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Violence and law enforcement in markets for illegal goods

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ABSTRACT

In this article, I try to establish optimal law enforcement efforts in markets for illegal goods taking into account both consumption and violence externalities. I model competition between firms as a Cournot duopoly game where they produce an illegal good and sabotage each other to gain a larger share of the market. I show that socially optimal law enforcement can result in any of the following corner solutions: letting firms produce freely, partially intervene punishing one firm more than the other, or fully intervene to eliminate them both. Which solution is optimal depends on the size of consumption and violence externalities; the direct costs of law enforcement and sabotage; the weight of profits in the welfare function of the authority; and how cautious is the authority avoiding violence externalities while enforcing the law.

1. Introduction

There has been a long-standing debate about the convenience of legalizing drugs. For example, the book of Evans and Berent (1992) brings together articles arguing either in favor or against the legalization of drugs. The book includes public correspondence between Milton Friedman and the former US drug czar William Bennett. Similarly, in the health arena Drucker (1999) and McDonough (1999) express opposite views on the effectiveness that drug prohibition had reducing consumption in the US during the 70s, 80s and 90s. In economics or sociology, plenty of articles such as Miron and Zwiebel (1995), Cussen and Block (2000), and Becker et al. (2006) argue against the prohibition of drugs.

Given that drug legalization is not politically feasible in many states or countries, it is tempting to ask how strict the authority should enforce the law against drug dealers. The arguments run in both directions and are similar to those in the prohibition *versus* legalization debate. On the one hand, some persons say that government intervention is necessary to reduce drug consumption and the negative externalities associated with it. On the other hand, other persons argue that law enforcement policies may not have the expected effects on consumption and may result in more violence. For instance, they claim that the actions of the authority against heavily-armed drug dealers generate property damages and casualties that may be more costly than drug consumption externalities.

There is a relatively recent literature in economics that models the effects of law enforcement on the incentives of firms that produce illegal goods. This literature includes the work of Burrus (1999), Skott and Jepsen (2002), Poret (2002), Chang et al. (2005), Kugler et al. (2005), Becker et al. (2006), Caulkins et al. (2006), Poret and Tejedo (2006), Garoupa (2007), Poret (2009), Naranjo (2010), Arango (2011), and Naranjo (2015).[1] Each of these articles pays special attention to particular aspects of illegal markets. For example, Kugler et al. (2005) assess the effects of corruption while analyzing criminal activities and law enforcement. Similarly, Chang et al. (2005), and Garoupa (2007) study the internal organization of mafias while Skott and Jepsen (2002) analyze the dynamics in the markets for heavy drugs. Interestingly, Burrus (1999), Caulkins et al. (2006), and Arango (2011) pay special attention to the effects of law enforcement on violence.

The idea that violence is related to illegal activities is not new. Goldstein and Brownstein (1987) classify drug related violence into three types: psychopharmacological, economic compulsive and systematic. The first type of violence results directly from the

[1] It is important to distinguish these articles from the vast literature on crime and punishment at the individual level that follows the seminal work of Becker (1968). The articles of Chang et al. (2005) and Garoupa (2007) can be considered at the intersection of the two literatures because they study criminal activities both at the individual and firm levels.

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consumption of drugs. The second type is caused by users who misbehave in order to obtain money to buy drugs. The third type is generated by the conditions in which illegal markets operate. The work of Goldstein et al. (1992), and Resignato (2000) suggests that drug related crime is caused mainly by systematic factors. In this sense, Blumstein (1995) suggests that participants in illegal activities arm themselves for self-protection. Similarly, Burrus (1999) says that drug dealers engage in violent activities for the following reasons: to protect themselves against theft because they carry drugs and cash; to convince their clients to pay their debts; and mainly to gain larger market shares.

In this article, I try to establish the optimal law enforcement efforts of the authority in markets for illegal goods taking into account both consumption and violence externalities. While consumption externalities may be the most important concern in countries where consumption is high and violence is low, drug-related violence has been the issue in countries where drug consumption is relatively low but violence is high. However, as explained by Werb et al. (2011), only a few theoretical articles model violence and law enforcement in the context of markets for illegal goods. Moreover, these articles arrive to opposite conclusions in terms of the optimal enforcement policy.

I model competition between drug dealers as a Cournot duopoly game where firms produce an illegal good and sabotage each other in order to gain a larger share of the market.[2] The novelty of this approach is considering that sabotage is what causes drug dealers to attack each other instead of fighting for territory as in Burrus (1999) and Caulkins et al. (2006) or for survival as in Arango (2011). In these models, firms participate in violent contests to determine directly the share of each firm in the market. However, their violent acts have no impact on rivals' marginal production or distribution costs. In contrast with this idea, I consider that violent acts affect these costs. As suggested by Levitt and Venkatesh (2000), drug-selling gangs have to pay higher wages to their dealers during wars.

