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UNDERGROUND GUN MARKETS

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ABSTRACT

This paper provides an economic analysis of underground gun markets drawing on interviews with gang members, gun dealers, professional thieves, prostitutes, police, public school security guards and teens in the city of Chicago, complemented by results from government surveys of recent arrestees in 22 cities plus administrative data for suicides, homicides, robberies, arrests and confiscated crime guns. We find evidence of considerable frictions in the underground market for guns in Chicago. We argue that these frictions are due primarily to the fact that the underground gun market is both illegal and "thin" – the number of buyers, sellers and total transactions is small and relevant information is scarce. Gangs can help overcome these market frictions, but the gang's economic interests cause gang leaders to limit supply primarily to gang members, and even then transactions are usually loans or rentals with strings attached.

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I. Introduction

This paper provides an economic analysis of underground gun markets drawing on interviews with gang members, gun dealers, professional thieves, prostitutes, police, public school security guards and teens in the city of Chicago, complemented by results from government surveys of recent arrestees in 22 cities plus administrative data for suicides, homicides, robberies, arrests and confiscated crime guns. The topic is of interest in part because of the substantial social costs of gun violence, on the order of $100 billion per year (Cook and Ludwig, 2000). Systematic data on prices and quantities are generally lacking for underground markets, and ours is no exception. But we are able to provide a qualitative picture of how Chicago's underground gun market operates.[1]

Underground gun markets have developed in America in response to regulations that seek to prohibit ownership and possession by that sub-set of the population deemed to be at unacceptably high risk of misusing guns – primarily youth and adults with serious prior criminal records[2] – while preserving easy access for everyone else. A few jurisdictions, including Chicago, go further and essentially prohibit the private possession of handguns, the type of gun most commonly used in crime and violence.

Economists and other skeptics like to point out that government prohibitions on transactions are difficult to enforce; the ingenuity of the marketplace, motivated by profit, will overcome whatever legal obstacles are put in place. If true for handguns in Chicago, then we would expect to find that youths and criminals are able to acquire them with little trouble (low transaction costs) at prices not that much higher from those in the legal market. As NYU law professor James Jacobs observes in this regard, "Some criminals claim that it is as easy to buy a gun on the streets as it is to buy fast food. One Chicago gang member stated, 'It's like going through the drive-through window. Give me some fries, a Coke, and a 9-millimeter" (2002, p. 150).[3]

Yet we find evidence of considerable frictions in the underground market for guns in Chicago and other cities as well, including substantial transaction costs and markups over prevailing prices in the legal market. We argue that the key features of the market that produce these frictions are illegality and "thinness," that is, small numbers of buyers, sellers and total transactions.

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[1] Most of what is known about the underground gun market comes from interviews with incarcerated prisoners or inner-city youth (for example Wright and Rossi, 1994, Webster et al., 2002, Sheley and Wright, 1993, Callahan and Rivara, 1992). However such interviews can at best shed light on how a subset of the retail market operates, and are not informative about other aspects of market structure or conduct.

[2] These groups do account for much of all crime (Cook and Laub, 1998, Cook, Ludwig and Braga 2005).

[3] Jacobs' quote taken from Don Terry, "How Criminals Get Their Guns: In Short, All Too Easily," *The New York Times*, March 11, 1992, p. A1.

Illegality introduces a variety of information problems into the market and complicates the search for trading opportunities for both buyers and sellers. The search problem is exacerbated in the underground gun market by the need for information about the trustworthiness of one's trading partner. There are legal risks resulting from the possibility that the buyer or seller is an undercover police officer, financial risks given that contracts cannot be enforced by the usual legal institutions, and risks of serious injury given the nature of the good itself.

Illegality and thinness both appear necessary to generate the substantial frictions that we document for the underground gun market. Thinness matters because as suggested by Diamond (1982), in a stochastic search model there will be trading externalities where trade makes further trade more profitable, which also implies that thinness begets further thinness. In part because guns are durable goods, repeat business is rare, and so most every transaction is problematic. In contrast, both legal, thin and illegal, thick markets create incentives for institutions to develop to reduce transactions costs. In thin gun markets only people whose existing social networks contain both potential buyers and sellers find it worthwhile to become market makers in the underground gun market. Transaction costs in this case persist in part because social networks are limited and not easily modified in response to changing market conditions.

We find that street gangs can help overcome these market frictions, in part because gangs have good information about members. But their economic objectives cause gang leaders to limit supply both in and out of the gang. Some of the gang's profits appear to be rent on the gang's monopoly over gun violence. To prevent hostile takeovers, sales are limited outside of the gang and to lower-level gang members as well. While the ability and willingness to inflict violence is useful to the gang, in the short term gun violence depresses profits in a variety of ways, including from stepped-up police attention to the gang's economic activities. As a result many gun transactions within the gang are loans or rentals with strings attached rather than outright sales. Despite these constraints many youths report joining gangs as a way to ensure access to guns, and when police catch gang members with guns they typically assume the guns were obtained through the gang. The importance of gangs in the market lend credence to our findings of high transaction costs and prices in the underground market.

As is often the case with illegal markets the objective of government policy is to reduce rather than enhance efficiency (Schelling, 1984), and our findings imply a number of ways that law enforcement might further increase transaction costs and prices at the retail level. Of particular interest are possible enforcement activities in the areas of gun storage and ammunition, two important complements to guns that have not received much attention in the policy arena or research literature to date. The Diamond model implies that there may be multiplier effects in the returns to enforcement activities in the underground gun market, given that market thinness begets further thinness.

The next section provides some background on the context in which Chicago's underground gun market operates. The third section presents our main findings on market transactions and the role of illegality and thinness. The role of gangs, gun storage and ammunition in the underground gun market are taken up in turn in sections four through six. The final section discusses the study's limitations and implications. Finally, we note that this paper quotes verbatim from the field interviews conducted by one member of our team, Sudhir Venkatesh (SV), despite the fact that his informants are not always politically correct in their choice of words.

II. Market Context

The underground market in Chicago is shaped by the legal framework that regulates gun ownership and transactions. The prevalence of guns in private hands is also relevant, since one source of guns to underground transactions is the existing stock.[4]

Nationwide, few criminals get their guns directly from licensed gun dealers (Wright and Rossi, 1994). But the legal market for guns and legal ownership patterns affect supply in the underground market through theft – over 500,000 guns are stolen each year (Cook and Ludwig, 1996) – and "secondary market" sales made by people who are not "engaged in the business" of selling guns and so under the 1968 Gun Control Act are not required to obtain a federal firearms license (FFL). The only federal restriction on these sales is that the seller cannot knowingly provide a gun to someone prohibited by law from having one;[5] the seller is not required to conduct a background check to verify eligibility or record the sale in any way (Cook, Molliconi and Cole, 1995, Vernick and Hepburn, 2003).

Both Illinois and Chicago have extended these federal regulations, including those for secondary-market sales. The state requires all gun owners to obtain a Firearm Owners ID card and bans private transfer of a gun to anyone lacking such a card. The city goes still farther, since 1982 essentially banning handguns except for those already in circulation that were then registered with the city. Furthermore, there are almost no legal firearms retailers operating in the

[4] Cook and Ludwig (2003b) show that burglary rates appear to be higher in areas where gun ownership is more common. Counties with higher levels of household gun ownership have teens who are more likely to carry guns (Cook and Ludwig, 2004a) and have relatively higher homicide rates and perhaps suicide rates as well (Duggan, 2001, 2003; Cook and Ludwig, 2005); availability to high-risk people is a plausible mechanism for these results.

[5] The federal Gun Control Act bans possession by a number of categories of individuals, including convicted felons, those under indictment, and those convicted of a domestic violence offense. Individuals under age 18 are barred from possession of a handgun unless under supervision.

city, so that a private citizen seeking to buy a firearm of any sort must travel outside of city limits.[6]

A. Gun Prevalence

Compared with other metropolitan areas, the Chicago area has low levels of household gun ownership. This was true prior to the adoption of the handgun ban, and prevalence has not been much affected by the ban. We measure household gun ownership using the best available proxy, the ratio of firearm suicides to total suicides, or FSS (Azrael, Cook and Miller, 2004, Cook and Ludwig, 2005). We can calculate FSS from Vital Statistics mortality data for Cook County, which is dominated by Chicago. In 1981, the year before Chicago enacted its handgun ban, FSS in Cook County was 35.7% compared to 49.4% nationwide in urban counties (100,000 or more residents). Figure 1 shows 5-year averages of FSS and reveals that Cook County experienced a temporary dip in gun ownership rates following Chicago's handgun ban in 1982.[7] However a simple difference-in-differences estimate suggests this is not due to the ban, since from 1978-82 to 1983-87 the dip in FSS in Cook County (-4.3 percentage points) is actually smaller than in surrounding counties unaffected by the ordinance (-8.8 points) or in the rest of Illinois (-6.0 points).

Gun ownership rates may have been reduced statewide by a 1968 Illinois law requiring licensing of gun owners and limiting secondary sales to licensed individuals (Vernick and Hepburn, 2003). Figure 2 shows that from 1967 to 1975 FSS increased by 5.5 percentage points in the U.S. as a whole and by 10.7 and 7.5 percentage points for Illinois' neighboring states of Indiana and Wisconsin. In contrast in Illinois over the same period FSS *declined* by 2.1 points. If these bordering states provide a good counterfactual for what would have happened in Illinois absent the 1968 law, then a difference-in-difference estimate indicates that these regulations depressed gun ownership rates (FSS) by 20-30% of the state's 1967 value.

