

Gun Markets

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Abstract

The systematic study of how available weapons influence the rates, patterns, and outcomes of criminal violence is new, but it is now a well-established and fast-growing subfield in criminology, legal studies, public health, and economics. This review focuses on the transactions that arm dangerous offenders, noting that if those transactions could be effectively curtailed it would have an immediate and profound effect on gun violence and homicide rates. Guns are legal commodities, but violent offenders typically obtain their guns by illegal means. Our knowledge of these transactions comes primarily from trace data on guns recovered by the police and from occasional surveys of gun-involved offenders. Because most guns used in crime are sourced from the stock of guns in private hands (rather than a purchase from a licensed dealer), the local prevalence of gun ownership appears to influence the transaction costs and the proportions of robberies and assaults committed with guns rather than knives or other weapons. Nonetheless, regulations that govern licensed dealers have been linked to trafficking patterns and in some cases to the use of guns in crime.

INTRODUCTION

The observance of the fiftieth anniversary of the publication of *The Challenge of Crime in a Free Society* (Katzenbach 1967) (the report of the President's Commission on Law Enforcement and the Administration of Justice) is a reminder that criminology had nothing to contribute to that report's discussion of firearms—simply because the first systematic research on guns and violence was not published until the following year (Zimring 1968). Since then, there has been a half-century of social-science research on criminal misuse of guns. This research, which began as a trickle, now constitutes a broad stream of work by criminologists, sociologists, and economists, overlapping to some extent with a research program on firearm violence as a public health problem that began circa 1980 (Cook & Goss 2014, Hemenway 2004, Kleck 1991, Webster & Vernick 2013, Wellford et al. 2004).

The focus of this review is on the sources of the guns used in crime and, in particular, on the transactions that arm dangerous people. The interest in transactions (rather than possession) is warranted because guns that are used in crime have usually not been in the offenders' possession for long. Of course, there are instances in which a gun that has been in the same hands for many years is used to assault another person, perhaps in a case of domestic violence. But crimes of violence are more typically committed using guns that the perpetrator acquired within a few weeks or months of the act. If transactions that arm active offenders with guns could somehow be stopped, the volume of gun violence would decline quickly.

The focus on transactions does not deny the importance of the prevalence of possession in influencing criminal use. In jurisdictions in which gun possession is common, offenders may find it easier to access a gun in the informal or underground market. Indeed, the stock of guns in private possession serves as a reservoir from which most problematic transactions originate. Those who are banned from a legal purchase from a licensed dealer due to their age, criminal record, or other disqualifier may, on average, have an easier time obtaining a gun if gun ownership is common rather than relatively rare. That generalization seems to apply to several of the important channels that supply the underground market, including voluntary transactions between acquaintances or family members, unauthorized takeaways within the household, and theft. The prevalence of ownership is primarily relevant, then, insofar as it affects the transaction costs for offenders seeking a gun.

Although the title of this review is Gun Markets, the scope is not limited to transactions that we usually think of as constituting a "market," namely voluntary exchanges of goods for cash. Relevant transactions that provide guns to offenders also take the form of gifts by family members, sharing arrangements within gangs, thefts and takeaways, and other possibilities. Offenders may serve as sources as well as recipients in these transactions.

Since Zimring (1968), the foundational issue for the study of weapons and crime has been whether and how the type of weapon matters in assaults and robberies. The most important conclusion is that the likelihood the victim will die in an assault or robbery depends on the intrinsic lethality of the weapon, not just the intent of the assailant. The next section sketches some of the evidence on this issue as motivation for what follows. The subsequent two sections summarize what is known about gun possession and transactions in the general public and the transactions that arm offenders, respectively. The section titled Gun Availability and Likelihood of Criminal Misuse summarizes the evidence on the relationship between the licit stock and flow of guns, and gun availability to offenders. The section titled Evidence of Effective Regulation reports evidence on the effects of various regulations on gun markets and ultimately on use of guns in crime.

WHY AND HOW THE TYPE OF WEAPON MATTERS

For millions of generally law-abiding Americans, guns are a durable commodity that provide a source of recreation or peace of mind. There are thousands of instances each year in which guns are used by private citizens to defend against burglary or assault, a virtuous use that has particular social importance. Indeed, the practice of keeping handguns in the home for defense against intruders was privileged by the US Supreme Court in *District of Columbia v. Heller* (2008), its recent interpretation of the Second Amendment as conveying a personal right to “keep and bear arms” (Blocher 2014, Rosenthal & Winkler 2013).

But like other valuable commodities, such as motor vehicles, alcoholic beverages, and legal opiates for pain management, guns are frequently misused by private citizens and cause considerable harm as a result. In 2015, there were 13,000 criminal homicides committed with a gun (73% of the total number of homicides) and another 63,000 assaults that inflicted nonfatal gunshot wounds requiring treatment in a hospital.¹ Based on the National Crime Victimization Survey, the total number of nonfatal assaults and robberies committed with a gun, including those in which there was no shooting, is estimated at 284,000 (Truman & Norman 2015).

These statistics would not be of much interest if the type of weapon were just an incidental detail, of no more importance than whether the perpetrator wore a hat. The argument that the type of weapon does matter begins with the obvious fact that firearms, in comparison with other readily available weapons such as knives and clubs, provide the assailant with the power to kill quickly, at a distance, with little strength or determination. In other words, a gun makes it easier to threaten, attack, and kill a victim than other weapons. In line with this observation, there are large weapon-specific differences in case-fatality rates for different types of criminal attack. For example, data for 2015 indicate that the crime victim who suffers a gunshot wound is 7.6 times as likely to die as the victim who is seriously injured in a knife attack.² Similarly, gun robberies are three times as likely to result in the victim’s death as knife robberies, despite the fact that the victim of a gun robbery is less likely to be injured (Cook 1987).

