washington may be somewhat easier, especially if it were to another large city bordering on a state with lax controls on gun transactions. But the Washington experience provides little guide to predicting the consequences of a *nationwide* ban on handguns, given notable differences in scale, initial prevalence, and enforcement problems. Still, a close look at dramatic policy changes provides potentially generalizable evidence on basic causal processes, such as the effect on crime and violence of a reduction in gun availability, however that is achieved.

Gun Availability and Residential Burglary

Survey evidence indicates that residences are more likely to be occupied during a burglary attempt in Britain, where relatively few homes have guns, than in the United States. Based on that observation and others, commentators have asserted that one of the benefits of widespread gun ownership is to deter burglars from breaking into occupied dwellings.[57] But no systematic analysis of this claim has ever been performed.

In chapter 3 we move beyond crude international comparisons and examine how burglary patterns within the United States relate to the prevalence of gun ownership. We use both National Crime Victimization Survey data on residen-

56. John R. Lott, "Gun Control Misfires in Europe." *Wall Street Journal,* April 30, 2002, p. A16.
57. Kleck (1997); Kopel (2001).

tial burglary and the FBI's *Uniform Crime Reports* panel data on burglaries reported to the police. Using a variety of statistical methods to deal with the problems of confounding variables and reverse causation, we conclude that an increase in gun prevalence has no effect on the likelihood that a residential burglary involves an occupied dwelling (a "hot" burglary), while it appears to have, if anything, a positive effect on the overall rate of residential burglary. Our tentative explanation for that surprising conclusion is that guns are valuable loot and that gun-rich communities are especially profitable to burglars.

In his comment, discussant David Kopel raises the reasonable concern that limitations of the available data prevent us from including the smallest counties in our analysis. But accounting for rural counties does not affect our central conclusion, since we obtain similar findings from our analysis of state-level data. Both Kopel and discussant Bruce Sacerdote echo our own concern that variation across states in "rurality"—what we use to isolate variation across counties and states in gun prevalence that is not contaminated by the reverse-causation problem—is likely to impart some bias to our estimates. But, as we note in the Appendix to chapter 3, this bias is likely to *overstate* any deterrent effects of guns on burglary. So we are reasonably confident that more guns do not lead to fewer burglaries, hot or otherwise.

More Guns, More Crime

As a whole, this research suggests that within the generally gun-rich context of the United States, higher gun prevalence is associated with more homicides and suicides, and possibly even more residential burglaries, while having little effect on other types of crime. Of course in the social sciences anything short of a true randomized experiment must inevitably leave some room for doubt about the causal interpretation of such findings, since whatever causes people and jurisdictions to have different rates of gun ownership may also affect their experiences with crime and violence. Policy changes, such as the ban on handguns in Washington, D.C., and on semiautomatic rifles in Australia, provide something closer to experimental evidence, though problems remain of finding a suitable control group and of generalizing to other times and places.

Gun Acquisitions

In practice most firearm regulation in the United States is not intended to have much effect on the overall prevalence of guns but rather to reduce criminal and reckless use of guns by banning possession by certain groups, such as youths and

felons. Fortunately an effective program to deny guns to those likely to misuse them does not require a house-to-house search; it would be enough to regulate transactions effectively. The reason is that criminal misuse usually follows rather quickly after gun acquisition. In other words, the millions of current gun possessors will account for little of the violent crime five years from now. A reasonable goal, then, is to increase the effective price of guns to the high-risk segment of the market.[58]

A critical review of this literature suggests mixed results on the effectiveness of targeted regulations of gun acquisition. The most important federal firearm law since 1968, the Brady Act, has not had a discernible effect on gun homicide, perhaps because it has been undercut by the largely unregulated secondary market. However, as Elizabeth Richardson Vigdor and James Mercy show in chapter 5, regulations to ban possession by domestic batterers seem to have been somewhat effective.

Gun Markets

To some people the notion of trying to keep guns away from a small subset of the population with 200 million guns already in circulation seems hopeless. But targeted regulation in an environment of widespread availability is not always futile, as suggested by the analogy to minimum drinking age laws. Many readers, particularly parents and those who were once teenagers themselves, may be surprised that minimum drinking age laws have any effect given the widespread use of alcohol among American adolescents. Yet there is consensus among scholars that these laws, while routinely violated by a majority of older teens, are nonetheless effective; the quasi-experimental evidence of numerous changes in state minimum-age laws during the 1970s and 1980s provide evidence that this partial prohibition lowers alcohol abuse, traffic accidents, and crime.[59]

Whether restrictions on gun acquisitions are or could be similarly effective is not clear, although the prospect is somewhat less daunting when we recognize that the stock of guns in America probably matters less than the flow. Most of our country's guns are in the hands of relatively low-risk people and are likely to remain there (theft notwithstanding) for many years. Most gun crimes are committed by a small group of criminally active people whose criminal "careers" are

58. In response to the question "Is there any gun control NRA supports?," the National Rifle Association's Institute for Legislative Action answers on its web page: "Yes. NRA supports 'gun control' that is designed to prohibit felons from buying and possessing firearms as long as those laws do not also infringe on the rights of law-abiding citizens." NRA (2002). The term "effective price" was coined by Mark Moore in 1973.

