THE ECONOMICS OF ORGANIZED CRIME AND OPTIMAL LAW ENFORCEMENT

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This article extends the optimal law enforcement literature to organized crime. I model the criminal organization as a vertical structure where the principal extracts some rents from the agents through extortion. As long as extortion is a costless transfer from individuals to the criminal organization, not only the existence of extortion is social welfare improving because it makes engaging in a criminal offense less attractive but it also allows the government to reduce expenditures on law enforcement. When extortion is costly because the criminal organization resorts to threats and violence, the existence of extortion is social welfare diminishing and may lead to higher expenditures on law enforcement. (*JEL* K4)

I. INTRODUCTION

The economic analysis of crime has its starting point with Becker's [1968] seminal work: individuals rationally decide whether to engage in criminal activities by comparing the expected returns to crime with the returns to legitimate business. Hence, crime is less attractive if the government increases the probability (certainty) and severity of punishment. Alternatively, by increasing market opportunities, one makes crime less attractive. Becker's main thesis is that, since imposing a fine is costless, this fine should equal an individual's entire wealth and be complemented by a probability of punishment to optimally deter crime.

Most of the literature on crime has focused on the role of deterrence as pointed out in a recent survey by Garoupa [1997]. The discussion has been around alternative characterizations of optimal penalties and enforcement strategies in the context of partial equilibrium, where the normative criteria is to minimize a given welfare function that measures the social loss resulting from crime.[1]

This article extends the optimal law enforcement literature to organized crime. The term "organized crime" has been used with various meanings by scholars and prosecutors in different countries. Some authors use it to define a set of relations among illegal organizations, whereas others use it to indicate a group of illegal activities performed by a given set of agents. Fiorentini and Peltzman [1995] summarize the following characteristics of organized crime: (i) economies of scale and exploitation of monopolistic prices on the supply of illegal goods and services; (ii) practice of violence against other legal and illegal business; (iii) criminal hierarchy with internalization of negative externalities and management of portfolio of risky activities; (iv) avoidance of resource dissipation through competitive lobbying and corruption; and (v) easier access to markets. Abadinsky [1994] classifies organized crime according to activities: (i) racketeering: individuals organize criminal activities to improve their business, (ii) vice operations: individuals provide illegal goods; (iii) theft-fence rings: individuals develop a network on a continuous basis in the business of pur-

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1. See also Ehrlich [1996] and Polinsky and Shavell [1999].

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chasing and reselling stolen goods; (iv) gangs: individuals band together to enhance their group and influence; and (v) terrorists: individuals get together to commit spectacular criminal acts to undermine an established government.

The distinction between the two main roles of the criminal organization—as government and as a firm—is especially fruitful when applied to the analysis of policymaking. In this respect, we have to distinguish between three main areas of deterrence policies against organized crime: first, the traditional deterrence strategies based on investment in investigate activities and in the judicial and penal systems in order to increase the probability of detection of crimes related to the criminal organizations' activities; second, the deterrence strategies related to the regulatory activities of the government; third, the deterrence policies against money laundering and the investment of illegal profits in legal activities.

Economic analysis of organized crime has stressed welfare comparisons between different market structures (monopoly versus competitive supply) of bads as in Buchanan [1973], Backhaus [1979], and Reuter [1983]: a monopolistic market is more efficient than a perfect competitive one in presence of bads because the output is smaller. Reinganum [1993] explores the possibility that offenders collude on making their criminal choices and shows that fewer offenses are committed. More recently, Dick [1995, 1998] has developed an analytical framework in which transaction costs, rather than monopoly power, primarily determine the activities of organized criminal firms. He predicts that organized crime is more successful when there is production cost advantage. A similar argument is presented by Posner [1998, 264–66]. Grossman [1995] has developed an alternative analysis: the Mafia is modeled as a competitor to the state in the provision of public services. In this literature, the effect of competition between the Mafia and the state on the allocation of resources and the distribution of income is analyzed. The model implies that, as long as taxation allows, competition between the Mafia and the state increases the provision of public services and, thereby, also increases the net income of the representative producer. Accordingly, the representative producer should support the continued existence of the Mafia. The Mafia exists as an alternative provider of production services to the private sector and competes with the government in terms of tax rates and provision of production services; its existence can have a beneficial effect because it moderates the "kleptocratic" tendencies of the government.[2]

