Status-Seeking in Criminal Subcultures and the Double Dividend of Zero-Tolerance[*]

Robert Dur[†]

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Abstract

This paper offers a new argument for why a more aggressive enforcement of minor offenses ('zero-tolerance') may yield a double dividend in that it reduces both minor offenses and more severe crime. We develop a model of criminal subcultures in which people gain social status among their peers for being 'tough' by committing criminal acts. As zero-tolerance keeps relatively 'gutless' people from committing a minor offense, the signaling value of that action increases, which makes it attractive for some people who would otherwise commit more severe crime. If social status is sufficiently important in criminal subcultures, zero-tolerance reduces crime across the board.

Keywords: status concerns, street crime, subcultures, penalties, zero-tolerance, broken windows policing.

JEL-codes: K14, K42.

[†]Department of Economics, Erasmus University Rotterdam, Tinbergen Institute, CESifo, and IZA. Address: Erasmus University, FEW/H 8-15, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands. E-mail: dur@ese.eur.nl.

1 Introduction

The 'zero-tolerance' or 'broken windows' approach to crime fighting holds that a more aggressive enforcement of minor offenses leads to a reduction in both minor offenses and more serious crime. This approach, first articulated by Wilson and Kelling (1982), has been pursued in New York City and, since recently, in several other US cities including Boston, Chicago, and Los Angeles. Although the effectiveness of zero-tolerance policies in fighting serious crime is still open to debate (see for instance Levitt (2004), Weisburd and Eck (2004), and Harcourt and Ludwig (2006)), a growing body of empirical evidence indicates that zero-tolerance indeed generates a double dividend. For instance, using cross-sectional data of US cities, Sampson and Cohen (1988), MacDonald (2002), and Kubrin et al. (2006) find a significant negative effect of police activity aimed at disorderly conduct on robbery rates, which can only be partly attributed to the indirect effect of zero-tolerance on the probability of arrest for robbery. Braga et al. (1999) conduct a randomized field experiment in Jersey City, New Jersey, and find that policing disorder has a negative effect on crime incidents, with little evidence of displacement to other areas. Corman and Mocan (2005) use monthly time-series data between 1974 and 1999 from New York City and find – after controlling for several potentially confounding variables including police presence and crime-specific arrests – support for negative effects of stricter enforcement of minor offenses on more serious crime. Funk and Kugler (2003) and Vollaard (2006) obtain similar results using Swiss and Dutch data, respectively.

The prevailing explanation for a double dividend of zero-tolerance relies on a signaling argument. In the words of former New York City mayor Rudolph W. Guiliani: "There's a continuum of disorder. Obviously murder and graffiti are two vastly different crimes. But they are part of the same continuum, and a climate that tolerates one is more likely to tolerate the other."[1] Likewise, Kahan (1997) argues that lax enforcement of lower-level crimes signals tolerance of more severe crime, and so increases both lower-level and more severe crime. The recent evidence in Lochner (2007) is not supportive of this signaling argument. Using longitudinal survey data for the US, he finds that young males' beliefs about the probability of arrest for various crimes are

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[1]See the Archives of Rudolph W. Giuliani, Major Addresses, "The Next Phase of Quality of Life: Creating a More Civil City," Wednesday, February 24, 1998. http://www.nyc.gov/html/rwg/html/98a/quality.html

not affected by local neighborhood conditions like general lawlessness and disarray.

This paper offers a new argument for a double dividend of zero-tolerance policies, one that holds even when enforcement policies and public tolerance of crime are common knowledge. We develop a model in which criminal behavior is, at least partly, motivated by status concerns. In particular, we assume that individuals in criminal subcultures care about their status for being 'tough.' Individuals differ in innate toughness, which may reflect differences in nerve, physical fitness, or sensitivity to guilt. Tougher individuals have an absolute advantage in crime as well as a comparative advantage in more severe crime. Importantly, innate toughness is not observable, and so individuals make inferences about an individual's toughness from his actions. We show that, if social status is sufficiently important in criminal subcultures, there is a double dividend of zero-tolerance in that it reduces both minor offenses and more serious crime.

The intuition behind this result is as follows. When minor offenses are punished harder, some individuals are deterred from committing those acts, and instead choose not to take action. Since these individuals are relatively 'gutless' individuals, the signaling value of committing a minor offense increases. This makes committing a minor offense attractive for some people who would otherwise commit more severe crime. If people in criminal subcultures care sufficiently about status, this effect dominates a positive substitution effect of zero-tolerance on more severe crime, and so stiffer penalties for minor offenses reduce crime across the board.

The paper is organized as follows. The next section discusses some stylized facts on status concerns and social norms in criminal subcultures and describes how the paper relates to the literature. Section 3 presents the model. Section 4 characterizes the equilibrium and Section 5 analyzes the effects of zero-tolerance. Section 6 concludes.