There is a long-standing controversy on how best to interpret such established patterns. Wolfgang (1958, p. 83) stated in his seminal study of homicide in Philadelphia that “it is the contention of this observer that few homicides due to shooting could be avoided merely if a firearm were not immediately present, and that the offender would select some other weapon to achieve the same destructive goal.” Wolfgang’s implicit explanation for the differences in case-fatality rates was that the assailants’ choice of weapon tended to be a good reflection of his intent; those with deadly intent would be more likely to choose a gun if available because it would be the easiest means for achieving that intent, but if need be they would accomplish their purpose with a less lethal weapon. But that was speculation and not based on any direct evidence.

As is often the case in the literature on gun violence, this instrumentality issue is debated both by social scientists and public advocates. A familiar bumper sticker follows Wolfgang in claiming “Guns don’t kill people; people kill people.” The counterpoint, meant to be ironic, is “Guns don’t kill people; they just make it real easy,” the implication being that when a task is made simpler, it will be accomplished more often. Wolfgang, in the same study of homicide, actually offers a speculation supportive of this position: “The offender’s physical repugnance to engaging in direct

¹ Computed from data accessed from <http://www.cdc.gov/injury/wisqars>.

² Computed from data accessed from <http://www.cdc.gov/injury/wisqars>. Note that the counts of nonfatal injuries are limited to those that were treated in a hospital emergency department.

physical assault by cutting or stabbing his adversary, may mean that in the absence of a firearm no homicide occurs” (Wolfgang 1958, p. 79).

Zimring’s (1968) early research focused on the issue of whether a gun attack was intrinsically more lethal than a knife attack. He established by a detailed comparison of victims suffering serious wounds that there was a good deal of overlap in circumstance and apparent intent on the part of the assailant between gun and knife attacks, suggesting that the large difference in death rates was the result of the difference in type of weapon, i.e., that the weapon type is not only a reflection of the assailant’s intent but also an independent contributor to the outcome. His subsequent study (Zimring 1972) compared the results of shootings by weapons of different types of gun, finding that larger caliber weapons were more likely to result in the victim’s death—again, a finding suggesting that the type of weapon had an independent causal effect on the probability of death.

The instrumentality argument was expanded to include several aspects of robbery in Cook (1987), which demonstrated, using a regression analysis on panel data for 43 large cities, that the robbery murder rate was closely linked to the rate of robberies, and that 100 additional gun robberies increased the robbery murder rate by 3 times as much as 100 additional non-gun robberies. That 3:1 ratio is in line with the difference in case-fatality rates for robbery and suggestive of a causal effect, as if robbery murder were a by-product of robbery, occurring with a likelihood that reflected the intrinsic lethality of the weapon.

Still, there remains some question, not so much about whether the type of weapon can influence the outcome of an assault but rather about how much of the large weapon-specific difference in case-fatality rates can be attributed to the intrinsic features of the weapons (Emmert et al. 2017, Wright et al. 1983). In any event, to the extent that intrinsic lethality matters, the situation is getting worse. Over the past generation, the trend in guns used in crime, as with guns sold to the public, has been toward larger caliber pistols with more power and larger capacity to fire multiple rounds without reloading (Braga 2017).

The case-fatality rate in violent encounters is not the only outcome of violent crime that is affected by weapon type. Other instrumentality effects have been documented for the crime of robbery (Cook 1980, 1991). Assuming that robbers are generally in it for the money, their goals are to choose lucrative victims, control them, and make good their escape. Use of a gun enhances the robber’s power, making it possible to successfully rob hard-to-control but relatively lucrative victims, such as groups (rather than individuals) or commercial establishments.

Based on this reasoning, we might expect gun robberies are more likely to be successful than other robberies and to involve more loot when they do succeed. Further, robbers with guns should be able to control the situation by use of the potent threat of the gun rather than by physical attack (as with a strong-arm robbery or mugging). As it turns out, these patterns are indeed evident in victim survey data. Robbers bearing guns are 12.5 percentage points more likely to succeed than are their knife-wielding counterparts, and when robberies by firearm do succeed, the average value of offender’s take almost doubles (Cook 2009; see also Kleck & McElrath 1991). Further, the likelihood of injury to the victim depends on the type of weapon, with gun robberies the least likely to involve injury. Of course, when the robber does fire his gun, it is quite likely that the victim will die, making gun robberies (as noted above) by far the most lethal type of robbery (Cook 1980).

The most important implication of this instrumentality perspective is that policies that are effective in reducing gun use in violent crime would reduce the murder rate, even if the volume of violent crime were unaffected. As it turns out, approximately half of the states have incorporated sentencing enhancements for use of a gun in crime (Vernick & Helpburn 2003). These enhancements, most of which were adopted in the 1970s and 1980s, were intended to reduce gun use in violence; systematic evaluations offer some indication that they have been effective (Abrams 2012;

Loftin & McDowall 1981, 1984).³ In any event, the widespread adoption of sentencing enhancements aligns with the view that an assault or robbery with a gun is intrinsically more serious than with other weapons.

Gun possession by a perpetrator may influence not only the outcome of his crimes and choice of targets but also whether he is inclined to commit a crime in the first place. Although there is some evidence that the act of gun carrying may, for example, inspire juvenile delinquents to commit more crimes (Emmert et al. 2017), there is no clear consensus on this matter. For certain crimes, however, a gun may be the only adequate weapon, and gun possession is the virtually necessary condition for a successful assault. For example, guns are the weapons of choice for assassins and cop killers. Fourteen of the fifteen direct assaults against Presidents, Presidents-Elect, and presidential candidates in US history were perpetrated with firearms, including the five resulting in death (Kaiser 2008). (The one exception of the 15, a failed attack with a hand grenade against President George W. Bush, occurred overseas.) In the decade 2006–2015, 521 law enforcement officers were shot dead, compared to just 12 who were stabbed to death and 13 who were victims of terrorist attacks (Natl. Law Enforc. Off. Meml. Fund 2017).