The current theory of optimal law enforcement might be helpful to discuss law enforcement policy in presence of organized crime. However, as I show in the article, applying the current theory misses one of the most important characteristics of the market for crime when there is a dominant firm extracting surplus from smaller criminal firms. A criminal organization has a principal of a vertically integrated structure where agents are individual criminal firms. Following Jennings [1984], Polo [1995], and Konrad and Skaperdas [1997, 1998], I consider the principal's necessity to discipline its members by introducing an incentive constraint. Depending on how credible are the principal's threats, different policy rules are derived. Moreover, I show that it is not necessarily true that a tougher law enforcement policy should be chosen when in presence of organized crime.

This view of organized crime as an illegal business organization relates more directly to the current work on corporate liability. Shavell [1997] develops the approach to criminal deterrence where the offender is not a single actor but a collective entity, and specifically a principal-agent structure is considered. In his example, the principal is a firm and the agent an employee. We can extend the example to the Mafia and its employees. Shavell argues that the enforcement design must be such that the principal will behave socially optimally in controlling agents. However, the particular allocation of sanction is irrelevant because agent and principal can reallocate sanctions through their own contract. The postcontract sanctions are independent of precontract division of sanctions. The rule does not apply when one party is unable to pay the fine (thus, the Mafia is able to escape some punishment because its employees have limited wealth) or when the principal cannot induce the

2. A general review can be found in Skaperdas [1998].

agent to behave optimally (the Mafia has limited ability to control employees): in such circumstances, Shavell argues for jail sentences and personal criminal liability for agents (Mafia employees).

These observations recognize the particular structural and institutional problem faced by a criminal organization. The problem emerges because a criminal organization is a vertical structure where there are information problems, incentives to extract rents, and the possibility of exerting violence. Konrad and Skaperdas [1997] consider the issue of credible threats and incentive effects within a gang. They show that there is a reputation problem and emphasize the role of strategic up-front investment. As long as threats are credible, contracts in the criminal world are self-enforced.

In this article, I model the criminal organization as a vertical structure where the principal extracts some rents from the agents through extortion. Threats may or may not be credible. Alternatively, we can see the criminal organization as a regulator. As long as threats are credible, the principal limits access to the market and so fewer offenses are committed. When threats are not credible, there is violence in the market and more offenses are committed.[3]

The article does not address the emergence of the Mafia. In this model, the Mafia exists and has a principal who extracts some rents appealing to a coercive system. I do not discuss how individuals go from bottom to top in the criminal world.[4] We can use Skaperdas and Syropoulos [1995] as the first stage of the game where the existence of a Mafia constitutes the outcome (and where the possibility of multiple Mafias is taken care); and this article corresponds to the second stage of the game, where a given local monopolistic Mafia engages in controlling criminal activities.

The article is organized as follows: in Section II, I discuss the basic model; in Section III, I introduce a criminal organization. I show that the existence of a criminal organization is welfare improving. In the following sections, I propose three reasons why a criminal organization may be welfare diminishing: in Section IV, I allow for costly extortion; in Section V, I consider violence; in Section VI, I allow for political corruption. The main conclusions are pointed out in Section VII.

3. In Abadinsky's [1994] terminology, we consider racketeering activities.

4. We acknowledge the point made by the referee that if committing an offense is critical to moving up in the organization, participants have an extra incentive to commit crimes.

II MODEL WITH A COMPETITIVE CRIMINAL MARKET

Risk-neutral individuals choose whether to commit an act that benefits the actor by b and harms the rest of society by h. The policy maker does not know any individuals' b but knows the distribution of parties by type described by a uniform distribution with support [0,1] and a cumulative distribution b. It is posed that $h > 1$ so that offenses are not socially beneficial.[5]

The social planner chooses a sanction, f, and a probability of detection and conviction, p. The expenditure on detection and conviction to achieve a probability p is given by cp, where $c > 0$ is a cost parameter. The objective function to be maximized is the sum of individuals' benefits minus the harm caused by their acts and enforcement costs. The maximum feasible sanction is F, which can be interpreted as the maximum wealth of individuals.[6] We assume further that the sanction is costless to impose and collect.

