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Optimal Law Enforcement with a Rent-Seeking Government*

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Abstract

This article analyzes public and private law enforcement when the government is motivated partially or entirely by rent-seeking. The model compares and contrasts the optimal law enforcement policies chosen by a benevolent, social welfare-maximizing government and a self-interested, rent-seeking government. The principal difference between these two kinds of governments is that a rent-seeking government seeks primarily to maximize revenue, while a welfare-maximizing government seeks primarily to deter socially harmful behavior. Among the central results of the paper are: (1) If offenders have sufficient wealth, a rent-seeking government is more aggressive in enforcing laws against minor crimes, while it is more lax in enforcing laws against major crimes. (2) Whether the government's objective is welfare maximization, rent maximization, or some combination of the two, competitive private enforcement is always at least as good and usually better than monopolistic private enforcement. (3) The choice between competitive private enforcement and public enforcement depends on which is cheaper and on whether the government seeks to completely deter offenses.

Keywords: economics of law enforcement, private enforcement, rent-seeking.
JEL literature: K4

1 Introduction

This article presents the first rigorous model of law enforcement under a rent-seeking government. Previous analyses have assumed that the government aimed to maximize social welfare. This article breaks new ground by comparing the different policies of a benevolent, social welfare-maximizing government and a self-interested, rent-seeking government. Both public law enforcement and private law enforcement are analyzed.

In the law enforcement literature, the optimal policy is usually derived by maximizing social welfare, which is assumed to be the government's objective function. In this context, social welfare is the sum of the offenders' benefits from committing offenses, minus the harm caused by offenses, minus governmental law enforcement expenditures.[1]

Friedman (1999) argues that by considering a social-welfare maximizing government, the law enforcement literature couples highly sophisticated opportunistic individuals with a benevolent government and thus fails to recognize the self-interest of policy makers. We build on this insight by analyzing a government motivated partially or entirely by rent-seeking. This view of the government is quite common in public choice scholarship.[2] A rent-seeking government designs enforcement and punishment with the goal of appropriating the rents of the criminal market. Deterrence is still relevant in this context, although, paradoxically, it is something that often impedes the government's objective. When high probabilities of detection and high fines deter offenses too much, revenue from fines goes down.

[1] See Garoupa (1997a) and Polinsky and Shavell (2000).

[2] See for example Gradstein (1993).

Even if one believed that most modern, democratic governments seek to maximize social-welfare, the model of a rent-seeking government would still be important as a tool for understanding non-democratic governments, both in the developing world today and in the not-so-distant past of many currently democratic countries. In addition, although the exposition assumes a unitary government with a single objective function, the model could also apply to bureaucracies or agencies with their own agenda. For example, even if a modern democratic government sought, in general, to maximize social welfare, the model of a rent-seeking government might still apply to an independent agency which was able to keep its own fines.[3] If such an agency aimed to maximize its fine revenue, its behavior could be analyzed with the rent-seeking model developed here.

We also consider public and private law enforcement. Becker's seminal 1968 article derived the optimality of a high-fine, low-probability policy in the context of public law enforcement, where the government could set both the sanction and the probability of punishment. In their 1974 article, Becker and Stigler argued that it might be advantageous to extend private enforcement to the criminal law and other areas where the law is now enforced publicly. Their principal argument was that public enforcement creates incentives to bribery which undermine deterrence. If law enforcement were privatized, however, competitive private enforcers could be rewarded with the fines paid by offenders. If so, enforcers would have no incentive to take bribes. Subsequent articles have responded to and refined the Becker and Stigler analysis. Landes and Posner (1975) showed that public enforcement may be superior to private enforcement in many contexts, because public

[3]See, for example, Wall Street Journal (1985).

enforcers can more easily enforce the combination of high fines and low probabilities of detection which Becker (1968) showed to be optimal. Polinsky (1980), Friedman (1984), Shavell (1993), and Garoupa (1997b) refined this analysis and reached somewhat different conclusions. This article extends this debate about public and private law enforcement to regimes which are motivated either partially or entirely by rent seeking.

Section 2 compares social-welfare maximizing and rent-seeking governments in the context of public law enforcement. It shows that, if offenders have sufficient wealth, a rent-seeking government will define more acts as illegal and will be more aggressive in prosecuting minor offenses, but more lax in enforcing laws against major offenses. Section 3 extends the comparison to private enforcement. It shows that the literature's conclusions about the advantages and disadvantages of private enforcement apply equally well to rent-seeking governments. Section 4 briefly considers nonmonetary sanctions and corruption. An Appendix contains proofs of the propositions.

2 Public Law Enforcement

Like Becker (1968), we start by assuming that each risk-neutral individual chooses whether to commit an offense, for example, smuggling or theft. The offender's gain from committing the offense is b, which is distributed across the population according to a uniform probability density function with support $[0, 1]$. The assumption of a uniform distribution is useful for exposition. The results are the same with more general distributions.