The most prominent cases of firearm victimization in recent decades have been the mass shootings at campuses, workplaces, movie theaters, and other places of assembly. The estimate of the rate at which such events occur of course depends on the definition of mass shooting. Using a relatively broad definition of at least 4 people shot in a single incident, there were more than 1,000 such incidents between 2013 and 2015, including 1,300 deaths (Klarevas 2016); a narrower definition (at least 6 killed) occurred 11 times during that three-year period. Grim experience from around the world suggests that assailants can use bombs to injure and kill large numbers of people in a single attack, but firearms have generally been the weapon of choice in the United States.⁴

Thus, there are plausible arguments and considerable evidence that the violent offenders' intent is not all that matters and that the type of weapon also matters in a number of ways. An offender who does not have access to a gun may still commit criminal assault and robbery. Indeed, most assaults and more than 60% of robberies are with other weapons. But the outcomes of these crimes—whether the victim is injured and if so how severely, whether the robbery includes physical attack and is successful—are influenced by the type of weapon. Violent crime patterns cannot be understood without taking technology into account.

GUN POSSESSION AND TRANSACTIONS IN THE GENERAL POPULATION

With few exceptions, the pistols, revolvers, rifles, and shotguns used to commit criminal assault and robbery are legal commodities being put to an illegal use and are often in the hands of a person who is legally disqualified from possessing a gun because of criminal record, age, or other characteristic. Guns used in crime usually originate from a legal supply chain of manufacture (or import), distribution, and retail sale.⁵ They may change hands a number of times after that first

³Cook & Nagin (1979) documented the influence of weapon use in a case on prosecutorial and judicial discretion. Our study found that defendants who used weapons were more likely to be convicted and sentenced to prison in the District of Columbia in 1974, but that there was little distinction between guns and other types of weapons in that court.

⁴A notable exception is the truck-bomb attack on the Murrah Federal Building in Oklahoma City in 1995 in which 168 people were killed.

⁵There are firearms that are illegal regardless of who owns them. For example, federal law bans firearms that have had their serial number eradicated, homemade firearms that were manufactured without a license, and newer firearms that fire more than one round with a single pull of the trigger.

retail sale, and some of those transactions may be a theft or violate one or more regulations on gun commerce. Understanding the sources of guns for criminal use thus requires some knowledge of the supply chain of guns generally as well as of patterns of gun possession, as any possessor is a potential supplier to an offender.

The annual General Social Survey, conducted by the National Opinion Research Center, has long included questions on gun ownership. In 2014, just 31% of American households included at least one firearm, down from 47% in 1980 (Smith & Son 2015). The drop in household gun possession in part reflects the trend in household composition during this period; households are less likely to include a gun because they have become smaller and, in particular, are less likely to include a man (Wright et al. 2012). In most cases, guns (unlike, say, toasters) are owned by individuals rather than households, and it is meaningful to track individual ownership; the General Social Survey reports a drop in the percentage of adults owning at least one gun from 28% in 1980 to 22% in 2014, in line with the trend in household prevalence (Smith & Son 2015). The trend among women during this period is essentially flat (10% reported owning in 1980, and 12% in 2014) so that the downward trend is due to reduced ownership by men (50% in 1980, down to 35% in 2014) (Smith & Son 2015).

Figure 1 depicts the trend in the number of new guns shipped to US retailers, with the data in this case based on federal tax records (since there is a federal excise tax imposed on new guns). Each year's total is the sum of manufactures and imports net of exports. **Figure 2** documents the surge in the volume of new guns beginning in 2003 and the growing relative importance of handguns (revolvers and pistols) as opposed to long guns (rifles and shotguns). In comparing **Figures 1** and **2**, it is clear that if both are accurate, then the surge in new gun sales (increasing by a factor of 3.5) has been absorbed by a declining population of gun owners. To an extent, new guns replace guns that are discarded, confiscated by police, or smuggled out of the country (e.g., to Mexico and the Caribbean) (Cook 1993). But it seems likely that the average number of guns per gun owner has increased, and that is confirmed by a recent survey (Miller et al. 2017).

The cumulative number of guns in private hands in the United States is not tracked from year to year by any data system, although in 1994 and 2015 there were national surveys that went beyond the usual questions on gun ownership to inquire about the number of guns in the home, thus providing the basis for an estimate of the total private stock. The most recent national survey (the 2015 National Firearms Survey) estimated that there were 270 million guns in private hands,

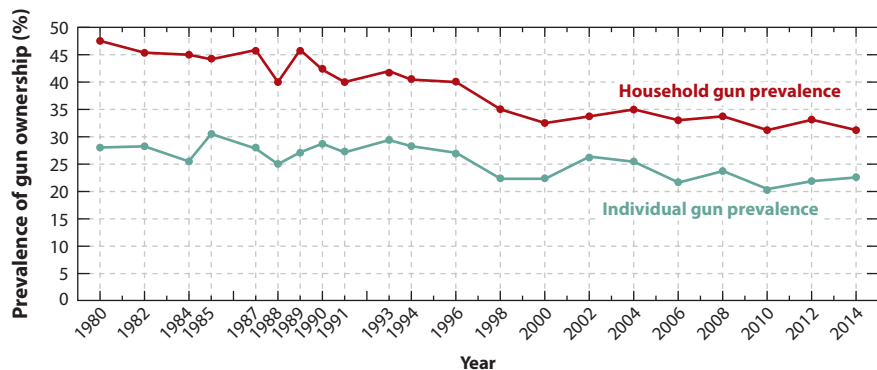


Figure 1

Prevalence of gun ownership, 1980–2014. Source: General Social Survey: Trends in Gun Ownership in the United States, 1972–2014.