Risk-neutral individuals commit an offense if and only if $b \geq pf$. Given individuals' decision of being honest or dishonest, social utility is

$$W = \int_{pf}^{1} (b - h)db - cp. \tag{1}$$

The social planner maximizes the welfare function in f (severity of punishment) and p (probability of punishment) subject to $0 \leq f \leq F$. The public sector budget is financed by lump-sum taxation.

5. This assumption is not fundamental, but it makes it easier to derive some of the comparative static results.

6. Following Usher [1986], we can further consider other social welfare objective functions. One is what Usher [1986] calls a "democratic objective," where gains from illegal activities are not included in the social objective. A third objective function is what Usher [1986] calls the "Leviathan objective," where the government maximizes its own budget, without any concern for social welfare.

PROPOSITION 1. *The optimal fine is the maximal fine. The optimal probability of detection and conviction satisfies* $p^*F = h - c/F$. *Some underdeterrence is optimal.*

PROOF OF PROPOSITION 1

Define the Lagrangean as $L = W + \lambda(F - f)$. The optimal f^* and p^* must satisfy

$$L_f = p(h - pf) - \lambda = 0 \tag{2}$$

and

$$L_p = f(h - pf) - c = 0, \tag{3}$$

where L is the Lagrangean, and λ is the Lagrangean multiplier. Suppose the optimal fine is not maximal. From (2), we have $p^*f^* = h$. However, from (3), we know that this is impossible. Hence, the optimal solution must be $f^* = F$ and $\lambda^* > 0$.

From (3), one gets an interior solution for the probability

$$p^*F = h - c/F \Rightarrow p^*F < h.$$

The first-order conditions are sufficient by virtue of the strict concavity of W on the positive orthant.

We have formally derived Becker's result as in the usual optimal law enforcement literature. We define the pair $\langle p^*, F \rangle$ as the competitive equilibrium.

III A MODEL WITH EXTORTION

Risk-neutral individuals that choose to commit an offense have to pay y to a local (monopolistic) Mafia to be able to benefit b.[7] We can think that each potential offender has to buy a license from the local Mafia to be able to commit the offense. In other words, entry in the criminal market is regulated by the Mafia. For simplicity of the exercise, we model the Mafia as a profit-maximizing regulator that cannot be punished by the government.[8] Criminal punished is exerted on offenders and not the criminal organization.[9]

Risk-neutral individuals commit an offense if and only if $b \geq pf + y$. Given individuals' decision of being honest or dishonest, the Mafia's profits are

$$\Pi = \int_{pf+y}^{1} y db, \tag{4}$$

and the optimal price for a criminal license is given by

$$\Pi_y = 1 - pf - 2y = 0 \Rightarrow y^{RF} = (1 - pf)/2. \tag{5}$$

We have derived the Mafia's reaction function to the government's policy: setting a higher expected sanction induces the Mafia to reduce the price for a criminal license, since fewer individuals are willing to commit the offense.[10]

Nash-Cournot game

In a Nash-Cournot game, the government and the Mafia (not the criminals, since they observe the probability and severity of punishment, and the level of commission to be paid to the Mafia, and then decide on becoming offenders) make their choices simultaneously. We propose the Nash-Cournot game as plausible for two reasons: (a) it has been argued in the literature that the Mafia is essentially a government,[11] and (b) empirically it is not clear if the government's policy reacts to the Mafia, or vice-versa, that is, who is the leader and who is the follower, if any.[12] For sake of completeness, we also consider Stackelberg solutions.

7. I aim at contrasting a monopoly with a competitive market. Multiple competing mobs correspond to a case of imperfect competitive market.

8. When h is near zero, we consider the relationship between an organized crime syndicate and legitimate merchants.

9. In line with the point made before in the discussion of criminal liability following Shavell [1997], we can argue that any particular allocation of sanctions is irrelevant.

