



## Guns and crime revisited



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## ARTICLE INFO

## Article history:

Received 16 December 2012

Received in revised form 29 July 2013

Accepted 31 July 2013

Available online 14 August 2013

## JEL classification:

K42

## Keywords:

Private precautions

Gun laws

Policing

Crime

Penalties

Incentives

Victims

## ABSTRACT

I focus on the effect of changes in public security (policing) on private security measures that potential victims can take. In particular, I look at the tradeoff between different types of private security measures – such as using or carrying guns, carrying less cash or keeping less valuables at home, and using burglar alarms or Lojack – and study how this tradeoff is affected by changes in public security. If private householders' direct security expenses are *strongly* substitutable with public policing (e.g., for guns which may be more useful in badly policed areas), an increase in policing results in a drop in these expenses; it also results in carrying or keeping less cash (an indirect security measure which reduces the prize a criminal can seize). If, however, householders' direct security expenses are “complementary” to policing in the sense that they are more effective when police response is rapid (e.g., for burglar alarms), more policing increases these expenses unless the efficacy of joint (public and private) security expenses on combating crime encounters very sharply diminishing returns; moreover, a rise in policing also induces carrying or keeping more cash. An increase in penalties increases the tendency to keep cash on hand, and also reduces crime, provided that as private precautions increase, with policing constant, it takes a larger increment in security spending to compensate for a specific drop in penalties. The results are consistent with some empirical trends in crime rates, policing, penalties and private precautions.

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## 1. Introduction

A spate of interesting empirical studies have looked at the factors affecting the drop in the US crime rate from the nineties. Many of these are surveyed in [Levitt \(2004\)](#). While [Levitt \(2004\)](#) mentions greater policing and harsher penalties for criminals as factors explaining significant parts of the decline, he also notes that relaxation of gun restrictions, such as CCW laws – which gave citizens the right to carry concealed handguns – did not seem to influence the drop in crime rates.<sup>1</sup> Moreover, some of the CCW literature that [Levitt](#) cites – [Duggan \(2001\)](#), for instance – makes it clear that there is no indication that potential victims responded to CCW laws by carrying guns more frequently, while gun ownership seems to have fallen, with a 17 percent drop in the fraction of households owning guns between 1993–1998.

At the same time, other studies (for instance, [Cook and Macdonald, 2010, 2011](#); [Ayres and Levitt, 1998](#)) stress the increase in *other* types of private precautions (apart from gun ownership or choosing to carry handguns for defensive purposes). These precautions include an expansion in the use of burglar alarms, carrying less cash<sup>2</sup> and using different debit or credit cards, and using Lojack to help avoid car thefts.

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E-mail addresses: [bguha@smu.edu.sg](mailto:bguha@smu.edu.sg), [brishtiguha@gmail.com](mailto:brishtiguha@gmail.com)<sup>1</sup> The empirical literature supporting these conclusions is partially discussed in detail in the literature review that follows.<sup>2</sup> The trend of carrying less cash was also noted by [Amromin and Chakravorti \(2009\)](#), [Bolt and Chakravorti \(2008\)](#), [Humphrey et al. \(1996\)](#) and [Kosse \(2011\)](#), among others.

While different empirical studies have focused on (a) the effect of policing on crime, (b) the effect of harsher penalties on crime, (c) the impact of relaxation of gun control laws, and (d) the trends in other types of private precautions taken by households, a coherent theory linking together these separate findings and illustrating the interplay between them is missing. This paper takes tentative steps to fill that gap.

I construct a simple theoretical model focusing on potential victims' incentives, studying the interaction between government security and private incentives to take precautions. I allow for the fact that different types of private precautions may differ in several respects. For example, precautions like keeping less cash and valuables at home or carrying less cash while outside reduce the prize that a criminal can seize in one criminal attempt, but differ intrinsically from direct expenses on security (such as on burglar alarms, Lojack or guns) that individuals undertake to raise the probability that a criminal attempt fails. Similarly, *direct* expenses on security can also differ in important respects. For instance, burglar alarms and car alarms are both more effective in the presence of rapid police response and are in this sense "complementary" to policing intensity. Guns, however, may be more useful to potential victims where the police are ill armed or in areas with scant police presence (Glaeser and Glendon (1998) confirm that householders' ownership of guns seems to be a "substitute" for, rather than a complement of, policing and is most common in badly policed areas; their results are discussed at more length in Section 3). I also distinguish between crimes which are financially motivated (for example, robbery, burglary or theft) and other violent crimes (such as hate crime or rape) where criminals may have other motives.