Finally, the Chicago Police Department (CPD) has a long-standing emphasis on taking guns off the street that may be relevant for the demand and supply sides of the underground gun market. Starting in the 1950s the CPD has emphasized a policy of "making your presence felt," which involves getting patrolmen out into the community to interact with the public, make vehicle or other stops and search for guns as appropriate. At least during the 1950s and 1960s officers who confiscated illegal guns were provided with departmental citations.[8] During the period 1999-2003, the Chicago Police Department

[6] The exceptions apparently include one FFL in Chicago that sells via mail order, and a local museum that has a FFL as part of its gun collection.
[7] When we isolate FS/S for Chicago itself the value of the FS/S gun proxy actually increases over time, from a value of 36% in 1981 to 38% in 1987-9 to 42% in 1993-5.
[8] Personal communication of Philip Cook with Herman Goldstein, August 18, 2004.

averaged over 10,000 firearms confiscations per year, which appears to be far in excess of other large cities.[9]

B. Imports to the Underground Market

The sources of guns in Chicago's underground gun market include guns already in the city prior to the 1982 ban, together with handguns imported illegally into the city. Some information concerning the importers operating in this market comes from the intensive field interviews conducted by one member of our research team, Sudhir Venkatesh (hereafter SV) in two high-crime neighborhoods on the city's South Side, Grand Boulevard/Washington Park (or GB/WP) during a 15-month period beginning in 2001 (see the data appendix).

SV's interviews revealed that importation of guns into the GB/WP neighborhoods is handled by a small number of elite suppliers or wholesalers. During his field observation period, there were never more than six such wholesalers in operation at once, only one of whom had an affiliation with a gang. (The fact that gangs are not involved in importation is an interesting fact to which we return later). Interviews with 12 of the importers who were in business at some point over the course of the study period suggest they in turn rely on a stable set of "finders" who obtain guns through personal connections in Chicago's poor inner-ring suburbs. Some finders may also be serving as conduits for people trafficking guns from Southern states that have laxer gun regulations.

The GB/WP neighborhoods are similar to the rest of the city with respect to the types and sources of guns being used by criminals. Table 1 provides a statistical description of the characteristics of guns confiscated by Chicago police during the period 1999-2003. Information on make, model, and source state are tabulated. (The source-state information is generated by the National Tracing Center of the Bureau of Alcohol, Tobacco and Firearms, which attempts to trace each gun to its first retail transaction. The appendix provides more details.) [10]

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[9] Chicago Police Department, *Annual Report: 2003 Year in Review.* By comparison, from 1999-2001 a total of around 12,000 guns of all types were confiscated each year in New York State as a whole (Council of the City of New York, Office of Communications, September 12, 2003, "Committee Hears Testimony on Proposals to Stem the Flow of Illegal Guns Into the City).

[10] An earlier analysis of Chicago trace data reported that 60% of traced guns recovered in violent Index crimes between 1995 and 1998 were first purchased within the Chicago metropolitan region (Block, Brice, and Galary, 2003). When our analyses are limited to Chicago guns recovered in violent Index crimes, we still find that only 36.4% were first purchased in Cook County, and 44.5% in the nine counties of the Chicago SMA. There seems to be at least three explanations for the disparate results. First, the comprehensiveness of Chicago ATF trace data improved substantially between the study time periods. Chicago did not participate in ATF's Youth Crime Gun Interdiction Initiative (YCGII) program until 1998 (ATF, 1999). The YCGII program requires participating cities to submit all guns recovered by police departments to ATF for tracing. Before 1998, the CPD was not required to engage in comprehensive tracing of recovered crime guns. Therefore, the previous analysis may not include all guns recovered in Chicago violent Index crimes between 1995 and 1997. Second, the quality of ATF trace data

III. Transactions in the Underground Market

The underground gun market in Chicago appears to be characterized by a relatively small volume of transactions, low gun quality, high prices and often substantial difficulty in arranging transactions. We argue that the frictions in this market are most likely due to the combination of illegality and market "thinness."

A. Volume of Transactions

The underground market in firearms is a small part of the overall underground economy. We estimate that there are no more than 1,400 gun sales per year in the GB/WP area,[11] or about 1 sale per year for every 30 people living in this very high-crime neighborhood. By comparison there would probably be at least 200,000 and perhaps as many as 500,000 or 1 million cocaine sales in the GB / WP community every year – a difference of up to three orders of magnitude. Total revenue in this community for gun sales would be on the order of $200,000 to $500,000, compared to perhaps $10 or $20 million in the market for cocaine.[12] Our findings in this sense are quite consistent with those reported by Koper and Reuter (1997). Presumably part of the explanation for the low

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improved dramatically in 1999 (Pierce, Braga, Hyatt, and Koper, 2004). In addition to administrative and information technology improvements in the tracing system, 1999 was the first year that ATF traced all firearms to their first retail sale regardless of the length of time between first retail sale and subsequent recovery in crime. Prior to 1999, ATF did not trace guns that were manufactured prior to 1990. Not surprisingly, only 35% of Chicago violent-crime guns were traced to a dealer in the previous study, whereas 57% of the violent-crime guns in our study were successfully traced Finally, research evidence suggests that illegal gun markets are sensitive to changes in enforcement policy and legislative changes. In Boston, Braga and Pierce (2005) found that a gun trafficking enforcement program significantly reduced the percentage of new handguns recovered in crime. Cook and Braga (2001) reported a large shift in the source states of guns recovered in Chicago that were first sold after the Brady Act was implemented. It is possible that focused enforcement initiatives implemented by the CPD and ATF may account for the smaller proportion of guns first purchased in Chicago suburbs between the two time periods.

[11] SV interviewed five gun "brokers," discussed in more detail below, who report an average number of gun transactions during the past year of 16. We knew of 24 brokers working during the 15 month period of our fieldwork, and believe there were no more than 5 or 10 additional brokers not known to us, so we conservatively assume 34 total brokers in operation in the GB / PW neighborhood, who (if our group of 5 interviewees is representative) would have facilitated a total of 544 sales. Gun suppliers report that 60-80% of their sales are negotiated through brokers (we assume the 80% figure) and by our own estimates gun suppliers account for around half of all gun sales in the GB/WP community, implying a total of around 1,360 gun sales per year. There are about 48,000 residents in the combined GB/WP neighborhoods.

[12] Our thanks to Peter Reuter for these drug market calculations. He notes that each year in the U.S. there are perhaps 250 tons of pure cocaine, sold in pure units of 250 milligrams, suggesting around 1 billion sales nationwide each year. If we assume the national rate applies in the South Side GB/WP neighborhood then there would be around 200,000 transactions, but given that this area is unusually disadvantaged there could plausibly be as many as 500,000 or even a million sales per year.

volume of transactions is that guns are durable goods. As we argue below, the thinness of this market is a key fact in understanding how the market functions.

B. Quality of Guns

Prevailing wisdom about the demand for gun quality in the underground market is nicely summarized by Wright and Sheley (1992, p. 33): "No military force willingly enters battle with inferior weapons, and likewise, no central city resident would willingly carry anything other than the best small arms available." On the other hand, some criminologists, such as Kennedy, Piehl, and Braga (1996), have observed that criminals may tend to acquire low quality guns in practice even though some express a desire for high-quality guns. ATF's top-ten crime-gun lists (e.g. ATF 2000b) have long noted the prevalence of cheap guns used in crime.

We find that preferences for gun quality are heterogeneous, and in fact a portion of the demand for guns consists of consumers who know very little about guns and are mostly interested in having one for show rather than to shoot.

In the GB/WP community the potential consumers for guns can be usefully partitioned into four groups, by age and degree of criminal involvement. The demand for guns tends to be most discriminating among older and more criminally active people. SV's younger informants seek guns for the status they confer, rather than as inputs into a crime production function. With status goods economists sometimes refer metaphorically to "arms races," but in the market for guns among young people there seems to be a literal arms race at work. As one young gang member notes, in the absence of having a gun: "Who [is] going to fear me? Who [is] going to take me seriously? Nobody. I'm a pussy unless I got my gun."

Just showing rather than actually firing guns is usually sufficient for the purposes of achieving the desired result. As one youth noted, "You have to let [other people] see it without letting them see it. See, it's all about them not messing with you." As another youth noted, "… Like them slick flicks [pornographic movies], it's all about the bulge. It never even gets that far [explicitly showing other people the gun]." One non-gang affiliated youth notes:[13]

> "When I bought [my .357], no, I didn't see if it was good [working]. Look man, I can get one of those guns that fires, but shit, sometimes you just need to show it, you know, and you get the respect you looking for. And,

[13] Similarly, another non-gang affiliated youth notes: "Some of these niggers do have a gun that could kill you, that's true. Thing is, see, it ain't really about fighting or nothing, because even if you have a group of guys and you see a group of guys, lot of times, it's just you show 'em you got one, they show you they got one, and you just be on your way. It's just like signifying that you prepared … I got this [.38 Smith and Wesson] – it don't work. My Davis [another manufacturer] don't work either, but I usually carry that one. I mean it probably don't look scary or nothing, but it does what I need it to do."

this thing was big man, I didn't give a shit if it fired or not, I could have killed somebody with it just hitting them over the head!"