10. It is assumed that $1/2 < h - c/F < 1$ to allow an interior solution to the problem.

11. On the Mafia as government, see Abadinsky [1994], Grossman [1995], Turvani [1997], and Dick [1998].

12. On the confused relationship between government and the Mafia, see Reuter [1983] and Robinson [1994].

In a Nash-Cournot game, the government's objective function is

$$(6) \qquad W = \int_{pf+y}^{1} (b - h)db - cp.$$

Again, the social planner maximizes the welfare function in f (severity of punishment) and p (probability of punishment) subject to $0 \leq f \leq F$. The public-sector budget is financed by lump-sum taxation.

Define the Lagrangean as $L = W + \lambda(F - f)$. The first-order conditions are

$$(7) \qquad L_f = p(h - pf - y) - \lambda = 0$$

and

$$(8) \qquad L_p = f(h - pf - y) - c = 0.$$

By the argument in the proof of proposition 1, the optimal fine is maximal and the probability reaction function satisfies $p^{RF}F = h - y - c/F$. Note that by increasing y, the Mafia increases criminal deterrence and the government can decrease costly expenditure on law enforcement.[13]

The Nash-Cournot equilibrium is found by solving both reaction functions in y and p, deriving

$$(9) \qquad p^{NC}F = 2(h - c/F) - 1$$

and

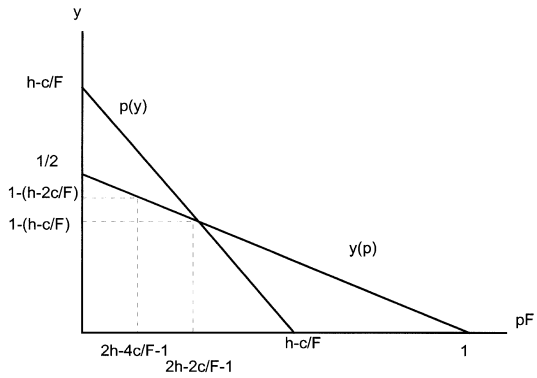
$$(10) \qquad y^{NC} = 1 - (h - c/F).$$

We can easily show that

PROPOSITION 2. *The optimal probability of detection and conviction in a model with extortion p^{NC} is smaller than in a competitive market p^*.*

Figure 1 shows the optimal policy in a competitive market and the Nash-Cournot equilibrium in a model with extortion. The intuition of the result follows Buchanan [1973]: by extorting criminals' gains, the Mafia makes a criminal offense less attractive, and so criminal deterrence increases. As a consequence, the optimal expenditure on law enforcement can be reduced.

FIGURE 1
Model with Extortion



The number of offenders is the same in a competitive market and in a model with extortion, namely, $1 - (h - c/F)$. Therefore, social welfare increases when the Mafia engages in extortion, since expenditure on law enforcement is reduced for the same number of offenses.

The optimal price for an entry license decreases with h, meaning that the Mafia's role as a regulator is more active and more profitable when in presence of less harmful crimes because expected punishment is higher for more harmful offenses.

Stackelberg leadership equilibrium

In a Stackelberg leadership game where the government is the leader and the Mafia the follower, the government maximizes social utility, where y is replaced by y^{RF}. The objective function is

$$(11) \qquad W = \int_{1/2+pf/2}^{1} (b - h)db - cp.$$

Again, the social planner maximizes the welfare function in f (severity of punishment) and p (probability of punishment) subject to

13. It has been assumed that y is not constrained by an individual's wealth. A more robust version of the model could explore the possibility that $f = F - y$. In this case, the reaction functions would become $y^{RF} = 1 - pF/(2 - p)$ and $p^{RF}(F - y) = h - y - c/(F - y)$. The properties of the Nash solution are not altered but the reaction functions are no longer linear making the analytical expressions more cumbersome.