Offenses are detected and punished with probability p. When punished,

the offender bears a monetary penalty f.[4] An individual commits an offense if and only if $b \geq pf$. That is, an individual commits an offense if his gains exceed the expected sanction. The number of offenders in this economy when the population is normalized to one is given by:

$$n(p, f) = \int_{pf}^{1} db = 1 - pf$$

When law enforcement is public, the government has direct control over the fine, f, and the probability that an offender will be punished, p, and sets them to maximize its objective function, whether that be social welfare or rents.

2.1 Social-Welfare Maximizing Government

In the optimal law enforcement literature, social welfare generally equals the sum of offenders' gains from committing the offense, minus the harm caused by offenses, minus expenditure on law enforcement:

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

where h is the harm caused by the offense, and xp is the cost function of law enforcement, where $x > 0$. The parameter h can be greater than one (in which case the harm is always greater than the offender's gain) or smaller

[4] We assume that all offenders, if caught, pay the same fine. This assumption is not crucial. Even if the government could vary the fine, it would not do so, because the maximal fine is always optimal. Of course, as discussed in footnote 6, if offenders vary in their wealth, the maximal fine might also vary. Another justification for a uniform fine is that, if the government cannot observe the offender's gain, b, it cannot condition punishment upon it. We assume that the government cannot measure an individual's gain, b, but knows its distribution across the population.

than one (in which case the harm is sometimes smaller than the offender's gain). Although inclusion of the offender's benefit from violating the law, b, in the government's objective function is controversial among legal scholars, it is conventional in the law and economics literature. Shavell (1993) has argued that the main results of this literature are robust to different specifications. We assume that the monetary sanction is socially costless (i.e. a pure transfer without transactions costs), as is conventional in the law enforcement literature.[5]

The government maximizes the social welfare function in f and p subject to the constraint that the fine, f, is upper bounded by the offender's wealth F, $F > 0$.[6]

Proposition 1 *Define $h_1 = x/F$ and $h_3 = x/F + F$. Under a social-welfare maximizing government which has chosen public enforcement, the optimal fine is maximal, F, and the optimal probability is (i) zero if $h < h_1$, (ii) $[h - x/F]/F$ if $h_1 \leq h \leq h_3$, (iii) one if $h > h_3$.*

The proof of this, and all other propositions, can be found in the appendix. The optimal probability is an increasing function of h and a decreasing function of x. For less harmful acts, in particular if $h < x/F$, the optimal probability of punishment is zero. In other words, acts which are beneficial or only slightly harmful should not even be considered offenses. Conversely, when $h > x/F + F$, the optimal probability of punishment is one. Very harmful acts should be punished with certainty. These results replicate those which

[5] Costly, nonmonetary sanctions are analyzed in Garoupa and Klerman (2000b).

[6] We are implicitly assuming here that all offenders have the same wealth as in the conventional enforcement model. See Polinsky and Shavell (1991) and Garoupa (2000) for the enforcement model when wealth varies.

are well known in the literature and provide a basis for comparison to the new analysis of a rent-seeking government in the next section.

2.2 Rent-Seeking Government

Although the economic literature on law enforcement generally assumes a benevolent, social-welfare maximizing government, this article considers the public choice perspective of a self-interested, rent-seeking government. A rent-seeking government's objective function equals the sum of revenues minus the fraction of the harm borne by the government minus expenditure on law enforcement:

$$\Pi \;=\; \int_{pf}^{1}(pf-\alpha h)db - xp$$

where $\alpha \in [0,1]$ is the fraction of the harm borne directly by the government. Even a government indifferent to the welfare of its people would perceive homicide, for example, as harmful to itself, because it would reduce tax revenue and, perhaps, military strength. The parameter α measures the degree to which the rent-seeking government perceives an offense as a harm to itself. A rent-seeking government differs from a social-welfare maximizing one in that (a) it considers revenue from fines to be a benefit rather than a neutral transfer, (b) it considers as detriment only that portion of the harm that affects the government directly, rather than the total social harm born by the entire population, and (c) it does not does not consider the benefit the offender reaps from crime.

Because its objective function is different, a rent seeking government

pursues a different law enforcement strategy:

Proposition 2 *(1) Let* $\alpha \in (0,1]$. *Define* $h_0 = (x-F)/\alpha F$ *and* $h_4 = (x/F+2F-1)/\alpha$. *Under a rent-seeking government which has chosen public enforcement, the optimal fine is maximal,* F, *and the optimal probability is (i) zero if* $h < h_0$, *(ii)* $[1+\alpha h - x/F]/(2F)$ *if* $h_0 \leq h \leq h_4$, *(iii) one if* $h > h_4$.

(2)(a) Let $\alpha = 0$. *Under a rent-seeking government which has chosen public enforcement, the optimal fine is maximal,* F, *and the optimal probability is (i) zero for all* h, *if* $x \geq F$, *and (ii)* $[1-x/F]/(2F)$ *for all* h, *if* $x < F$.

