Do more guns lead to more crime? Understanding the role of illegal firearms☆

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ABSTRACT

Using a detailed jurisdiction-quarter level dataset, I create a proxy for illegal firearm flows: the number of firearms reported stolen in each police jurisdiction, and map their effect on crime in the U.S. Estimates show a strong, positive impact of increased stolen firearms, in the previous quarters, on firearm aggravated assaults, homicides, and robberies in the current quarter. However, no statistically significant relationship is estimated between firearm flows and non-firearm offenses, providing a crucial falsification test. Various other robustness checks, including an analysis of potential spillovers in illegal firearm flows, find no evidence of a spurious relationship driving the results.

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1. Introduction

Gun prevalence and gun crime are extraordinarily high in the United States relative to the rest of the developed world. In 2009, U.S. citizens were estimated to possess around 310 million firearms privately, amounting to almost one firearm per capita (William, 2012; Department of Justice et al., 2011).[1] This is close to double that of Switzerland, the country with the second highest rate of firearms per capita in the developed world. In 2000, the U.S. rate of homicide by firearm was 3.6 per 100,000, accounting for 65% of all homicides. In contrast, the rate of homicide by firearm ranges between 0.1 and 0.5 per 100,000 in the UK, Australia, Germany, and Canada. Moreover, firearms account for a significantly smaller share of all homicides in these countries, ranging from 8% in the UK to 30% in Canada.[2,3] The fact that the U.S. is such an outlier in both dimensions raises the question about a potential causal impact of gun prevalence on homicides and on crime more

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[1] The stock consists of around 114 million handguns, 110 million rifles, and 86 million shotguns. These numbers, estimated by the ATF, includes all firearms available to civilians for purchase as well. Given that firearms are such a durable goods with potentially having a working life of even up to a 100 years, if properly cared for, it is hard to put an accurate number on the total stock without a decent idea of firearm depreciation rates.

[2] *Source*: United Nations Office on Drugs and Crime.

[3] Switzerland, the next highest in gun ownership, has a low rate of firearm homicides, around 0.7 but these also comprise close to 70% of all homicides.

generally. In this paper I estimate the effect of gun prevalence on crime, focusing particularly on the role of flows of illegally obtained firearms.

The effect of gun prevalence on crime levels is theoretically ambiguous. Under the Beckerian framework (Becker, 1968; Ehrlich, 1973), higher gun prevalence may reduce overall crime rates by increasing the expected cost of illegal activity.[4] On the other hand, increased firearm prevalence can lead to greater misuse of firearms by legal owners and can also increase the likelihood of criminals obtaining firearms through unregulated channels like theft. The possibility that higher gun prevalence could cause more crime is often disregarded with the argument that if a potential offender decides to commit a crime he would attempt it regardless of the availability of his weapon of choice. However, there are at least two channels through which guns can directly increase criminal activity. First, a potential offender who possesses a firearm may be more confident in the success of his criminal enterprise and increase his overall criminal behavior as a result. Second, the presence of a firearm can lead to an unanticipated escalation in the crime committed. For example, an assault incident can end up causing grave bodily damage to the victim if the offender actually fires his weapon.[5] Theoretical studies on the incentives of using firearms by offenders has also postulated the increased likelihood of offenders owning firearms to enhance the ex-ante probability of a successful criminal enterprise (Mialon and Wiseman, 2005; Bac, 2010). Moreover, this conclusion is robust to incorporating the idea that a potential offender almost always has a first-mover advantage over the victim (Oliveira and Balbinotto Neto, 2015).