2   Some stylized facts and related literature

Recent studies in criminology, law, and economics have emphasized the role of social status and social norms in criminal behavior. Most of these studies consider negative stigma-effects of committing crime, and argue that stigma, in addition to imprisonment and fines, can be an important deterrent of criminal activity (e.g. Rasmusen (1996), Posner (2000), Bar-Gill and Harel (2001), Blume (2004), Funk (2004), and

Arbak (2005)). While social norms that condemn criminal behavior are adhered to by a large part of the population, they are not universally shared. Indeed, in some subcultures, criminals are actually glorified. Meares, Katyal, and Kahan (2004) note that criminals "develop subnorms that may be antiethical to those of the law-abiding world. [...] The subnorms of this group reward the criminal activity that the law-abiding world punishes, and devalues the lawful alternatives that the law-abiding world celebrates." (pp. 1184-1185).

Street cultures are a case in point. Anderson (1999)'s ethnographic study *Code of the Street* on violence in Philadelphia's poor inner-city neighborhoods finds that residents are confronted with a "local hierarchy based on toughness" in which a reputation for being willing and able to fight earns respect among peers (p. 67). Based on interviews with 191 uncaught violent street offenders in St. Louis, Missouri, Topalli (2005) concludes that these offenders "operate in an environment in which oppositional norms catering to ethics of violence, toughness and respect dominate the social landscape" and that they "strive to protect a self-image consistent with a code of the streets orientation rather than a conventional one" (p. 797). Wilkinson (2001), in her study of violence in New York City, states that: ""toughness" has persistently been highly regarded, a source of considerable status among adolescents in a wide range of adolescent subcultures from street corner groups to gangs. [...] Violence often is used to perpetuate and refine the pursuit of "toughness," and to claim the identity of being among the toughest. [...] The status and reputations earned through violent means provide inner city adolescent males with positive feelings of self worth and "large" identities especially when other opportunities for identity development are not available." (pp. 231-233).[2] Lastly, Matsueda et al. (2006a) test a rational choice model of theft and violence using data from the Denver Youth Survey. They find that "youth who expect to be seen as cool (and value being seen as cool) if they commit theft or violence tend to commit substantially more acts of theft and violence, on average, in the coming year." (p. 115). Matsueda et al. (2006b) obtain similar results using survey data from Seattle neighborhoods.

Our analysis is closely related to studies of social status, in particular to Bernheim (1994) and Bénabou and Tirole (2006). In Bernheim (1994), individuals conform to

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[2] See also Fagan and Wilkinson (1998). Similar findings are reported by Hughes and Short (2005) studying street gangs in Chicago and by King (2001) discussing studies on violence among football fans in European countries.

a standard of behavior so as to avoid being seen as having extreme preferences, which would reduce their status or popularity. In Bénabou and Tirole (2006), there is no such desire to resemble the mainstream. Instead, individuals want to signal their altruism and aim to appear as altruistic as possible. Likewise, in this paper, individuals who appear more 'tough' earn more respect from their peers. We share with these papers the focus on how external incentives may interfere with the desire to signal one's personality traits.

The idea that people may engage in costly signaling so as to gain esteem or acceptance by peers is also prominent in Austen-Smith and Fryer (2005). They develop a model in which individuals signal their social compatibility by underinvesting in education.[3] Glaeser, Sacerdote, and Scheinkman (1996) and Patacchini and Zenou (2005) study models in which individuals want to minimize the social distance between their crime level and that of their reference group. Their empirical analyses show that decisions to commit crime are strongly affected by social interaction. Silverman (2004) studies a matching game with two-sided reputation in which some people directly benefit from violence, whereas others may participate in violence to acquire a 'street reputation,' which provides protection from future assault. One of his main results is that varying levels of participation in violence may be sustained by the same economic and social fundamentals. Further, he argues that the effects of enforcement policy may depend on how policy affects the visibility of a criminal action to peers, as visibility affects the reputational gain from crime.

3 The model

Individuals choose between three possible actions denoted by $x \in \{0, m, e\}$, where $x = 0$ represents abstaining from crime, $x = m$ represents committing a minor crime, and $x = e$ represents committing a serious crime. Apart from social status gains or losses, an individual who commits crime suffers an expected net utility loss of c_x. This expected net utility loss, which can be negative for some individuals, reflects among others the expected pecuniary gain or loss from crime, the risk of being arrested and punished, the risk of injury or death, and anticipated feelings of fear and guilt.

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[3] Our study also relates to papers in which education signals ability, in particular to Bedard (2001) who argues that greater university access may reduce the signaling value of high school, and so may increase high school dropout rates.