Note that in this context, and indeed whenever we are talking about a rent-seeking government, "optimal" means maximizing the government's objective function. As will be discussed below, however, what is optimal for a rent-seeking government is different from what is optimal from a social-welfare perspective.

It is a well-known result in the literature that a social-welfare maximizing government always chooses an expected sanction less than the harm caused by the offense.[7] This result is clear from Proposition 1: the expected sanction is less than the harm caused by an offense, because enforcement is costly. When rent-seeking is considered, however, the expected sanction is not necessarily less than the harm caused by the offense. That is, pF can be greater than h. The intuition is that sanctioning aims at raising revenue instead of, or in addition to, deterrence. When the harm is low, the desire

[7]See Garoupa (2000) and Polinsky and Shavell (2000).

for revenue induces a rent-seeking government to set an expected sanction which more than compensates for the harm done. Consider, for example, the case where α is zero. In this situation, the expected sanction will be the same for any harm, h. Since the expected sanction can be very high, while h can get very low, it is clear that the expected sanction will sometimes exceed the harm.

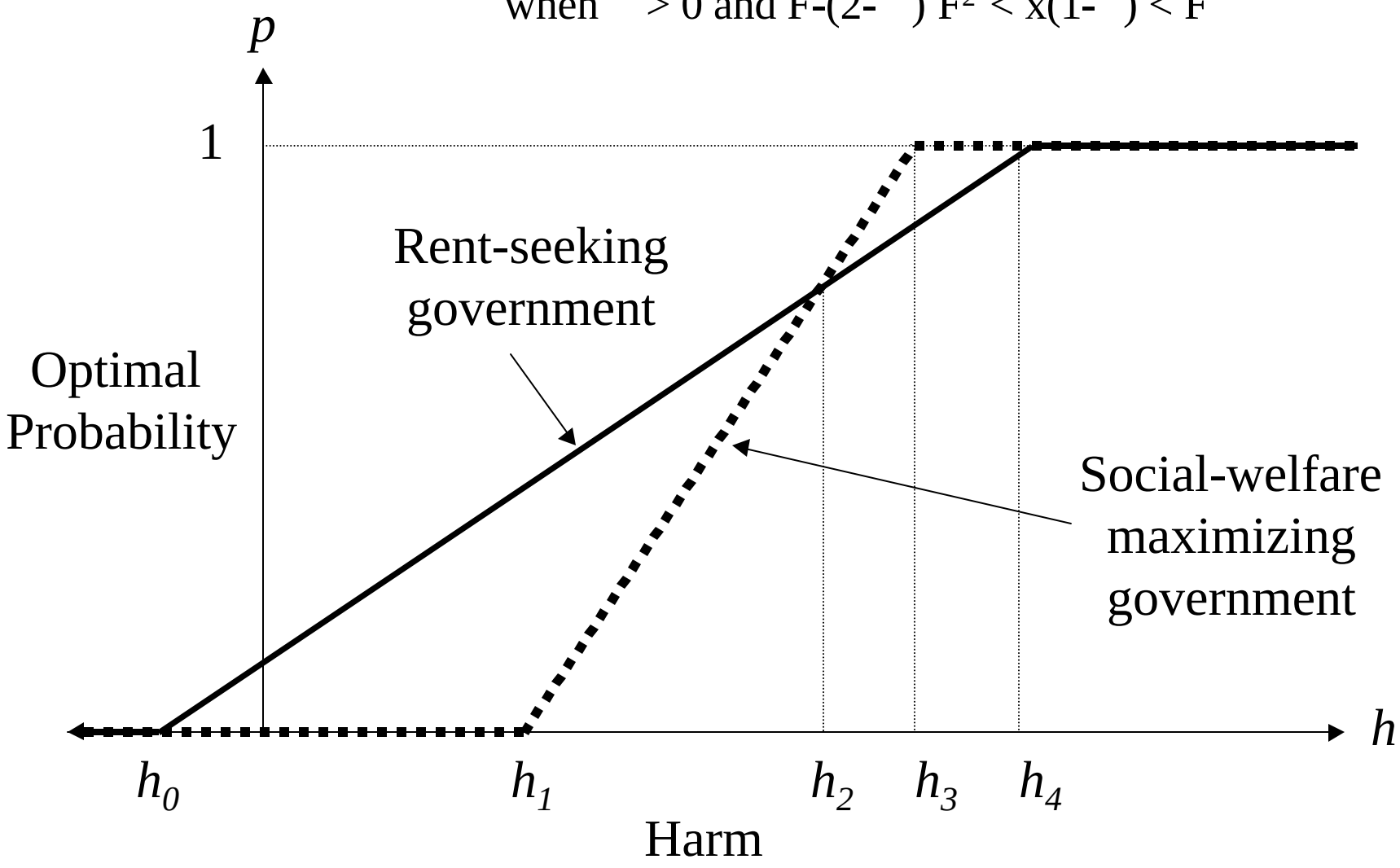
The relationship between harm and the optimal probability is most interesting when the government bears some of the harm from offenses (i.e. $\alpha > 0$) and when offenders have more than minimal wealth, in particular, when $F - (2-\alpha)F^2 < x(1-\alpha) < F$.[8] Figure 1 compares the optimal probability chosen by social welfare maximizing and rent-seeking governments under these assumptions.