These youth also tend to be quite ignorant about gun quality and general gun use. Fewer than one in ten of the 190 non-gang affiliated youth SV interviewed had ever been taught how to use a gun.[14] This ignorance matters for the gun market in a variety of ways. For example firearms come in different calibers (barrel diameters) and will only fire ammunition of the same caliber. The most common way for users that SV interviewed to determine the correct ammunition for their firearm was to purchase many bullets on the street from suppliers, or to borrow bullets from friends and relatives, and attempt to fit them into the firearm.

Older gang members and professional criminals tend to be more discerning. One older gang affiliate recounts his gun preferences for the purposes of robbing commercial establishments, especially for daytime robbery:

"When [cashiers] see that Glock [manufacturer of popular 9mm semi-automatic pistols] or that .38 [caliber handgun] – I mean, a .44 [caliber] would be better, but that's hard to find around here – then you get that cash quick. You don't want to be keeping one of them sissy weapons."

But even for those regularly engaged in crime, gun use was typically limited to simply brandishing the weapon and so ensuring that a broken gun (as long as it was not obviously broken) had some value. For example of the 57 older gang members SV interviewed, only around 10% admitted to having fired their gun during a robbery.[15]

The patterns of gun demand reported in SV's interviews are consistent with the results from administrative ATF data on confiscated crime guns. Table 3 shows that the crime guns confiscated from juveniles (under 18) are on average of lower quality than those confiscated from youth (18-24) or adults (25 or older), where "quality" here is measured by gun age or expected retail price for the

[14] For example one youth, "Tony," narrated a common learning experience:

SV: "So, how did you know what to do with the .38?"
T: "I took it, started putting bullets in. Hell, I even put a rock in there and tried to fire it! You know, I just fiddled with it."
SV: "Did it fire?"
T: "I'm not sure. I think it did."
SV: "Well, that's kind of like saying 'I might be pregnant.' Either it fired or it didn't."
T: "I mean it made a noise."
SV: "Um, hmm. A noise. So, you really don't know anything about guns except possibly how to kill yourself."
T: "Listen, it's not like we get taught that in school."

[15] One informant described his technique for robbing drug dealers, firing a shotgun through the dealer's door in order to "buy yourself some time to steal their shit because it makes so much noise… and they need to see you mean business."

same make and model, estimated from the firearms Blue Book. (Unfortunately the ATF records do not indicate whether the guns are in working order.) These patterns are similar in both the GB/WP neighborhoods and in the rest of Chicago. The lower quality of guns among younger people is presumably due to some combination of differences in preferences for gun quality by age and income effects. Table 4 shows that the fraction of crime guns confiscated because of weapons offenses (such as carrying the gun in public) rather than for more serious criminal activity such as violent or narcotics crimes is higher for juveniles compared to older people, especially in the high-crime GB/WP neighborhood where guns may be especially important status items for teens.

Note that the presence of buyers who are indifferent to whether a gun is in working order helps explain how the gun market handles the problem that guns are "experience goods"– sellers for obvious reasons discourage buyers from test-firing the gun during the transaction. But the same information problem that faces buyers – a non-working gun is typically observationally equivalent to a working gun – means that youth can "produce" the ultimate services of interest (status, intimidation) with a broken gun as easily as with a working gun.

C. Prices

Interviews by SV with 116 gun-owning non-gang affiliated youth (under 22 years) reveal prices paid that range between $250 and $400, with groups of youth often joining together to purchase a gun collectively.[16] Interviews with 11 local gun brokers, who handle a large share of retail transactions on behalf of importers, suggest most of their guns are sold for between $150 and $350. These data provide suggestive evidence for price discrimination against youth, either because youth are more difficult to deal with (which many brokers report to SV) or because brokers know youth have fewer connections in the underground market and so are unable to shop around. The market frictions that we describe below may help limit resale opportunities and so facilitate some price-discrimination by brokers.

The prices quoted to SV in his field interviews are generally consistent with those reported by 1,194 arrestees interviewed in Chicago in 1996-7 as part

[16] In the inner city, it is common for youth and young adults to share ownership of a gun. In other words, a gun may be claimed as property by several friends or kin. They may have pooled resources to purchase the weapon, for example. Symbolically, this arrangement enables several people to derive the status that a gun can afford a young person. It poses some methodological problems because "gun ownership" in the conventional sense (of a gun owned by an individual) may not always apply in inner city contexts. Thus, a researcher interviewing all members of a peer group may hear reports of the existence of several guns, whereas only one actually exists. Wherever possible, SV tried to ensure that this over-count did not occur during interviews and conversations, but we cannot be certain that every instance was eliminated.

of the U.S. Department of Justice's Drug Use Forecasting (DUF) system (see data appendix). Table 5 shows that of the 20% of Chicago arrestees who have ever owned a gun, more than two-thirds report having paid between $100 and $499 for their most recent gun, with a median price of $150. The second column restricts the analytic sample to just adult males; they report a median price of $100, a pattern that is consistent with the suggestive findings from SV's interviews about price discrimination against youth.

These street prices for guns in Chicago seem high given that many of these guns are of low quality, manufactured by companies such as Lorcin, Raven and Bryco. (These names are often mentioned to SV in interviews and also show up frequently in ATF data for confiscated crime guns). While SV's interviews do not include information on the condition of the gun, it is noteworthy that most pistols from these manufacturers listed on websites (such as gunsamerica.com) sell for between $50 and $100 (with a $10 mailing / transaction fee), even used guns that are reported to be in "excellent condition."[17] Thus the markup in the underground market is substantial.[18]

D. Transaction Costs

SV's interviews together with the DUF surveys are also consistent in pointing to substantial transaction costs in Chicago's underground gun market. The discussions held by SV on the city's South Side provide three types of support for this assertion:

- A system of local brokers has developed to facilitate market exchange and typically charge $30 to $50 per transaction, a large percentage of the sales price. These brokers capitalize on the information they have about the local underground economy – of the 11 brokers SV interviewed, all were over 30 and long-time residents of the area, and most were either participants in or closely connected to suppliers in the illegal markets for sex, gypsy cabs, or unregulated car repair or hairstyling.
- Even local gun brokers report that a large share of their transaction attempts goes unfulfilled – around 30-40%. Reasons included the inability to get a gun from a supplier; the customer and broker could not agree on the location for the transaction; and the broker either did not trust the customer's intentions or thought he or she was an undercover police officer.[19]

[17] Under federal law guns can only be sent by mail to licensed dealers, so these web sites require some FFL to broker the sale.
[18] The street markup for illicit drugs such as heroin and cocaine appears to be higher (Koper and Reuter, 1997). But the closer analogy is with prescription drugs that are diverted into illicit transactions, such as with oxycontin or Ritalin.
[19] In other cases, the transaction failed because the customer failed to bring enough cash to the transaction or tried to negotiate down the price

- Interviews with 17 young adults who consider themselves "regular" thieves, self-defined as deriving a substantial share of income from crime and engaging in at least four thefts per year, further support the general finding. Of the 17 interviewees in this group, only one person said they could find a gun in less than a week.

Youths who are not affiliated with a gang would be expected to have greater difficulty in making an arms-length connection than others. In SV's 116 interviews with non-gang affiliated youth who had owned a gun, 40% reported obtaining their gun from a relative.[20] The importance of family sources for this group is consistent with previous surveys of criminally-active youth (see Koper and Reuter, 1997).

Somewhat more systematic data on high transaction costs in Chicago's underground gun market comes from the government's surveys of Chicago arrestees as part of the DUF system (Table 5). Of Chicago arrestees interviewed by DUF who had never owned a gun but indicated they might want one someday (just under one-quarter of those who never had a gun), fully 61% indicated that it would take them more than one week to get a gun. These DUF findings are quite consistent with the results of SV's field interviews, and also suggest that scarcity and frictions in the underground gun market cannot be fully overcome by turning to non-market sources of guns.

One puzzle raised by these findings is why people tolerate these transaction costs given that suburban gun dealers are just a short drive away from any city neighborhood (at least outside of rush hour). Even those people who are themselves ineligible to buy a gun from a dealer can get someone else, usually a wife or girlfriend, to make a "straw purchase" on their behalf if she obtained an Illinois Firearm Owners ID (FOID) card. Yet Table 6 suggests that guns recently purchased in the Chicago suburbs of Cook County account for only around one-tenth of the city's crime guns, with only about a fifth of these guns (2 percent of the total) first having been purchased by a female.[21] Straw purchases reduce one type of transaction cost but increase legal exposure (since dealers record the identity of the official purchaser). There may also be transaction costs of a different sort associated with traveling outside of the individual's own neighborhood, including the dangers of crossing gang boundaries. As one gang leader notes:

[20] In addition, 35% obtained their gun from someone affiliated with a gang; 17% from a licensed security guard; 6% from a broker; and 2% from some other source.

[21] Our finding that straw purchasing is rare in Chicago's underground gun market is consistent with results from interviews with incarcerated juveniles in Maryland, who also report rarely leaving their communities to get guns (Webster et al., 2002). It is possible that increased enforcement by Chicago Police Department and ATF over the course of the 1990s made it less attractive for gun traffickers to use females as straw purchasers of new guns at nearby licensed dealers.