$0 \leq f \leq F$. Define the Lagrangean as $L = W + \lambda(F - f)$. The first-order conditions are:

$$(12) \quad L_f = p(h - 1/2 - pf/2)/2 - \lambda = 0$$

and

$$(13) \quad L_p = f(h - 1/2 - pf/2)/2 - c = 0.$$

By the argument in the proof of proposition 1, the optimal fine is maximal and the optimal probability satisfies $p^{Sl}F = 2h - 4c/F - 1$. The Stackelberg equilibrium is found by solving y^{RF}, deriving

$$(14) \qquad y^{Sl} = 1 - (h - 2c/F).$$

We can easily show that

PROPOSITION 3. *The optimal probability of detection and conviction in a Stackelberg leadership game where the government is the leader is smaller than in a Nash-Cournot game.*

In Figure 1, we compare the three possible cases: competitive market, Nash-Cournot, and Stackelberg games. Note that in this last case the number of offenders is given by $1 - (h - 2c/F)$, that is, more individuals commit an offense when Mafia and government play a Stackelberg game than in a competitive market.

In the case of a Stackelberg game, where the Mafia is the leader and the government the follower, the Mafia chooses $y^{Sf} = h - c/F$, and so the optimal probability of detection is zero.[14] Law enforcement is totally delegated in the Mafia.

In any case, the economy is better off with the existence of a Mafia. In the Nash-Cournot game and the Stackelberg leadership game where the Mafia is the leader, the number of offenders is the same and expenditure on law enforcement is smaller than in the competitive case. Consequently, social welfare is necessarily higher in the first two cases than in the competitive situation. In the Stackelberg leadership game, where the Mafia is the follower, the number of offenders is higher and expenditure on law enforcement is smaller than in the competitive case. The gain from the second more than compensates the loss from the first, increasing social welfare: the government can always choose the Nash-Cournot solution, which is strictly preferred to the competitive solution. Thus, the Stackelberg solution must be strictly preferred to the Nash-Cournot solution and, by consequence, to the competitive solution.

Note that social welfare is higher in the Stackelberg leadership game, where the Mafia is the leader than, in the Nash-Cournot solution. In other words, both players (government and Mafia) prefer the former to the latter. The usual myopic behavior at the Nash-Cournot solution (the government assumes that the Mafia does not change the license price if punishment decreases) gives the analytical explanation. An alternative interpretation is that there are transaction costs that make impossible for the government and the criminal organization to agree on moving from a Nash-Cournot solution to the Stackelberg leadership solution.

Having derived that the existence of the Mafia is welfare improving, we now explore three arguments to show that a criminal organization can be welfare diminishing.

IV MODEL WITH COSTLY EXTORTION

In the previous model, offenders pay a license to enter the criminal market, and the license is costlessly enforced. In other words, individuals willing to commit an offense accept the regulatory role of the Mafia without further cost to the regulator. Here we extend the model by assuming that individuals consider the possibility of not paying the license and suffer the consequences. Let us say that to enforce a price y for the license for criminal activities, the Mafia has to invest up front ey to support a credible threat of destruction if an individual does not pay the license, where $e > 0$.

Given an individual's decision of being honest or dishonest, the Mafia's profits are now

$$(15) \qquad \Pi = \int_{pf+y}^{1} ydb - ey,$$

14. The Mafia maximizes $\Pi = \int_{h-c/F}^{1} ydb$ in y subject to $y \leq h - c/F$.

and the optimal price for a criminal license is given by

$$(16)\quad \Pi_y = 1 - pf - 2y - e = 0 \Rightarrow y^{RF} = (1 - pf - e)/2.$$

We have derived the new Mafia's reaction function to the government's policy.

