Less Crime May Be Worse

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ABSTRACT

The probability of being a crime victim, conditional on engaging in risky activity, acts like a tax on the risky activity. The higher the probability, the greater the loss to potential victims in consumer surplus. Higer conditional probabilities, however, do not always increase actual crime; sometimes the decrease in risky activity more than offsets the increase in conditional probability. Under these circumstances, less crime is associated with greater welfare loss.

1. INTRODUCTION

Public perception of crime is often decried as misguided or irrational. Victimization studies, for instance, show that most serious crime has been declining since 1981 [U. S. Bureau of Justice Statistics, 1992], and yet public opinion polls show rising concern about crime. Similarly, experiments show that people like walking patrols even when they do not reduce crime.

This note will argue that public perceptions are probably right. Statistics on crimes actually committed are not the correct measure of the burden of crime. The correct measure is the probability of being a victim, conditional on engaging in risky activity. Increases in conditional victimization probability can lead to fewer actual crimes if they also cause large reductions in risky activity, and for plausible parameter values this relationship will hold. Fewer crimes will be committed, but the burden of crime will be greater.

The best analogy is the Laffer curve in public finance. Think of criminal activity as a tax on risky activity--walking in Morningside Park after dark, leaving your car without an alarm, wearing expensive jewelry, living in the South Bronx. The conditional victimization probability is like the tax rate, and the actual number of crimes is like the revenue that the tax raises. If demand for risky activity is sufficiently elastic, increases in the "tax rate" above a certain level will cause "revenue" to fall.

Why would the "tax rate" ever be set so high as to fall on the wrong side of the Laffer curve? The reason is tragedy of the commons: noncooperative perpetrators can overuse a common resource--the willingness of victims to engage in risky activities--even though a monopolistic criminal syndicate would not. This part of the story is like the corruption studied by Shleifer and Vishny [1993] or the criminal industrial organization in Schelling [1967].

The next section sets out the model of victim behavior and derives the Laffer curve. Section 3 presents a simple model of perpetrator behavior, and derives the conditions under which increasing crime is associated with a decreasing burden of crime. Section 4 concludes.

2. VICTIMS

A representative potential victim must decide how much of the risky activity to do. Holding her income and the full price of other activities constant, how much of the risky activity she does depends on the full price p:

(1) $p = p_r + \pi C$

where p_r is the price of the activity in terms of money and time--Becker's [1965] "full price"-- and πC is the expected cost of crime for each unit of the activity: π is the probability of being victimized conditional on engaging in one unit of the risky activity, and C is the cost, in monetary terms, of being victimized.[1]

Notice that this formulation presumes that all other activities are safe from crime--just as the usual partial equilibrium analysis of an excise tax assumes that no other commodities are taxed. If other activities has varying degrees of danger attached to them, the algebra would be seriously complicated, but the basic results would not change. We would just have to use the techniques of cost-benefit analysis for the situation when several markets have distortions.

Let D(p) denote the demand function for the risky activity. Specifically, let

$$D(p) = \alpha\, p^{-\eta}, \quad \alpha>0,\ \eta>0$$

and assume that the risky activity constitutes a small enough share of total expenditures that income effects can be ignored.

The burden of crime (for potential victims) B is the loss in consumer surplus associated with the rise in price from p_r to $p_r + \pi C$. Obviously, this burden is a function of π:

$$B(\pi) = \int_{p_r + \pi C}^{p_r} D(p)\, dp.$$

It is easy to show:

Proposition 1: *The burden of crime is a monotonically increasing function of the conditional probability of victimization* π.

This result does not depend on the particular functional form I have assumed for the demand curve.

The (expected) number of crimes $A(\pi)$ is the product of π and the level of risky activity D:

(2) $$A(\pi) = \pi\, D(p_r + \pi C).$$

Differentiating (2) gives the Laffer curve result:

Proposition 2: *If*

(3) $$\eta > 1 + \frac{p_r}{C},$$

then for

$$\pi \geq \pi^* = \frac{p_r}{C(\eta-1)}$$

$A(\pi)$ *is a decreasing function of* π.

Corollary: *If (3) holds and* $\pi \geq \pi^*$, *increases in* π *increase the burden of crime but decrease crime.*

From proposition 2 we can see when the Laffer curve result is likely to hold: when demand is elastic, when the conditional probability of victimization is large, and when crime is very costly relative to the normal activity. This is not a bad picture of violent urban street crime.

3. PERPETRATORS

The equilibrium value of π depends on the actions of perpetrators as well as those of victims. Let there be a large number n of identical perpetrators--large enough so that each takes π and $D(\pi)$ as given. Each perpetrator i chooses a number of crimes A_i to commit, and so the total number of crimes is

$$A = n A_i.$$

Each perpetrator chooses A_i to maximize a quadratic utility function

$$(4) \quad u(A_i) = \tau A_i - \frac{\gamma A_i^2}{2D(\pi)}, \quad \tau>0, \gamma>0.$$

In (4), τ is the benefit from committing a crime (generally $\tau<C$) and γ represents the cost, including the probability of punishment. $D(\pi)$ in the denominator of (4) represents the increased costs that fewer victims cause for perpetrators. Obviously, more sophisticated versions of this relationship are possible; Clotfelter [1978] can be understood as a catalogue of some of the possibilities. These simple functional forms, however, are sufficient for our purposes.