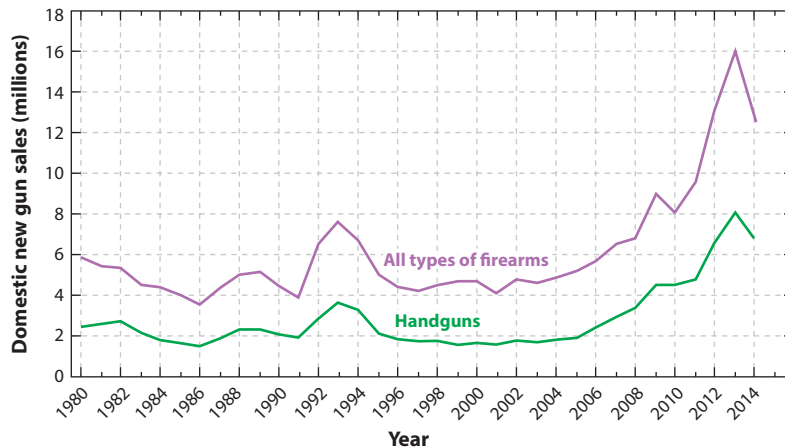


Figure 2

Bureau of Alcohol, Tobacco, Firearms and Explosives data on new guns introduced to US retail market 1980–2014.

more than enough to provide one for every American adult (Azrael et al. 2017). But, in fact, gun ownership is quite concentrated, and individuals who own at least one gun averaged 4.9 guns in 2015 (Miller et al. 2017). That average is indeed higher than in a previous survey of this sort conducted in 1994 (Cook & Ludwig 1997).

A recent snapshot of who owns the guns is provided by an analysis of Pew Research Center survey data for 2014 (Cook & Pollack 2017). A multivariate logit analysis of these data found that all things equal, men are much more likely to own a gun than women; Anglo whites are more likely to own than minorities (blacks and Hispanics); and low-income households are less likely to own a gun than those of the middle class. With respect to education, gun ownership peaks among those who graduated from high school but not college. After accounting for individual and household characteristics, there remains a regional effect, with the South at the high end and Northeast at the low end. The biggest surprise is that after controlling for other factors, rural respondents do not display discernibly higher gun ownership rates than those living in urban or suburban areas (Cook & Pollack 2017).

Participation in traditional gun sports, especially hunting, has greatly declined over the past four decades, in part because of the decline in rural traditions generally. Increasingly, people buy guns not to shoot animals or targets but rather to prepare for a time when they might need to shoot or at least threaten another person. Half of gun owners say that self-protection is the reason or primary reason they own a gun, compared with just a quarter of owners who gave that response as recently as 1999 (Pew Res. Cent. 2013).

The retail market for guns is centered on federally licensed gun dealers; approximately 64% of all gun transactions involve a purchase from a dealer (Miller et al. 2017). There are currently approximately 64,000 dealers who sell guns from a variety of retail outlets, including stores specializing in firearms and ammunition, sporting goods stores, general department stores, and pawn shops (which need a distinct federal license) (Wintemute 2017). The federal license allows a dealer to receive interstate shipments of guns, something that individuals without a license may not do. They are responsible for selling the 15 million or so new guns each year but are also authorized to sell used guns. The remaining transactions include private sales at gun shows or in person as well as gifts and other sorts of transactions. Federal law requires a background check for would-be

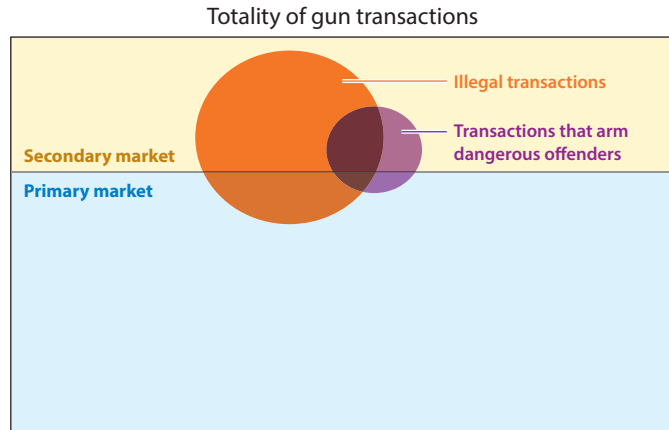


Figure 3
Venn diagram of gun transactions by legal status.

buyers from a licensed dealer, and a number of states extend that requirement to cover some or all private transactions. The National Firearms Survey of 2015 found that in 78% of all transactions, the acquirer was subjected to a background check against state and federal records to ensure that they were legally qualified to own a gun (Miller et al. 2017).

SOURCES OF GUNS TO CRIMINAL USE

Criminal careers tend to be quite brief—by one estimate, an average of five years for those who begin committing property and violent crimes as youths (Blumstein et al. 1982)—and each new crime cohort must acquire their guns if they are to be armed. Interviews with offenders suggest that those who are involved with guns may have several over the course of their career, with some gaps. For example, they may sell their gun to raise cash, ask a friend to hold it when they are under legal pressure, or lose the gun to the police or to theft. The elapsed time between the acquisition of a particular gun and use of that gun in crime is typically a matter of weeks or months.⁶ Thus, even though guns are durable, the close link between transactions and use in crime focuses attention on the market.

Most gun transactions are legal. The sales and transfers that are illegal include thefts, transfers to people who are disqualified due to their youth or criminal record, and transactions that are in technical violation of firearms regulations (e.g., a state regulation requiring that the buyer have a permit). The available evidence, meager though it is, suggests that a large percentage of the transactions that arm dangerous offenders are illegal under current law (Braga & Cook 2016). Also relevant is whether the transaction is in the primary market, i.e., a documented sale by a licensed dealer, or in the informal secondary market. **Figure 3** is an attempt to represent these distinctions with a Venn diagram and locate the transactions that arm dangerous offenders.

In the diagram, the transactions that arm dangerous offenders (those likely to use the gun to injure another person) are divided into four segments, as shown schematically in the relevant circle. The orange segment represents illegal transactions in the secondary market, which probably constitute the majority of all transactions of interest (Braga & Cook 2016). But as represented in

⁶An Illinois survey of Chicago offenders conducted by the author included questions about the gun they used in the current crime. Over half of the guns were acquired within nine weeks of the crime.

the diagram, some, perhaps most, of the transactions that are illegal do not arm people who are likely to use the guns in violent crime, and some of the transactions that do arm dangerous people are legal. In the latter category, there may be sales to individuals who have numerous arrests for violence or drug and alcohol problems but no felony convictions.