Figure 2 compares the Nash-Cournot equilibrium when $e = 0$ and $e > 0$. Note that if $e \geq 1 - (h - c/F)$, the Mafia does not exert extortion and the Nash-Cournot equilibrium coincides with the competitive solution. The equilibrium is found by solving both reaction functions in y and p deriving:

$$(17)\quad p^E F = 2(h - c/F) - 1 + e$$

and

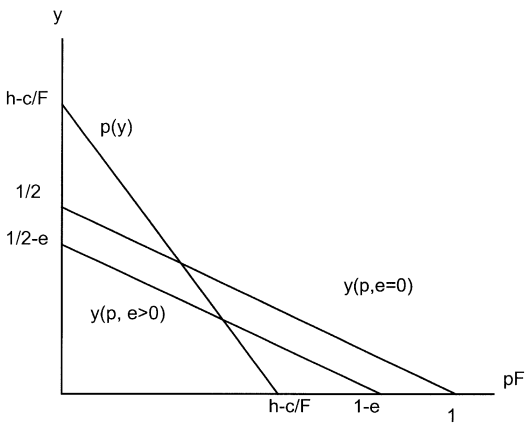
$$(18)\quad y^E = 1 - (h - c/F) - e.$$

We can easily show that

PROPOSITION 4. *The optimal probability of detection and conviction in a model with costly extortion increases with the cost parameter e.*

The number of offenders is still given by $1 - (h - c/F)$. However, now social welfare is not necessarily higher when the criminal market is regulated by the Mafia. More precisely, as long as $e > c/F$ and $y^E > 0$, social welfare is lower in presence of the Mafia.

FIGURE 2
Model with Costly Extortion



We can postulate that the government and the Mafia compete to get rents from their regulatory role in the criminal market. From a social viewpoint, the existence of the Mafia is social welfare improving as long as it is more efficient in regulating the market than the government.

In summary, when extortion is costly, the presence of the Mafia can be social welfare diminishing. As long as the government is more efficient in regulating criminal markets than the Mafia, costly extortion is socially inefficient. As an example, Robinson [1994, p. 69], cites the U.S. Department of Justice saying, "The crooks keep so far ahead of us, we will never completely close the net," suggesting that criminal syndicates are more efficient than governmental agencies in regulating criminal markets.

V MODEL WITH VIOLENCE

I have shown that costly extortion can be social welfare diminishing. Nevertheless, all potential offenders do pay the entry license. Threats of violence are credible given an up-front investment. In this section, I allow for violence occurring: some offenders do not pay the entry license and have their business destroyed.

Each offender has the opportunity to pay y or face an expected damage given by d. The expected damage d is set by the Mafia with a cost ed, where $e > 0$. The Mafia chooses $y = d$ so that all individuals have an incentive to pay rather than face an expected damage. The problem is similar to the one solved in the previous section.[15]

Suppose now that a proportion $1 - \sigma$ of individuals in this economy thinks that the expected damage is zero. One justification is that there is noise in the criminal market such that some individuals have imperfect observation of damages in the criminal market: a proportion of the population underes-

15. It is assumed that the government is constrained by moral or constitutional principles and cannot resort to violence to enforce the law. Hence, the coercive technology of the government is different from the coercive technology used by the Mafia. Even if the government could use violence, it is not necessarily the case that both players should use the same coercive technology, since they can differ on information sets or internal transaction costs and contracting. See Reuter [1983] and Robinson [1994].

timates damages.[16] Another possible reason is that some potential offenders are bounded rational and do not realize that by not paying the Mafia they risk violent confrontation.[17] A third explanation is that some individuals face a liquidity constraint and simply cannot pay the Mafia.[18]

Only σ individuals pay the Mafia, and it is immediate that the Mafia's reaction function is $y^{RF} = (1 - pf - e/\sigma)/2$. An increase in the proportion of the population paying the Mafia increases the marginal revenue and as a consequence the price for an entry license, ceteris paribus.[19]

Social welfare to be maximized in p and f is given by

(19)

$$W = \sigma \int_{pf+y}^{1} (b - h)db + (1 - \sigma)\int_{pf}^{1}(b - y - h)db - cp - ey$$

$$= \int_{pf+y}^{1} (b - h)db + (1 - \sigma)\int_{pf}^{y}(b - h)db - (1 - \sigma)\int_{pf}^{1} y db - cp - ey,$$

where social cost of violence is posed to be the value of expected damages consequent from violent confrontation, namely y. For a given policy $\langle p, f \rangle$ and a price for an entry license y, the social welfare consequence of more individuals underestimating expected damages is an increase in the number of offenders and in the cost of violence.