As the figure makes clear, for acts with high social benefit (i.e. very negative harm, $h \leq h_0$), both governments pursue the same policy. They set the probability to zero, and thus effectively decline to define the act as an offense. Criminalizing such acts does not make sense, because it would deter very beneficial behavior. Similarly, for offenses that are very harmful ($h \geq h_4$), both government set probability equal to one. That is, they try to completely deter these offenses, because the harm is so high that it justifies maximal enforcement. For other levels of harm, the governments pursue different strategies. If an act is socially neutral, slightly beneficial, or slightly harmful (i.e. $h_0 < h \leq h_1$), a social-welfare maximizing government declines to criminalize it. For these acts, the benefit of law enforcement, if any, is simply too low to justify its costs. In contrast, a rent-seeking government would criminalize (i.e. set probability greater than zero for) these acts, because

[8]This reason for these conditions will be discussed further below.

Figure 1. Harm and Optimal Probability

when " > 0 and F-(2- ") F^2 < x(1-") < F



the revenue thus generated is greater than the combined cost of enforcement and of possibly of deterring acts from which the government derives benefit. Both governments impose sanctions for moderately low harm offenses ($h_1 < h < h_2$),[9] but the rent-seeking government sets a higher probability, because doing so increases revenues. For moderately high harm offenses ($h_2 < h < h_4$), the social-welfare maximizing government sets higher probabilities, because its primary goal is to deter harmful offenses. High levels of deterrence, however, reduce revenue, so a rent-seeking government is more moderate in its punishment of these offenses. By decreasing the expected punishment, the rent-seeking government induces more people to commit the offenses and is thus able to collect more revenue.

The previous paragraph and Figure 1 assumed that $\alpha > 0$ and $F - (2 - \alpha)F^2 < x(1-\alpha) < F$. These conditions assured that $h_0 < h_1 < h_2 < h_3 < h_4$. The next three paragraphs relax those assumptions. First, suppose that $x(1-\alpha) \geq F$. This inequality will hold when offender wealth (F) is low relative to enforcement costs (x) and the government does not bear all the harm ($\alpha < 1$). Although this inequality may hold even when the government bears much of the harm (i.e., when α is high), it is more likely to be true when the government bears very little of the harm (i.e., when α is low). When the inequality holds, a rent-seeking government will always set a probability lower than or equal to that set by a social-welfare maximizing government.[10] The intuition behind this result is that additional law enforcement does not generate additional net revenue, because law enforcement is expensive while low offender wealth keeps even maximal fines low. As a result, law enforcement

[9] h_2 is the harm level at which both kinds of government set the same probability. $h_2 = (x + F)/[(2 - \alpha)F]$.

[10] In mathematical terms, this is because $h_2 \leq h_1 \leq h_0$.

can be justified only in terms of deterrence. Since the inequality only holds when the rent-seeking government values deterrence less than a social-welfare maximizing government (i.e., when $\alpha < 1$), the rent-seeking government derives less benefit from enforcement. So the rent-seeking government sets a lower probability.

Now suppose that $\alpha > 0$ and $F - (2 - \alpha)F^2 \geq x(1 - \alpha)$. The latter inequality will hold only when wealth is low, but not too low. As wealth gets high, the left side of this inequality becomes negative, while the right side is always positive or zero. Conversely, as wealth approaches zero, the left side of this inequality also becomes zero. In addition to requiring low wealth, this inequality will hold only if enforcement is inexpensive (i.e. x is low) and/or the government bears much of the harm (i.e. α is high). When these conditions are met, the rent-seeking government always sets a probability higher than or equal to that set by a social-welfare maximizing government.[11] The intuition behind this result is somewhat complex and requires consideration of the relationship between offender wealth (F), probability (p) and gross revenue (i.e. revenue without subtracting law enforcement costs). When wealth is high, increasing the probability may decrease revenue, because doing so may completely or almost completely deter offenses. On the other hand, when wealth is sufficiently low, increasing the probability always increases revenue, because low wealth means low fines, and low fines have little deterrent effect. As a result, when wealth is low, increased enforcement is more attractive to a rent-seeking government than a social-welfare maximizing government, as long as the cost of enforcement (x) is also low. In addition, even if the cost of enforcement is high, increasing enforcement will still be more

[11] In mathematical terms, this is because $h_4 \leq h_3 \leq h_2$.

attractive to a rent-seeking government, as long as the government bears a high proportion of the harm and wealth is low. In this situation, if harm is low, both a social-welfare maximizing government and a rent-seeking government will set probability equal to zero, because the cost of enforcement is too high. When harm gets high, however, both governments will benefit from deterrence. A rent-seeking government, however, will also benefit from the increase in revenue. As a result, it will set a higher probability.