Data on Supply Chains of Crime Guns

Given that a large share of the transactions that arm dangerous people are undocumented, our knowledge of these transactions is far from complete. One type of data that has proven useful to researchers in some jurisdictions is from guns recovered by law enforcement that were confiscated from an identified offender or associated with a particular type of offense. Police departments can trace such guns through the services of the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) National Tracing Center. Based on the make, model, and serial number of the gun, the ATF attempts to trace each gun from entry into the chain of commerce (manufacture or import) to eventual first retail sale by a licensed dealer (Bur. Alcohol Tob. Firearms Explos. 2011). Dealers are then queried to determine when and to whom the gun was first sold, which is information that should be in the dealer's records.

Even in jurisdictions where the police place a priority on recovering crime guns and tracing them, the sample of guns that is successfully traced bears an uncertain relationship to the population of guns used by offenders at any point in time (Cook & Braga 2001). First, only a small share of the guns actually used in robberies and assaults are recovered by the police, and for most of those guns that are recovered the charge is illegal carrying or possession. Second, only 50–60% of trace requests are successful, in the sense that the ATF is able to establish when, where, and to whom the gun was first sold. And perhaps most important, the information returned from a successful trace—which pertains to the first retail sale—is usually not about the most recent transaction by which the offender obtained the gun, as guns typically change hands several times after that first sale before being recovered by the police. Nonetheless, trace data are the best available source of information on such issues as interstate trafficking, the identification of scofflaw dealers, and the age and other characteristics of guns being used in crime (Cook et al. 2016, Collins et al. 2017).

Although the ATF trace data provide some information about the origins of crime guns, the best information on transactions that directly arm offenders is from surveys of offenders. We can think of trace data and inmate surveys as providing information on the first and last transactions in the sequence of retail transactions that connect guns to offenders. In cases in which the offender acquired the gun directly from a dealer or through a straw purchaser (a buyer acting on the offender's behalf), that information is enough. More commonly, however, there are intermediate transactions, including some of particular interest involving a theft or systematic trafficking or brokering arrangements. Information on the activities of these intermediaries may come from law-enforcement investigation files, ethnographies, or inmate interviews.

Proximate Sources of Guns to Offenders

The US Department of Justice has conducted several nationally representative surveys of inmates of state and federal prisons and jails, the most recent of which were from 2004. Gun-involved inmates were asked about the source and type of transaction by which they obtained their most recent gun. The state prisoner survey is largest and is the focus here, although it is reassuring that the results from the other two surveys are similar (Cook et al. 2015b). The results reported here are based on the responses from inmates who have been imprisoned for less than two years.

Table 1 Sources of guns used in current crime. Males age 18–40 with recent sentence federal survey data weighted to be nationally representative.^{a,b} Reprinted from Cook et al. (2015)

Source	SISCF	SIFCF	SILJ
	State prisoners, %, n = 438	Federal prisoners, %, n = 155	Jail inmates, %, n = 145
	2004 ^c	2004 ^c	2002 ^c
Gun store or pawn shop	10.1	12.9	18.8
Flea market or gun show	1.1	2.6	1.7
Friend or family	36.8	31.6	45.4
Fence, street, drug dealer	31.4	22.8	24.2
From victim, burglary	2.7	1.4	2.7
Other	8.2	14.2	7.3
Refused, don't know, blank	5.3	11.6	NA
Total	100.0	100.0	100.0

^aFor the state and federal prison surveys, the results are based on just those respondents who were sentenced in 2002 or 2003, who used or possessed a weapon when the offense occurred (V1072 = 1), and whose weapon was a gun (V1073 = 1). All results weighted by the final sample weight for males, V2622. For the jail survey, the same definitions applied: used or possessed a gun (V1057 = 1, with subsequent indications that this weapon was a gun in V1058–V1061 and V1063 when the offense occurred). The final weight is V2291.

^bData downloaded from <http://www.icpsr.umich.edu>. Refer to ICPSR 4572.

^cSample restricted to males age 18–40 who are in the first two years of their prison term, and who admit in the survey interview that they had a gun at the time of the crime (Bur. Alcohol Tob. Firearms Explos. 2011).

Abbreviations: SIFCF, Survey of Inmates in Federal Correctional Facilities; SILJ, Survey of Inmates in Local Jails; SISCF, Survey of Inmates in State Correctional Facilities.

Although the data are somewhat out of date, there is no reason to believe that the patterns have changed in the intervening years.

As documented in **Table 1**, it is rare for offenders to obtain their guns directly from the formal market: Only 10% of recently incarcerated state prison inmates who carried a gun indicate that they purchased that gun from a licensed dealer (gun store or pawnbroker). That result contrasts with the sources of guns to the general public, where 64% of the transactions are purchases from a licensed dealer (Miller et al. 2017).⁷ Rather, most of the transactions (70%) that arm offenders are with social connections (friends and family) or street sources. The latter may include fences, drug dealers, brokers who sell guns, and gangs. It should be noted that street sources are not necessarily strangers—the survey questionnaire does not ask. And although most of these transactions were illegal for some reason (including the criminal record of the recipient), not all of them were.

The types of transactions that arm offenders are documented in **Table 2**. Cash purchases and trades constitute approximately half of all transactions. Approximately one in six are temporary arrangements involving a gun owned by someone else, and take the form of borrowing, renting, or holding the gun. Perhaps surprisingly, one in ten guns are gifts, but gifting of guns is also quite common in the population at large.

Finally, the respondent admitted to having directly stolen the gun in only a small fraction of cases (~4%), so it appears that theft is of little significance as an immediate source of guns to offenders. It should be noted that theft may play a greater role at an earlier stage of moving guns from the licit to the illicit sector. The discussion of theft is continued below.

⁷The 2015 National Firearms Survey found that 64% of recent transactions were purchases from a gun store. The corresponding statistic from the 1994 National Survey of Private Ownership of Firearms in the United States was 60% (Cook & Ludwig 1997), suggesting that the general market has not changed much in this respect (Cook 2017).