Individuals differ in innate 'toughness' σ (a composite of nerve, physical fitness, insensitivity to guilt, and so on) and so expect a different net utility loss from committing a criminal act. Tougher individuals have higher σ and face lower net cost of committing a crime: $c'_x(\sigma) < 0$ for $x = m$ and $x = e$. Besides an absolute advantage in both forms of crime, tougher individuals also have a comparative advantage in serious crime: $c'_e(\sigma) < c'_m(\sigma)$. For convenience, we assume that σ is uniformly distributed, with lower bound σ_l, upper bound σ_h, and density $f = 1/(\sigma_h - \sigma_l)$.

Individuals care about their social status for being tough. That is, an individual cares about other people's belief about his σ. People cannot observe each other's type, but they know the distribution of σ. They observe each other's actions, and update beliefs according to Bayes' rule.[4] The posterior belief about an individual's σ is denoted by $\widehat{\sigma}$. Since there are three possible actions $(0, m, e)$, an individual's $\widehat{\sigma}$ can take three values, which we denote by $\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$. Following Bénabou and Tirole (2006), we assume that an individual's utility from social status depends linearly on the posterior belief about his type. Thus, the utility from social status is given by $s(\widehat{\sigma})$, with $s'(\widehat{\sigma}) > 0$ and $s''(\widehat{\sigma}) = 0$. By the latter assumption, $s'(\widehat{\sigma})$ is a constant and can be described as the weight on social status in the utility function.

4   Equilibrium

Throughout, we focus on a partially-separating Perfect Bayesian Equilibrium where some individuals abstain from crime, some commit a minor crime, and some commit a serious crime. Without loss of generality, we assume that if an individual is indifferent between actions, then he chooses the least serious crime.

Let us first consider what happens when individuals do not care about their social status for being tough. Clearly, all individuals who expect a net utility loss from committing crime ($c_x(\sigma) \geq 0$ for $x = m$ and $x = e$) abstain from crime. Individuals who expect a net utility gain from minor crime ($c_m(\sigma) < 0$) which is larger than or equal to the expected net utility gain from serious crime ($c_m(\sigma) \leq c_e(\sigma)$) commit a minor crime. Lastly, individuals expecting a net utility gain from serious crime ($c_e(\sigma) < 0$) which is larger than the expected net utility gain from minor crime

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[4]Silverman (2004) discusses evidence showing that a majority of violent crimes is committed in public. Also, many of the studies discussed in Section 2 stress the presence of peers when committing crime.
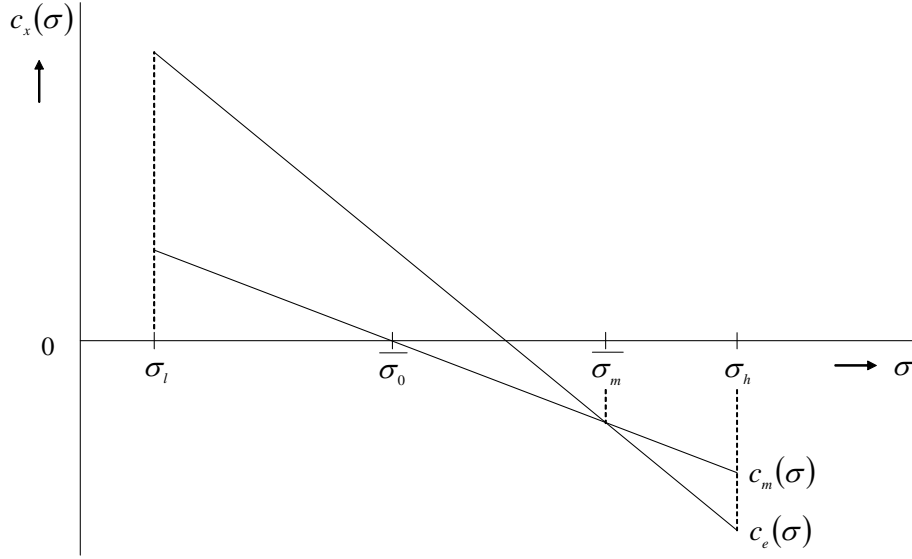
Figure 1: Crime in the absence of status concerns

$(c_e(\sigma) < c_m(\sigma))$ commit a serious crime. Clearly, given that σ_l is sufficiently low and σ_h is sufficiently high, the assumption of absolute advantage $(c'_x(\sigma) < 0)$ implies that some people choose to abstain from crime whereas others choose to commit crime. If $c_e(\widetilde{\sigma}) = c_m(\widetilde{\sigma}) \leq 0$, then the assumption of comparative advantage $(c'_e(\sigma) < c'_m(\sigma))$ implies that among those who prefer crime some choose minor crime while others choose serious crime. Such a situation is depicted in Figure 1, where $\overline{\sigma}_0$ denotes the toughness of individuals at the margin between abstaining from crime and committing a minor crime and $\overline{\sigma}_m$ denotes the toughness of individuals at the margin between minor and serious crime.[5] Since tougher individuals have an absolute advantage in crime as well as a comparative advantage in serious crime $(c'_e(\sigma) < c'_m(\sigma) < 0)$, the toughest individuals will commit serious crime while the least tough individuals will