59. Cook and Moore (2001).

typically fairly short. Regulation might be effective if it makes it harder for each new cohort of criminally active young people to acquire guns, particularly the new guns that they seem to favor.[60]

Since the secondary market is the proximate source for the vast majority of crime guns, one obvious intervention point is the movement of guns from the primary to secondary markets. High-volume traffickers play some role in moving guns across markets, as demonstrated by Bureau of Alcohol, Tobacco, and Firearms (ATF) investigation files and crime-gun trace data.[61] Other "traffickers" may simply be girlfriends or relatives who engage in one or two straw purchases to provide guns to someone with a disqualifying criminal record.

Some licensed gun dealers are willing accomplices to gun trafficking or straw purchases, or are selling to criminals off the books.[62] One ATF investigation of the relatively small subset of dealers who account for the original retail sale of most crime guns submitted for tracing found that 75 percent were in violation of at least one federal regulation. Although most of these were for minor violations, 20 percent of dealers in this sample were recommended for license revocation.[63]

Regardless of the actual frequency of dealer malfeasance, the ability of ATF to monitor dealers under the current regulatory system is limited. As a practical matter there are so many retail licensees—currently about 80,000—that ATF can only inspect a few percent of them in any one year.[64] Even when ATF investigators determine that a dealer is in serious violation of the law it can be very difficult to take effective action, thanks in part to federal legislation (the McClure-Volkmer Act, or Firearm Owners Protection Act of 1986), which limits regulatory actions and establishes a near-impossible evidentiary requirement for successful prosecution.[65]

If regulation could reduce the flow of guns from primary to secondary market, standard economic analysis suggests that the resulting decline in supply would increase the price of guns in secondary markets. Diverting high-risk buyers from the primary to the secondary market (by, for example, improving background checks) would further increase prices in the secondary market by increasing demand.[66] Whether these price increases translate into decreased gun misuse depends on how sensitive teens and criminally inclined adults are to the price of guns.

60. Cook and Braga (2001).
61. Cook and Braga (2001).
62. Wachtel (1998).
63. ATF (2000b).
64. ATF (2000a).
65. Cook and Ludwig (2002); Butterfield (2001).
66. Cook and Leitzel (1996).

Surprisingly little is known about the sensitivity of high-risk groups to gun prices, although scattered survey evidence suggests that criminals are not entirely immune to the financial and other costs of getting guns. In one survey of incarcerated adults, 21 percent of those who chose not to use a gun to commit their crimes said that the trouble of getting a gun played a "very" or "somewhat" important role in their decision; 17 percent cited the financial cost.[67] In a survey of incarcerated teens in North Carolina, one said that "When [people] are short of money, they have no choice but to sell [their guns]," while another remarked that he had "traded a .22 for a Super Nintendo and some other guns for a VCR and for my waterbed. I got other stuff for my room, like a phone with lights and a copy [fax] machine for a twenty-gauge."[68] With higher prices we would expect cash-strapped youths to be less inclined to buy a gun and more inclined to sell whatever guns come their way. Further, higher prices would provide an incentive for those who do have a gun to exercise greater caution against theft and confiscation by law enforcement, by, for example, leaving it at home.

The goal of gun control is thus to increase the effective price of guns to that segment of the market that is at highest risk for misuse, while doing little to the price facing most other people. Unless eligible buyers are substantially more price sensitive than are teens and convicted felons, the result should be a decline in gun ownership among prohibited buyers with little effect on overall gun prevalence. What the system achieves in practice is of course an empirical matter.