I find that if direct private security expenses are *strongly* substitutable with public policing, an increase in policing (i) reduces these expenses, and (ii) induces individuals to keep/carry less cash and valuables. In contrast, if direct private security expenses are complementary or less substitutable to policing, an increase in policing increases these expenses and also encourages individuals to keep or carry *more* cash and valuables. If, however, the marginal efficacy of joint security expenses on crime reduction encounters sharply diminishing returns, I find that an increase in policing reduces direct private security expenses unless there is a strong complementarity between policing and private security expenses. A rise in penalties, holding policing constant, encourages individuals to keep/carry more cash, and also reduces crime, provided that as security expenditure goes up, the same fall in penalties must be compensated by a relatively large increment in security spending to keep crime from increasing.

The rest of the paper is organized as follows. Section 2 discusses some related literature. Sections 3 and 4 contain my results. Section 5 concludes.

## 2. Some related literature

This paper is connected to three strands of the literature on the economics of crime. The first is the empirical literature on the determinants of the drop in crime and trends in private precautions. The second is the theoretical literature on private precautionary measures against crime, and the third, which partly overlaps with the second, is a small theoretical literature dealing specifically with gun control laws. I discuss each of these in turn.

First I discuss the relevant empirical literature. Several studies have found that increases in policing reduce crime. These include Levitt (1997, 2002), Di Tella and Schargrodsky (2004), Draca et al. (2011), Machin and Marie (2011), Marvell and Moody (1996), Corman and Mocan (2000), and Lin (2009).<sup>3</sup> Similarly, increasing penalties for criminals seem to have been a major factor behind the reduction in crime (Levitt, 1996, 2004). The effect of penalties on crime may incorporate both deterrence and incapacitation (see Miceli, 2010 for a theoretical model which incorporates both these effects). Several studies have independently found that changes in average sentence length have an inverse impact on crime (Machin and Meghir, 2004; Kessler and Levitt, 1999; Pyle, 1989; Owens, 2009).

I now turn to the empirical literature on gun control and gun ownership, in particular, that on CCW laws allowing potential victims to carry concealed weapons for self-defense. Lott and Mustard (1997) argued in favor of such laws and found that they reduced crime. However, these results have since been challenged and contradicted by a number of studies including Duggan (2001), Ayres and Donohue (2003) and Cook and Ludwig (2006), among others. Duggan (2001) finds that gun ownership did not increase in states that passed CCW laws relative to those that did not. There was no evidence that private individuals responded positively to CCW laws by arming themselves more frequently. Moreover, there was no evidence that householders increased gun ownership in response to anticipated rises in crime. He also finds that the fraction of gun-owning households actually decreased by 17 percent between 1993 and 1998 in spite of the implementation of CCW laws. Both Duggan and Cook and Ludwig (2006) find that gun ownership, far from causing crime to fall, causes crime to increase, if anything (this increase in crime being driven by criminals who used the guns to commit homicide). Similarly Ayres and Donohue (2003) also find that the CCW laws did not play a role in reducing crime.

Despite this, potential victims' use of several other types of precautions was increasing. For instance, Cook and Macdonald (2011) document an increase in the use of burglar alarms and other types of security equipment while Cook and Macdonald (2010), Amromin and Chakravorti (2009), Humphrey et al. (1996), Kosse (2011), and Bolt and Chakravorti (2008), among others, note the trend of carrying or keeping less cash at hand. Interestingly, there is empirical evidence that the trend of keeping less cash at hand, and, in particular, tending to substitute away from cash toward debit cards is significantly driven by safety concerns. Kosse (2011) finds using Dutch survey data that consumers' safety perceptions play a major role in

<sup>3</sup> See Cameron (1988) for a survey on earlier studies on the effects of policing on crime. Some of these found mixed results because of endogeneity issues.

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