



The Last Link: from Gun Acquisition to Criminal Use

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Abstract Guns that are used in crime and recovered by the police typically have changed hands often since first retail sale and are quite old. While there is an extensive literature on “time to crime” for guns, defined as the elapsed time from first retail sale to known use in a crime, there is little information available on the duration of the “last link”—the elapsed time from the transaction that actually provided the offender with the gun in question. In this article, we use data from the new Chicago Inmate Survey (CIS) to estimate the duration of the last link. The median is just 2 months. Many of the gun-involved respondents to the CIS (42%) did not have any gun 6 months prior to their arrest for the current crime. The CIS respondents were almost all barred from purchasing a gun from a gun store because of their prior criminal record—as a result, their guns were obtained by illegal transactions with friends, relatives, and the underground market. We conclude that more effective enforcement of the laws governing gun transactions may have a quick and pervasive effect on gun use in crime.

Keywords Time to crime · Gun violence · Underground gun markets · Inmate survey · Chicago

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Introduction

With approximately 300 million guns in private hands [1], it is natural to assume, and frequently asserted, that most every American adult has ready access [2]. Yet, in practice, gun possession is quite concentrated: only about 25% of adults own one or more guns, and on average, they own five [1]. The large majority are currently unarmed and would have to buy, borrow, or otherwise transact for one if they wanted to use a gun in crime (or, of course, for any other purpose).

Federal and state regulations place legal limits on gun transactions with the primary goal of reducing criminal use of guns. Every transaction with a legitimate gun dealer (where most Americans in fact obtain their guns) entails a background check to determine if the would-be buyer is disqualified by reason of his or her criminal history or other reason [1]. As a result, relatively few active criminals buy from gun stores, but rather obtain firearms from their social connections or make other off-the-books transactions that constitute the underground gun market [3, 4]. Most such transactions are illegal, but enforcement is scanty. What could be accomplished by more vigorous enforcement?

To sharpen this question, consider this thought experiment: what if all illegal transactions involving firearms had been stopped for the last 6 months? What effect would that have had on the rates of gun robbery, gun assault, and gun murder? (It is logically equivalent to ask what percentage of those individuals who did commit a violent crime with a gun in the 6 months were in possession of a gun at the beginning of that period, or

were entitled to acquire one legally?) The answer is not just of academic interest—it would provide an indication of the potential impact on violent crime of a crackdown on illegal firearms transactions. If gun crimes are typically committed by offenders who remain armed for long periods of time, then the effect of the crackdown would be slow to emerge. But if gun crimes tend to follow quickly after a transaction that arms the offender, then the effects of greater enforcement would be correspondingly quick and far reaching.

The current analysis does not provide a precise answer for the thought experiment, but does offer relevant evidence. Our data are primarily taken from a recent survey of Chicago-based gun-involved offenders serving prison sentences in Illinois: the Chicago Inmate Survey (CIS). The survey questionnaire included questions about the guns in the respondents' possession at the time they committed the crime that led to the current prison sentence. Based on their responses, we conclude below that the elapsed time from acquisition to this particular criminal use tends to be brief, with a median of 2 months. More directly to the point of our thought experiment, more than 42% of these CIS respondents were not in possession of any gun 6 months before their arrest. Furthermore, most or all of the transactions that provided survey respondents with guns were illegal, in that they violated state or federal regulations. The suggestion here is that more effective enforcement of existing regulations could have had a quick and substantial effect on gun crime in Chicago.

Time to Crime Measured from Trace Data

These results extend the existing literature on the underground gun market [3, 4]. In particular, there have been a number of reports in the literature of “time to crime,” usually based on data from crime-involved guns recovered by the police [5–7]. It is important to understand the difference between the “time to crime” measure and the duration measure that is the focus of this study. The “time to crime” is measured as the elapsed time from first retail sale to when it was known to be used in crime. The date of first retail sale is determined by tracing the gun through the distribution chain (beginning with administrative records on import or manufacture) to sale by a licensed retail dealer. Police departments, including Chicago's, routinely submit identifiers of recovered guns to the Bureau of Alcohol, Tobacco, Firearms, and

Explosives (ATF), which attempts to conduct the trace through available records [8].

