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Private protection against crime when property value is private information

Florian Baumann [a], Tim Friehe [b,c,*]

[a] University of Düsseldorf, Düsseldorf Institute for Competition Economics, Universitätsst. 1, 40225 Düsseldorf, Germany
[b] University of Bonn, Center for Advanced Studies in Law and Economics, Adenauerallee 24-42, 53113 Bonn, Germany
[c] CESifo, Munich, Germany

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ABSTRACT

This paper analyzes private precautions against crime when the value of the property to be protected is private information. In a framework in which potential criminals can choose between different crime opportunities, we establish that decentralized decision-making by potential victims may lead to suboptimal levels of investment in private protection. This outcome is possible when observable precautions inform potential offenders about the value at risk even when the diversion effect due to private safety measures is taken into account.

1. Introduction

1.1. Motivation and main results

Crime is a social phenomenon of great importance, adversely affecting many individuals by the minute. Indeed, crime is consistently placed at or near the top of the list of social maladies (see, e.g. Helsley & Strange, 1999). In response, potential victims go to considerable length in order to address the crime risk by taking private action. Such private precautions include not only minor expenses such as walking a detour to avoid a dark alley but also sizable investments such as security systems to safeguard the private home, allowing for the empirical judgment that private precaution expenditures are at least of the same order of magnitude as public expenditures (Shavell, 1991). Despite its importance for crime control, private protection has received little scholarly attention when compared to public law enforcement (Cook & MacDonald, 2010).

We analyze observable private precautions against crime when the value of the property to be protected is private information.[1] Observable private protection against crime is ascribed to possibly deter crime and/or possibly *divert* crime from protected to unprotected potential victims (e.g. Clotfelter, 1978; Cook, 1986; Shavell, 1991). When private precautions against crime divert offenders to other potential victims, private action is associated with a negative externality, implying a private net benefit in excess of the social net benefit. Individuals invest in private protection without taking into account the adverse consequences for individuals whose crime risk has increased as a result of the investment in precautions against crime, so that *overinvestment* in private precautions results for a given level of crime. In fact, there is some empirical evidence for this diversion effect of private precautions against crime. For example, an analysis by the National Highway Traffic Safety Administration (NHTSA, 1998) reports that the marking of car parts and the consequent drop in the theft of marked cars corresponded to a rise in theft rates for unmarked cars. Similarly, Priks (2009) establishes that the installation of surveillance cameras in the Stockholm subway displaced crime to the surrounding area. However, there is also extensive empirical evidence to the contrary. For example, Guerette and Bowers (2009) analyzed numerous evaluations of situationally focused crime-prevention projects, concluding that crime displacement appears to be the exception rather than the rule. The detailed

* Corresponding author at: University of Bonn, Center for Advanced Studies in Law and Economics, Adenauerallee 24-42, 53113 Bonn, Germany.
E-mail addresses: fbaumann@dice.hhu.de (F. Baumann), tim.friehe@uni-bonn.de (T. Friehe).

[1] The literature on private action against crime distinguishes observable protection measures such as iron bars on the windows of a house and unobservable protection such as storing valuables in a safe (see, e.g. Shavell, 1991). Our analysis is restricted to the case of observable protection measures.

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exploration of the subject by Weisburd et al. (2006) also questions the relevance of displacement.

This paper establishes that observable private protection against crime may *attract* crime instead of divert it, and therefore may make it individually optimal to *underinvest* in private action for a given level of crime. The intuition for this finding is that private precautions against crime signal information about the value of the property to be protected. Consequently, on the one hand, private protection makes it more difficult for criminals to succeed at burglarizing a given target; on the other hand, private protection indicates that the target is particularly worthwhile. In other terms, observable private precaution against crime is a clear indication that thieves might either only be able to appropriate a smaller share of the property or that they will succeed with a smaller probability. Accordingly, potential offenders are diverted to unprotected targets, *ceteris paribus*. However, the fact that the potential victim found it worthwhile to invest in precautions induces potential offenders to update their belief regarding the property value at stake when information about it is asymmetrically distributed, because bearing precaution costs is rational only for potential victims with sufficiently high property values. This reality thus attracts potential offenders toward protected targets, *ceteris paribus*. We identify a simple condition that describes the scenario in which the attraction effect dominates the diversion effect, i.e. in which obtaining a smaller share of a more valuable property is preferable from the offender's standpoint to securing a larger share of a less valuable property. In such a scenario, private protection attracts criminals and therefore potential victims underinvest.

