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Robert Dur

Erasmus University Rotterdam, Tinbergen Institute, and CESifo, Munich.

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Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

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Status-Seeking in Violent Subcultures and the Double Dividend of Zero-Tolerance*

Robert Dur†

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Abstract

This paper develops a model in which individuals gain social status among their peers for being 'tough' by committing violent acts. We show that a high penalty for moderately violent acts (zero-tolerance) may yield a double dividend in that it reduces both moderate and extreme violence. The reason is that a high penalty keeps relatively 'gutless' individuals from committing moderately violent acts, which raises the signaling value of that action, and thus makes it more attractive for otherwise extremely violent individuals. Conversely, a high penalty for extremely violent acts may backfire, as it induces relatively 'tough' individuals to commit moderately violent acts and so makes moderate violence more attractive for otherwise nonviolent individuals.

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

JEL-codes: K14, K42.

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†Tinbergen Institute, Erasmus University Rotterdam, and CESifo, Munich. Address: Department of Economics H 8-15, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands. dur@few.eur.nl

1 Introduction

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 (Rasmusen (1996), Posner (2000), Bar-Gill and Harel (2001), Blume (2004), Funk (2004, 2005), Arbak (2005)).

While social norms that condemn criminal behavior are adhered to by a large part of the population, they are not universally shared. Some subcultures actually glorify criminals. In quite some American films as well as in many hip-hop songs, rebelliousness is celebrated and inmates are heroic figures (Butler (2004), Kubrin (2005)). 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).

Violent subcultures 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). King (2001) discusses studies on violence among football fans in European countries showing "the central role of honour in the encounters between hooligans. For hooligans, masculine honour refers to their willingness to engage in violence against other hooligans." (p. 573). Fagan, Wilkinson, and Davies (2000), in their study of violence in New York City, state that: ""toughness" has always been highly regarded and 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. 32-34). Hughes and Short (2005) obtain similar findings using field observations of street gangs in Chicago.

This paper develops a model of status-seeking through violent behavior. In line with the above-mentioned studies, we assume that individuals in violent subcultures care about their status for being 'tough.' Individuals differ in innate toughness, which may reflect differences in fear, physical fitness, or sensitivity to guilt. Tougher individuals have an absolute advantage in violence as well as a comparative advantage in more severe violence. Importantly, innate toughness is not observable, and so individuals make inferences about an individual's toughness from his actions.[1] We assume that individuals choose between three possible actions: no violence, moderate violence, and extreme violence. In line with Fagan, Wilkinson, and Davies (2000)'s empirical study of violent events in New York City, a hierarchy of social identities consisting of three broad types arises in equilibrium, with individuals committing extremely violent acts at the top of the status hierarchy, and individuals who take no action at the bottom.[2]

We next study the effects of penalties for violent acts. We show that the introduction of status concerns may reverse some of the effects of penalties that arise from standard economic analyses following the seminal papers by Becker (1968) and Stigler (1970). First, we show that, if individuals care enough about their social status, there is a 'double dividend' of fighting moderate violence in that it reduces both the number of moderately violent acts as well as the number of extremely violent acts. The intuition behind this result is straightforward. When moderate violence is punished harder, some individuals are deterred from committing moderately violent acts, and instead choose not to take action. Since these individuals are relatively 'gutless' individuals, the signaling value of committing a moderately violent act

[1] We will refer to individuals as male. It should be noted, however, that violent behavior is not restricted to men, see e.g. Chesney-Lind and Pasko (2003).

[2] Based on narrative reconstructions of violent events reported by 125 young men from New York City, Fagan, Wilkinson, and Davies (2000) find a hierarchy of social identities with regard to violent behavior consisting of three broad types. At the top of the status hierarchy is the 'crazy' or 'wild' individual who performs extraordinary acts of violence. They are often feared and they are granted the highest level of respect. Individuals being known as 'holding your own' or 'cool' do 'what it takes' in heated situations. They have used violence as a resource for obtaining that status. 'Punks' or 'herbs' are those who cannot fight or do not prove their toughness, and are at the bottom of the status hierarchy. See also Fagan and Wilkinson (1998) for a more detailed account.

increases. This makes moderate violence more attractive for otherwise extremely violent individuals. If people care sufficiently about status, this effect dominates the standard substitution effect which raises extreme violence, and so stiffer penalties for moderate violence reduce both the number of moderately violent acts and the number of extremely violent acts.