Table 2 Type of transaction, guns used in current crime, males age 18–40 with recent sentence federal survey data weighted to be nationally representative.^{a,b} Reprinted from Cook et al. (2015)

	SISCF	SIFCF	SILJ
	State prisoners, %, n = 438	Federal prisoners, %, n = 155	Jail inmates, %, n = 145
	2004*	2004*	2002
Purchased or traded	51.9	49.0	50.4
Theft	4.3	1.3	4.0
Rent, borrow, hold for someone	15.8	16.8	18.9
Gift	12.1	9.0	9.0
Other	8.8	16.1	14.4
Refused, don't know, blank	7.1	7.8	NA
Total	100.0	100.0	100.0

^aSample restricted to males age 18–40 who are in the first two years of their prison term, and who admit in the survey interview that they had a gun at the time of the crime (Bur. Alcohol Tob. Firearms Explos. 2011).

^bData downloaded from <http://www.icpsr.umich.edu>. Refer to ICPSR 4572.

Abbreviations: SIFCF, Survey of Inmates in Federal Correctional Facilities; SILJ, Survey of Inmates in Local Jails; SISCF, Survey of Inmates in State Correctional Facilities.

The results from this national survey received qualitative support from the results of a recent survey of inmates of Cook County Jail (Cook et al. 2015a). The gun transactions in which the respondents were involved were typically with family and acquaintances, illustrating the importance of social network as the source of guns (Braga et al. 2010, Papachristos 2009, Papachristos et al. 2015, Papachristos & Wildeman 2013). Relatedly, guns do not change hands in the equivalent of open-air drug markets; buyers and sellers are likely to know each other or at least to have an acquaintance in common who can vouch for them. The logical implication is that the underground gun market is thin and balkanized, with great variability in price and other transaction costs.

Thus, within the same city, some individuals may have ready access to guns while others have no idea how to find one (Cook et al. 2007). That observation may explain the disagreement among observers as to whether guns are readily available in a particular jurisdiction; the right answer may be that guns are readily available to some criminal offenders and not to others. Furthermore, for those buyers who are connected and can access the underground market, the economist's famous law of one price does not apply; similar guns sell at a wide range of prices (Hureau & Braga 2016).

Theft and Other Intermediate Links in the Supply Chain

The role that theft plays in supplying offenders with guns, either directly or indirectly, is far from settled. Kleck & Wang (2008) assert that theft is central to criminal gun acquisition, but although that is plausible, much of the evidence suggests a less important role.

A conservative estimate is that 250,000 firearms are stolen each year. The ATF reports 173,675 guns were reported “lost or stolen” by private individuals to National Crime Information Center in 2012, as well as 16,667 firearms from federally licensed dealers, for a total of around 190,000 (Bur. Alcohol Tob. Firearms Explos. 2013). Presumably, some thefts are not reported. Based on the National Crime Victimization Survey, the Bureau of Justice Statistics estimates that an average of 232,400 firearms were stolen each year from households during the period 2005–2010 (Langton 2012). The 2015 National Firearms Survey generates a higher estimate (Miller et al. 2017). Given that there are approximately half a million robberies, assaults, and murders committed with guns

each year, it is reasonable to say that a quarter million guns stolen are enough to arm all those who commit violent offenses (Kleck 1997). However, as noted above, the best available evidence from offender surveys indicates that only 4% of recently incarcerated prisoners obtained their guns directly by theft.

In part, the controversy harks back to the prominent survey of 2,000 prisoners conducted by Wright et al. (1983), from which they estimated that 32% of guns acquired by their respondents reported stealing them. But for a variety of reasons, the much smaller estimate appears more credible. The Wright-Rossi survey was based on a sample of convenience, not a representative sample of prisoners. The estimates reported in **Table 2** are from a survey of a representative sample conducted by the Census Bureau on behalf of the US Department of Justice, with the sample pruned to get an estimate based only on recently admitted prisoners (and hence a reference to a particular point in time). As mentioned, other recent inmate surveys find that when inmates are asked about where they themselves obtained their guns, relatively few mention theft.

But accepting that conclusion, there remains a possibility that theft plays an intermediate role. Most of the reported theft is by burglary and theft from vehicles. Even if burglars and thieves do not themselves use the stolen guns to commit violent crime, they may sell them into an underground market that is a source of guns to gang members or other violence-prone offenders. Alternatively, burglars dispose of guns the same way that they dispose of other stolen merchandise, through fences, who in turn sell to whoever is interested in buying merchandise at a discounted price. Very little is known about the post-theft supply chain in American cities (Morselli & Blais 2014). Unfortunately, there is little basis for saying whether an effective crackdown on gun theft would have much effect on gun availability to violent offenders.

Another channel by which guns are diverted from the licit market to offenders is systematic trafficking. Trace data provide some measure of trafficking for jurisdictions that regularly submit recovered guns for tracing. Generally speaking, states that have relatively stringent regulations on gun transactions have a relatively high percentage of their crime guns imported from another state. Those findings, developed in the section titled Evidence of Effective Regulation below, are supplemented by an analysis of ATF investigation files (Braga et al. 2012). The general picture is of guns flowing from less regulated to more regulated states, typically in small shipments. There is no indication of large crime organizations playing an important role, perhaps because anyone with suitable connections in an unregulated state is in a position to obtain guns and transport them to their home city where, again with the right connections, they will be worth more. Again, relevant information is very sparse about these illegal conduits.

GUN AVAILABILITY AND LIKELIHOOD OF CRIMINAL MISUSE

It seems reasonable to believe that guns are readily available in the United States, and for that reason it would be difficult to prevent a motivated person, whether legally qualified or not, from obtaining one (Jacobs 2002). That view is reinforced by the recent Supreme Court finding of a personal right to gun ownership, which places a Constitutional limit on the types of regulations that government may impose on gun ownership and transactions. The implication appears to be that an effort to regulate gun transactions is futile if the goal is to reduce gun use in crime. But this is a testable proposition, and some evidence suggests otherwise. This section reviews findings suggesting that gun use in crime is responsive to the observed variation in one indicator of availability, gun prevalence, both over time and across jurisdictions. The next section focuses specifically on evaluations of regulations intended to reduce availability to offenders.