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[5]Notice that if $c_e(\widetilde{\sigma}) = c_m(\widetilde{\sigma}) > 0$, then all individuals who prefer committing a crime to abstaining from crime choose serious crime, and so nobody commits minor crime. Clearly, if the expected penalty for serious crime is sufficiently high compared to the expected penalty for minor crime, then $c_e(\widetilde{\sigma}) = c_m(\widetilde{\sigma}) \leq 0$. This can also be seen from Figure 1 by noticing that an increase in the expected penalty for serious crime shifts the $c_e(\sigma)$-curve upwards. Likewise, an increase in the expected penalty for minor crime shifts the $c_m(\sigma)$-curve upwards.

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abstain from crime. A group in the middle will commit minor crime.

Crime in equilibrium when individuals care about their social status for being tough is described in the following Proposition.

Proposition 1: *In an equilibrium where each action $x \in \{0, m, e\}$ is chosen by a strictly positive number of people, individuals committing serious crime enjoy highest status and individuals committing minor crime enjoy higher status than individuals who abstain from crime. Such an equilibrium exists if $\sigma_l \leq \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$ where $\overline{\sigma}_0$ and $\overline{\sigma}_m$ are implicitly defined by:*

$$
\begin{aligned}
-c_m(\overline{\sigma}_0) + s(\frac{\overline{\sigma}_0 + \overline{\sigma}_m}{2}) &= s(\frac{\sigma_l + \overline{\sigma}_0}{2}), \\
-c_m(\overline{\sigma}_m) + s(\frac{\overline{\sigma}_0 + \overline{\sigma}_m}{2}) &= -c_e(\overline{\sigma}_m) + s(\frac{\overline{\sigma}_m + \sigma_h}{2}).
\end{aligned}
$$

Proof: See Appendix.

Clearly, when crime is also motivated by a concern to signal one's toughness, some individuals who would otherwise abstain from crime commit minor crime. Even though, apart from status concerns, minor crime yields an expected net utility loss to these individuals, this is compensated by a gain in social status. Likewise, some individuals who would otherwise commit minor crime, choose serious crime instead so as to increase their social status. Social status concerns thus induce more people to commit crime. Moreover, among those who commit crime, more people commit serious crime than when social status plays no role.

5   Double dividend of zero-tolerance

This section examines the effects of a more aggressive enforcement of minor crime (zero-tolerance) on minor and serious crime. Zero-tolerance may take the form of an increase in the probability of punishment for minor crime or an increase in the punishment for minor crime itself. Recall that the expected net utility loss from crime, $c_x(\sigma)$, includes the risk and severity of punishment. Hence, zero-tolerance can be represented by an increase in $c_m(\sigma)$ for all σ. Clearly, in the absence of status concerns, this gives rise to two effects. First, it induces some individuals to abstain from crime rather than to commit minor crime. Second, some individuals choose

serious crime rather than minor crime.[6] Hence, in the absence of status concerns, zero-tolerance decreases minor crime and increases serious crime. Because of social status concerns, the last effect may be reversed, and so zero-tolerance may yield a double dividend. This is shown in the following Proposition.

Proposition 2: *Zero-tolerance always decreases the number of people committing minor crime. It also decreases the number of people committing serious crime if:*

$$\frac{1}{2}s'(\widehat{\sigma}) > -c'_m(\overline{\sigma}_0),$$

that is, if the weight on social status in the utility function is sufficiently high.

Proof: See Appendix.

The intuition behind Proposition 2 is straightforward. Given the people's beliefs ($\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$), zero-tolerance induces some people to abstain from crime rather than to commit minor crime. Since these individuals are relatively 'gutless' individuals (that is, have relatively low toughness), the social status gained through committing minor crime increases.[7] This makes minor crime more attractive for individuals at the margin between minor and serious crime, and so gives them an incentive to choose minor crime. In other words, by deterring some relatively gutless people, being tough on minor crime makes minor crime a tougher act, and so it becomes more attractive for some people who would otherwise commit more serious crime.

Obviously, for a double dividend to arise, people in criminal subcultures must care enough about their social status ($s'(\widehat{\sigma})$ should be sufficiently high). Moreover,

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[6]This can also be seen from Figure 1 by noting that a stiffer penalty for minor crime shifts the $c_m(\sigma)$-curve upwards and hence increases $\overline{\sigma}_0$ and decreases $\overline{\sigma}_m$, implying a decrease in the number of people committing minor crime, $(\overline{\sigma}_m - \overline{\sigma}_0)f$, and an increase in the number of people committing serious crime, $(\sigma_h - \overline{\sigma}_m)f$.