The Brady Act

One sign of the 1968 GCA's effectiveness comes from the fact that surveys of prisoners from the 1980s show that only around one-fifth obtained their guns directly from a licensed gun dealer, even though dealers in most states were not required to conduct background checks to verify the buyer's eligibility.[69] The GCA's restrictions were strengthened in 1993 with the Brady Handgun Violence Prevention Act, which required gun dealers in states without background-check requirements to begin to conduct such checks on prospective buyers. Hundreds of thousands of potential buyers have been denied handguns as a result of Brady-mandated background checks, leading many to conclude that the Brady Act has had a substantial effect on crime and suicide.[70]

More direct evidence on the Brady Act's effects on public safety comes from comparing mortality trends in the thirty-two states that were required to abide

67. Wright and Rossi (1994, pp. 128–29).
68. Cook, Molliconi, and Cole (1995).
69. Wright and Rossi (1994).
70. Manson and Gilliard (1997).

by Brady's background check and waiting period requirements with the eighteen states (plus the District of Columbia) that already had sufficiently stringent policies in place, and as a result were exempt from the Brady provisions. Our own analysis published in the *Journal of the American Medical Association* reveals no detectable difference in homicide trends between the "Brady" (treatment) and "non-Brady" (control) states among people 25 and older.[71] Our focus on *adult* mortality rates is motivated by the different trajectories that juvenile homicides follow in treatment and control states even before the Brady law went into effect. As a result, any differences in juvenile homicide trends following implementation of the Brady Act cannot be confidently attributed to the effects of the law itself. Excluding juvenile victims is not particularly problematic, since most of them were shot by those who would have been too young to be directly affected by the Brady background check requirement.[72]

Our methodological point is that in evaluating discrete policy interventions, one check on the validity of the "control" group is whether it follows a trajectory similar to the "treatment" group *before* the intervention. If not, then the resulting estimates of the treatment effect may well be biased.[73] This type of objective test provides the basis for a rejoinder to the common complaint that statistics can be used to "say anything" and argue either side of an issue.

The *Brady* case provides an illustration. Although our analysis finds no statistically significant effect of the Brady Act on homicides or other violent crime, John Lott asserts that *Brady* increased the number of rapes and perhaps assaults as well.[74] The contradiction results from the fact that Lott's evidence comes from comparing crime rates in treatment and control states following Brady's implementation for people of *all* ages, including juvenile as well as adult perpetrators. Since juvenile crime trends in the Brady treatment and control states diverge even before Brady goes into effect, Lott's analysis is likely to confound the effects of the Brady Act with those of whatever unmeasured factors cause juvenile trends to differ across the two groups of states during the pre-Brady period.

A distinct concern in evaluating the effects of the Brady Act is that the new law may have reduced gun running from the treatment to control states, in which case comparing the two groups of states might understate the overall effects of the law. In a nutshell, the concern is that the "control" states were in fact affected by the intervention. Some support for this concern comes from ATF trace data in Chicago showing that the fraction of crime guns in the city that could be traced

71. Ludwig and Cook (2000).

72. Cook and Laub (1998).

73. See Bassi (1984); Heckman and Hotz (1989); Black and Nagin (1998); Ludwig (2000); Smith and Todd (forthcoming).

74. Lott (2000, pp. 90, 200).

to the *Brady* treatment states declined dramatically following implementation of the Brady law.[75] However, the proportion of homicides in Chicago committed with guns did not change over this period, despite the substantial changes in gun-trafficking patterns. One explanation is that traffickers can adapt easily to changes in the larger environment. If correct, that suggests that any bias introduced into comparisons of *Brady* treatment and control states owing to changes in across-state gun running is minor.

Of course the Brady Act may affect outcomes other than crime. Comparing trends in treatment and control states suggests that Brady may have reduced gun suicide rates among those 55 and older, who commit suicide at higher rates than younger people, and that the waiting period requirement of the law may have been responsible. However these gains were at least partially offset by an increase in nongun suicides, so whether the waiting periods reduced overall suicides among this age group is unclear.[76]

Gun Possession by Violent Misdemeanants

State or federal initiatives occasionally move the boundary between who is and is not eligible to purchase a firearm. Two recent federal examples include the 1994 ban on gun possession essentially by people under a restraining order for domestic violence, and the 1996 Lautenberg Amendment that extended that ban to anyone convicted of a domestic-violence misdemeanor.[77] Although neither act has been evaluated directly, encouraging evidence for the effects of these laws comes from study of similar state-level laws.

California's experience has been of particular interest because it is a large state and an early mover in this area. The state's 1991 law prohibits handgun purchases by people convicted of any violent misdemeanor, not just those for domestic violence, and has been subject to evaluation by Garen Wintemute and his colleagues.[78] Their analysis compares the likelihood of arrest during the three years following a handgun purchase attempt for two groups of people with misdemeanor convictions: The treatment group—those who attempted to purchase their guns in 1991 and were denied because of the new law; and the control group—those who succeeded in purchasing a handgun in 1989 and 1990, be-

75. Cook and Braga (2001).

76. Ludwig and Cook (2000).

77. We say "essentially" because, as Elizabeth Richardson Vigdor and James Mercy note in their chapter, only restraining orders issued as a result of a hearing in which the individual had a chance to participate invoke the gun prohibition.