The informational set-up we study in this paper is characterized by observable private precautions against crime and unobservable property values, and has been introduced by Lacroix and Marceau (1995). Although it seems to abstract from many important aspects, similar circumstances may be identified in the real-world. For example, there are often neighborhoods where houses are relatively similar from the outside. This is particularly true in modern large-scale construction projects, but also holds in other cases. The potential thief may then wonder about the likely contents of the various houses. In that scenario, a surveillance camera in front of a private house, for example, makes a successful burglary more difficult (and might even make the thief turn to another property), but also indicates that valuable goods are being protected by homeowners. It is this trade-off that our study focuses on. For example, Mejia and Restrepo (2010) provide some evidence for a linkage between a decision that sends signals about an otherwise only incompletely observable property value and crime in their study on conspicuous consumption. In addition, the mechanisms that take center stage in our contribution are important in related settings. For example, consider the decision of a firm regarding whether or not to patent an innovation. The patent is observable for competitors and the fact that the innovative firm patents may signal to competitors information about the profitability of imitating the innovation (see, e.g. Horstmann, MacDonald, & Slivinski, 1985). Likewise, when trying to defend several sites against attacks by terrorist groups, for example, the policy maker must be aware of the fact that concentrating defensive resources in a few sites may provide a signal about the relative vulnerability of the sites to terrorists (Powell, 2007). In all of these instances, there is a direct benefit – private protection against crime lowers thieves' appropriable share or success probability, patenting rules out duplication, and protected sites are safer – and a potential costs due to the signaling characteristic of the action.

Our central result is derived in a setting in which potential victims differ in the level of property value that is at risk of crime. The probability that offenders will find a suitable target to attempt to burgle is determined by a function that takes into account both the number of thieves that focus on the same subgroup of potential victims and the number of potential victims in that subgroup, and thereby incorporates the concept of congestion of criminal opportunities (as described, for example, in Helsley & Strange, 2005 and Engelhardt, 2010). In our benchmark scenario, the value of property is observable. As a result, offenders can perfectly discriminate between potential victims with different property values. For this case, we reproduce the finding that decreasing the share of protected households below the level that results under decentralized decision-making is welfare-improving for a given level of crime. In this assessment, we evaluate the investment in private action against crime that is individually optimal from the viewpoint of the collective of potential victims.[2] Next, we consider the fact that property values are usually not easily observable. We suppose that potential victims have private information about their property value, but may signal some information about it by deciding on whether or not to invest in observable private protection against crime. In this scenario, offenders can only discriminate between households with and without private precautions against crime. As a result, thieves update their belief about the expected value of the property upon observing (no) private protection, and make an attempt to steal where it seems to be most profitable. In this setting, it may turn out that decentralized decision-making results in a situation in which an increase in the number of protected potential victims leads to an improvement from the viewpoint of the collective of potential victims (i.e. that there is underinvestment in precautions against crime). Should the signaling attribute of private precautions not lead to suboptimal levels of investment in private precautions, its existence will provide a counterweight to the gap between private benefits and social benefits that is due to the diversion effect, implying that private decisions are not as disparate from that of the social planner as has been proposed previously.

In the equilibrium of our model, rich individuals invest more in private precautions against crime and are less adversely affected by crime than individuals with low property values. Empirical observations show that households with higher incomes spend more on private protection (Di Tella, Galiani, & Schargrodsky, 2010; Hotte et al., 2009) and are less likely than lower-income households to experience property crime (Bureau of Justice Statistics, 2011; Levitt, 1999). For instance, based on data of the National Crime Victimization Survey, households with an annual income of $15–25 thousand suffered from 32.8 burglary victimizations per thousand households, whereas those with income $75 thousand and higher experienced only 16.7 victimizations (Bureau of Justice Statistics, 2011). Accordingly, the outcome of our model corresponds with these real-world findings. Furthermore, our framework is capable of producing an outcome in which (from the viewpoint of the collective of potential victims) there is insufficient investment in private precautions against crime. This is consistent with the observation that law enforcement authorities frequently provide assistance free-of-charge to homeowners seeking to safeguard their property against crime.[3]

1.2. Relation to literature

The present study analyzes potential victims' private protection investment when property values vary and are private information,

[2] The level of precautions that victims would collectively agree on is considered as a benchmark in Shavell (1991, see also Fn. 9). The objective function we consider when we seek to determine what level of private precautions against crime may be optimal from a social standpoint is the sum of the expected stolen goods and the protection expenditures and thus may be labeled the aggregate burden of crime (as in, e.g. Hotte & van Ypersele, 2008).

[3] For example, the police in Greenville, SC (USA) will arrange home visits and provide homeowners with target-specific advice on how they can protect their property (http://police.greenvillesc.gov/protecting-your-home.aspx).