[7]Recall that, given the posterior beliefs, zero-tolerance also induces some individuals to choose serious crime instead of minor crime, which reduces both the status gained through committing minor crime ($\widehat{\sigma}_m$) and the status gained through committing serious crime ($\widehat{\sigma}_e$), see equation (A3) in the Appendix. The status gained through committing minor crime nevertheless always increases, because the deterrent effect of zero-tolerance is always larger for individuals at the margin between minor crime and inaction than for individuals at the margin between minor crime and serious crime. This follows from the assumption of comparative advantage ($c'_e(\sigma) < c'_m(\sigma)$) and the uniformity of the distribution function. Obviously, if σ is distributed non-uniformly, this need not always be the case. Then, the condition for a double dividend of zero-tolerance will generally put a constraint on the distribution function $f(\sigma)$ too.

the deterrent effect of zero-tolerance at the lower ends of the toughness distribution must be sufficiently large (that is, $-c'_m(\overline{\sigma}_0) > 0$ should be sufficiently low). The reason is that if individuals at the margin between inaction and minor crime are more responsive to enforcement policies, then the increase in the signaling value of minor crime in response to zero-tolerance is larger. When $s'(\widehat{\sigma})$ is sufficiently high and $-c'_m(\overline{\sigma}_0)$ is sufficiently low so that the condition in Proposition 2 is satisfied, the increase in the utility from status gained through minor crime dominates the direct utility effect of the increased risk and severity of punishment for minor crime. As a result, some people who would otherwise commit serious crime are induced to commit minor crime. Hence, zero-tolerance reduces the number of individuals committing serious crime as well as the number of people committing minor crime.

6   Concluding remarks

We have studied the effects of law enforcement on crime when crime is, at least partly, motivated by social status concerns. We have shown that, when status concerns are sufficiently important, zero-tolerance may yield a double dividend in that it reduces both minor crime as well as more severe crime. Obviously, an alternative way to reduce crime across the board is to increase the penalties for both minor and serious crime. It is straightforward to verify that, in our model, such a policy can simultaneously reduce minor and serious crime. However, increasing penalties across the board may not always be optimal or feasible. One reason is that zero-tolerance policies may be less costly than e.g. longer terms of imprisonment for severe crime (Kahan (1997)). Another reason is that some forms of punishment may be considered immoral, which puts a limit on the harshness of punishment of serious crimes.[8]

In line with the evidence cited in Section 2, we have assumed that individuals care directly about status. It is easy to think of alternative interpretations, though, where status is a means to obtain e.g. protection, attention, or sex. Anderson (1999),

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[8]In a previous draft of this paper, we have also examined the effects of stricter enforcement of serious crime while keeping constant the enforcement of minor crime. While this always reduces the number of people committing serious crime, the total number of people committing crime increases when people care about social status. The reason is that, in response to stricter enforcement of serious crime, some relatively tough individuals commit minor crime rather than serious crime, which raises the signaling value of minor crime, and so induces some people to commit minor crime who would otherwise abstain from crime. See Dur (2006).

Bandiera (2003), and Silverman (2004) stress the importance of acquiring a reputation for being tough so as to protect oneself or others against future attacks. Wilkinson (2001) finds in her sample of young men in New York City that "criminals and those who exhibit tough qualities and behavior are the "populars" and get the most attention from others." (p. 241). Relatedly, in Poutvaara and Priks (2009)'s model of hooligan groups, some of the members fight so as to retain the social benefits from being part of the group. Drawing on literature from evolutionary psychology and biology, Rebellon and Manasse (2004) argue that criminal behavior by males may signal positive adaptive qualities like nerve and bravery and so may attract females. Using US panel data, they find some evidence for a causal effect of delinquency on romantic involvement (see also Palmer and Tilley (1995)).

We have restricted the analysis by assuming that individuals can only take one of three actions: abstaining from crime, committing a minor crime, and committing a serious crime. While this is clearly a restrictive assumption, the resulting status hierarchy consisting of three broad groups is well in line with the findings in Fagan and Wilkinson (1998)'s empirical study of violent events in New York City. Based on narrative reconstructions of violent events reported by 125 young men, they find a hierarchy of social identities consisting of three broad types with 'wild' individuals (who have performed extraordinary acts of violence) at the top, 'cool' individuals (who do what it takes in 'heated' situations) in the middle, and 'herbs' (who cannot fight or do not prove their toughness) at the bottom of the status hierarchy. Clearly, extending the model to allow for a richer action space will result in a larger number social identities arising in equilibrium. The spirit of our main result does not change, however, as long as the equilibrium remains partially separating.