78. Wintemute and others (2001).

fore the law was in effect. California data on criminal histories demonstrate that those in the control group were one-third more likely to have been arrested during the three years following their purchase attempt than was the treatment group that was denied guns.

Although of considerable interest, the proper interpretation of Wintemute's findings remains unclear for two reasons. First, the number of people with disqualifying records who attempted to purchase guns in 1991 (1,099) is greater than the combined numbers for 1989 and 1990 together (877). This surprising surge in the number of violent misdemeanants who tried to purchase handguns after the ban went into effect (perhaps resulting from misinformation about the date the ban was to be imposed) raises the possibility that the 1991 applicants were not really comparable in criminal propensity to the earlier applicants. In fact the criminal records of the treatment and control groups were somewhat different even before the purchase attempts. Although Wintemute's analysis controls for measured differences in demographics and prior criminal records, we cannot rule out the possibility of unmeasured compositional changes. Second, the analysis may confound the effects of California's law with the effects of overall crime trends within the state, since the treatment and control groups were observed in different years in a time when crime rates were changing. The direction of bias from any unmeasured "period effects" is difficult to determine.[79]

In chapter 5, Elizabeth Richardson Vigdor and James Mercy provide new evidence on the effects of state laws that prohibit gun ownership to those with histories of domestic violence. Vigdor and Mercy find that laws that prevent those who are subject to a restraining order from owning or purchasing a handgun reduce rates of homicides of intimate partners, while there are no clear effects for prohibitions directed against those people with prior misdemeanor convictions for domestic violence. Presumably the difference in the effects of the two laws is because of some combination of the inability of available data systems to identify all those with records of domestic violence, the close timing between state and federal laws that keep guns from those convicted of domestic violence misdemeanors, and the fact that there may be more people subject to restraining orders than with prior convictions for domestic-violence misdemeanors.

79. Predicting the direction of bias is complicated in part because individuals are only tracked up until they experience their first arrest or three years have elapsed since they tried to purchase a handgun, whichever comes first. If everyone were followed for the full three years, the control group would be tracked for the period 1989–93 and the treatment group for 1991–94. In California UCR property crimes declined gradually starting in 1989, while the overall rate of violent crimes was increasing until its peak in 1992, and then began to decline thereafter (*www.disastercenter.com/crime/cacrime.htm,* [March 6, 2002]).

The results for the restraining-order laws are also more likely to reflect causal policy effects than those for domestic-violence misdemeanors. Prohibitions on those people with restraining orders are consistently related to intimate partner homicides and unrelated to other crimes that should less clearly be affected by gun regulations; the reverse is true for the domestic-violence laws. The data also suggest that states with restraining-order prohibitions experience rates of intimate partner homicides similar to those observed in other areas before these gun laws go into effect, at least up to one year before passage. While discussants John Laub, Garen Wintemute, and Brian Jacob are concerned that the estimated effects are biased because of covariation of these prohibitions with other unmeasured factors, the general similarity in trends across states before the restraining-order laws go into effect and the lack of relationship with other nondomestic crimes makes us somewhat more confident that Vigdor and Mercy have isolated the effects of this legislation. Improved enforcement of these laws, another concern of Laub and Wintemute, would almost surely improve the effectiveness of such policies in preventing intimate partner homicides.

Concluding Thoughts

What do these results imply for the prospects of regulating gun acquisitions? Evidence that the Brady Act did not have the substantial effect on crime that proponents had hoped suggests a limited potential for regulations seeking to deny dangerous people access to the primary market while leaving the secondary market unregulated. If mild, inexpensive regulations save even just a few lives, however, they may be justified. That principle applies to the case of banning gun possession by domestic batterers, where there appears to be a small but discernible effect. More information about how high-risk groups respond to changes in the effective price of guns, as well as about how gun markets operate, would have substantial value in refining evaluations of regulations and determining why some regulations appear to be effective in saving lives while others seem less so.

The uneven evidence on the effectiveness of gun-control measures stands in seeming contrast to the relatively strong evidence that gun availability has a positive effect on homicide rates. There are several possible explanations, including that most gun-control measures have not affected gun availability to dangerous people very much in practice—certainly not as much as would a substantial reduction in the prevalence of gun ownership. As pointed out by Franklin Zimring in chapter 11, modest interventions produce, at best, modest results. Although he encourages advocates to aim higher, rather than squander political effort on trivial gains, even modest results may be enough to justify an intervention if the costs are sufficiently low.