In a market context, it is natural to equate the notion of availability with money price. But for durable items such as guns, the current prevalence of ownership is relevant as an indicator of the

portion of the population with immediate availability at zero cost. More important, the prevalence of gun ownership may also affect the availability of guns to those who do not currently possess one, where availability is understood to include not only the money price but other transaction costs.

Availability as Prevalence

Rates of gun ownership differ widely across regions, states, and localities—from 13% in Massachusetts to 60% in Mississippi, according to one set of estimates (Azrael et al. 2004). Current gun ownership influences the use of guns in crime directly—a gun in the home increases the chance that violent domestic relationships will end up involving gunplay and result in death (Campbell et al. 2003). But the prevalence of guns may also affect the transaction costs of guns to those who are disqualified from buying one at a store. In a community in which guns are prevalent, it is more likely that an offender who is seeking a gun knows someone, or knows someone who knows someone, who is willing to lend, sell, or share a gun. It is plausible that potential connections of that sort are likely to reduce search time for a gun, or reduce the money price, because a personal connection may reduce the risk premium. Another channel of guns to offenders may be sensitive to prevalence of guns: Burglaries and thefts from vehicles are more likely to include a gun as part of the loot (Cook & Ludwig 2003). Regardless of the scenario, this line of reasoning suggests that violent crimes in gun-rich communities are more likely to involve guns than in other communities.

A test of the hypothesis that greater gun prevalence induces greater criminal gun use requires a measure of the prevalence of gun possession, a measure that is valid for comparing jurisdictions at a point in time and tracking movements over time. It turns out that in many respects the best index is the percentage of suicides with guns (Azrael et al. 2004, Kleck 2004). Several studies have investigated the effect of gun prevalence [measured by this proxy of firearm suicide divided by suicide (FSS)] and homicide rates across counties (see, for example, Cook & Ludwig 2002, Miller et al. 2002).

The interpretation of such correlational results is in some doubt because of the difficulty of isolating a causal mechanism from the analysis of cross-section data. Gun-rich jurisdictions, such as Mississippi, systematically differ 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 other characteristics, 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 (Glaeser et al. 1996), suggesting that the list of available control variables is inadequate to the task. Also unclear is whether widespread gun ownership is the cause or effect of an area's crime problem, as high crime rates may induce residents to buy guns for self-protection. These same concerns are arguably even more severe with cross-national comparisons at any point in time.

Some of the problems with cross-sectional 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 from existing data sources. But by comparing changes rather than levels, we implicitly control for many unmeasured differences across states that are relatively fixed over time, such as a "Southern culture of violence" (see Butterfield 1997, Loftin & McDowall 2003). The best available panel data evidence suggests that more guns lead to more homicides, a result that is driven entirely by a relationship between gun prevalence and homicides committed with firearms; there is little association between gun prevalence and non-gun homicides or other types of crimes (Cook & Ludwig 2006, Duggan 2001).

It is worth emphasizing that the conclusion from this line of research is not "more guns, more crime." Gun prevalence is unrelated to the rates of assault and robbery (Cook 1979, Cook

& Ludwig 2006; see also Kleck & Patterson 1993). The strong finding that emerges from this research, as discussed above in the section titled Why and How the Type of Weapon Matters, is that gun use intensifies violence, making it more likely that the victim of an assault or robbery will die. The positive effect is on the murder rate, not on the overall violent-crime rate.

These findings raise a basic question: Are there feasible methods for reducing overall gun prevalence? Some jurisdictions have adopted regulations that were intended to reduce overall handgun prevalence, either through a near ban on acquiring such guns (Chicago, District of Columbia) or by restrictive licensing (New York City, Massachusetts). Handgun bans were ruled unconstitutional by the US Supreme Court in *McDonald v. Chicago* (2010), which extended the Second Amendment ruling in *District of Columbia v. Heller* to states and localities. In any event, it is not clear whether the ban in either Chicago or Washington, DC, was effective in reducing overall prevalence (Cook & Ludwig 2006). Both jurisdictions border states where guns are largely unregulated.

Money Prices

Although handgun bans are unconstitutional, it may be possible to influence prices in the primary market through excise taxes or regulations, for example, the ban on imports of small, cheap handguns known as Saturday Night Specials that is part of the Gun Control Act of 1968. One careful analysis of retail price trends for guns finds that a downward trend in the prices of the cheapest pistols coincided with the epidemic of youth violence in the late 1980s (W.A. Bartley & G.F. Williams, unpublished results). But what is the evidence that retail prices are linked to the prices or other availability measures in the market for guns that supply offenders?

There has been remarkably little research on pricing in the underground gun market. An important exception is the new analysis by David Hureau & Anthony A. Braga (unpublished results) of guns purchased by gangs in Boston. Through his personal connections with gang members, Hureau was able to get detailed information on make, model, and condition of a number of these guns and compare the price paid by the gang with the Blue Book price that reflects prices in the licit market. The two sets of prices are positively correlated for cheaper guns, i.e., those valued at less than \$350 in the licit market, with a large markup and considerable variance. The markup, which averages out to be a factor of three, may be higher than in most cities because Boston has one of the lowest gun ownership rates of any city in the nation. But the fact is that comparable data are not available for other cities.

The variability of money prices extends the finding that transaction costs differ widely within the same jurisdiction. In a well-functioning market, the law of one price prevails. But in a thin market where trust is important and gun transactions are often based on personal connections, the equilibrating force is weak.