From the first-order conditions for utility-maximization, we can write the number of crimes perpetrators commit as a function of victim behavior $D(\pi)$:

(5) $$A(\pi) = \frac{n\tau}{\gamma} D(\pi).$$

Comparing (2) and (5) gives the necessary and sufficient condition for an internal equilibrium:

Proposition 3: *At an internal equilibrium, the conditional victimization probability is*

$$\pi^{**} = \frac{n\tau}{\gamma}.$$

Figure 1 illustrates the equilibrium: the supply curve of risky behavior given by (2) must intersect with the demand curve given by (5). The demand curve (5) must be a decreasing function of π (negligible income effects imply that the risky activity cannot be a Giffen good), while the supply curve (2) can either increase or decrease. At the intersection, the algebraic slope of (5) must be smaller than the algebrac slope of (2).

Equilibrium will be on the downward slope of the Laffer curve if $\pi^{**} > \pi^{*}$. Simple algebraic manipulation yields:

Proposition 4: *Decreasing crime will be associated with an increasing burden of crime in the neighborhood of equilibrium if*

(6) $$\eta > 1 + \frac{n\tau}{\gamma} \frac{p_r}{C}.$$

Hence the perverse relationship between actual crime and the burden of crime is more likely when demand elasticity is large, the crime is horrible relative to the normal cost of the activity, and the rewards of crime are large relative to its cost to the perpetrators.

This argument has restricted welfare analysis to the welfare of potential victims only. Considering the welfare of perpetrators as well would only strengthen it by making the Laffer curve peak at a smaller probability of victimization.

Notice that if (6) holds, anticrime measures like increased incarceration (reducing n and possibly increasing γ) and increased legitimate employment opportunities can make victims better off even though they increase the amount of crime (more perpetrators may be in prison or working in legitimate jobs, but the ones who are not commit more crimes).

4. CONCLUSION

Anticrime measures should not be judged by their effects on actual crime. Especially for violent street crime, what matters are the conditional probability of victimization and the associated loss in consumer surplus.

This conclusion has an important implication. For most individuals at most times, π is impossible to observe, and doing experiments could be extremely costly. It seems implausible to posit a learning process that could lead people to learn π in any reasonable amount of time. A more natural model would be a multi-armed bandit (no pun intended) process, in which optimal play does not surely lead to finding true probabilities. Whether losses are greater when people are uninformed than when they are informed is a subject for further work.

NOTE

1. There are (at least) two ways that this particular formula can be derived from utility maximization.

First, suppose utility is of the form

$u(x_r, x) - (\pi x_r)G$,

where x_r is the level of the risky activity, x the level of other activities, and G is the utility loss from being a crime victim. Let λ denote the marginal utility of (time and money) income and let

$C = G/\lambda$.

First order conditions include

$$\frac{\partial u}{\partial x_r} = \lambda\ (p_r + \pi\ C),$$

and so $(p_r + \pi\ C)$ can be treated as the price of the risky activity.

Alternatively, let the utility function be standard, without crime entering into it directly, but let crime reduce income by C. Then if the potential victim is sufficiently insured that she faces an expected income constraint, (1) also follows.

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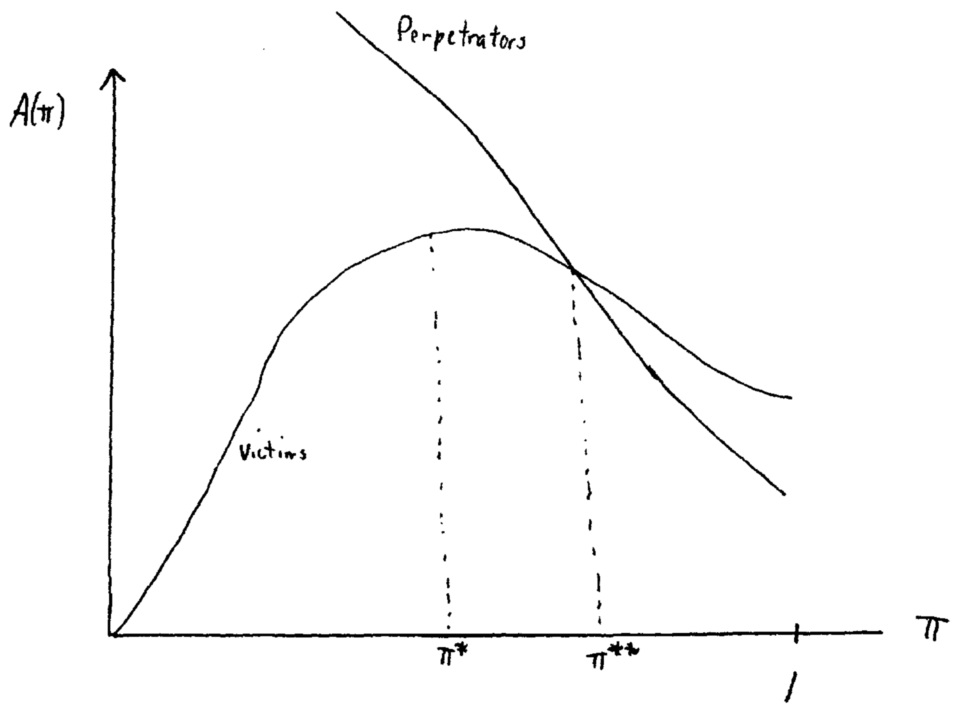

Figure 1

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