Gun Carrying

Whether or not it is possible to sustain effective discrimination in the gun markets between the minority who are banned from acquisition and the majority who are entitled, criminal misuse will not be eliminated. Some observers argue that a gun policy should focus on reducing misuse directly rather than on forestalling misuse by regulating acquisition. Indeed, in most states the criminal law specifies a harsher sentence if a gun is used in a violent crime than a less lethal weapon. One step back from gun use in crime is illegal carrying, and policies to deter carrying by dangerous people may be an efficient strategy for reducing misuse. As Lawrence Sherman notes, "To the extent that homicide frequently occurs spontaneously among young men in public places, it is the *carrying* of firearms, rather than their ownership, that is the immediate proximate cause of criminal injury."[80] James Q. Wilson extends the argument: "Our goal should not be the disarming of law-abiding citizens. It should be to reduce the number of people who carry guns unlawfully, especially in places—on streets, in taverns—where the mere presence of a gun can increase the hazards we all face."[81] Others, impressed by the potential value of an armed public in deterring street crime, have successfully advocated for relaxing restrictions on carrying by adults who can pass a criminal-record check.

Policing Against Illegal Guns

The most straightforward way to keep people from carrying guns illegally is to arrest them when they do so. The widespread belief in the effectiveness of police patrols against illegal gun carrying is motivated in large part by findings from the Kansas City Gun Experiment, in which patrol resources were added in one high-crime neighborhood to search pedestrians and motorists for guns. Analysis by Lawrence Sherman and his colleagues suggests that gun seizures increased by 65 percent in the target neighborhood during the program, while gun crime declined by 49 percent. In contrast there was little change over this period in either outcome in a comparison neighborhood several miles away.[82]

Despite the apparent promise of the Kansas City Gun Experiment, it is important to recognize that this program was not an "experiment" in the true sense of the term. There were just two neighborhoods involved, and they experienced

80. Sherman (2000, p. 1193).

81. James Q. Wilson, "Just Take Away Their Guns." *New York Times Magazine,* March 20, 1994, sec. 6, p. 47.

82. Sherman, Shaw, and Rogan (1995); Sherman and Rogan (1995).

different levels and trends in firearm offenses even before the policing program was put into place.[83] As we have argued, that difference should make for caution in drawing inferences from differences in crime rates after the program was put into place. While policymakers in New York City and elsewhere have implemented police patrols against illegal guns, more convincing evidence on the effects of this strategy is lacking.

This void is addressed in chapter 6, in which Jacqueline Cohen and Jens Ludwig provide new evidence on the effects of such policing programs in Pittsburgh. Their evaluation strategy seeks to isolate the causal effect of the police program by exploiting the fact that gun-oriented patrol was implemented in some parts of the city but not others, and that in the targeted areas the extra patrols were focused on just four evenings each week (Wednesday through Saturday). Their main finding is that during the targeted nights of the week, the target neighborhoods experienced much larger declines in gunshot injuries and citizen reports of shots fired compared with the experience in control areas.

The innovation of this evaluation is to provide evidence that at least for gunshot injuries the control neighborhoods in Pittsburgh provide a reasonable estimate for what *would have* happened in the treatment areas had the program not been enacted—the necessary condition for determining the intervention's effect. First, the authors show that following the launch of the program there was little difference in injury or shots-fired trends between treatment and control neighborhoods on days in which the new antigun patrols were *not* scheduled (Sunday through Tuesday). Second, the treatment and control neighborhoods have similar trends in gunshot injuries *before* the policing program was implemented. However the treatment and control neighborhoods did have significantly different experiences with reports of shots fired even before the program was in effect, so we should be more confident in the results for gunshot injuries than shots fired.

This evaluation supplements existing evidence that police programs targeted against illegal gun carrying may reduce gun violence. Given the substantial costs of gun violence to society—on the order of $1 million per gunshot injury—these policing programs easily generate benefits to society in excess of their operational costs.[84] Of course aggressive police patrols may generate other costs, impinging on civil liberties and straining police-community relations. In Pittsburgh, at least, the police appear to have been mindful of these concerns, and quite restrained.