Again define the Lagrangean as $L = W + \lambda(F - f)$. The first-order conditions are

$$(20) \quad L_f = p[h - pf + (1 - 2\sigma)y] - \lambda = 0$$

and

$$(21) \quad L_p = f[h - pf + (1 - 2\sigma)y] - c = 0.$$

By the argument in the proof of proposition (1), the optimal fine is maximal and the probability reaction function satisfies $p^{RF}F = h + (1 - 2\sigma)y - c/F$. Note that now by increasing y, the Mafia simultaneously increases criminal deterrence and the cost of violence. Therefore, it is no longer true that the government should decrease costly expenditure on law enforcement. The slope of the reaction function depends crucially on σ. If σ is sufficiently high, that is, most individuals have accurate information about damages, the deterrence effect dominates the violence effect, and so the government decreases expenditure on law enforcement. If σ is low, that is, most individuals risk confrontation with the Mafia, the violence effect dominates, and so the government increases expenditure on law enforcement to deter more individuals.

The Nash-Cournot equilibrium is found by solving both reaction functions in y and p, deriving

$$(22) \quad p^V F = [2(h - c/F) - (2\sigma - 1) \times (1 - e/\sigma)]/[3 - 2\sigma]$$

and

$$(23) \quad y^V = [1 - h + c/F - e/\sigma]/[3 - 2\sigma].$$

We can easily show that

PROPOSITION 5. *The optimal probability of detection and conviction p^V can be greater than in a competitive market $p*$.*

Figure 3 shows the Nash-Cournot equilibrium when σ takes the following three values: $1/4$, $1/2$ and 1. As we can easily check, for $\sigma < 1/2$, the optimal probability of detection and conviction is now higher than in the competitive case because of the violence effect.

The number of offenders is given by $[(2 - \sigma)(1 - (h - c/F)) + e(1 - \sigma)/\sigma]/[3 - 2\sigma]$. We can observe that for $\sigma \neq 1$, the number of offenders is increasing in the cost parameter e. Increasing the cost of extortion at most increases the expected sanction less than de-

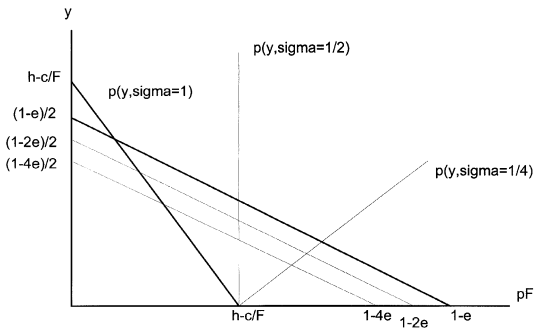
16. Possible justifications for this noise can be found in Konrad and Skaperdas [1997, 1998].

17. See Turvani [1997] for possible reasons for criminals' bounded rationality.

18. And they hope that the Mafia will take that into consideration sparing them from destruction.

19. The proportion σ is taken as given. However, it may be more appealing to assume that σ decreases with y. Such property introduces a new marginal cost term when y increases. The main conclusions of the article are not affected by these considerations. One could consider $\sigma = 1 - \beta y$ and vary β for comparative static analysis.

FIGURE 3
Model with Violence



creases the price of a criminal license (at most because increasing e may affect negatively the expected sanction). As to σ itself, it is ambiguous how the number of offenders varies. We can observe that if $e = 0$, the number of offenders increases with σ: increasing the proportion of offenders that pay a criminal license does not affect the price of the license but decreases the expected sanction (because the cost of violence decreases). However, when e is sufficiently high (extortion is very costly), it is possible that the number of offenders decreases with σ: increasing the proportion of offenders that pay a criminal license increases the price of the license and may increase the expected sanction.

VI MODEL WITH POLITICAL CORRUPTION

We consider a situation where the Mafia is able to command some influence on the government's policy choices. We can think that political influence is exerted through corruption of the policy making.[20] Suppose that the social welfare maximizes an objective function given by

(24)
$$W = (1-\alpha)\left\{\int_{pf+y}^{1}(b-h)db - cp\right\} + \alpha\Pi,$$

where α measures the degree of political influence exerted by the Mafia.