In this article, the idea is that firms engage in cost-increasing sabotage as they try to destroy the production and distribution structure of their rivals. By increasing the costs of rivals, firms indirectly increase their market shares. This idea is similar to the one expressed by Levitt and Venkatesh (2000) when they say that drug-selling gangs have incentives to generate violence in rival territories to reduce drug selling there. In spite of the high costs of violence, the gang studied by Levitt and Venkatesh (2000) was involved in a war about 25% of the time. Therefore, it is reasonable to model violence as the result of permanent efforts of firms to sabotage each other or the efforts of the authority to punish them (and efforts of the illegal firms to avoid sabotage or punishment as well).

The analysis indicates that socially optimal law enforcement efforts can result in any of the following: the authority lets illegal firms produce freely; it partially intervenes by punishing one firm more than the other; or it fully intervenes to eliminate both firms. Which of these policies is optimal depends on the relative importance of consumption and violence external costs, how careful the authority enforces the law and the weight of profits from illegal firms in the welfare function that is maximized by the authority.

The rest of the article is organized as follows. In Section 2, I develop a theoretical model that involves illegal firms and an authority. In Section 3, I study the role of an authority that punishes either one or both firms in order to maximize welfare. I conclude in Section 4.

[2] There is a variety of assumptions in the literature regarding the structure of illegal markets. For instance, Becker et al. (2006) assume perfect competition; Skott and Jepsen (2002) assume monopolistic competition; Kugler et al. (2005), Poret (2009), and Arango (2011) assume Cournot oligopoly; and Burrus (1999) and Garoupa (2007) assume a monopoly.

2. Model

Suppose as in Burrus (1999) that two firms compete in the market for an illegal good. Firm i(=1 or 2) produces q_i units of the good at marginal cost $c > 0$. In addition, firms engage in cost-increasing sabotage as in Economides (1998) or Mandy and Sappington (2007).[3] In particular, suppose that $s_i \geq 0$ is the additional marginal cost that firm j generates to firm $i \neq j$ by means of sabotage. Finally, suppose that the authority punishes firm i increasing the marginal cost of this firm in $l_i \geq 0$.[4] Therefore, the total marginal cost of firm i is $c + s_i + l_i$.

There are essentially three ways in which law enforcement is modeled in the literature. In some articles such as Chiu et al. (1998), Burrus (1999), Skott and Jepsen (2002), and Becker et al. (2006) law enforcement increases the expected per unit production costs of the illegal firms. In this type of models, law enforcement is similar to a per unit production tax. I follow this approach because it is simple and transparent. Other articles such as Lee (1993), Poret (2002), Poret (2009), and Poret and Tejedo (2006) consider that drug dealers exposure to arrest and punishment depends on the number of transactions they make as well as production. Therefore, law enforcement has a non-linear effect on the illegal firms' production costs. Finally, in some articles such as Jacobsson and Naranjo (2009), Naranjo (2010), and Naranjo (2015) law enforcement reduces demand available to drug dealers.

Suppose now that the market clearing price for the illegal good is given by the linear demand function $p(Q) = 1 - Q$ where $Q = q_1 + q_2$. It is worth making some comments about this assumption. First, it is relatively standard to assume specific demand functions in the literature. For example, Burrus (1999), Poret (2002), Kugler et al. (2005), Poret and Tejedo (2006), Poret (2009), and Arango (2011) assume linear demands while Skott and Jepsen (2002) assume a constant elasticity demand function. Second, as pointed out by Burrus (1999), the empirical literature on drugs includes both price-elastic and price-inelastic estimates of the demand function. Hence, a linear demand is open to either possibility. Third, it allows finding closed-form solutions for all the variables of interests in the model and simplifies welfare analysis.

As mentioned earlier, consumption of the illegal good generates a negative externality. The idea is that individuals using drugs are more likely to cause problems to other members of society than individuals not using them. For example, individuals under the influence of drugs are more likely to cause traffic accidents, require public health services, incur in domestic violence or commit public order offenses (Hay, 1991; Goldstein et al., 1992; Anderson, 1999; Resignato, 2000). Assume that the cost of this externality is $c_e \geq 0$ per unit of the good that reaches the consumer. This is a relatively standard assumption in the literature. For instance, Chang et al. (2005), Becker et al. (2006), Garoupa (2007), and Arango (2011) consider consumption externalities explicitly in their analysis.

Sabotage inflicted by rivals and punishment efforts by the authority involve the use of force. These efforts are violent in nature and may impose an external cost on society. I will assume that $v_e \geq 0$ is the external cost imposed on society per unit of sabotage that firms exercise on rivals. It is reasonable to assume that the authority punishing criminals generates only a fraction $\mu \in (0, 1)$

[3] In the context of drugs, it is reasonable to assume that firms will involve in cost-increasing rather than demand-reducing sabotage. However, demand-reducing sabotage resembles the efforts of the authority in programs such as "say no to drugs" analyzed by Becker et al. (2006) as well as Arango (2011).

[4] The authority enforces the law more strictly by adopting measures that increase the probability of catching criminals, the penalties for criminals in case they are caught or both. Additionally, as explained by Kuzienko and Levitt (2004), punishment can include confiscating illegal production. At the end of the day, all these actions lead to higher (expected) marginal costs for producers of illegal goods.