83. Sherman, Shaw, and Rogan (1995).
84. Cook and Ludwig (2000); Ludwig and Cook (2001).

Enhanced Punishment

Another approach to deterring illegal gun carrying is to enhance the threatened severity of punishment for those who are caught. In the 1970s this approach was used with apparent success in Massachusetts, which enacted the Bartley-Fox Amendment mandating a one-year prison sentence for unlicensed gun carrying. The new law prohibited plea bargaining and was widely advertised; the law was subsequently evaluated in several careful studies, which agreed that it caused a substantial drop in the homicide rate and in gun use in street crime.[85]

In recent years the most highly touted example of this approach is in Richmond, Virginia's Project Exile, which diverted convicted felons arrested for gun possession from state courts into the federal system where penalties are more severe. The Bush administration has taken Exile nationwide as one model for the new Project Safe Neighborhoods initiative. Advocates for Project Exile often point to the 40 percent reduction in gun homicides in Richmond between 1997 and 1998 as evidence.[86] But skeptics point out that homicides actually increased during the last ten months of 1997 following Exile's launch in February, and that the homicide rate during 1997 as a whole was around 40 percent higher than in 1996.

In chapter 7 Steven Raphael and Jens Ludwig provide the first rigorous evaluation of Project Exile. They note that previous claims about Exile's success rest on simple before-and-after comparisons for the city of Richmond, and even those are problematic given the short-term increase in homicide. Without a control group, there remains the obvious question of what Richmond's crime trajectory would have been in the absence of this "Project": after all, crime rates were declining dramatically across the country during the 1990s.[87]

Raphael and Ludwig's analysis offers no evidence that Project Exile effected a reduction in homicides or other types of crime in Richmond. They show that Richmond's crime trajectory (even removing 1997 data from the picture) in the late 1990s is not notably better than other cities that had experienced similarly volatile homicide rates since 1980. This null finding is robust to a variety of methodological adjustments, including a check for omitted variables bias that uses juveniles (who are generally exempt from the federal felon-in-possession charges that make up the bulk of Exile prosecutions) as an additional within-city control group.

85. Pierce and Bowers (1981); Cook (1991).

86. See, for example, Elaine Shannon, "Have Gun? Will Travel," *Time Magazine,* August 16, 1999, p. 154; and "Remarks by the President on Project Safe Neighborhood," White House, Office of the Press Secretary, May 14, 2001.

87. Blumstein and Wallman (2000).

In their comments the discussants note that expectations of large impacts were probably unrealistic from the start; Steven Levitt notes that Exile engendered a fairly modest objective increase in the threat of punishment, while Peter Greenwood suggests that the program did not focus sufficiently on the most dangerous group of offenders. But the failure of Richmond's Project Exile to live up to the inflated expectations of some proponents does not rule out the possibility that the program is worthwhile. Given the substantial costs that gun violence impose on society, even modest effects of the size suggested by Steven Levitt in his discussion—which would be too small to be detected by the analysis in chapter 7—might be large enough to justify the program. Our bottom line is that policymakers searching for ways to reduce gun violence should not necessarily eliminate Project Exile from their portfolio but should recognize that the program is not the miraculous intervention that has been claimed and is not a substitute for other efforts to address the problem.

Permissive Gun-Carrying Laws

While many big city police departments devote substantial resources to keeping guns off the street, during the past several decades state governments across the country have made it easier for people to carry guns legally in public. More than thirty states have now enacted permissive gun-carrying laws, and a number of others such as Missouri, Minnesota, Ohio, and Wisconsin are considering such laws.[88] These laws are not necessarily in conflict with police patrols against illegal gun carrying, since there is not much overlap in the population characteristics of those who apply for permits to carry and those who are targeted in police patrols.

Proponents of permissive gun-carrying laws hope that the increased likelihood of encountering an armed victim will deter criminals, a possibility that receives some support from prisoner surveys: 80 percent in one survey agreed with the statement that "a smart criminal always tries to find out if his potential victim is armed."[89] But the same data also raise the possibility that an increase in gun carrying could prompt an arms race: two-thirds of prisoners incarcerated for gun offenses reported that the chance of running into an armed victim was very or somewhat important in their own choice to use a gun. Currently criminals use guns in only around one-quarter of robberies and one of every twenty assaults.[90] If increased gun carrying among potential victims causes criminals to carry guns more often themselves, or become quicker to use guns to avert armed self-defense, the end result could be that street crime becomes more lethal.