While there has been much empirical research examining the relationship between guns and crime, little consensus exists about the sign or magnitude of the effect. One major issue plaguing researchers in establishing a causal link between gun ownership and crime is the difficulty in measuring gun prevalence at an acceptable geographic level.[6] Federal law restricts maintenance of any registry of legal gun owners, and only a small number of states impose registration or licensing requirements for gun owners (Azrael et al., 2004). As a result, most studies in the literature use proxy measures of gun ownership and trace their effects on crime levels. Among the more influential measures, Lott and Mustard (1997) use changes in right-to-carry concealed weapon laws, Duggan (2001) uses *Guns & Ammo* magazine subscription levels across U.S. counties, and Cook and Ludwig (2006) use the fraction of suicides committed by firearms (FSF). However, these studies reach different conclusions with Lott and Mustard (1997) finding that increased firearm prevalence reduces crime rates while the latter two studies find robust evidence that firearms result in higher crime rates.

A common feature of the above mentioned studies is that they rely almost exclusively on firearm proxies measuring overall legal gun ownership. This makes it difficult to interpret the coefficient on gun prevalence, especially when a significant proportion of gun crime is committed using illegally obtained firearms.[7] For instance, if legal and illegal firearm prevalence are spatially unrelated, then using only an aggregate measure of legal gun ownership can vastly understate the actual effect of firearms on crime rates since it would fail to capture illegal firearm prevalence. On the other hand, if the two measures are substantially correlated estimated effects can be close to the true effect however, it would not be possible to distinguish which channel is more important. This makes designing effective gun policy difficult since it is not clear whether to focus on regulating new legal firearm purchases or getting illegal firearms off the street. The literature has been aware of the important role that illegal firearm prevalence can play in increasing crime rates but has thus far lacked a way to measure it.[8]

I address this shortcoming in the literature by investigating the impact of illegal firearm flows on crime levels across the United States. I use a detailed criminal incident level data set compiled by the FBI, the National Incident Based Reporting System (NIBRS) to construct a measure of illegal firearm flows: the number of firearms reported stolen in each police jurisdiction by victims of property crime.[9] To control for the spatial spread of legal gun ownership, I use the best available proxy in the literature; the fraction of suicides committed by firearms (FSF). Both Kleck (2004), Azrael et al. (2004), find that the FSF proxy has the highest correlation with aggregate measures of gun ownership available from the General Social Survey (GSS), around 0.87 compared to 0.70 for the *Guns & Ammo* proxy.[10]

Using the NIBRS, I examine the relationship between various crime measures and the number of stolen firearms over the last four quarters at the jurisdiction level. One potential concern in investigating these effects is that unobservable

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[4] During a criminal enterprise the offender's probability of being apprehended or injured likely increases when the potential victim is armed.

[5] I present suggestive evidence for the existence of such a channel in Section 6.

[6] The General Social Survey (GSS) is the most widely cited survey for aggregate measures of gun ownership, but the selected sample of respondents are only representative of the nine Census divisions (Azrael et al., 2004).

[7] I provide new evidence in a later section for the assertion that a vast majority of firearms involved in crimes are acquired illegally.

[8] For example, both Duggan (2001), Cook and Ludwig (2006) attribute their estimated positive effect to the potentially significant role that could be played by illegally acquired firearms.

[9] Two previous attempts, in the criminology literature, Stolzenberg and D'Alessio (2000), Haas et al. (2007) used the NIBRS data in a similar way. However, I attempt to deal with potential endogeneity concerns in a more meticulous manner conducting various falsification tests to allay such concerns as outlined below. In addition, the focus of these previous papers was on a single state over a small time period, Stolzenberg and D'Alessio (2000), South Carolina and Haas et al. (2007), West Virginia. I focus on a much broader time period, 1993–2010, and over 400 jurisdictions from around 34 different states, enhancing the external validity of the findings.

[10] There is a separate strand of literature which establishes how the presence of a gun in a household increases the probability of suicide being committed with a firearm in that household, however there seems to be a substitution effect in operation with the firearms not resulting in increased suicides but by more potential suicide victims choosing firearm as the method of choice for committing suicide (Ludwig and Cook, 2000; Miller et al., 2002; Shenassa et al., 2003).