The analysis of these trace data has documented the fact that guns used in crime tend to be quite old in Chicago [9]. Current data provided by the Chicago Police Department (CPD) data confirms the earlier published findings [9]. In particular, of 15,930 guns recovered by CPD in connection with an arrest of someone under 40 between 2009 and early 2016, and submitted to ATF for tracing, 67% (10,596) were successfully traced to the first sale and had complete information; the average age of guns that were traced was 9.2 years, with only 6.6% less than 6 months old. Had it been possible to trace all the guns, the average age might well have been older yet, since older guns tend to be relatively more difficult to trace.

The fact that the average crime gun is 9 years old or older of course does not indicate how long it has been in the possession of the person from whom it was confiscated. In fact, only 7.3% of the traced guns were recovered from the individual who first bought the gun. Indeed, the supply chain for guns used in crime is likely to include multiple transactions [7, 10]. The timing of the last transaction before criminal use (the “last link”) is the focus of the current study. As a matter of logic, “time to crime” is an upper bound on the duration of the “last link,” and the difference can be considerable: A 20-year-old gun may be in the possession of the offender for only a few days before being used in robbery or assault.

ATF trace data are of little use in characterizing the last link in the supply chain of guns to crime. In the handful of states, including California and Massachusetts, that require all gun transactions to be registered with the state, it is possible to track some secondary transactions [11, 12]. A careful analysis of guns recovered by the Boston Police Department found that of those that were traced to first retail sale in Massachusetts, only 16% were in the hands of the original buyer [7]. Another 24% were found in the state registration data to have undergone one or more additional transactions. For these guns, the state registration of secondary transfers provided the BPD with a clearer picture of the gun's path, although that registration data still stopped short of the current possessor in most cases. Thus, even in a state that does require all transactions to be registered, the administrative registration data were usually not of direct use to identifying the current owner of a crime gun.

Indeed, because the last transaction before criminal use is typically illegal and off-the-books, most of the available information on such transactions is taken from interviews of gun offenders, rather than from administrative records. Our data source for this analysis, the Chicago Inmate Survey of Gun Access and Use (CIS), is by no means the first survey of inmates to include items on how and where they obtained any guns that they possessed before their incarceration. Most notable is a series of nationally representative sample surveys of inmates conducted by the Census Bureau on behalf of the US Department of Justice [3]. The most recent of these occurred in 2002 (for jails) and 2016 (for state and federal prisons) [13, 14]. In addition, several one-off inmate surveys have been conducted by researchers, typically using samples of convenience [3, 15]. These survey data help establish the sources of guns to criminals (retail outlets, acquaintances, the street, gun shows, and so forth), and also the types of transactions (purchase, loan, theft, gift). But such surveys have typically not included items on how long the respondent had been in possession of the gun used in crime.

Here, we report CIS results regarding when and how the respondents obtained the guns in their possession at the time of the crime that led to their current sentence. We explore when respondents report obtaining their most recent gun or guns and whether they were legally entitled to acquire or possess a gun at the time.

The Chicago Inmate Survey of Gun Access and Use

The CIS included interviews with 221 male prison inmates in seven Illinois Department of Corrections prisons. Interviews were conducted between March and September, 2016. Respondents were asked a series of questions regarding how they acquired and used guns, as well as their observations on gun markets and gun violence in their neighborhoods. A final report provides details on the survey and data collection process summarized here [16].