88. Dvorak (2002).
89. Wright and Rossi (1994).
90. Rennison (2001).

Economist John Lott has argued that the deterrent effects of permissive gun-carrying laws dominate: "Of all the methods studied so far by economists, the carrying of concealed handguns appears to be the most cost-effective method for reducing crime."[91] A previous evaluation of permissive concealed-carry laws focused on how crime rates changed within jurisdictions that enacted such measures.[92] But, as with Project Exile, having a valid control group is important in making a credible assessment of program effects. Lott and fellow economist David Mustard improved on earlier research by comparing crime changes in states that enact concealed-carry laws with changes in other jurisdictions.[93] Lott has now performed this analysis in several ways, reaching differing conclusions about the effect on property crime, but always finding that adopting permissive gun-carrying laws reduced homicide rates.[94]

In chapter 8 economist John Donohue argues that while Lott's analysis improves on previous research on this topic, in the end Lott's findings cannot support the conclusion that permissive concealed-carry laws reduce crime. Donohue shows that Lott's estimates are sensitive to the correction of several coding errors and to reasonable changes in the model specification. More important, Donohue's reanalysis of the Lott data shows that states that eventually passed permissive concealed-carry laws had systematically different crime trends from the other states even before these gun-carry laws went into effect—violating what we have argued is a minimum necessary condition for deriving unbiased estimates of policy impacts. The violation of this condition implies that the estimated treatment effect may occur because of whatever unmeasured factors caused crime trends to diverge before the laws are enacted.

In his comment, David Mustard notes that his work with John Lott addresses this apparent omitted-variables problem in several ways. In our own judgment none of these approaches is entirely persuasive.[95] The puzzling pattern of results for robberies and property crimes in this literature is one manifestation of this issue; another is Donohue's findings that right-to-carry laws in the 1980s seemed

91. Lott (2000, p. 20).

92. McDowall, Loftin, and Wiersema (1995).

93. Lott and Mustard (1997).

94. Cook and others (2002); Lott (2000, pp. 90, 100).

95. For example, the instrumental variables (two-stage least squares) estimates presented by John Lott and David Mustard yield implausibly large estimates for the effects of right-to-carry laws on crime; see Donohue's chapter as well as Ludwig (1998, 2000). Using nonlinear state-specific trends may yield evidence for right-to-carry laws when separate trends are included for the pre- and postlaw periods, but not when each state's crime trend over the entire sample period as a whole is modeled using a linear and quadratic term. See Black and Nagin (1998). Because crime rates follow the same types of cyclical patterns as do many economic indicators and these right-to-carry laws are adopted during periods of increasing crime, isolating their causal effects is difficult. That the postlaw crime levels are below the prelaw levels does not rule out the influence of other factors that drive these crime cycles over time.

to reduce crime, while those adopted in the 1990s appear to have the opposite effect.[96] Willard Manning notes in his comment that few of the estimates reported in this literature may be statistically significant anyway once one correctly calculates standard errors and the relevant statistical tests.

Whether the net effect of permissive gun-carry laws is to increase or reduce the burden of crime, there is good reason to believe that it is not large. One recent study found that in twelve of the sixteen concealed-carry states studied, fewer than 2 percent of adults had obtained permits to carry concealed handguns.[97] The actual change in gun-carrying prevalence will be smaller than the number of permits issued would suggest because many of those who obtain permits were already carrying guns in public.[98] Moreover, the change in gun carrying seems concentrated in rural and suburban areas where crime rates are already relatively low, among people who are at relatively low risk of victimization–white, middle-aged, middle-class males.[99] The available data about permit holders also imply that they are at fairly low risk of misusing guns, consistent with the relatively low arrest rates observed to date for permit holders.[100] In sum, right-to-carry laws are likely to induce only modest changes in the incentives facing criminals to go armed themselves or to avoid potentially armed victims.

Summary

The available results on the effects of permissive gun-carrying regulation are mixed. While there is no evidence at this point to suggest that states should repeal the laws that are already in effect, there is also no reliable evidence that en-

96. In his commentary David Mustard argues that the net effect of right-to-carry laws on a county or state's robbery rate is ambiguous because not all robberies occur in public places, and right-to-carry laws may cause some criminals to substitute from robbing people in public places to committing such crimes in private areas instead. But the proportion of criminal events that occur in public areas is higher for robbery than for murder, rape, and other violent crimes. Why we should see substitution from public to private areas suppressing the right-to-carry effect on robbery more than for other violent crimes is unclear.

Mustard argues that compared with right-to-carry laws enacted in the 1980s, the laws adopted in the 1990s involved higher fees, more stringent training requirements, and more restrictions on where those with permits can legally carry their firearms. Although this argument offers some hypotheses about why the crime-reducing effect of the laws adopted in the 1990s might be more muted compared with those enacted in the 1980s, it cannot explain why Donohue finds that right-to-carry laws adopted in the 1990s seem to increase crime. A more likely explanation in our view for the conflicting results between the laws of the 1980s and 1990s is that both sets of estimates are driven by confounding factors that are not captured by the regression model.