> "Most of us, we never been outside these four or five blocks, our neighborhood. Now, how can you bring the guns here if you don't even know how to get to other places? … Even if we go to jail, we really spend most of our time around where we live, where we work."

E. Why Is There Friction in the Underground Gun Market?

Why are there persistent market frictions in Chicago's underground gun market? We believe the most likely answer is market "thinness" together with illegality of gun transactions in Chicago. The prohibition on gun sales in Chicago introduces trade frictions, and moves us away from what Diamond (1982) describes as the "fictional Walrasian auctioneer" that is usually assumed to facilitate exchange. Illegality makes it difficult to advertise, and so trade requires some search effort by both buyers and sellers with some probability of failure that is inversely related to overall market activity.

The information problems that arise in linking buyers and sellers in markets with trade frictions are exacerbated in an illegal market by the fact that buyers and sellers now also require information about prospective trading partners in order to engage in exchange. In an analysis of drug law-enforcement strategy, Mark Moore points out that "…what is consistently difficult about drug trafficking is the process of reliably executing large financial transactions in a crooked world with no police or courts to enforce the contracts (Moore 1990, p. 138)." In this market, reliable "connections" are scarce and vulnerable to law-enforcement pressure. The underground market for guns in Chicago does not involve large amounts of money, but executing transactions with strangers is surely a risky business. The buyer may be an undercover police officer or potential informant, or simply dangerous. One gun dealer explained to SV his preference for relying on brokers to negotiate sales rather than dealing directly with customers:[22]

> "You never know who these niggers are that need these things. Sometimes they just act crazy on you, 'cause you know, if I want a gun, then usually you pissed off. And, I don't like messing with these fools, 'cause they sometimes don't pay, they steal your shit. And, you know, they could be working for the cops, too, so I got to trust the folks I'm working with."

Diamond's (1982) stochastic search model provides an explanation for why thinness hampers trade in a market such as that for guns in Chicago, where buyers and sellers search for trustworthy trading partners and 30-40% of transaction attempts even by retail brokers in high-crime neighborhoods go unfulfilled. In this type of environment economic activities can create trading externalities and positive feedback effects: "The externality comes from the

[22] The account suggests part of the broker's fee is rent on broker information, and part is compensation for the unavoidable risks associated with selling guns.

plausible assumption that an increase in the number of potential trading partners makes trade easier. The positive feedback is that easier trade, in turn, makes production more profitable" (Diamond, 1982, p. 882). [23]

Consistent with the predictions of Diamond's model, the limited number of potential transactions does discourage supply. As one gang leader explained to SV about why his organization does not sell guns: "It's really not worth it because not that many people buying." The Chicago PD's emphasis on policing guns seems to introduce some fixed costs to selling guns, since the legal risk may be only weakly related to the number of guns sold. As a gang leader explains to SV, "…Police don't like [guns] moving around here, man. We stay away from that shit, see, 'cause we already got enough trouble with them [police]." Many of those sellers who are involved with the gun market have diversified into multiple markets – of the brokers SV interviewed in South Side Chicago, all of them also had other full-time jobs in various blue-collar occupations.[24]

Note that it is the *combination* of illegality and thinness that seems to be the key for creating the frictions and trading externalities that characterize the underground gun market in Chicago. If the market were illegal but thick, as for narcotics, institutions would develop to facilitate exchange, and sellers and buyers would have incentives to develop reputations (Koper and Reuter, 1997). For example drug-selling corners have developed in that market and seem to change locations easily in response to law-enforcement pressures, given that buyers and sellers are closely connected and so information about changes in trading locations is easily transmitted back and forth. In contrast in the underground gun market some white ethnic street gangs or gun importers help organize fist-fighting events in the city's warehouses, but these occur only every 3-4 months. The coordination costs of moving these fighting events in response to legal or other threats is greater than with relocating a drug corner, and so these events are advertised only among a selected clientele.[25]

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[23] Gan and Li (2004) note other models yield different predictions about whether match rates will in fact be lower in "thin" markets, and that to date there is very little empirical evidence on this point (especially outside of the labor market context).

[24] Mark Moore (1981) analyzed black-market firms encountered by ATF undercover investigations. In Chicago/northern Illinois during the period 1974-1976, he found that only 4 of the 13 "firms" observed by ATF were conducting as many as 5 transactions per month. In general, research has found that gun traffickers do not divert many guns over the course of their illicit enterprise. ATF (2000a) found that 43% of 1,530 gun trafficking investigations made in the United States between July 1996 and December 1998 involved the diversion of 10 guns or less. In Boston, the average ATF gun trafficking investigation made between July 1996 and December 2003 involved the illegal diversion of 16 guns (Braga and Pierce, 2005).

[25] At these fist-fighting events usually 6 to 18 cars are parked around the "ring," with guns displayed in the trunks. Drug sales are usually discouraged, and security is provided by the "home field" gang and reinforced by a ban on ammunition sales. Fist-fighting events provide one of the few occasions when importers are willing to deal directly with customers. Importers are also careful to try to sell only working guns to ensure that fight organizers invite them to sell at

Market makers can also easily develop in thin but legal markets. For example, eBay has special sections of its website devoted to the markets for antique dolls (pre-1930), Annette Funicello bears, imitation pearl pins and brooches, and game-used Major League Baseball memorabilia.[26] In contrast the thinness of the underground gun market limits the economic incentives for entrepreneurs to become market makers, not surprising if this activity entails some fixed costs – there are few participants in the gun market because there are few participants in the gun market.

Since the gun market is so thin and sales opportunities are limited, market makers (brokers) are those people who already have information about the trustworthiness of potential sellers and buyers as a byproduct of other activities. As noted above, most of the people who serve as retail brokers in the underground gun market are involved in some way with other underground activities such as unlicensed car repair or hairstyling. Several of the prostitutes interviewed by SV also indicate that they periodically brokered a gun acquisition. We might also expect a large share of gun sales to be made by drug dealers, yet SV's reports suggest this is not the case. Drug dealers seem to be wary of jeopardizing the profits associated with drugs for modest gains from diversifying into guns, given the Chicago PD's gun emphasis and federal laws that provide for sentence enhancements for combined gun-drug offenses. SV's field data on the limited involvement of drug dealers with gun sales are consistent with data from the 1996-7 DUF reports by Chicago arrestees, only 40% of whom agree with the statement that "if you want a gun, drug dealers will be able to get one for you," and with the fact that very few people arrested in Illinois from 1990-2001 for drug dealing were in possession of guns.[27]

IV. Gangs and the Underground Gun Market

Chicago is infamous for its powerful criminal gangs, dating back to Prohibition and before. A gang creates a social network within which gun transactions can be accomplished with relatively little risk. The gang leadership has information about the reliability of its members and can make a credible threat to punish misbehavior. Interestingly the kinds of transactions that arm youthful gang members are typically not one-time sales, but loans or rental arrangements with strings attached. The constraints on gun transactions within a gang are motivated in part by the desire by leaders to prevent hostile takeovers,

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future events as well – that is, repeat transactions with these fighting events facilitate the development of reputations.

[26] See www.ebay.com

[27] We find that only a very small share of all drug arrestees are also charged with weapons offenses as part of the same arrest event, and that only a small share of those arrested for weapons offenses are charged with drug offenses. This evidence is obviously imperfect in part because conglomerates could keep their drug and gun inventories separate, and so apprehension for the illegal sale of one good need not involve police discovery of the seller's inventory of the complementary good.

and because gun violence depresses profits in the short term by scaring away drug customers and bringing unwanted police attention. The fact that people join gangs for access to guns even with these constraints, and the assumption by police that gang members obtained their guns from the gang, provide additional support for our findings above about high transaction costs in the gun market.

Gangs also provide one explanation for why the underground gun market in Chicago seems to have considerable friction, yet gun crime (at least by some measures) is not much lower in Chicago than other cities.

A. Gangs and the Underground Economy

The economic objectives of modern street gangs are central to understanding the nature of the gang's involvement in the underground gun market. While historically gangs were often organized for defensive or social purposes (Klein, 1995),[28] over time gangs have undergone a process of "corporatization" (Taylor, 1990, Levitt and Venkatesh, 2000). The most important income-generating activity of the gangs studied by SV on the South Side of Chicago is the distribution of illegal drugs (see Levitt and Venkatesh, 2000 for more details). The gang also "taxes" other activities in the underground economy that occur on the gang's turf.[29]

Violence can help or hurt the gang's corporate interests, depending on the circumstance and time horizon in question. Over the long run the gang's capacity and reputation for violence helps protect the gang's local monopoly over drug distribution and extortion. But in the short term violence, particularly gun violence, can scare away drug customers[30] and bring additional law enforcement attention.

Gangs are not active suppliers in the underground gun market in part because the meager profits associated with selling guns are outweighed by gains to the gang from its monopoly over the capacity for serious violence. Gang leaders also seek to preserve this monopoly within the gang itself to prevent hostile takeovers, which is a threat in part because of the skewed earnings distribution within the gang (see Levitt and Venkatesh, 2000). For example as one gang officer reports to SV: "[Our superiors] want us to tell them who have a gun because they fearing that someone may try to take over from the inside."