We developed a semi-structured, 48-page survey instrument, based in part on the experience with an earlier survey of gun-involved inmates of Cook County Jail (CCJ) [3]. Among other matters, the survey instrument included items on guns that had been in the respondents' possession during the 6 months prior to the arrest that led to conviction and current prison sentence. Five administrative datasets were linked with the CIS sample, and were utilized to validate the interviews: (1)

Sentencing data from the Illinois Department of Corrections, (2) Disposition data from Cook County Courts, (3) Arrest data from the Chicago Police Department (CPD), and (4) Gun-trace data from CPD.

Prison inmates were considered eligible for selection to participate in the interviews if they were males who were serving time for a gun- or weapons-related charge and had not been in prison too long; we stipulated that the current arrest must have occurred no more than 3 years before the interview. The lists of such inmates were provided by the Illinois Department of Corrections. Seven IDOC facilities were included in the study. The research team consulted with wardens at each prison about arranging interviews with the list of eligible inmates. The wardens excluded from the list anyone housed in segregation, as well as those diagnosed with a mental disorder, or identified as posing a danger to the interviewer, or any who had been transferred to another facility. The remaining inmates were then notified of the opportunity to participate in a confidential survey of safety and violence in Chicago neighborhoods, for which they would be paid \$10 to their commissary account. Those who agreed then had a private meeting with our interviewer who further described the study and obtained written consent. The interview lasted up to 1 h. At no point did the interviewer learn the identity of the respondent.

Survey procedures were designed to ensure the safety of respondents and to ensure that their responses would remain confidential. Each inmate on the list was assigned a random number; the names associated with these numbers were kept secure and not available to the interviewers or the criminal-justice authorities. Furthermore, the names were never listed in any dataset that contained the interview responses. The administrative records were obtained using the respondents' names linked to their random case ID, but these names were expunged after the research team linked the administrative records to the case IDs and before linking the administrative data to the survey responses.

The research team partnered with Research Support Services Inc. (RSS) for assistance with instrument design, interviewing, and coding of closed-ended items. RSS conducted an in-house training for the seven interviewers, who were all female. The overall response rate was 53.3%, with most nonresponse occurring following the initial invitation

to take part. Almost all subjects who agreed to meet with the interviewer consented and participated in the interview.

The initial sample was selected in part because their criminal histories indicated they had been involved with guns in Chicago and hence would have first-hand knowledge of the underground market for guns and ammunition in that city. For 70% of the sample, the current conviction had included a gun-related charge; only 3% of the respondents had never been arrested for a gun. Table 1 provides gun-related charges for their most recent conviction (leading to the current prison term). Note that most of these gun-related convictions are for illegal possession or use, rather than for the commission of a violent crime such as assault, robbery, or murder. On the other hand, 75% (112/150) of respondents with a current conviction for a gun charge had previously been arrested for a violent crime.

We make no claim that the respondents are a representative sample of gun-involved offenders. To get some sense of how they might relate to that population, we compared known characteristics of our entire sample of CIS respondents with that of all men aged 18 and over from whom the CPD had confiscated a gun in the relevant study time period (2013–2016). (These gun confiscations are usually in connection with an arrest for illegal possession or carrying.) The inmate sample is similar with respect to age distribution (68% under 30 years old for CIS sample, 67% for CPD sample). Both samples are predominantly Black (90% vs. 83%)

Table 1 Rs highest gun-related charge for current sentence ($n = 155$ inmates who possessed a gun at time of arrest)

| | # Rs | Percent |
|------------------------------|------|---------|
| Illegal gun possession | 97 | 62.6 |
| Aggravated discharge firearm | 8 | 5.2 |
| Attempted armed robbery | 3 | 1.9 |
| Armed robbery | 18 | 11.6 |
| Armed violence category 1 | 1 | 0.6 |
| Armed habitual criminal | 21 | 13.5 |
| Gunrunning | 1 | 0.6 |
| Attempted murder | 2 | 1.3 |
| Second-degree murder | 1 | 0.6 |
| Murder | 3 | 1.9 |
| Total | 155 | 100.0 |

Source: Publicly available Illinois Department of Corrections Sentencing Data

or Hispanic (9.5% vs. 13%). But the CIS sample members are much more likely to have a known gang association and tend to have a more extensive criminal record. For the CIS sample, fully 72% had had ten or more arrests, compared to “just” 45% of the CPD sample.