97. Hill (1997).

98. Robuck-Mangum (1997).

99. Hill (1997).

100. Lott (2000).

acting these laws will save lives or reduce street crime. States that enact such laws in the expectation of launching an effective deterrent to crime are likely to be disappointed.

However, strategies to reduce gun carrying by youths and felons deserve consideration. Among the strategies that have made it onto the current policy "menu," directed police patrol is promising, while the threat of more severe punishment seems less reliably effective.

Finally, we take note of an important new twist on the least controversial approach to reducing gun violence: threatening punishment for criminal misuse of guns. The Boston Gun Project's Operation Ceasefire was developed in 1995 in response to the epidemic of lethal gang violence. One of its innovations was to reach out directly, with an explicit and personalized message that gun violence would be met with severe sanctions, to members of targeted gangs. Then the threat was backed up.[101] The hope was to shift gang norms about gun use. Following the adoption of this strategy in Boston in May 1996, youth homicides fell dramatically and stayed down thereafter. One influential evaluation concluded that this drop was the direct result of the intervention, although that conclusion has not gone uncontested.[102]

Future Research

The research discussed in this book provides some guidance for a pragmatic approach to gun policy. The use of empirical evidence in place of dogmatic assertion does have a major drawback, which must be obvious by now: the conclusions are usually hedged by uncertainty. Indeed, some of the more confident conclusions offered, as in the case of the Project Exile evaluation, have the effect of challenging received opinion (that the evidence claimed in support of Project Exile's success does not stand up to close scrutiny) without providing a firm alternative answer. This problem is by no means unique to gun policy.[103] Good empirical research does not necessarily yield definitive results but should serve as an important check on other means by which policymakers form opinions and choose among the available options.

101. Braga and others (2001).

102. Braga and others (2001); Fagan (2002).

103. Take the case of welfare reform. Robert Moffitt observes that "making recommendations for reauthorization is difficult not only for the obvious reason that the goals of the next round of welfare reform are unclear, but also because the evidential base to support specific policy recommendations is weak. Despite the great volume of data analysis conducted on welfare reform since 1996, a careful review of what has been done reveals, unfortunately, that there is very little strong research evidence on many of the key reforms." Moffitt (2001).

Two of the contributions in this book are concerned with the basic ingredients for policy research—a database on state gun laws and the ongoing development of a violent-death reporting system. First, in chapter 9 Jon S. Vernick and Lisa M. Hepburn provide a meticulous description of laws affecting firearm manufacture, sale, possession, and use since 1970, listed by individual state, with the dates of implementation. This is an important research tool that will facilitate the work of future researchers who seek to take advantage of the experience generated by the laboratory of state policymaking. As an interesting by-product, this work provides a basis for assessing an old "chestnut" of anticontrol rhetoric, that there are more than 20,000 gun-control laws on the books in the United States. The earliest use of this figure that Vernick and Hepburn could identify was in testimony by Congressman John D. Dingell in 1965, though no basis for the figure was provided. Yet it has been repeated thousands of times since then, usually coupled with the assertion that no additional legislation is needed when we have so much already—as if laws were some sort of homogeneous commodity, like eggs. In any event, the authors conclude that there are about 300 state laws, and that few local laws are of much importance, especially since some forty states now preempt localities from legislating in this area.

In chapter 10, Deborah Azrael, Catherine Barber, David Hemenway, and Matthew Miller discuss the type of data system that would improve our ability to understand gun violence and evaluate the injury-related outcomes of policies. They point out that currently available data systems lack the detail and consistency needed to support a sensitive evaluation of such measures as a ban on a particular type of weapon or a requirement that guns be stored safely. Indeed, the fact that no such "surveillance" system is currently in operation may strike many as surprising, given the magnitude of the problem.[104] The authors are leaders in the effort, described in this chapter, to develop a workable system, and can take much of the credit for the Centers for Disease Control's recent initiation of a pilot effort. As discussants Alfred Blumstein and David McDowall note, taking such a system to scale will raise a number of challenges in securing complete, consistent data from law enforcement, public health, and medical officials across the country. But if all goes well, the National Violent Death Reporting System might do for intentional injury what the Fatal Accident Reporting System has done for the analysis of highway accidents.

In conclusion, we offer this book in support of the view that the goal of a skilled and dispassionate analysis of the evidence is attainable, even in an area as

104. The National Rifle Association opposes a national injury data system on the grounds that "data collection, even if objectively conducted, would inevitably have biased results" because the data system would fail to capture information about defensive gun uses. This does not strike us as a compelling argument, since one desired outcome of a defensive gun use is often the avoidance of an injury.

contentious as firearm policy. For pragmatists who wish to reduce the social burden of gun violence, there is no acceptable alternative.

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