The gang's other economic interests also provide gang leaders with an incentive to restrict access to guns and gun misuse by members. As one gang

[28] Akerlof and Kranton (2000) provide another explanation for gangs – the utility from identity.
[29] The fact that the gang taxes rather than supplies these activities directly is presumably due to some combination of fixed costs to entry into some underground industries and coordination costs within the gang beyond some point that lead to diseconomies of scale.
[30] Levitt and Venkatesh (2000) show that gang revenues decline substantially during periods of gang war.

leader explains to SV about why he tries to limit gun use by the gang's local affiliates: "If they don't have guns, they don't cause a lot of trouble, nobody [from the police] comes down on them, things just flow [and we make our money]. And, if they need a gun, then we'll give it to them." Another gang leader expressed his frustration about gun use by gang alumni:

> "It's like these niggers get stupid after they leave. I mean, they know not to keep a gun on them when they do this [engage in income-generating crime], 'cause the cops hate that shit. I mean, they could use a knife or something. Why the gun? That just brings down [the police] on us really, I mean, that's the thing that happens all the time, [the gang] gets blamed and we get shut down."

Police typically assume that gang members or alumni caught in possession of a gun obtained the weapon from the gang and so crack down on the gang accordingly.[31] As one police officer noted to SV:

> "Look, I'll be honest with you. There will always be drugs, drug dealing and drug dealers. The reason we get tight on guns is that it's better that there be drugs and no one gets killed than if someone gets killed. We love guns! We love getting them because it makes the job easier on the street. So, when we find one, yes, we really go after them [gang leaders] because they know the rules. They know the agreement, and if we get a gun, that means they broke it."

B. Gun Transactions within Gangs

Compared to the rest of the underground gun market, gangs are like islands of availability. But economic considerations cause gang leaders to run these islands like Fidel Castro's Cuba, with many restrictions on gun transactions and use.

In principle the information available within the gang about the gang's resources and reliability of individual members can help overcome many of the problems that seem to plague the underground gun market in Chicago. And in fact many respondents reported to SV that they joined or stay in the gang to preserve access to guns. As one former gang member notes, "You never leave [the gang] before you got the gun, because after you leave, they don't really have no reason to help you get one."

[31] During SV's fieldwork on the GB / WP neighborhood, 43 gang members exited out of the 2 largest street gangs in the area, of which 37 continued to work in some capacity in the local underground economy (such as selling drugs, committing burglars, fencing, or providing off-the-books services as day laborers or security guards). Of this group, 11 were arrested and in every case a gun was confiscated. In 7 of these cases, the police confronted the gang leaders about whether they had provided the suspect his gun.

Yet in practice access to guns within the gang is regulated, with most transactions in the form of loans or rentals with strings attached. The general rule is that members can only own guns if authorized by gang leaders. These gang leaders in turn ration gun ownership in part on the basis of statistical discrimination by age. "Shorties," young rank-and-file members ages who often want guns for social status, are typically authorized to access guns during gang wars (though even then many shorties are only allowed to carry knives), drug sales (at least for the one member of the 4-6 member drug selling team assigned to provide security), and drug pick-ups and drop-offs outside the gang's own turf. Older gang members are less likely to use guns in ways that are contrary to the gang's economic interests both because age may reduce impulsivity and because many older members maintain gang affiliation for primarily economic reasons. Gang leaders also value the human capital developed by experienced gang members and so are more likely to formally or informally waive the gang's rules on gun ownership for older members. As one gang official notes, "The way we do it is that we just don't write down that [the older guys] are carrying something." Gang leaders also use access to guns as an incentive for performance within the gang; for example, within some gangs the custom is to provide a gun to members who successfully execute authorized drive-by shootings.

The gang leaders share the interests of local law enforcement in reducing gun access, particularly among the more impulsive younger gang members. Consistent with the observation that shorties typically want guns for social rather than economic reasons, most violations by younger members are associated with social situations such as sporting events, parties, and some unauthorized gun use against enemy gangs as part of thefts or drive-by shootings. The standard punishment for violation of these gang rules includes a physical beating by the gang's security team, a monetary fine and, in some cases where an unauthorized gun is confiscated by the police, expulsion from the gang and assault in prison by the gang's incarcerated affiliates. But gang leaders admit to some inconsistency in the enforcement of these rules.

Sometimes gang leaders actually enlist the police as agents in controlling gun use among younger members by notifying the police about unauthorized gun possession by rank-and-file shorties. In this scenario the police usually confiscate the gun but do not make an arrest, which helps reduce enforcement costs to both gangs and the police. As one police officer reports to SV:

> "Yes, I suppose I'll admit that on occasion, we will act on a call from [the gang leaders]. We prefer to have the guns off of the street. That is our first priority. It's hard, we cannot stop guns from coming through here, but these kind of arrangements help us to control who gets hurt. That's not good policing some would say, but they are not seeing what I see every day."

So how common is gun ownership among gang members? One gang leader reports to SV that his gang records gun ownership among 25% of gang members, and estimates that another 5% owned guns but didn't officially report them to the gang's leaders.[32] This figure is about 1.5 times as high as the fraction of all arrestees in the Chicago DUF sample who report having ever owned a gun (Table 5), consistent with the idea of gangs as islands of availability in the underground gun market. But it is striking that so few members own guns given the gang's capacity to arm most members.

C. Guns and Gangs Across Cities

The results presented in Section III concerning high prices and transaction costs in Chicago's underground gun market suggest that gun use in crime may be rare in that city compared to other places. Yet this is not obviously the case, at least with respect to some measures of gun use. For example, gun use in robbery was less prevalent in Chicago than in other cities but gun use in homicide was more prevalent than average.[33]

One explanation for why generally low availability of guns to Chicago criminals does not yield unusually low gun use in violent crime is suggested by the preceding discussion – the pervasiveness of gangs. Table 7 shows that around 20% of adult male arrestees in the Chicago DUF sample report membership in a gang at the time of their arrest, nearly *twice as high* as the rate reported in the next-highest city, Los Angeles. (We focus on adult male arrestees as a simple way to adjust for demographic differences in arrestees across cities). No other city in the DUF sample reports current gang membership rates of even one-third Chicago's level. Figures for lifetime rather than current gang membership also reveal Chicago to be an outlier.

Interestingly, guns may be difficult for a high proportion of criminals to access in most of the DUF cities, not just Chicago. On average across these cities only 36% of adult male arrestees had ever owned a gun. Of the 20% of those who had never owned a gun but thought they might want one someday, 54% report that it would take them a week or more to get a gun and only about one-fifth think they could get a gun within a day.

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[32] These figures are down substantially from the height of the crack epidemic, when gang leaders report 40-50% of members owned guns.

[33] For the period 1997-1999, 75 percent of homicides reported by the police in Chicago were committed with guns, which is above the national average of 67 percent. On the other hand, only 29 percent of Chicago robberies were committed with a gun during this period, compared to a national average of 42 percent.

V. Storage[34]

Another salient feature of the underground gun market is the shortage of an important complement to guns – a reliable place for gun storage. This shortage is particularly relevant for non-gang affiliated youth, many of whom live at home with their parents. Consider the storage challenge for one youth interviewed by SV:

> "OK, in March, I had my gun at my uncle's place, but he got kicked out so I had to keep it behind our house for a while. But, I think those niggers sleeping out there saw me, so I gave it to Buck [my friend] but, he had to give it to the security guard at school. I hated that nigger, so Buck got it back from me and then I gave it to Charlese who kept it in her school locker for a while. But we broke up and now it's at Tiny's house."

The table below presents the distribution of gun storage locations among the 116 young (under 22) non-gang affiliated people SV interviewed who owned a gun:

Location	Percentage of guns stored in location[35]
School	43%
Home	11%
Car	26%
Abandoned building	15%
Other	5%

The large share of guns stored in school is striking, particularly given that school lockers are rarely used to store guns. (When lockers are used they usually belong to girlfriends.) School security personnel play an important role in this practice, as explained by one guard: "Schools are a great place to do [gun] business, because police never come in! Its funny, how much dope, guns, sex, all that shit goes down after the kids leave. As far as guns go, I'd say you probably got about 30 to 40 guns, at least, being kept in these schools." Another guard discusses the incentives: "You have to understand, we don't get paid a lot [as security guards.] Some little kid, with a big roll of hundreds comes up to us

[34] The data on storage in school settings are based on self-reports by individuals who identified themselves as security personnel. We must exercise some caution with these data because of the difficulty of finding an independent source to verify their claims. Wherever possible, SV tried to obtain information from non- security personnel (e.g., principals, school teachers) that such storage was a persistent issue. Today, many of the schools in the fieldsite neighborhood have undergone transformation due to demographic shifts and realignments by the Chicago Board of Education. As a result, the patterns reported here may well have changed.

[35] Note: "Home" can include private areas outside the house or apartment; "Car" may include someone else's car.

and says, 'We'll give you $500 a month to keep our guns here.' Hell yeah! I'm going to take the money."[36]

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VI. The Market for Ammunition

Guns are of public policy concern in part because they are more lethal than the most likely substitute weapons that assailants would use in their place (Zimring, 1968, Cook, 1991). But guns are only more lethal than other weapons when combined with a particularly important complement – ammunition. Chicago's laws essentially ban the possession or sale of ammunition within city limits.[37] It may seem plausible that the market for ammunition would have less friction than the market for guns; ammo is more consumable than guns and so the ammo market may be more active than the gun market.