When $\alpha = 0$, a rent-seeking government does not care at all about the harm imposed by the offense, because none of the harm is borne by the government. Its only concerns are revenue and law enforcement costs. As mentioned above, if enforcement costs are sufficiently high compared to offender wealth (i.e. if $x \geq F$), then the government always sets probability equal to zero. That is, law enforcement is too costly to be worthwhile, no matter what the harm imposed by an offense. On the other hand, if wealth is sufficiently high (i.e. if $x < F$), then, according to the model, such a government would define every act, even if socially beneficial, as a punishable offense. Monetary sanctions would become just a form of taxation, and probably an inefficient one. This odd result suggests that the model of a pure rent-seeking government is too simple. One way to make the analysis more plausible is to model governments which are concerned about both rents and social welfare. The next subsection takes up that task.

2.3 Mixed Government

Most governments are neither purely rent-seeking nor purely social welfare-maximizing. A government usually combines both social-welfare objectives

and rent-seeking objectives. Even a government which was only maximizing its rents might adopt policies to enhance social welfare in order to retain power. Conversely, even public-spirited rulers care about their own salaries and perks. We call governments concerned about both social welfare and rents "mixed governments." One can also think of a mixed government as the outcome of a contest between two groups, one that favors maximizing social-welfare and another that favors maximizing rents. The objective function of a mixed government can be written as:

$$U = (1-\sigma)W + \sigma\Pi = \int_{pf}^{1}[(1-\sigma)b + \sigma pf - (1-\sigma+\sigma\alpha)h]db - xp$$

where $\sigma \in [0,1]$ reflects the degree to which rent-seeking motivation is relevant in designing law enforcement policies. If σ is zero, the objective function is the usual social welfare objective function. If σ is one, the objective function describes a pure rent-seeking government.

Define p' as follows:

$$p' = \frac{(1-\sigma+\sigma\alpha)h + \sigma - x/F}{(1+\sigma)F}$$

The optimal governmental policy is characterized as follows[12]:

Proposition 3 *Define* $\underline{h} = (x/F - \sigma)/(1-\sigma+\sigma\alpha)$ *and* $\bar{h} = [x/F - \sigma + (1+\sigma)F]/(1-\sigma+\sigma\alpha)$. *Under a mixed government which has chosen public enforcement, the optimal fine is maximal,* F*, and the optimal probability is (i) zero if* $h < \underline{h}$*, (ii)* p' *if* $\underline{h} \leq h \leq \bar{h}$*, (iii) one if* $h > \bar{h}$.

Note that in this context, and indeed whenever we analyze a mixed government, "optimal" means maximizing the government's objective function, which is not necessarily synonymous with maximizing social welfare.

[12]It is assumed that $\sigma(1-\alpha) < 1$. Otherwise, see the second part of Proposition 2.

Having found the optimal probability set by the government, we can analyze how enforcement policy changes as the government gets more (or less) concerned with rent-seeking. The relationship between the optimal probability p' and σ is given by:

$$\frac{\partial p'}{\partial \sigma} = \frac{1 + x/F - h(2-\alpha)}{(1+\sigma)^2 F} = \frac{(2-\alpha)(h_2 - h)}{(1+\sigma)^2 F}$$

The relationship between governmental motivation and probability of detection is not monotonic. The sign of the derivative depends on the parameters of the model. As in section 2.2, the value of the harm, h, plays a central role. If harm is low ($h < h_2$), the optimal probability p' set by the government increases with σ. That is, as rents become a more important governmental objective, more resources are invested in detection and punishment. On the other hand, if harm is high ($h > h_2$), as rent-seeking becomes more central, fewer resources are invested in law enforcement. Of course, the derivative expression above and this paragraph so far have assumed that $\underline{h} \leq h \leq \bar{h}$. When $h < \underline{h}$, optimal probability is zero and does not change with small changes in σ. Similarly, when $h > \bar{h}$, the optimal probability is one and does not change with small changes in σ.

Although modeling a mixed government is important primarily because most real governments are probably mixed, this modeling is also useful for another reason: it helps simplify the analysis of private law enforcement, which is the topic of the next section. Since pure social-welfare maximizing governments and pure rent-seeking governments are special cases of mixed governments ($\sigma = 0$ and $\sigma = 1$), analysis of the mixed government's objective function not only yields results about governments which pursue both rents and social welfare, but also results about pure rent-seeking and pure social-welfare maximizing governments.

3 Private Law Enforcement

3.1 Monopolistic Enforcement

Suppose the government privatizes law enforcement by delegating apprehension and prosecution of offenders to a single private enforcement agency. The private agency gets the right to apprehend individuals and is paid a reward γ for each individual it catches and convicts. The government sets and collects the fine f paid by offenders.