Critical for our results is the assumption that people in criminal subcultures care about their social status for being 'tough.' In Section 2, we discussed several studies stressing the relevance of status hierarchies based on toughness and the prevalence of antiethical norms in a wide range of subcultures. An important question that we did not deal with in this paper is how such norms and subcultures come into being and evolve over time? Empirical studies suggest that a lack of alternative opportunities for identity development may be responsible (e.g. Wilkinson (2001)). Work along the lines of Oxoby (2004) may shed more light on this important issue as well as on the implications for optimal enforcement policies of endogenous formation of subcultures

and norms.

Appendix

Proof of Proposition 1: Given the posterior beliefs $(\widehat{\sigma}_0, \widehat{\sigma}_m, \widehat{\sigma}_e)$, individual i prefers $x = m$ to $x = 0$ if:

$$-c_m(\sigma_i) + s(\widehat{\sigma}_m) > s(\widehat{\sigma}_0). \tag{A1}$$

From $c'_m(\sigma) < 0$ (absolute advantage), it follows that if individual i prefers action $x = m$ to action $x = 0$, then all individuals with $\sigma \geq \sigma_i$ prefer action $x = m$ to action $x = 0$, and vice versa. Denote by $\overline{\sigma}_0$ the value of σ_i for which (A1) holds with equality. Clearly, in an equilibrium where some people abstain from crime it must hold that $\overline{\sigma}_0 \geq \sigma_l$.

Given the posterior beliefs $(\widehat{\sigma}_0, \widehat{\sigma}_m, \widehat{\sigma}_e)$, individual i prefers $x = m$ to $x = e$ if:

$$-c_m(\sigma_i) + s(\widehat{\sigma}_m) \geq -c_e(\sigma_i) + s(\widehat{\sigma}_e). \tag{A2}$$

From $c'_e(\sigma) < c'_m(\sigma)$ (comparative advantage), it follows that if individual i prefers action $x = m$ to action $x = e$, then all individuals with $\sigma \leq \sigma_i$ prefer action $x = m$ to action $x = e$, and vice versa. Denote by $\overline{\sigma}_m$ the value of σ_i for which (A2) holds with equality. Clearly, in an equilibrium where some people choose to commit serious crime it must hold that $\overline{\sigma}_m < \sigma_h$.

From (A1) and (A2) and our assumptions on absolute and comparative advantage, it follows that an equilibrium where some people choose to commit minor crime must have $\overline{\sigma}_0 < \overline{\sigma}_m$. For if $\overline{\sigma}_0 \geq \overline{\sigma}_m$, then individuals always prefer either $x = 0$, or $x = e$, or both $x = 0$ and $x = e$ to $x = m$.

Summarizing, if $\sigma_l \leq \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$, then given the posterior beliefs $(\widehat{\sigma}_0, \widehat{\sigma}_m, \widehat{\sigma}_e)$ individuals with $\sigma_l \leq \sigma_i \leq \overline{\sigma}_0$ prefer abstaining from crime to committing minor crime and to committing serious crime; individuals with $\overline{\sigma}_0 < \sigma_i \leq \overline{\sigma}_m$ prefer committing minor crime to abstaining from crime and to committing serious crime; and individuals with $\overline{\sigma}_m < \sigma_i \leq \sigma_h$ prefer committing serious crime to abstaining from crime and to committing minor crime. Hence, if $\sigma_l \leq \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$, the posterior

beliefs in equilibrium are given by:

$$\widehat{\sigma}_0 = \frac{\sigma_l + \overline{\sigma}_0}{2} < \widehat{\sigma}_m = \frac{\overline{\sigma}_0 + \overline{\sigma}_m}{2} < \widehat{\sigma}_e = \frac{\overline{\sigma}_m + \sigma_h}{2}. \tag{A3}$$

The final step is to find out whether the condition $\sigma_l \leq \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$ holds given the posterior beliefs (A3). Following the definition above, $\overline{\sigma}_0$ and $\overline{\sigma}_m$ are given by:

$$
\begin{aligned}
-c_m(\overline{\sigma}_0) + s(\widehat{\sigma}_m) &= s(\widehat{\sigma}_0), \\
-c_m(\overline{\sigma}_m) + s(\widehat{\sigma}_m) &= -c_e(\overline{\sigma}_m) + s(\widehat{\sigma}_e).
\end{aligned}
$$

Substituting (A3) yields the two equations in the Proposition. If the solutions to these equations for $\overline{\sigma}_0$ and $\overline{\sigma}_m$ satisfy $\sigma_l \leq \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$, then an equilibrium exists in which each action $x \in \{0, m, e\}$ is chosen by a strictly positive number of people. In such an equilibrium, it follows from (A3) and $s'(\widehat{\sigma}) > 0$ that

$$s(\widehat{\sigma}_0) < s(\widehat{\sigma}_m) < s(\widehat{\sigma}_e).$$

Hence, individuals committing serious crime enjoy highest status and individuals committing minor crime enjoy higher status than individuals who abstain from crime. □