However, our findings suggest that if anything the market for ammunition appears to have even *greater* friction than the market for guns. While older professional thieves had reliable sources of ammunition, most other people interviewed by SV have trouble securing ammunition and faced considerable price markups compared to the legal market. Waits of 1 to 4 weeks for ammunition were not unusual. As one respondent noted, "You really don't have someone who sells ammo around here, I mean its like you have to hope you an get it from [the organization] or maybe [a gun broker]. But you never know, so, lots of times its just a waiting thing, where you hope that someone who you got the gun from might have some bullets. But that really never happens, usually it's the gang that sells it or you just know somebody." One non-gang affiliated youth reported that he spent $50 to get 10 bullets for a Beretta semi-automatic for which he had paid $300. By contrast, for $50 in the legal market one can purchase a box of 500 rounds of 9 millimeter ammunition. The ratio of street to legal prices in this case is on the order of 50:1.[38]

An additional indication of ammunition scarcity comes from a census of all arrests made in Illinois between 1990 and 2001 obtained from the Illinois State Police (see data appendix). Of the 82,903 arrests for firearm offenses in the ISP data, only 2,887 (3.5%) were also charged with the illegal possession of ammunition.[39] One professional criminal reports to SV about his efforts to ration

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[36] It must be emphasized that these interviews were conducted in 2001 and 2002. Since then the Chicago Public Schools have taken a number of new steps to get guns out of schools.

[37] Chicago law forbids the possession of ammunition except if the individual "is the holder of a valid registration certificate for a firearm of the same gauge or caliber as the ammunition possessed, and has the registration certificate in his possession while in possession of the ammunition," or "is a licensed weapons dealer … or [runs] a licensed shooting gallery or gun club." Put differently, anyone found in illegal possession of a gun will also by definition be in illegal possession of ammunition if the gun is loaded. Secondary sales of either guns or ammunition are illegal by private parties in Chicago.

[38] http://www.ammunitionstore.com/pricelist_ammo4.htm#9mm

[39] In Chicago anyone not allowed to have a handgun is also not allowed to possess ammunition. Interviews with the Chicago PD (Rachel Johnston) suggest that whether an additional ammo charge will be filed against people with loaded guns is up to the discretion of the arresting officer

ammunition: "I'm stealing a lot of car radios right now, and sometimes, if I get really brave I may try to take a purse. For that shit, I keep the gun, but I never use it, you know. I don't even load it, I keep the bullets I got for the bigger shit I do."

One important problem limiting transactions in the market for ammunition is consumer ignorance, described in detail above. For obvious reasons prospective buyers can't test whether ammunition fits their gun by loading the weapon at the time of sale, and so must know the caliber of their gun and the ammunition being offered. Moreover if youth cycle through multiple guns, related in part to the storage problems mentioned above, then buying ammunition for a given gun entails some risk that the owner's next gun may be of a different caliber thus rendering the bullets at least temporarily useless. Finally, ignorance about how to operate guns makes many users nervous about carrying loaded weapons because they did not understand the mechanisms by which the gun could accidentally fire ("go off on them").

Why don't gun dealers also distribute ammunition given the complementarity between the two goods? The answer seems to be that ammunition and guns are too complementary. For example 14 of the 22 professional criminals interviewed by SV, who do have good access to ammunition, offered a moral argument for not selling ammo; e.g., "Helping someone kill someone else is not what I'm into. Guns are for protection and for business, not for killing," implying (consistent with our arguments above) that an unloaded gun is adequate for most uses. The remaining eight professional criminals suggested that this would threaten other suppliers, or the monopoly local gang members try to maintain over lethal violence: "Are you crazy? No way I'd ever sell ammo. [A local gang leader] would shoot me himself. Why? Because, I could be arming all these people that might want to overtake him."

VII. Discussion

Our findings about the presence of substantial transaction costs and price mark-ups in Chicago's underground gun market stand in stark contrast to conventional wisdom in the sociology and criminology literatures. One candidate explanation is that previous research has sometimes relied on answers to questions that were too vague to provide a measure of actual prices or transaction costs.[40]

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and the state's attorney. Because not all people may *immediately* be charged with possession of ammo, in our ISP analysis we also examine charges filed later by the state's attorney and uncover only 3 additional ammo charges.

[40] Our results on search costs and prices contrast with common interpretation of the results of Sheley and Wright's (1998) survey of youth in other parts of the U.S. In their survey of 16-18 year old high school students drawn from a convenience sample of 53 schools, 50% reported that obtaining a gun would be "little" or "no" trouble if they desired one, while the other half of the sample indicated that getting a gun would be "a lot of trouble" or "impossible." Yet these

In principle an alternative way to reconcile our findings with previous research is that our data are unreliable. Our study relies in large part on the unusually detailed interviews and field observations of Sudhir Venkatesh, which in turn rely heavily on self-reports from people who regularly engage in criminal or anti-social activities, for which lying is often a useful input.

However SV's field observations are generally quite consistent with the variety of other data sources that are available to us, including those that do not rely on self-reports by criminals. For example SV's field interviews about gun quality, prices and transaction costs are consistent with data from ATF data on confiscated crime guns.[41] Reports to SV about the scarcity of ammunition and the limited role of drug dealers in the distribution of guns match up closely with data on all arrests made in Chicago during the 1990s obtained from the Illinois State Police.

From a policy perspective the results suggest that law enforcement efforts targeted at reducing gun availability at the street level seem promising. The possibility of buy-and-bust or sell-and-bust operations by undercover police officers further erodes trust in the underground gun market and increases the information requirements for successful exchange. Similarly, offering rewards for information about gun sellers and possessors, either in the form of cash or leniency for the informant's own legal difficulties, should further inhibit the flow of information in the underground market, which consists primarily of word-of-mouth within social networks. Providing informants with incentives might also reduce the value of guns to youth for social status, since public display of a firearm would now entail additional legal risk.[42]

If "thinness begets thinness" in the underground gun market, as suggested by the trading externalities arising in the search model of Diamond (1982), then the impact of stepped-up enforcement activities may be subject to multiplier

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questions are quite ambiguous; what is a "little" trouble? How would a youth who could get a gun in 1-4 weeks answer?

[41] One way to determine the truthfulness of DUF reports about guns is to consider the accuracy of self-reports for drug use, since DUF and its successor ADAM collect biological specimens (urine) which are then tested for indicators of drug use. Marijuana use typically seems to be reasonably well reported, cocaine and opiate use less so. One problem with urine tests is that opiates and cocaine are rapidly excreted from the body and so use only within the past 24-36 hours can be detected in urine, compared to use within the past 2-3 weeks for marijuana (Richter and Johnson, 2001). Hair analysis does a better job of detecting use over the past month, particularly for opiates and cocaine, but is less reliable for capturing very recent use given that hair takes time to grow out. In any case the ratio of self-reported use to positive drug assays (urine tests) in the national DUF for 1987-91 equal 1.1 for marijuana use past 48 hours, 1.3 for opiate use past 48 hours, and 0.51 for cocaine past 48 hours; for use past 30 days self reports and hair analysis correspond closely for pot but less well for cocaine and opiates (Mieczkowski, 2002, p. 108).

[42] This type of reward program has been employed in New York but has to date not been rigorously evaluated (Golden and Almo, 2004).

effects. Of course this virtuous cycle becomes vicious if reversed, which is of some concern given recent cuts in federal funding for law enforcement in general and for gun-oriented activities in particular (Donohue, 2004, Lichtblau, 2004).

In addition our results provide some support for police strategies that hold the gang as a whole accountable for gun possession or misuse by individual members, thus creating an incentive for gang leaders to regulate gun access among members. This collective-deterrence strategy seeks to leverage gang cohesion together with the economic motivations of gang leaders and was a key feature of Boston's Operation Ceasefire (Braga et al., 2001, Piehl et al., 2003).

Finally, our study highlights the potential value in also targeting policies at goods that are complementary to gun ownership – namely, storage and ammunition. Youths tend to have limited storage options. And increasing the costs of storage by may depress youth demand for guns. The Chicago Public Schools have recently strengthened their efforts in this regard.[43] Guns and ammo are even stronger complements, which leads to considerable physical risks in transacting both goods simultaneously and causes the markets for these two goods to be largely distinct. Additional efforts to separate gun and ammo markets and make the latter even more friction-laden may have limited effects on gun use in crime, since an unloaded gun may be adequate for securing compliance by victims, but could help reduce the number of deaths each year from gun assaults, suicides and accidents.

[43] While many public school systems in urban areas employ metal detectors in high schools, since the 2003-04 academic year the Chicago Public Schools has also employed X-ray machines at a growing number of high schools and even a few middle schools as well. In addition over the past few years the CPS has increased the amount of training for school security guards,.All CPS employees, including security guards, must submit to a fingerprinting background check before being hired. Increasingly CPS makes use of random "surprise screening" programs in schools that are not able to conduct their own regular metal screening at school entrances.