The profits of the private agency are given by:

$$R = \gamma p n(p, f) - xp$$

where the first term refers to the revenues raised by the private enforcement agency and the second term refers to its costs, that is, the private agency's expenditures on law enforcement. In this section and 3.2, we assume that the cost function, xp, is the same for public and private enforcement. This assumption is relaxed in section 3.3.

The private agency maximizes profits so that:

Proposition 4 *Define $\hat{p} = [1 - x/\gamma]/2f$. The probability set by the private agency is (i) zero if $\gamma \leq x$, (ii) $\hat{p}$ if $\gamma > x$.*

The probability of detection and conviction $\hat{p}$ set by the private agency increases with the reward γ, because detecting offenders becomes more profitable. On the other hand, the probability decreases with the fine f, because fewer individuals will be offenders, which reduces the incentive to look for them.

From Proposition 4, it is clear that the reward must satisfy $\gamma > x$, because otherwise the private agency sets a zero probability. That is, if the reward is too low, the private enforcement agency will not find it profitable to enforce the law, even though it has a monopoly.

As long as the reward is sufficiently high to make monopolistic private enforcement plausible (i.e. $\gamma > x$), enforcement will be profitable to the agency. There is no reason, however, for the government to leave this profit with the agency. Rather, a sensible government would auction the right to be the sole private enforcement agency, thus appropriating all of the agency's profits (R). The government's objective function is thus:

$$U = \int_{\hat{p}f}^{1} [(1-\sigma)b + \sigma\hat{p}f - (1-\sigma+\sigma\alpha)h]db - x\hat{p}$$

Note that the reward does not appear in the government's objective function, because money paid out in rewards is recouped through sale of the right to be the enforcement agency.

The government's policy (choice of fine and reward) follows easily from its objective function and the definition of p' from the previous section. Define $\gamma(p)$ as:

$$\gamma(p) = x/(1-2pF)$$

Proposition 5 *Under a mixed government which has chosen private enforcement, the optimal fine is maximal, F, and the optimal reward is (i) zero if $h < \underline{h}$, (ii) $\gamma(p')$ if $\underline{h} \leq h \leq \bar{h}$, (iii) $\gamma(1)$ if $h > \bar{h}$.*

The argument for a maximal fine is the usual Beckerian one. The reward is set so that the probability chosen by the private agency is optimal from the government's viewpoint. That is, the reward is set to induce the agency to set $\hat{p}$ to the optimal probability derived in Proposition 3.

As long as the government can set the reward in this fashion, monopolistic private enforcement is as good as public enforcement, because the government's objective function takes the same value. The problem is that there is no guarantee that the appropriate reward can be set. If p' is too high, that is, if $p' \geq 1/(2F)$, there is no (finite) reward which induces the agency to set the optimal probability. According to Proposition 4, as the reward approaches infinity, the probability set by the agency approaches $1/(2F)$. Therefore, the agency will never choose a probability equal to or higher than $1/(2F)$. Equivalently, since p' is a function of h and x, we can say that monopolistic enforcement fails to induce the optimal probability (p'), and is thus problematic, when $h \geq \hat{h} = [(1+\sigma)/2 + x/F]/(1-\sigma+\sigma\alpha)$. The critical value, $\hat{h}$, defines an upper bound on the level of harm such that optimal enforcement can be delegated to a monopolistic agency.

The problem of delegating enforcement to a monopoly comes from the fact that the agency knows that by detecting and punishing more offenders, fewer individuals will become offenders, which reduces the agency's incentive to look for them. The private agency does not care about the social damage caused by crime, but only about the revenues. For very harmful acts that the government seeks to completely or almost completely deter, the agency is not willing to enforce the policy favored by the government. From section 2.3, we know that, a rent-seeking government seeks to completely or almost completely deter fewer very harmful offenses than a social-welfare maximizing

government.[13] Therefore, when the government is captured by a rent-seeking group, the problem is much reduced.

One way to solve the problem generated by monopolistic enforcement would be to require the agency to insure a fraction of the harm. Similarly, the government could pay the agency an additional reward which was inversely related to the number of offenses. These mechanisms could induce even a monopolistic private agency to set the appropriate level of deterrence.[14] Unfortunately, they are also informationally demanding, as the government would need to know the amount of crime. Because it is very difficult to measure the incidence of crime, we have assumed that the government cannot rely on such mechanisms.[15]

In summary, given the assumption of equal public and private enforcement costs, monopolistic private enforcement is sometimes as good as public enforcement, but sometimes worse. For less harmful acts, any government is indifferent between private monopolistic enforcement and public enforcement. For more harmful acts, however, private enforcement does not satisfy the objectives of the government. Thus, for more harmful acts, public enforcement is superior to monopolistic private enforcement. Monopolistic private enforcement is less problematic, however, when the government is concerned primarily with rents.

[13] This sentence follows from the fact that p' is decreasing with σ if harm is high ($h > h_2$), and from the fact that $\bar{h}$ is also decreasing in σ. See section 2.3.

[14] On the conflict of interests of a principal-agent relationship within law enforcement, see Besanko and Spulber (1989).