Proof of Proposition 2: We consider the effects of increasing the expected net utility loss from minor crime by μ for all types. (It is straightforward to let μ depend on σ. When $\mu'(\sigma) < 0$, the condition under which a double dividend arises becomes milder.) The equilibrium values of $\overline{\sigma}_0$ and $\overline{\sigma}_m$ become:

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\begin{aligned}
-c_m(\overline{\sigma}_0) - \mu + s(\widehat{\sigma}_m) &= s(\widehat{\sigma}_0), \\
-c_m(\overline{\sigma}_m) - \mu + s(\widehat{\sigma}_m) &= -c_e(\overline{\sigma}_m) + s(\widehat{\sigma}_e),
\end{aligned}
$$

where $\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$ are functions of $\overline{\sigma}_0$ and $\overline{\sigma}_m$ as described by (A3). Applying the

implicit function theorem, we obtain after some rewriting:

$$\frac{d\overline{\sigma}_0}{d\mu} = -\frac{c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m) - \frac{1}{2}s'(\widehat{\sigma})}{[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)]\, c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma})\right]^2}, \tag{A4}$$

$$\frac{d\overline{\sigma}_m}{d\mu} = \frac{c'_m(\overline{\sigma}_0) + \frac{1}{2}s'(\widehat{\sigma})}{[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)]\, c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma})\right]^2}. \tag{A5}$$

Using (A4) and (A5), the effect of zero-tolerance on the number of individuals committing minor crime, $(\overline{\sigma}_m - \overline{\sigma}_0)\, f$, is given by:

$$\left(\frac{d\overline{\sigma}_m}{d\mu} - \frac{d\overline{\sigma}_0}{d\mu}\right) f = \frac{c'_m(\overline{\sigma}_0) + [c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)]}{[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)]\, c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma})\right]^2} f,$$

which is negative because $c'_m(\sigma_i) < 0$, $c'_e(\sigma_i) - c'_m(\sigma_i) < 0$, and $f > 0$.

The number of individuals committing serious crime is described by $(\sigma_h - \overline{\sigma}_m)\, f$. Since σ_h and f are constants, it suffices to examine the effect of μ on $\overline{\sigma}_m$, which is given by (A5). Note that the denominator of (A5) is positive since $c'_e(\sigma_i) - c'_m(\sigma_i) < 0$ and $c'_m(\sigma_i) < 0$. If the condition in the Proposition is satisfied, then the numerator is also positive, implying that $\overline{\sigma}_m$ increases with μ, and so the number of individuals committing serious crime decreases with μ. $\square$

References

[1] Anderson, Elijah (1999), *Code of the Street*, New York: Norton.

[2] Arbak, Emrah (2005), Social Status and Crime, GATE Working Paper 05-10, Université Lyon 2.

[3] Austen-Smith, David and Roland G. Fryer, Jr. (2005), An Economic Analysis of "Acting White", *Quarterly Journal of Economics*, 120(2): 551-583.

[4] Bandiera, Oriana (2003), Land Reform, the Market for Protection, and the Origins of the Sicilian Mafia: Theory and Evidence, *Journal of Law, Economics, and Organization*, 19(1): 218-244.

[5] Bar-Gill, Oren and Alon Harel (2001), Crime Rates and Expected Sanctions: The Economics of Deterrence Revisited, *Journal of Legal Studies*, 30(2): 485-501.

[6] Bedard, Kelly (2001), Human Capital versus Signaling Models: University Access and High School Dropouts, *Journal of Political Economy*, 109(4): 749-775.

[7] Bénabou, Roland and Jean Tirole (2006), Incentives and Prosocial Behavior, *American Economic Review*, 96(5): 1652-1678.

[8] Bernheim, B. Douglas (1994), A Theory of Conformity, *Journal of Political Economy*, 102(5): 841-877.

[9] Blume, Lawrence (2004), Stigma and Social Control, Mimeo, Cornell University.

[10] Braga, Anthony A., David L. Weisburd, Elin J. Waring, Lorraine Green Mazerolle, William Spelman, and Francis Gajewski (1999), Problem-Oriented Policing in Violent Crime Places: A Randomized Controlled Experiment, *Criminology*, 37(3): 541-580.

[11] Corman, Hope and Naci Mocan (2005), Carrots, Sticks and Broken Windows, *Journal of Law and Economics*, 48(1): 235-266.

[12] Dur, Robert (2006), Status-Seeking in Violent Subcultures and the Double Dividend of Zero-Tolerance, Tinbergen Institute Discussion Paper 06-005/1.

[13] Fagan, Jeffrey, and Deanna Wilkinson (1998), Guns, Youth Violence, and Social Identity in Inner Cities, *Crime and Justice: A Review of Research*, 24: 105-188.

[14] Funk, Patricia (2004), On the Effective Use of Stigma as a Crime-deterrent, *European Economic Review*, 48(4): 715-728.