EVIDENCE OF EFFECTIVE REGULATION

As we have seen, current regulations are effective in keeping offenders from buying their guns from retail dealers and in influencing interstate trafficking patterns and other aspects of the underground gun market. One consistent pattern is that guns recovered in states that have relatively tight regulations are more likely to come from out of state and, in particular, from states with lax regulations (Knight 2013). For example, 85–90% of the guns recovered in New York City were first sold in another state and, for the most part, in lax states along the eastern seaboard (the I-95 corridor), such as Virginia, Georgia, and Florida (Smith 2016).

Interstate gun flows change in response to changes in regulations. A notable example is the dramatic change in sources of crime guns to Chicago following the adoption of the Brady Act

in 1994; the percentage coming from the Deep South states, where gun stores for the first time were required to run background checks, dropped abruptly by 15 points, replaced by in-state sales (Cook & Braga 2001). Other examples of how interstate movements respond to changes in state regulations have also been well documented (Braga et al. 2012). Braga (2017) uses 1981–2015 Boston data to strengthen these analyses. The likelihood that a Boston handgun would be traced to a Virginia retailer nearly doubled after Virginia repealed its law limiting consumers to one handgun per month. Such evidence helps document the importance of systematic trafficking into jurisdictions with tight controls.

This same evidence is suggestive of the importance of retail dealers as the source of guns to traffickers. In Virginia, for example, private sales are largely unregulated, so a reduction in trafficking from Virginia attributed to the old one-gun-a-month regulation implies both that the dealers were compliant with that provision and that collectively they were an important source of guns to traffickers. Indeed, it appears that federal firearms licensees (FFLs) are largely compliant with federal and state regulations or at least sufficiently compliant as to profoundly influence the channels by which guns are obtained by disqualified offenders. That is rather remarkable, given the light touch of the ATF's regulatory efforts. Of course, there are exceptions, as documented most directly by ATF investigations (Braga et al. 2012) and by some experimental studies (Sorenson & Vittes 2003, Wintemute 2010) and regulatory interventions (Webster et al. 2006). Wintemute's (2013) Firearm Licensee Survey asked respondents what percentage of licensees might be bad apples who participate knowingly in illegal gun sales. The median response was 3 percent.

The bottom-line question is whether regulatory effects on transaction patterns translate into reduced gun violence. A noteworthy example is the Brady Act, which imposed a nationwide requirement that FFL dealers conduct background checks of would-be buyers. Since the Brady Act was fully implemented in 1998, three million transactions have been blocked as a result of these background checks, for the most part because the customer had a felony conviction. But according to one evaluation, the direct effect of the Brady Act on homicide rates was statistically negligible (Ludwig & Cook 2000). Closing the secondary-market or private-sale loophole may be a necessary precondition for effective screening (Cook & Ludwig 2013).

As of this writing, 19 states require a background check for most private sales of handguns (and in some cases long guns); these checks are accomplished either by requiring buyers to obtain a permit from local government authorities or by mandating that the transaction be processed by a licensed dealer. This sort of universal background check requirement was proposed by the Obama administration following the Sandy Hook massacre of schoolchildren in 2012 but was narrowly defeated in the US Senate.

The strongest evidence that a permit system can be effective comes from an evaluation of the repeal of the Missouri law requiring that all handgun buyers obtain a permit from the sheriff. After the repeal, there were measurable changes in the transaction channels that were arming criminals and, more importantly, a spike in firearms violence (but no change in non-firearms violence) that was unique to Missouri (Webster et al. 2014). The involvement of local authorities in the Missouri law may have been key to its effectiveness; so far, none of the laws that simply require private transactions to be channeled through FFLs have been shown to be effective in reducing gun violence.

Strong evidence suggests that expansions in the categories of people disqualified from owning guns could save lives. In 1991, California implemented legislation that disqualified those convicted of violent crimes at the misdemeanor level. A causal analysis by Garen Wintemute and colleagues found a substantial reduction in violent recidivism by those convicted of misdemeanor violence after the gun ban than immediately before (Wintemute et al. 2001). Similarly, in 1996 the Gun Control Act was amended by Congress to expand the federal ban on felons to include those

convicted of misdemeanor-level domestic violence. The ban was implemented at different times in different jurisdictions due to legal challenges, which created a natural experiment for evaluating its effectiveness. Using this source of variation, Raissian (2016) found that the ban reduced domestic murders involving guns, with no effect on non-gun murders.

Another area of gun regulation that has been in flux is the disqualification of those who are mentally ill or incapacitated. The Gun Control Act bans gun possession by those who have been “adjudicated as a mental defective,” an unfortunate phrase that among other things refers to individuals who have at some point been involuntarily committed to a mental institution. The background checks conducted by gun dealers tap into several databases kept by federal authorities, but most states have not provided the necessary information on a consistent basis. One exception has been Connecticut, which in 2007 began reporting relevant records of mental illness to the federal National Instant Criminal Background Check System (NICS). One analysis found that disqualified individuals were less likely to be arrested after the data transfer made their history accessible as part of the NICS check (Swanson et al. 2013).

In sum, there are various examples in which gun regulations have been carefully evaluated and shown to be effective at reducing criminal misuse of firearms. The lesson is not that all such regulations are effective but rather that regulations can be effective and should not automatically be written off as futile given the alleged efficiency of the underground market. But there is no such thing as a free lunch when it comes to regulatory effectiveness, and, in particular, jurisdictions that adopt regulations but do not enforce them will be disappointed (Braga & Hureau 2015).

CONCLUSIONS

Federal regulations allow every American adult who does not have a serious criminal record or another specific disqualifying condition to possess all of the firearms they want. In fact, there are something like 270 million firearms in private hands, and one out of every three households has at least one. With firearms so plentiful, what realistic scope is there for market regulations to reduce the proportion of violent offenders who are armed? This review suggests that it is useful to approach this question from the perspective of transactions and markets rather than simply observing the stock in private hands.

The systematic study of guns and violence over the past 50 years has been productive but still leaves us far short of a reliable basis for predicting the crime-related consequences of changing regulations or the enforcement effort. There is enough evidence of regulatory effectiveness to rule out the extreme version of the futility argument. State legislatures and local jurisdictions continue to innovate in this arena and provide an opportunity for learning from experience.

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