Eligibility for Legal Possession of a Gun

At the time of the CIS interviews, all respondents were in prison following a conviction for a felony. That felony conviction ensures that they will not be eligible to legally possess a gun following their release, since felons are banned from gun acquisition and possession by both federal law and Illinois law. But it is possible that some of them would have been eligible to acquire and possess a gun prior to their current arrest and conviction. To determine eligibility, we analyzed the administrative data linked to each respondent.

Eligibility is regulated by both federal and state law. Illinois requires that anyone wishing to acquire or possess a gun must have a Firearm Owners ID card (FOID) issued by the state following an application and background check. To qualify for the FOID, applicants must be US citizens, age 21 or older, with no felony conviction or conviction for domestic violence [17]. Individuals who have been a patient in a mental institution are disqualified for 5 years following release. Of the 221 respondents in the CIS sample, 143 (65%) were disqualified due to a prior felony conviction in Cook County. Of the remainder, 42 (19%) were disqualified because they were not yet 21, and 18 more appear to have had a disqualifying felony conviction outside of Cook County. The remaining 8 (4% of total respondents) may have been eligible for a FOID, but our limited access to criminal records data leaves open the possibility that they too were ineligible. (For example, we did not have access to data on misdemeanor domestic-violence convictions, or convictions outside of Illinois, or commitment to a mental institution, any of which would be disqualifying.) Further, none of the remaining 8 respondents who may have been eligible reported acquiring a gun from a retail supplier. The bottom line is all or almost all of the respondents were disqualified from acquiring or possessing a gun in Illinois at the time of their current arrest. Yet, most of them had extensive involvement with guns at that time.

Table 2 Gun ownership by CIS respondents (*n* = 221)

| Gun ownership | Yes | No | Other |
|--|-----------|----------|--------|
| Ever owned? | 184 (83%) | 33 (15%) | 4 (2%) |
| Owned within 6 months prior to arrest? | 169 (76%) | 50 (23%) | 2 (1%) |
| Possessed at time of arrest | 155 (70%) | 62 (28%) | 4 (2%) |

Source: Chicago Inmate Survey

Note: “Other” category includes responses that are missing, refused, or do not know

Gun Access, Possession, and Use

The CIS asked a number of questions about illegal or otherwise problematic behavior. So, it is reasonable to ask to what extent the responses were truthful. To some extent, we were able to compare individual responses to administrative records. Those comparisons were generally reassuring about the accuracy of the self-report data.

For example, we checked their response to the question of whether they had ever owned a gun against gun-related items on their criminal record. In all, 83% said yes, they had owned a gun at some point. Among those who said no or refused to answer, six (3% of the total sample) had not been arrested for a crime involving a gun, but the remainder had been; that group, one out of seven respondents, were most likely misrepresenting their involvement with guns. Of course, surveys of the general public on sensitive topics (including gun ownership) also engender false responses [18]. The great majority of the CIS respondents responded accurately, at least on this item.

While 83% said that they had had a gun at some time, a somewhat smaller percentage, (76%), indicated that

Table 3 Gun acquisition methods

| Acquisition method | Primary gun | Up to three guns in 6-month period |
|-------------------------------|-------------|------------------------------------|
| Purchase or trade | 82 (54%) | 188 (59%) |
| Gift | 21 (14%) | 34 (11%) |
| Found | 11 (7%) | 16 (5%) |
| Borrowed or shared | 19 (13%) | 45 (14%) |
| Stole | 9 (6%) | 22 (7%) |
| Other | 9 (6%) | 11 (3%) |
| Total | 151 (100%) | 316 (100%) |
| Missing, refused, do not know | 4 | 6 |

Source: Chicago Inmate Survey

they had been in possession of a gun within 6 months of their current arrest. The results from the relevant survey items are tabulated in Table 2.