[15] Funk, Patricia and Peter Kugler (2003), Dynamic Interactions between Crimes, *Economics Letters*, 79(3): 291-298.

[16] Glaeser, Edward L., Bruce Sacerdote and José A. Scheinkman (1996), Crime and Social Interactions, *Quarterly Journal of Economics*, 111(2): 507-548.

[17] Harcourt, Bernard E. and Jens Ludwig (2006), Broken Windows: New Evidence from New York City and a Five-City Social Experiment, *University of Chicago Law Review*, 73(1): 271-320.

[18] Hughes, Lorine A. and James F. Short, Jr. (2005), Disputes Involving Youth Street Gang Members: Micro-Social Contexts, *Criminology*, 43(1): 43-76.

[19] Kahan, Dan M. (1997), Social Influence, Social Meaning, and Deterrence, *Virginia Law Review*, 83: 349-395.

[20] King, Anthony (2001), Violent Pasts: Collective Memory and Football Hooliganism, *Sociological Review*, 49(3): 568-585.

[21] Kubrin, Charis E., Steven F. Messner, Glenn Deane, Kelly McGeever, Thomas D. Stucky (2006), Proactive Policing and Robbery Rates Across Large U.S. Cities: Assessing Robustness, Mimeo, State University of New York.

[22] Levitt, Steven D. (2004), Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not, *Journal of Economic Perspectives*, 18(1): 163-190.

[23] Lochner, Lance (2007), Individual Perceptions of the Criminal Justice System, *American Economic Review*, 97(1): 444-460.

[24] MacDonald, John M. (2002), The Effectiveness of Community Policing in Reducing Urban Violence, *Crime & Delinquency*, 48(4): 592-618.

[25] Matsueda, Ross L., Derek A. Kreager, and David Huizinga (2006a), Deterring Delinquents: A Rational Choice Model of Theft and Violence, *American Sociological Review*, 71(1): 95–122.

[26] Matsueda, Ross L., Kevin Drakulich, and Charis E. Kubrin (2006b), Race and Neighborhood Codes of Violence, In: Ruth D. Peterson, Lauren J. Krivo, and John Hagan (Eds.), *The Many Colors of Crime: Inequalities of Race, Ethnicity, and Crime in America*, New York University Press.

[27] Meares, Tracey L., Neal Katyal, and Dan M. Kahan (2004), Updating the Study of Punishment, *Stanford Law Review*, 56: 1171-1210.

[28] Oxoby, Robert J. (2004), Cognitive Dissonance, Status and Growth of the Underclass, *Economic Journal*, 114: 727-749.

[29] Palmer, Craig T. and Christopher F. Tilley (1995), Sexual Access to Females as a Motivation for Joining Gangs: An Evolutionary Approach, *Journal of Sex Research*, 32(3): 213-217.

[30] Patacchini, Eleonora and Yves Zenou (2005), Crime and Conformism, CEPR discussion paper 5331.

[31] Posner, Eric A. (2000), *Law and Social Norms*, Cambridge, MA: Harvard University Press.

[32] Poutvaara, Panu and Mikael Priks (2009), Hooliganism and Police Tactics, *Journal of Public Economic Theory*, 11(3): 441-453.

[33] Rasmusen, Eric (1996), Stigma and Self-fulfilling Expectations of Criminality, *Journal of Law and Economics*, 39(2): 519-544.

[34] Rebellon, Cesar J. and Michelle Manasse (2004), Do "Bad Boys" Really Get the Girls? Delinquency as a Cause and Consequence of Dating Behavior Among Adolescents, *Justice Quarterly*, 21(2): 355-389.

[35] Sampson, Robert J. and Jacqueline Cohen (1988), Deterrent Effects of the Police on Crime: A Replication and Theoretical Extension, *Law and Society Review*, 22: 163-189.

[36] Silverman, Dan (2004), Street Crime and Street Culture, *International Economic Review*, 45(3): 761-786.

[37] Topalli, Volkan (2005), When Being Good is Bad: An Expansion of Neutralization Theory, *Criminology*, 43(3): 797-835.

[38] Vollaard, Ben (2006), Evaluating the Push for Tougher, More Targeted Policing in the Netherlands, CPB Document No. 119.

[39] Weisburd, David and John E. Eck (2004), What Can Police Do to Reduce Crime, Disorder, and Fear?, *Annals of the American Academy of Political and Social Sciences*, 593(1): 42-65.

[40] Wilkinson, Deanna (2001), Violent Events and Social Identity: Specifying the Relationship between Respect and Masculinity in Inner-City Youth Violence, *Sociological Studies of Children and Youth*, 8: 231-265.

[41] Wilson, James Q. and George Kelling (1982), Broken Windows: The Police and Neighborhood Safety, *Atlantic Monthly*, 249(3): 29-38.