Second, we show that higher penalties for extreme violence may increase the total cost of violence to society. The reason is as follows. Through a standard substitution effect, higher penalties for extreme violence induce some individuals to choose moderate violence rather than extreme violence. Since these individuals are relatively tough, the signaling value of committing moderate violence increases, and so induces some otherwise passive individuals to commit moderately violent acts. We show that if status concerns are important, the increase in moderate violence is large compared to the decrease in extreme violence, and so total cost of violence to society may increase.

The policy implications of the model are well in line with the 'zero-tolerance' or 'broken windows' approach to crime fighting, which has been pursued in New York City and, since recently, in several other US cities including Chicago and Los Angeles. This approach, made famous by Wilson and Kelling (1982), holds that a more aggressive enforcement of minor offenses leads to a reduction in both minor offenses and more serious crime. 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."[3] 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.[4] In our framework, there is no such signaling role of enforcement of lower-level crimes, as enforcement policies are assumed to be common knowledge. We offer a complementary argument for zero-tolerance policies, one that holds

[3]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

[4]The recent evidence in Lochner (2005) 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 are not responsive to local neighborhood conditions and to information about the arrests of other random individuals. Perceptions do respond to changes in an individual's own criminal and arrest history. A higher perceived probability of arrest turns out to deter crime.

even when criminals are perfectly informed about enforcement policies and public tolerance of crime in their neighborhood.

Despite its clear policy relevance, there exist few empirical studies on the effects of zero-tolerance policies. Using cross-sectional data of US cities, Sampson and Cohen (1988) 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 through the arrest rate. Funk and Kugler (2003) and Corman and Mocan (2005) use high-frequency time-series data on crimes in Switzerland and New York City, respectively. Both studies find support for a sizeable and significant negative effect of stricter enforcement of minor offences on more serious crime. Levitt (2004) and Harcourt and Ludwig (2005), however, take a more sceptical view of broken windows policing.

2 Related literature

Our analysis is closely related to studies of social status, in particular to Bernheim (1994), Benabou and Tirole (2004), and Seabright (2004).[5] In Bernheim (1994), individuals conform to a standard of behavior so as to avoid being seen as having extreme preferences, which would reduce their status or popularity. In Benabou and Tirole (2004) and Seabright (2004), as well as in this paper, there is no such desire to resemble the mainstream. Instead, in Benabou and Tirole (2004) and Seabright (2004), individuals want to signal their intrinsic motivation to participate in prosocial activities, and aim to appear as altruistic as possible. We share with these papers the focus on how external incentives may interfere with the desire to signal one's personality traits. We differ from these papers in our focus on social status seeking within violent subcultures. Also, we allow individuals to choose among three different actions, whereas Benabou and Tirole (2004) and Seabright (2004) consider the cases of two-action space and continuous action space. Clearly, the assumption that individuals can choose among several violent actions – rather than face a choice between violence and no violence – enables us to study the effect of penalties for one crime on the incentive to commit other crimes.

[5] Other related papers include Akerlof and Kranton (2000) on social identity, Janssen and Mendys-Kamphorst (2004) on social approval with network effects, and Brekke, Kverndokk, and Nyborg (2003) on self-image.

Austen-Smith and Fryer (2005) develop a model in which individuals signal their social compatibility by underinvesting in education, so as to be accepted by their peers.[6] 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 (see also Case and Katz (1991), Ludwig, Duncan, and Hirschfield (2001), Kling, Ludwig, and Katz (2005), and Calvó-Armengol, Patacchini, and Zenou (2005)). Akerlof and Yellen (1994) stress the role of community values and citizens' willingness to cooperate in law enforcement in a model where gangs may retaliate on informers to the police and citizens may perceive penalties as unfair.

Most closely related to our paper is Silverman (2004). He 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 violence may be sustained by the same economic and social fundamentals. Hence, his model can explain the substantial local variation in violent crime in the US. An important difference between his and our paper is that we allow individuals to choose among several violent actions, while in his model individuals face the choice of either being violent or passive. This opportunity to choose between violent actions of different severity gives rise to our results that zero-tolerance may yield a double dividend and that fighting extreme violence may have a perverse effect on the total cost of violence.[7]

3 Assumptions

Individuals choose between three possible actions $x \in \{0, m, e\}$, where action $x = 0$ is no violence, $x = m$ is moderate violence, and $x = e$ is extreme violence. Committing a violent act entails an expected utility loss to individual

[6] Our study is also related 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. See also Hendel, Shapiro, and Willen (2004) and Bergh and Fink (2005).