[15] A similar criticism applies to the solution proposed by Friedman (1984). In his paper, the government sets the expected sanction pf and allows the enforcement agency to choose both probability and severity of punishment.

3.2 Competitive Enforcement

Let us now assume that there are many private enforcement agencies, each of which can apprehend and prosecute crimes. Following Landes and Posner (1975), we assume that the first enforcer to apprehend and convict the offender is entitled to the reward.[16] The private enforcers are constrained to zero profits because the market is contestable,[17] so the probability set by a competitive agency, $\hat{p}$, is easily found by solving $R = 0$:

$$\hat{p} = [1 - x/\gamma]/f$$

As with monopolistic private enforcement, the reward must satisfy $\gamma > x$, because otherwise the private agencies set a zero probability. That is, if the reward is too low, no private agency will enforce the law, because the costs are greater than the revenue generated by the rewards.

Re-define $\gamma(p)$ as

$$\gamma(p) = x/(1 - pF)$$

The optimal policy is described by Proposition 5. For the usual reasons, the optimal fine is maximal (F), and the government sets the reward so that the probability chosen by a competitive agency is optimal from the government's perspective.

The reward $\gamma(p')$ is smaller when enforcement is competitive than when it is monopolistic. Nevertheless, this does not provide any net benefit to the

[16] The fact that several enforcement agencies might simultaneously investigate and prosecute the same crime results in some duplication of enforcement effort and thus may increase law enforcement costs. See Polinsky (1980), p. 107. The effect of higher law enforcement costs is discussed in section 3.3.

[17] See Landes and Posner (1975); Polinsky (1980).

government, because the lower reward payouts are exactly offset by the fact that, under competitive enforcement, the government gets no revenue from auctioning the right to be an enforcer.

As with monopolistic private enforcement, if the government can set the reward equal to $\gamma(p')$, the probability set by the private agency is optimal from the government's viewpoint. Unlike the monopolistic context, however, the appropriate reward can almost always be set. As long as $p'F < 1$, a finite reward can motivate competitive enforcement agencies to set the government's optimal probability p'. It is important to note that $p'F = 1$ implies complete deterrence of all offenders, because potential offenders only commit an offense if $b \geq pf$, and both b and p are bounded above by one. Thus, as long as the government does not seek complete deterrence, delegating law enforcement to competitive private agencies can implement the government's optimal policy. Complete deterrence ($p'F = 1$) cannot be achieved through private enforcement, because such enforcement yields no rewards, and thus provides no revenues which would justify enforcement effort by a private agency. Thus, when the government seeks complete deterrence, public enforcement is superior.

Under monopolistic private enforcement, delegation of the optimal probability is more difficult because the agency behaves strategically and anticipates that a high probability would reduce profits. In a competitive enforcement environment, that strategic effect is not present because profits are zero. Even if one agency tried to raise profits by lowering the probability, other competing agencies would simply increase the number of offenders they prosecute, thus bringing the probability up to the level set by the government (p').

In summary, given the assumption of equal enforcement costs, the government is indifferent between competitive private enforcement and public enforcement. The only exception would be when the government seeks complete deterrence of all offenses.

3.3 Comparison of Enforcement Methods

So far, we have analyzed private enforcement under the assumption that public and private enforcers share the same cost function, xp. In this section we relax that assumption and compare public and private enforcement.

Let $x_1 p$ and $x_2 p$ be the cost functions of law enforcement for public and private enforcement respectively. We consider the possibility that x_1 is less than, equal to, or greater than x_2. That is, public enforcement can be cheaper, equally expensive, or more expensive than private enforcement. Table 1 compares the enforcement mechanisms under various assumptions about cost functions and harm levels.

The third column, labeled "Private and Public Enforcement Equally Expensive: $x_1 = x_2$," summaries the conclusions of the article so far. When public and private enforcement are equally costly, private competitive enforcement and public enforcement are equally good, except for very harmful offenses which the government would seek to complete deter. For such offenses, public enforcement is superior. Monopolistic private enforcement is fine for very low and low harm offenses, but inferior to both competitive private enforcement and public enforcement for high and very high harm offenses.

Table 1. Comparison of Enforcement Mechanisms

Harm Level	Optimal Enforcement Mechanism		
	Private Enforcement Cheaper ($x2 < x1$)	Private and Public Enforcement Equally Expensive ($x1 = x2$)	Public Enforcement Cheaper ($x1 < x2$)
Very Low ($h \leq \underline{h}$)	C or M or P	C or M or P	C or M or P
Low ($\underline{h} < h < \hat{h}$)	C or M	C or M or P	P
High ($\hat{h} \leq h < \hat{h} + (1+\sigma)/2$)	C	C or P	P
Very High ($h \geq \hat{h} + (1+\sigma)/2$)	C or P, depending on the extent to which $x1 > x2$	P	P

C= Competitive Private Enforcement
M= Monopolistic Private Enforcement
P= Public Enforcement