Recent Transactions

CIS included a series of questions for respondents who indicated that they had been armed during the 6 months prior to their current arrest. These explored transactions by which they had obtained the gun or guns possessed during that period. Table 3 reports the method of acquisition. The second column tabulates responses regarding the gun that they had in their possession at the time of their current arrest, which is denoted the “primary gun.” (Those who indicated they had no guns were excluded, so each respondent is represented at most once.) The third column summarizes the method of acquisition for all the guns (up to three per respondent) respondents owned during that 6-month window.

Table 4 reports the sources of these guns and is organized the same way as Table 3.

The results in Table 3 indicate that a majority of guns were obtained by purchase or trade. Other prominent types of transactions are sharing or borrowing the gun, or obtaining it as a gift. Very few respondents indicated that they had stolen the gun. From Table 4, we learn that a majority of transactions occur within the social network, with a friend, or acquaintance [19, 20]. Also important are “street” sources. Only 1% of all the guns were acquired at a store, and none of the respondents mentioned a gun show or the Internet as a source. These findings are similar to those from an earlier survey of gun-involved inmates of Cook County Jail [3].

Table 4 Gun acquisition sources

| Source | Primary gun | Up to three guns in 6-month period |
|-------------------------------|-------------|------------------------------------|
| Friend or acquaintance | 66 (57%) | 150 (58%) |
| Stranger/on the “street” | 23 (20%) | 39 (15%) |
| Gang member | 10 (9%) | 34 (13%) |
| Family member | 2 (2%) | 9 (3%) |
| Gun store | 2 (2%) | 3 (1%) |
| Other | 13 (11%) | 24 (9%) |
| Total | 116 (100%) | 259 (100%) |
| Missing, refused, do not know | 39 | 73 |

Source: Chicago Inmate Survey

Table 5 Elapsed time from gun acquisition to current arrest

| Elapsed time | Primary gun | Up to three guns in 6-month period |
|--------------------|-------------|------------------------------------|
| Same day | 9 (6%) | 10 (3%) |
| ≤ 5 days | 29 (19%) | 38 (12%) |
| ≤ month | 58 (39%) | 84 (27%) |
| ≤ 2 months | 78 (52%) | 116 (37%) |
| ≤ 6 months | 102 (68%) | 172 (54%) |
| ≤ 1 year | 122 (81%) | 227 (72%) |
| Total | 150 (100%) | 316 (100%) |
| Missing or refused | 5 | 16 |

Source: Chicago Inmate Survey

Of greatest interest to the current inquiry are respondents' answers to the question "How long did you have that gun prior to your arrest?" for each of the up-to-three guns under discussion. Table 5 and Fig. 1 summarize the elapsed time from gun acquisition to the current arrest. For the primary gun that was in the respondent's possession at the time of the arrest, the median time since acquisition was just 9 weeks. Fully 19% had had the gun for less than 5 days. Thus, the last link typically has a brief duration.

Of course, some respondents had had other guns during that 6-month period. As noted above, we asked respondents to provide information on up to three guns (including the primary gun if there was one) possessed during that period. Given our thought experiment, it is of particular interest to know how many had at least one gun 6 months prior to their arrest. To summarize, of the 150 respondents who said that they had one or more guns at the time of their arrest and provided information on acquisition, 48 (32%) reported that they already had