[7] Silverman (2004) shows that non-standard effects of enforcement policy can arise in his model when policy changes affect the visibility of a criminal action, and thus affect the reputational gain from crime.

i of $c_x(\sigma_i)$. This expected utility loss includes the risk of being arrested and punished, the risk of injury, and the risk of death. It is assumed to be higher for more violent acts: $c_e(\sigma_i) > c_m(\sigma_i) > c_0(\sigma_i) = 0$.[8]

Individuals differ in innate 'toughness' (a composite of fear, physical fitness, sensitivity to guilt, and so on) and so face different cost of committing a violent act. Individuals with higher σ face lower cost of committing a violent act: $c'_x(\sigma) < 0$ for $x = m$ and $x = e$. Besides an absolute advantage, tougher individuals are also assumed to have a comparative advantage in extreme violence: $c'_e(\sigma) < c'_m(\sigma)$. σ is uniformly distributed, with density f, lower bound σ_l, and upper bound σ_h.

Violence imposes negative externalities on society. The cost to society of a moderately violent act is denoted by M and of an extremely violent act by E, with $E > M > 0$.

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.[9] 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 $\widehat{\sigma}_e$. The utility from social status is described 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 of status in the utility function.

In line with the evidence cited in the Introduction, we assume 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) and Silverman (2004) stress the importance of acquiring a reputation for being tough so as to prevent future attacks. Fagan, Wilkinson, and Davies (2000) find in their sample of 125 young men in New York City that "criminals and males who exhibit tough qualities and behavior are the "populars" and get the most attention." (p. 37). Relatedly, in Poutvaara and Priks (2005)'s model of hooligan groups, some of the members fight so as to retain the social benefits from being part of the group. Drawing

[8] It is straightforward to extend the model to allow for individuals who actually enjoy committing violent acts, that is to allow $c_x(\sigma_i)$ to be negative for high σ_i. This does not affect the conclusions, as long as for some individuals committing violent acts is costly.

[9] Silverman (2004) discusses evidence showing that a majority of violent crimes is committed in public. Also, many of the studies discussed in the Introduction stress the presence of peers when committing violence.

on literature from evolutionary psychology and biology, Rebellon and Manasse (2004) argue that criminal behavior may promote status among peers and may thus attract prospective romantic partners. Using US panel data, they find evidence for a causal effect of delinquency on romantic involvement (see also Palmer and Tilley (1995)).

4 Equilibrium

We focus on an equilibrium where some individuals do not commit a violent act, some commit a moderately violent act, and some commit an extremely violent act. Without loss of generality, we assume that if an individual is indifferent between actions, he chooses the least violent act.

Proposition 1: *In equilibrium, individuals committing extremely violent acts enjoy highest status; individuals committing moderately violent acts enjoy higher status than individuals committing no violent act.*

Proof:
Individual i prefers $x = m$ to $x = 0$ if:

$$-c_m(\sigma_i) + s(\widehat{\sigma}_m) > s(\widehat{\sigma}_0). \tag{1}$$

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 $x = 0$. Similarly, if individual i prefers action $x = 0$ to action $x = m$, then all individuals with $\sigma \leq \sigma_i$ prefer action $x = 0$ to action $x = m$. Denote by $\overline{\sigma}_0$ the value of σ_i for which (1) holds with equality.

Individual i prefers $x = m$ to $x = e$ if:

$$-c_m(\sigma_i) + s(\widehat{\sigma}_m) \geq -c_e(\sigma_i) + s(\widehat{\sigma}_e) \tag{2}$$

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 $x = e$. Similarly, if individual i prefers action $x = e$ to action $x = m$, then all individuals with $\sigma \geq \sigma_i$ prefer action $x = e$ to action $x = m$. Denote by $\overline{\sigma}_m$ the value of σ_i for which (2) holds with equality.

