

Crime, coordination, and punishment An economic analysis

Peter-J. Jost*

WHU-Otto-Beisheim-Hochschule, Institute for Organization Theory, Burgplatz 2, D-56179 Vallendar

Abstract

In the standard economic theory of crime and punishment, a risk-neutral individual will commit an offense if and only if his private benefit exceeds the expected sanction for doing so. To the extent that several individuals simultaneously choose whether or not to commit the offense, it is assumed that their decisions are independent of each other.

The purpose of this paper is to investigate a situation in which an individual's propensity to engage in an illegal activity may depend also on the behavior of other individuals. We consider a two-period model: In each period, individuals decide simultaneously whether to commit the offense. A police authority is in charge for the arrest and conviction of offenders. We assume that the police authority has a limited enforcement budget such that it cannot arrest and convict every offender. In this situation, the expected payoff of an individual from committing the offense is higher the more individuals also decide to behave illegally.

We analyse the interactive behavior in this model and answer the following questions: When are individuals responding to others' behavior, when are they influencing others' behavior. And, what is the optimal enforcement policy to forestall interactive behavior. © 2001 Elsevier Science Inc. All rights reserved.

1. Introduction

In Basel, Switzerland, handicrafts are traditionally organized in guilds. Besides representing the interests of their members, the main purpose of guilds is to share business information and to cultivate commercial relations. Commenting on enforcement of environmental regulations, representatives of the environmental agencies in Basel remarked that meetings by

* Corresponding author. Tel.: 49-261-65-09-300; fax: 49-261-65-09-111.

E-mail address: pjost@whu-koblenz.de (P.-J. Jost).

guild members are also used to exchange information concerning individual compliance with law. They expect that such information about the behavior of other members influences the propensity of one member to comply with environmental regulations.

The reason for this apprehension is well justified: To induce as many firms as possible to engage in adequate protection, the environmental agencies used a sequential enforcement process—see for example Shavell [1991] or Mookherjee and Png [1992]: First, they make spot inspections (general enforcement) which keeps enforcement costs low, but implies that monitoring will be imprecise. If a monitoring visit indicates insufficient protection, an agency investigates in a second step the actual degree of the firm's protection at high cost (specific enforcement). Now suppose that the owner of an environmentally risky plant knows that others are already violating environmental regulations. Since a limited enforcement budget restricts the agency's ability to detect all violations, the agency has to concentrate its specific enforcement activities to only some of those firms where general enforcement indicated an offense. But then the incentive of the owner to behave illegally increases with the number of firms already violating the regulations because the probability that the agency actually investigates his plant decreases.

One of the most important issue confronted by environmental agents thus is to organize their enforcement activities to forestall such interactive behavior. The standard literature on crime and punishment fails to give a suitable theoretical answer to this issue. According to Becker's [1968] seminal study, a risk-neutral individual will commit an offense if and only if his private benefit exceeds the expected sanction for doing so.¹ To the extent that several individuals simultaneously choose whether or not to commit the offense, it is assumed that their decisions are independent of each other. An individual's compliance decision then is not influenced by the behavior of other individuals. The behavior of the aggregate is merely an extrapolation from the behavior of an individual.

Situations, however, in which an individual's behavior depends on what others are doing usually do not permit simple extrapolation of individual behavior to the aggregate.² To make that connection we then have to look at the system of interaction between individuals: When do individuals respond to others' behavior; when do they influence others' behavior; and (in case of criminal activities) what is the optimal enforcement policy to forestall interactive behavior?

The purpose of this paper is to investigate these questions in a game-theoretical model.³

¹ See e.g. Ehrlicher [1973], Becker and Landes [1974], Heinecke [1978], Andreano and Siegfried [1980], Pyle [1983], Schmidt and Witte [1984] or the symposium on the economics of crime in the *Journal of Economic Perspectives* Vol. 10(1) [1996] and the references therein.

² Empirical evidence on tax evasion, for example, suggests that evasion decisions are not independent. Instead, individuals are more likely to evade once they expect others evading; see e.g. Benjamini and Maitail [1985], Schlicht [1985] or Gordon [1989]. This interactive behavior is also common to many other criminal or social activities; see Case and Katz [1991]. For instance, one's incentive to double-park is higher if many others do so and one is less discouraged from smoking marijuana if most of one's friends do. The formation of mobs, riots, or panic behavior are other examples. See Schelling [1978, p. 36ff] for a more elaborate discussion.

³ Decision-interdependency among potential offenders is also analyzed in Sah [1991] and Chu [1993]. Sah

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