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Data Appendix

Our analysis of Chicago's underground gun market draws on data from 6 main sources: intensive field interviews and observations conducted in high-crime neighborhoods on the city's South Side by one member of our team (Sudhir Venkatesh); data on crime gun traces from Chicago collected by the Bureau of Alcohol, Tobacco and Firearms (ATF); a census of all arrests made in the state of Illinois from 1990 to 2001 recorded by the Illinois State Police (ISP); city- and state-level data on crime rates and gun ownership from the FBI's Uniform Crime Report (UCR) system; the census of all death certificates in the U.S. maintained as part of the Vital Statistics (VS) system; and data from the Drug Use Forecasting (DUF) system of arrestee interviews, specifically data from the 1996-7 gun addendum to DUF. In what follows we discuss each of these sources in turn.

A. Field Interviews

Starting in 2001 fieldwork was conducted by one member of our team (Sudhir Venkatesh) over a period of 15 months in a poor urban region of Chicago known as Greater Grand Boulevard. This community is a large contiguous swatch of poor and working-class neighborhoods in the Southside of Chicago. The area is comprised almost entirely of African-Americans; it forms the heart of the "Black Metropolis," Chicago's most historic African-American settlement. Three distinct "community areas"—the historic administrative unit that sub-divides (in a mutually exclusive manner) the City of Chicago—comprise Greater Grand Boulevard. At the northern end is Grand Boulevard, which has become a space of considerable gentrification and economic development, thereby combining extremely poor city blocks with blocks of middle-class homeowners. At the eastern end is Oakland, an institutionally eviscerated space and one that is extremely poor. At the southern end is Washington Park, a concentrated poverty neighborhood that is noteworthy for the presence of the Robert Taylor Homes public housing development and open expanses of under-used and abandoned land tracts that host numerous forms of underground economic activity (of which gun sales are one).

In 2003 these three Chicago community areas – Oakland, Grand Boulevard and Washington Park – experienced a total of 17 homicides. Given 48,262 people, this figure implies a homicide rate per 100,000 people of about 35 (Chicago PD Annual Report, 2003), around 6 times the national average.

It is worth noting several community-wide attributes of Greater Grand Boulevard that impact this study of gun markets. First, the street gangs in Greater Grand Boulevard have historically been the most powerful African-American gangs in the city. In the last three decades, the local gangs have become increasingly entrepreneurial; their income derives primarily from narcotics and extortion, secondarily from guns and looting. In the late 1990s, an

important shift occurred that is beginning to affect the organization of gun markets: federal law enforcement indictments, by dissolving gangs and loosening their ties to one another, are leading to changes in the supply and demand structure of guns—e.g., leading to rising gun sales among young people in gangs, shifts in the suppliers to the area, changing patterns of violence (in which guns are and are not present).

Second, the physical infrastructure of the area is changing dramatically because of public housing demolition and heightened gentrification—shifts that are accelerating population turnover and leading to re-zoning of industrial and residential lands. An area once known only for blight and physical deterioration is beginning to boast a real estate revival. The implications for gun trading are significant because the physical landscape can play an important role in shaping how guns are stored, sold, and used. Given these changes we focus only on gun markets outside of public housing, given that any in-depth findings on public housing-based gun use and trading would soon be outdated.

SV's interview samples are defined by age and criminal orientation, as well as role in the underground gun market. Sample size is a somewhat imprecise concept with ethnographic fieldwork, since for example some of these discussions might be held informally with a group of people in a public housing hallway. We try to count "respondents" only as those with whom SV had a reasonably lengthy one-on-one discussion. There is also some ambiguity about people's roles within the neighborhood; for example SV's definitions of "gang affiliated" may not correspond to those used by the Chicago Police Department.

With these caveats in mind, interviews were conducted with around 190 non-gang affiliated youth (under 22 years of age), of whom 116 owned a gun, and around 75 gang-affiliated youth, whose gun ownership status is difficult to determine from these interviews directly since gangs strictly regulate access to guns for youth. Note that human subjects requirements prevented us from interviewing minors, so youth are 18 and older. SV also interviewed around 90 non-gang affiliated adults (22 or older), of whom around 45 owned a gun; and around 57 interviews with gang-affiliated adults (including 12 gang leaders), of whom 50 owned a gun.. In addition SV conducted interviews with 12 elite gun suppliers (importers or wholesalers), 11 retail brokers, 17 adults engaged actively with criminal associations, and 77 prostitutes.

B. Crime Gun Traces

We also draw on data from the Bureau of Alcohol, Tobacco and Firearms (ATF) on crime guns confiscated by the Chicago Police Department between 1999 and 2003 submitted to ATF for tracing. By using serial numbers that are unique to a given gun (conditional on manufacturer), ATF tries to identify the first legal purchaser of the firearm by accessing the commercial transactions records maintained by law by dealers, distributors and manufacturers.

Between 1999 and 2003 the Chicago PD submitted all confiscated crime guns to the ATF for trace requests, as part of ATF's Youth Crime Gun Intervention Initiative (YCGII). A total of 43,413 guns were submitted for tracing over this period, of which 23,237 (53.5%) were successfully traced. This tracing success rate is quite similar for our study area of GB / WP and for the rest of Chicago. This tracing success rate is also quite similar to national data for 1999 (54%). Nationwide in 1999, 10% of guns could not be traced because the guns were too old, while others could not be traced because of problems with the serial number or errors in the paperwork and the like. It is important to note that even when guns are successfully traced this process can only identify the first purchaser from a FFL, and provides no information on subsequent transactions in the underground distribution chain (see Cook and Braga, 2003 for more on the trace process and limitations of the ATF data).

C. Arrest Data

Our third source of data consists of a census of all arrests made in the state of Illinois from 1990 to 2001 reported to the ISP. These data provide information on the date of each arrest, the arresting agency (so that we can distinguish arrests in Chicago versus elsewhere in the state, but cannot determine where within Chicago a crime was committed), all criminal charges filed against the suspect as part of the arrest, and (albeit with some additional measurement error) the disposition of these charges.

D. UCR Crime Data

To measure gun involvement in crime in Chicago and other cities we use standard data from the FBI's Uniform Crime Report (UCR) system. These data capture crimes voluntarily reported by victims to the police and then voluntarily submitted by police to the FBI. Problems with the UCR data in terms of variation across areas and time in victim reporting to police and police reporting to the FBI are well known (see for example Maltz, 1999). However the UCR data are generally believed to be more reliable for more-serious than for less-serious offenses.

E. Vital Statistics

To measure gun ownership rates we use data from the Vital Statistics (VS) census of all deaths to construct a measure of the fraction of suicides within a jurisdiction that is committed with firearms (firearm suicides divided by suicides, or FSS). While the VS is generally thought to capture most deaths that occur in the U.S., one source of measurement error comes from the fact that coroners or medical examiners report the cause of death on the death certificate, which may disagree with the results of subsequent police investigations and more generally can be subject to some ambiguity. (For example, when the beat-era writer

William S. Borroughs famously tried to shoot an apple off of his wife's head but missed and killed her instead the medical examiner handling the case may plausibly have had some doubts about whether to classify this as an accident, homicide or, from the perspective of Borroughs' wife, suicide at least in a probabilistic sense). The fraction of suicides that involve a firearm has been shown to be strongly correlated with survey-based measures of household gun ownership rates in the cross-section (Azrael, Cook and Miller, 2004) and within states or regions over time as well (Cook and Ludwig, 2005).

F. Drug Use Forecasting data

The Drug Use Forecasting (DUF) system is administered by the U.S. Department of Justice and has collected survey information on arrestees from 1987 through 1997. (The successor to the DUF is called the ADAM, which was itself recently discontinued). Usually the sample includes arrestees from 24 different U.S. cities, although sites vary somewhat from year to year. Within participating cities, first a set of selected booking facilities are selected and then arrestees within these booking facilities are asked to be interviewed. In Chicago and 10 other DUF sites (Atlanta, Cleveland, Denver, Detroit, Houston, Kansas City, Omaha, Philadelphia, St. Louis and Washington, DC) the catchment area for selecting booking facilities was the city. In the other DUF sites (Dallas, Ft. Lauderdale, Indianapolis, Miami, New Orleans, Manhattan, Phoenix, Portland, San Antonio, and San Jose) booking facilities were selected from catchment areas defined by borough, county, or parish. Each site attempts to collect data from around 225 adult males per quarter and 100 adult females. Some (but not all) sites also attempt to collect data from 100 juvenile males and 100 juvenile females.

Typically around 90 percent of arrestees asked to participate agree to answer survey questions about drug use and involvement with crime, while 80 percent agree to provide urine samples for drug testing. These sources of data are complemented by administrative data from police arrest records regarding the arrestee's demographics (age, race) and the crime for which the person was arrested.

In 1995, 1996 and 1997 the DUF survey included a gun addendum that asked survey respondents to report on their experiences with guns, including ownership, gun use in the most recent crime, acquisitions, victimization experiences and general availability in the community. Because these data were collected for only the second half of 1995 we focus our analysis on data from 1996 and 1997. The DUF data used in our analyses are restricted-use and obtained under a special agreement with ICPSR. For more information about the dataset see the documentation for ICPSR study number 9477.