Given the assumption that in equilibrium some individuals choose to commit a moderately violent act, it follows from (1) and (2) that $\overline{\sigma}_m > \overline{\sigma}_0$. For if $\overline{\sigma}_m \leq \overline{\sigma}_0$, then individuals always prefer either $x = 0$, or $x = e$, or

both $x = 0$ and $x = e$ to $x = m$. In equilibrium, individuals with $\sigma_i \leq \overline{\sigma}_0$ commit no violent act; individuals with $\overline{\sigma}_0 < \sigma_i \leq \overline{\sigma}_m$ commit a moderately violent act; individuals with $\sigma_i > \overline{\sigma}_m$ commit an extremely violent act. The posterior beliefs are:

$$\widehat{\sigma}_0 = \frac{\sigma_l + \overline{\sigma}_0}{2} < \widehat{\sigma}_m = \frac{\overline{\sigma}_0 + \overline{\sigma}_m}{2} < \widehat{\sigma}_e = \frac{\overline{\sigma}_m + \sigma_h}{2}. \tag{3}$$

Since $s'(\widehat{\sigma}) > 0$ and $\sigma_l < \overline{\sigma}_0 < \overline{\sigma}_m < \sigma_h$, individuals taking action $x = e$ enjoy highest status, followed by individuals taking action $x = m$. Individuals taking action $x = 0$ enjoy lowest status.

□

5 Double dividend of zero-tolerance

This section examines the effect of increasing the penalty for moderate violence.[10] We derive under which conditions harsher penalties for moderate violence not only reduce the number of moderately violent acts, but also reduce extreme violence.

Proposition 2: *A stiffer penalty for moderately violent acts:*

- always decreases the number of moderately violent acts;

- decreases the number of extremely violent acts if the weight on status in the utility function is sufficiently high;

- decreases total cost of violence to society unless the weight on status in the utility function is low and the social cost of an extremely violent act is high compared to the social cost of a moderately violent act.

Proof:

Consider the effects of increasing the cost of committing a moderately violent act by μ for all types. Thus, the cost of committing a moderately violent act becomes $c_m(\sigma_i) + \mu$. Using (1) and (2), we find implicit functions for the equilibrium values of $\overline{\sigma}_0$ and $\overline{\sigma}_m$:

$$-c_m(\overline{\sigma}_0) - \mu + s(\widehat{\sigma}_m) = s(\widehat{\sigma}_0), \tag{4}$$

$$-c_m(\overline{\sigma}_m) - \mu + s(\widehat{\sigma}_m) = -c_e(\overline{\sigma}_m) + s(\widehat{\sigma}_e), \tag{5}$$

[10] Since individuals are risk-neutral in our model, it does not matter whether an increase in the penalty takes the form of an increase in the probability of punishment or an increase in the punishment itself.

where $\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$ are functions of $\overline{\sigma}_0$ and $\overline{\sigma}_m$ given by (3). Totally differentiating (4) and (5) with respect to $\overline{\sigma}_0$, $\overline{\sigma}_m$, and μ yields after some rewriting:

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

Solving these differential equations results in:

$$\frac{d\overline{\sigma}_0}{d\mu} = -\frac{c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m) - \frac{1}{2}s'(\widehat{\sigma}_m)}{\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right]c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma}_m)\right]^2}, \tag{6}$$

$$\frac{d\overline{\sigma}_m}{d\mu} = \frac{c'_m(\overline{\sigma}_0) + \frac{1}{2}s'(\widehat{\sigma}_m)}{\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right]c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma}_m)\right]^2}. \tag{7}$$

The effect of a stiffer penalty for moderate violence on the number of individuals committing moderately violent acts, $(\overline{\sigma}_m - \overline{\sigma}_0)\,f$, is:

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

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 extremely violent acts is given 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 described by (7). Note that the denominator of (7) is positive since $c'_e(\sigma_i) - c'_m(\sigma_i) < 0$ and $c'_m(\sigma_i) < 0$. The numerator is positive if:

$$\frac{1}{2}s'(\widehat{\sigma}_m) > -c'_m(\overline{\sigma}_0). \tag{8}$$

Hence, when the weight on status in the utility function, $s'(\widehat{\sigma})$, is sufficiently high, $\overline{\sigma}_m$ increases with μ, and so the number of individuals committing extremely violent acts decreases with μ.

The effect of a stiffer penalty for moderate violence on the total cost of violence to society, $(\overline{\sigma}_m - \overline{\sigma}_0)\,fM + (\sigma_h - \overline{\sigma}_m)\,fE$, is:

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

The denominator is positive. The first term in brackets of the numerator is negative. The second term can be positive or negative, depending on whether condition (8) holds. If the weight on status in the utility function is sufficiently high so that (8) holds, then both terms of the numerator are negative, and so a stiffer penalty for moderate violence decreases the total cost of violence to society. If (8) does not hold, a stiffer penalty for moderate violence may increase the total cost of violence to society, as the second term of the numerator is positive and may dominate the negative first term. This is more likely when E is high relative to M and when $-1/c'_m(\overline{\sigma}_0)$ is low relative to $-1/\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right]$.