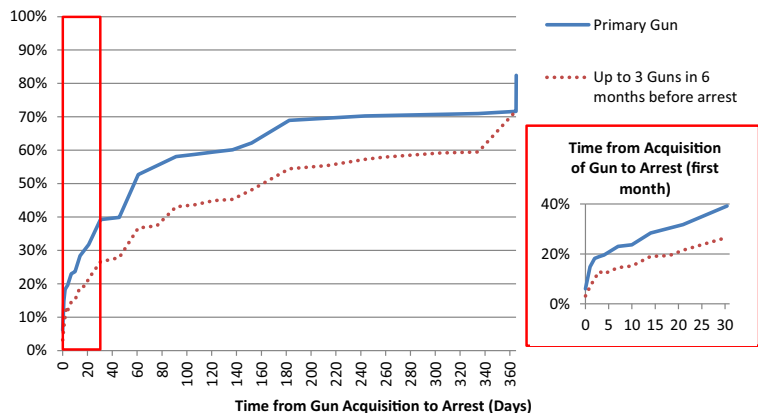
their primary gun 6 months earlier; of the remaining 102 of these 150 respondents, 39 indicated that they had another gun 6 months earlier. So, of all those 150 who were armed at the time of their arrest, 87 (58%) had also been armed 6 months earlier, while 63 (42%) had not.

Finally, given the particular interest in the use of guns in violent crime, we analyzed the distributions of elapsed time (from the acquisition of the primary gun to the current arrest) for partitions of the 150 respondents. First, we partitioned the 150 according to whether their current conviction offenses included a violent offense ($N=33$) or not ($N=117$). Using a bootstrap procedure, we found no statistically significant difference in the median elapsed time for the two groups. Second, we partitioned the 150 according to whether the respondent had a criminal history of one or more violent arrests ($N=112$) or not ($N=38$). Again, using the bootstrap procedure, we found a notable and statistically significant difference ($p < .05$); 61 days for the violence-arrest group, versus 91 days for the remainder. This latter result suggests that the time to crime for offenders with violence arrests was still less than for the others.

Discussion

We motivated this analysis with a thought experiment. Suppose illegal gun transactions had stopped 6 months ago. How might that have affected rates of gun assault, robbery, and murder? The evidence presented here is limited to one jurisdiction, Chicago, and utilizes a sample that, while consisting of gun-involved offenders, is not necessarily representative of the adult population of Chicago offenders who commit gun assault, murder,

Fig. 1 Duration of the last link.
Source: Chicago Inmate Survey



and robbery. The majority of CIS respondents were not in prison for a violent crime, but rather for a mix of crimes that included felonious possession, carrying, or use of a gun. On the other hand, our records search found that 75% of the 150 respondents who provided data on the last link had been arrested for a violent crime at some time and had other indications of being at risk for gun violence (gang membership, gunshot victimization).

The results of the CIS suggest three conclusions about our respondents: First, most of those who commit a serious crime (including everything from felonious possession to murder) with a gun were not in possession of that gun as recently as 6 months before. Half of them did not have the gun even 2 months before the crime. For these offenders, criminal use tends to follow closely on the transaction by which they acquire the gun. Second, a large minority (42%) of those who had a gun at the time of their arrest were not armed with any gun 6 months earlier. Third, few if any of them were eligible to obtain a gun legally. Had illegal transactions unexpectedly been blocked, two thirds would not have had the gun they ended up using, and 42% would not have had any gun at all during the 6 months prior to their arrest.

Of course, there is no chance of shutting down the underground market and blocking all illegal transactions that arm Chicago-based offenders. But more effective enforcement of current regulations is possible [21–23]. The current findings suggest that more effective enforcement of existing regulations could have an immediate and substantial effect on gun crime.

These findings also point up the limitations of the familiar claim that the large stock of guns in private hands, upwards of 300 million, implies that guns are readily available to all Americans, including those who are likely to use a gun in crime if they obtain one. It is not the stock but the flow of guns that arms criminals, since criminal use tends to follow transactions within a few weeks or months. It is true that the current stock of guns in private hands is the source for a large percentage of transactions in the underground gun market (the main exception being straw purchases of new guns from dealers), but those transactions, because they are illegal, often have high transactions costs [4, 24]. A feasible goal for enforcement efforts is to make those transactions still more difficult.

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