Defining Π as in (4), we can rearrange social welfare to get

(25) $$W = \int_{pf+y}^{1}[(1-\alpha)(b-h) + \alpha y]db - (1-\alpha)cp.$$

The social planner maximizes the welfare function in f (severity of punishment) and p (probability of punishment) subject to $0 \leq f \leq F$. The public sector budget is financed by lump-sum taxation.

Define the Lagrangean as $L = W + \lambda(F - f)$. The first-order conditions are

(26) $$L_f = p[(1-\alpha)(h - pf) - y] - \lambda = 0$$

and

(27) $$L_p = f[(1-\alpha)(h - pf) - y] - (1-\alpha)c = 0.$$

By the argument in the proof of proposition (1), the optimal fine is maximal and the probability reaction function satisfies $p^{RF}F = h - y/(1-\alpha) - c/F$. Note that by increasing α, the Mafia's political influence, one decreases the marginal benefit of criminal punishment and consequently the government sets a lower probability, ceteris paribus.

The Nash-Cournot equilibrium is found by solving both reaction functions in y and p, deriving:

(28) $$p^{C}F = [2(1-\alpha)(h-c/F) - 1]/[1-2\alpha]$$

and

(29) $$y^{C} = [(1-\alpha)(1-(h-c/F))]/[1-2\alpha].$$

20. It has been shown in the literature that corruption weakens criminal deterrence. As pointed out by Becker and Stigler [1974] and Bowles and Garoupa [1997], in presence of corruption, the government must design different law enforcement policies, including being tougher on criminal offenses or punishing harshly corruption. It is much easier for a criminal organization to engage on corruption than individuals because of economies of scale and access to information.

We can easily show that

PROPOSITION 6. *The optimal probability of detection and conviction in a model where the Mafia exerts political influence p^C is decreasing in the influence degree α.*

The number of offenders in the economy is $[(1 - \alpha)(1 - (h - c/F))]/[1 - 2\alpha]$. As one can observe, the number of offenders is increasing in α. By exerting political influence, the Mafia is able to increase the number of offenders in order to increase its own profitability. A Mafia with political influence is welfare diminishing to the point of increasing criminal offenses to its own profit.

VII CONCLUSION

I have modeled a criminal organization as a vertical structure where the principal extracts some rents from the agents through extortion.

The main result of this article is that it may be optimal to choose a less severe enforcement policy when there is organized crime. This result is derived from the observation that vertical integration in the criminal world creates barriers to entry that make criminal offenses less attractive. However, this effect can be offset by the fact that enforcement is this market is achieved by destroying the businesses of those who do not comply with the norms or abusing political corruption.

Most of the optimal law enforcement literature considers the benefits and costs of criminal deterrence; and that has been the view taken in the article. Alternatively, we could consider criminal incapacitation as in Shavell [1987]. In such a context, another dimension to consider is that those criminals who have a higher probability of committing a criminal act again should face tougher jail sentences to free society from them. In other words, more dangerous criminals should face a more severe punishment to incapacitate them from repeating offenses. As noted by Robinson [1994, p. 206], criminal organizations welcome the most dangerous criminals in the world: "today's criminals make the Capone crowd and the old Mafia look like small time crooks." Therefore, members of criminal organizations should face a more severe punishment because they signal their higher likelihood of repeating offenses. Such policy of course faces the same trade-off as considered in the article. By making a criminal organization less attractive, the criminal market becomes more competitive.

A fundamental argument presented in the article is that the desirability of a criminal organization depends on the effectiveness of its coercive technology as compared to the one used by government. As an example, Robinson [1994] suggests that criminal syndicates are more efficient than governmental agencies in regulating criminal markets.

A second feature of the article has been to study if the government's policy should be more severe in a monopolistic market than in a competitive one. We have proposed that as long as the Mafia controls entry at low cost, the government should opt for a less severe policy. However, if entry is controlled at a high cost, the government should seek a more severe policy to deter more individuals from even attempting to enter the market.

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