□

The intuition behind Proposition 2 is straightforward. Given the people's beliefs ($\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$), a stiffer penalty for moderate violence brings about two substitution effects. First, it induces some individuals to remain passive rather than to commit moderate violence. Second, some individuals choose extreme violence rather than moderate violence. Given the people's beliefs, an increase in the cost of moderate violence thus decreases moderate violence and increases extreme violence. Because of status concerns, the last effect may be reversed. As the individuals who are deterred from committing moderately violent acts and instead remain passive have relatively low toughness, the social status gained through committing a moderately violent act increases. This makes moderate violence more attractive for individuals at the margin between moderate and extreme violence, and so gives them an incentive to choose moderate violence.[11] The increase in the signaling value of moderate violence is larger, the more responsive are individuals at the margin between inaction and moderate violence, which is measured by $-1/c'_m(\overline{\sigma}_0)$. Also, the more individuals care about status (high $s'(\widehat{\sigma})$), the larger is the increase in the utility from social status compared to the increase in the penalty for moderate violence. When $-1/c'_m(\overline{\sigma}_0)$ and $s'(\widehat{\sigma})$ are sufficiently high so that (8) is satisfied, the increase in the utility from status gained through moderate violence dominates the increase in the penalty. As

[11] Note that, in contrast to changes in $\overline{\sigma}_0$, changes in $\overline{\sigma}_m$ have no effect on the attractiveness of moderate violence compared to extreme violence, because the posteriors $\widehat{\sigma}_m$ and $\widehat{\sigma}_e$ change to the same extent. For instance, when less people decide to commit extremely violent acts, the status benefit from both moderate violence and from extreme violence increases with $\frac{1}{2}s'(\widehat{\sigma})$, see also (3). Similarly, changes in $\overline{\sigma}_0$ do not affect the attractiveness of moderate violence compared to inaction.

a result, stiffer penalties for moderate violence reduce the number of individuals committing extremely violent acts as well as the number of people committing moderately violent acts.

Clearly, when people care sufficiently about status, the total cost of violence to society always decreases when moderately violent acts are punished more severely. However, if condition (8) does not hold, stiffer penalties for moderate violence may increase the total cost of violence to society. The reason is that, in that case, more people will choose extreme violence, which may compensate for the decrease in moderate violence. This is more likely when extreme violence is much more costly to society than moderate violence (E is high relative to M), and when people at the margin between moderate and extreme violence are relatively responsive to changes in costs and benefits compared to the responsiveness of people at the margin between moderate violence and inaction (that is, $-1/\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right]$ is high relative to $-1/c'_m(\overline{\sigma}_0)$).

6 Fighting extreme violence

This section studies the effects of stiffer penalties for extremely violent acts.

Proposition 3: *A stiffer penalty for extremely violent acts:*
- always increases the number of moderately violent acts;
- always decreases the number of extremely violent acts;
- increases the total cost of violence to society if the weight on status in the utility function is high and the social cost of an extremely violent act is close to the social cost of a moderately violent act.

Proof:

Consider the effect of increasing the individual's cost of committing an extremely violent act by ε for all types. Thus, the cost of committing an extremely violent act for individual i becomes $c_e(\sigma_i) + \varepsilon$. Using (1) and (2), we find implicit functions for the equilibrium values of $\overline{\sigma}_0$ and $\overline{\sigma}_m$:

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

where $\widehat{\sigma}_0$, $\widehat{\sigma}_m$, and $\widehat{\sigma}_e$ are functions of $\overline{\sigma}_0$ and $\overline{\sigma}_m$ given by (3). Totally

differentiating with respect to $\overline{\sigma}_0$, $\overline{\sigma}_m$, and ε yields after some rewriting:

$$\begin{aligned} d\overline{\sigma}_0 &= \frac{\frac{1}{2}s'(\widehat{\sigma}_m)}{c'_m(\overline{\sigma}_0)} d\overline{\sigma}_m, \\ d\overline{\sigma}_m &= \frac{1}{c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)} \left[-d\varepsilon - \frac{1}{2}s'(\widehat{\sigma}_m) d\overline{\sigma}_0 \right]. \end{aligned}$$