Table 1:

Type and Caliber of Guns Confiscated in Chicago

	Grand Blvd. / Wash Park (%)	Rest of Chicago (%)
Number	4,483	38,930
Type of firearm		
Semiautomatic Pistol	49.0	50.2
Revolver	34.6	33.0
Shotgun	7.7	7.9
Rifle	7.2	7.0
Derringer	1.5	1.6
Other	0.1	0.2
Total	**100.0**	**100.0**
Caliber / Gauge		
9mm	18.7	18.0
.38	15.9	15.5
.22	11.4	12.9
.380	10.4	11.2
.32	7.5	6.7
.25	7.2	8.4
.357	6.9	6.5
.45	5.5	4.7
12 gauge	5.4	5.7
.40	2.5	2.1
Other	8.7	8.3
Total	**100.0**	**100.0**

Source: Authors' calculations of guns submitted by Chicago Police Department to ATF for tracing in 1999-2003 (see appendix).

Table 2:

Source States of Guns Confiscated in Chicago

	Grand Blvd. / Wash Park	Rest of Chicago
	(%)	(%)
State		
Illinois	46.2	48.3
Indiana	11.5	11.6
Mississippi	10.9	9.6
Wisconsin	3.4	2.8
Georgia	2.4	1.8
Arkansas	2.3	1.8
Kentucky	2.3	2.5
Alabama	2.0	1.8
Texas	1.9	2.0
Tennessee	1.7	2.2
Other	15.4	15.6
Total	**100.0**	**100.0**

Source: See Table 1

Table 3:

Retail Price and Age of Guns Confiscated in Chicago

	Grand Blvd/ Wash Park			Rest of Chicago		
	Juveniles (under 18)	Youth (18-24)	Adults (25+)	Juveniles (under 18)	Youth (18-24)	Adults (25+)
Number	72	301	293	484	2,055	2,525
Retail Price						
Mean	$294	$312	$326	$297	$316	$350
Median	$173	$311	$400	$269	$303	$410
Price Distribution	%	%	%	%	%	%
<$150	43.1	28.9	30.0	35.5	30.5	23.7
$150-300	11.1	20.9	16.0	17.9	19.4	17.2
$300-450	15.2	23.5	23.5	19.4	21.7	25.0
$450-600	29.2	24.9	29.4	26.2	26.3	31.2
>$600	1.3	1.7	1.0	0.8	2.1	2.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Age of gun	%	%	%	%	%	%
<=3 years	18.2	22.3	25.6	18.4	25.7	24.0
4-7 years	27.3	19.8	20.2	23.2	20.4	23.3
8-12 years	10.9	17.8	15.5	17.6	17.1	16.7
13-19 yrs	10.9	11.6	6.2	10.1	11.2	9.1
20+ years	32.7	28.5	32.5	30.7	25.6	26.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: See Table 1. "Retail price" is estimated price of gun sold new at retail from Blue Book figures, and does not account for actual condition of gun, which is not available in the ATF data.

Table 4:

Type of Crimes Leading to Gun Confiscation in Chicago, by age of Possessor

	Grand Boulevard / Wash Park			Other Neighborhoods		
Recovery crime	*Juvenile* (<18) %	*Youth* (18-24) %	*Adult* (25+) %	*Juvenile* (<18) %	*Youth* (18-24) %	*Adult* (25+) %
Firearms offense	50.0	39.4	37.0	57.8	51.1	51.0
Narcotics crime	43.6	50.6	49.6	24.8	33.8	33.1
Violent crime	5.1	8.3	11.1	13.7	11.6	10.8
Other crime	1.3	1.7	2.3	3.6	3.6	5.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
(Number)	(78)	(348)	(395)	(548)	(2432)	(3252)

Source: See Table 1
Violent crime = homicide, robbery, assaults, kidnapping, sex crimes (i.e. rape / assault);
Narcotics crime = drug offenses not distinguished by possession, sales, or type of drug;
Other crime = burglary, theft, fraud, explosives, vice crimes, integrity crimes, etc.;
Firearms offense = illegal carrying or possession of a firearm (carrying and possession are not distinguished in the data).

Table 5

Gun Acquisition and Gang Membership in Chicago Arrested

	Full sample	Adult males only
Sample size (N)	1,194	1,074
Ever own handgun?		
Yes	20.8%	20.4%
Gun acquisitions (for those ever owned gun)	%	%
Stole	6.1	6.9
Rented / borrowed	10.4	10.3
Bought	61.9	59.6
Gift / other	21.6	23.2
Total	100.0	100.0
Amount paid if bought:	%	%
$ 0-50	5.7	6.8
$ 50-99	20.5	24.7
$100-199	34.1	34.2
$200-499	33.0	26.0
$500 or more	6.8	8.2
Total	100.0	100.0
(Median paid)	($150)	($100)
Might want gun? (of those never owning)	17.6%	17.4%
How long to get gun? (those who want one)		
More than a week	61.4%	60.4%
Gang member?		
Current	21.1%	19.8%
Current or Past	44.3%	43.6%

Source: Author calculations from Drug Use Forecasting System data for 1996 and 1997 (ICPSR 9477).

Table 6

Markers for Straw Purchases for Guns Confiscated in Chicago

	Grand Blvd/Wash Park	Rest of Chicago
Confiscated within 3 years of initial purchase	25.5%	27.6%
Confiscated within 3 years of initial purchase and first purchased in Cook County	10.6%	11.8%
Confiscated within 3 years of initial purchase and first purchased in Cook County by a female	2.1%	1.8%

Source: See Table 1

Table 7:

Gang Membership among Adult Male Arrestees

City	Current gang member	Current or past gang member	Sample Size
Chicago	19.8	43.6	1,074
Los Angeles	12.2	27.5	1,181
Indianapolis	5.5	22.0	1,811
St. Louis	5.5	25.2	1,039
Birmingham	5.1	14.6	1,738
Denver	3.7	17.8	1,830
Omaha	3.5	16.5	1,756
Houston	3.2	16.1	1,325
San Antonio	3.0	14.6	1,110
Dallas	2.7	13.2	1,892
San Jose	2.4	12.1	708
Miami	2.2	10.5	1,059
Cleveland	1.5	15.6	1,130
Philadelphia	1.4	15.1	1,083
New York	1.2	13.9	1,471
New Orleans	0.9	7.0	1,931
Portland	0.9	10.9	211
Detroit	0.8	9.9	1,408
Atlanta	0.7	8.1	1,525
Washington	0.4	5.2	1,377
Median	**2.6**	**12.7**	**29,149**

Source: DUF samples of adult male arrestees, 1996 and 1997. (See appendix for details.)

Figure 1

Trends in % Suicides with Guns (Proxy for Gun Ownership) for Cook County, Neighboring Counties and the Rest of Illinois

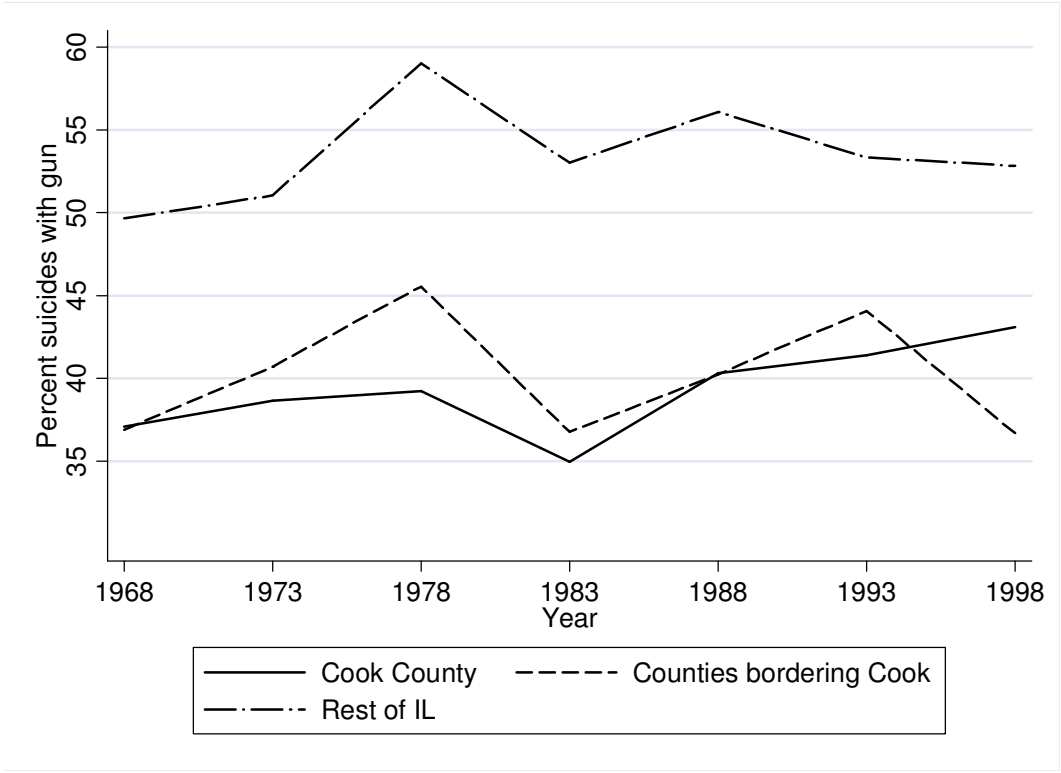

Figure 2

Trends in % Suicides with Guns,
IL versus Neighboring States and National, 1960-75