Solving these differential equations results in:

$$\frac{d\overline{\sigma}_0}{d\varepsilon} = \frac{-\frac{1}{2}s'(\widehat{\sigma}_m)}{\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right] c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma}_m)\right]^2}, \tag{9}$$

$$\frac{d\overline{\sigma}_m}{d\varepsilon} = \frac{-c'_m(\overline{\sigma}_0)}{\left[c'_e(\overline{\sigma}_m) - c'_m(\overline{\sigma}_m)\right] c'_m(\overline{\sigma}_0) + \left[\frac{1}{2}s'(\widehat{\sigma}_m)\right]^2}. \tag{10}$$

Note that the denominators are positive since $c'_e(\sigma_i) - c'_m(\sigma_i) < 0$ and $c'_m(\sigma_i) < 0$; the numerator of (9) is negative because $s'(\widehat{\sigma}) > 0$; the numerator of (10) is positive since $c'_m(\sigma_i) < 0$. Hence, an increase in the cost of committing an extremely violent act decreases the number of extremely violent acts, $(\sigma_h - \overline{\sigma}_m) f$, because $\overline{\sigma}_m$ increases with ε. Stiffer penalties for extremely violent acts increase the number of moderately violent acts, $(\overline{\sigma}_m - \overline{\sigma}_0) f$, because $\overline{\sigma}_m$ increases and $\overline{\sigma}_0$ decreases with ε. The effect on the total cost of violence to society, $(\overline{\sigma}_m - \overline{\sigma}_0) fM + (\sigma_h - \overline{\sigma}_m) fE$, is:

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

which is positive if

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

that is, when $s'(\widehat{\sigma})$ is large and E is close to M.

□

The intuition behind these results is as follows. Through a standard substitution effect, stiffer penalties for extreme violence induce some individuals at the margin between extreme and moderate violence to commit moderately violent acts rather than extremely violent acts. Since these individuals are relatively tough, this raises status when committing a moderately violent act

compared to status when being passive, and thus induces individuals at the margin between moderate violence and inaction to commit moderately violent acts. The total cost of violence to society thus decreases as some people choose moderate violence rather than extreme violence, but it increases as more people choose moderate violence rather than inaction. The strength of the latter effect again depends on the responsiveness of individuals at the margin between inaction and moderate violence ($-1/c'_m(\overline{\sigma}_0)$) and on how much individuals value status ($s'(\widehat{\sigma})$). Moreover, whether the total cost to society of violence increases naturally depends on the cost of extreme violence (E) relative to the cost of moderate violence (M) to society. When individuals care sufficiently about status, and the social cost of an extremely violent act is close enough to the social cost of a moderately violent act, the increase in the cost of moderately violent acts dominates the reduction in the cost of extreme violence.

7 Concluding remarks

We have studied the effects of law enforcement on status-seeking behavior in violent subcultures. We have shown that, when status concerns are sufficiently important, zero-tolerance may yield a double dividend in that it reduces both the number of minor offences as well as more severe crime. On the contrary, intensifying the fight against serious crime may backfire as it strengthens the incentive to commit minor crime.

Obviously, an effective way to reduce total crime is to increase the penalties for both minor and more severe crime. It is straightforward to verify that, in our model, this leads to a reduction in both moderate and extreme violence, and that status concerns increase the effectiveness of such a policy. However, increasing penalties across the board may not always be optimal or feasible. One reason is that particular forms of punishment are considered immoral, which puts a limit on the harshness of punishment of serious crimes. Another reason is that people may anticipate that, at some point in their life, they may suffer from a lack of self-control, commit a crime, and may be penalized. This, too, will put a limit on optimal penalties.

We have restricted agents to choose between three possible actions. While this is clearly a limitation of our analysis, its implication that in equilibrium a status hierarchy arises consisting of three groups is consistent with the observations by Fagan, Wilkinson, and Davies (2000) in their study on vi-

olence in New York City. Extending the model to allow for a richer action space need not affect the main conclusions. Suppose we would add an action which is even more brutal than extreme violence, 'excessive violence.' Then, a zero-tolerance policy would not only reduce moderate and extreme violence, but also reduce excessive violence. The reason is that, as zero-tolerance reduces extreme violence, the signaling value of extreme violence increases, and so induces some otherwise excessively violent individuals to choose extreme violence. The same holds if we add more actions which are even more brutal. Our conclusions on fighting extreme violence may be affected by adding the excessively violent act, as harsher penalties for extreme violence will induce some otherwise excessively violent people to commit extreme violence. Hence, it is less likely that such a policy will increase the total cost of violence to society.

Critical for our results is the assumption that people in violent subcultures care about their social status for being 'tough.' In the Introduction, 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. Fagan, Wilkinson, and Davies (2000)). 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.

8 References

Akerlof, George A. and Rachel E. Kranton (2000), Economics and Identity, *Quarterly Journal of Economics*, 115(3): 715-753.

Akerlof, George and Janet L. Yellen (1994), Gang Behavior, Law Enforcement, and Community Values, In: Henry J. Aaron, Thomas E. Mann, and Timothy Taylor (Editors), *Values and Public Policy*, Washington D.C.: The Brookings Institution.

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

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

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

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.

Becker, Gary S. (1968), Crime and Punishment: An Economic Approach, *Journal of Political Economy*, 76(2): 169-217.

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

Benabou, Roland and Jean Tirole (2004), Incentives and Prosocial Behavior, CEPR Discussion Paper 4633.

Bergh, Andreas and Günther Fink (2005), Escaping from Mass Education – Why Harvard Pays, Mimeo, Bocconi University.

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

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

Brekke, Kjell Arne, Snorre Kverndokk, and Karine Nyborg (2003), An Economic Model of Moral Motivation, *Journal of Public Economics*, 87(9-10): 1967-1983.

Butler, Paul (2004), Much Respect: Toward a Hip-Hop Theory of Punishment, *Stanford Law Review*, 56: 983-1016.

Calvó-Armengol, Antonio, Eleonora Patacchini and Yves Zenou (2005), Peer Effects and Social Networks in Education and Crime, CEPR discussion paper 5244.

Case, Anne C. and Lawrence F. Katz (1991), The Company You Keep: The Effects of Family and Neighborhood on Disadvantaged Youths, NBER working paper 3705.

Chesney-Lind, Meda and Lisa Pasko (2003), *The Female Offender: Girls, Women, and Crime*, London: Sage Publications.

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

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.

Fagan, Jeffrey, Deanna Wilkinson, and Garth Davies (2000), Social Contagion of Violence, Mimeo, Columbia Law School, New York.

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

Funk, Patricia (2005), Governmental Action, Social Norms, and Criminal Behavior, *Journal of Institutional and Theoretical Economics*, 161(3): 522-535.

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

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

Harcourt, Bernard E. and Jens Ludwig (2005), Broken Windows: New Evidence from New York City and a Five-City Social Experiment, *University of Chicago Law Review*, forthcoming.

Hendel, Igal, Joel Shapiro, and Paul Willen (2005), Educational Opportunity and Income Inequality, *Journal of Public Economics*, 89(5-6): 841-870.

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

Janssen, Maarten and Ewa Mendys-Kamphorst (2004), The Price of a Price: On the Crowding Out and In of Social Norms, *Journal of Economic Behavior and Organization*, 55(3): 377-395.

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

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

Kling, Jeffrey R., Jens Ludwig, and Lawrence F. Katz (2005), Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Voucher Experiment, *Quarterly Journal of Economics*, 120(1): 87-130.

Kubrin, Charis E. (2005), Gangstas, Thugs, and Hustlas: Identity and the Code of the Street in Rap Music, *Social Problems*, 52(3): 360-378.

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.

Lochner, Lance (2005), Individual Perceptions of the Criminal Justice System, Mimeo, University of Western Ontario.

Ludwig, Jens, Greg J. Duncan and Paul Hirschfield (2001), Urban Poverty And Juvenile Crime: Evidence From A Randomized Housing-Mobility Experiment, *Quarterly Journal of Economics*, 116(2): 655-679.

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

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

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.

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

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

Poutvaara, Panu and Mikael Priks (2005), Hooligans, Mimeo, University of Munich.

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

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.

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.

Seabright, Paul (2004), Continuous Preferences Can Cause Discontinuous Choices: An Application to the Impact of Incentives on Altruism, CEPR discussion paper 4322.

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

Stigler, George J. (1970), The Optimum Enforcement of Law, *Journal of Political Economy*, 78(3): 526-536.

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

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