This analysis is easily extended to situations where private enforcement is cheaper than public enforcement, $x_2 < x_1$, or vice versa. The second and fourth columns summarize the results for these conditions. As is clear from the table, no enforcement mechanism is always best. Monopolistic private enforcement is never better than the other two mechanisms.[18] Nevertheless, for low harm offenses, it is as good as competitive private enforcement. Competitive private enforcement is always at least as good as monopolistic enforcement, but not as good as public enforcement when the harm is very high or when public enforcement has a cost advantage. When private agencies are more efficient in detecting offenders (i.e. when $x_2 < x_1$), public enforcement is potentially superior only when harm is very high. Even for very harmful offenses, however, public enforcement is not necessarily preferred to competitive private enforcement. The possible advantage of public enforcement derives from the fact that it is impossible to achieve the desired complete deterrence though competitive enforcement. Nevertheless, in spite of this impossibility, competitive private enforcement will still sometimes be better, because if private enforcement is sufficiently cheap relative to public enforcement, the benefit of reducing costs will be larger than the harm in not completing deterring offenses.

These results are generally consistent with the conclusions of Polinsky

[18]This, of course, assumes that private monopolistic and private competitive enforcement share the same cost function, $x_2 p$. As mentioned in the previous section, however, duplication of costs might make competitive enforcement might be more expensive. If so, monopolistic private enforcement would be superior to competitive private enforcement, except for high or very high harm offenses. Even for high or very high harm offenses, monopolistic enforcement might be superior, if its cost advantage were large enough. On the other hand, competition might put pressure on costs, which might make competitive private enforcement cheaper than monopolistic private enforcement.

(1980),[19] which suggests that, although Polinsky assumed a social-welfare maximizing government, his results remain valid even when the government also pursues rents.

4 Extensions

4.1 Nonmonetary Sanctions

Nonmonetary sanctions differ from monetary sanctions, because they are costly (both to society and to the government) and because they do not generate revenue. Polinsky and Shavell (1984) demonstrate that a social-welfare maximizing government should exhaust the deterrent effect of fines first, and then, if necessary, combine maximal monetary sanctions with nonmonetary sanctions. This result follows from the fact that the marginal social cost of a monetary sanction is zero, while the marginal social cost of a nonmonetary sanction is strictly positive. As is discussed more fully in Garoupa and Klerman (2000b), a government partially or entirely motivated by rents, may use nonmonetary sanctions more or less often than a social welfare maximizing government. The fact that such a government may be less interested in deterring offenses, because it may bear only part of the harm, αh, means that it may use nonmonetary sanctions less often. On the other hand, the fact that the government ignores part or all of convicted offenders' disutility from the imposition of nonmonetary sanctions, makes nonmonetary sanctions more

[19]Polinsky (1980) analyzes private enforcement both under the assumption that the reward equals the fine and under the assumption that the reward can be different from the fine. This article makes the latter assumption, and our results are consistent only with the part of Polinsky (1980) which also makes that assumption.

attractive. In the special cases of a pure rent-seeking government when α is zero, nonmonetary sanctions should be set to zero, because nonmonetary sanctions are costly and do not raise revenue, and because such a government does not care at all about deterrence.

4.2 Corruption

In this article, we have ignored the incentives for corruption that private enforcement produces. As is discussed more fully in Garoupa and Klerman (2000a), the fact that the optimal fine is usually different from the optimal reward means that an agreement advantageous to both offender and enforcer can often be reached. When the fine is higher than the reward, the offender can bribe the enforcer not to prosecute. Such agreements dilute deterrence and make it difficult for the government to achieve its optimal policy through private law enforcement. Nevertheless, this problem is less severe when private enforcement is competitive, because the possibility that an offender may be prosecuted by one agency after bribing another reduces the incentive to engage in corruption. Corruption is also less of a problem when the government is concerned primarily about rents and α is low, because such a government is not disturbed by the dilution in deterrence.

When rewards are higher than fines, it is worthwhile for an enforcement agency to collude with a potential offender to commit an offense, because the agency can use the reward to reimburse the offender for the fine. Such collusion results both in more crime and in higher enforcement costs. As a result, it is unambiguously bad, no matter what the government's objective function is.

5 Final Remarks

This article has shown that consideration of rent-seeking enriches the analysis of both public and private law enforcement. If offender wealth is sufficiently high, a rent-seeking government behaves differently than one motivated by social welfare, in that it is more aggressive in enforcing laws against minor crimes, while it is more lax in enforcing laws against major crimes. With regard to the choice between public enforcement, private enforcement with competing agencies, and private enforcement with one monopolistic agency, this article shows that Polinsky's (1980) conclusions for a social-welfare maximizing government hold true also for rent-seeking and mixed governments. Competitive private enforcement is always at least as good and usually better than monopolistic private enforcement. The choice between competitive private enforcement and public enforcement depends on which is cheaper and on whether the government seeks to completely deter offenses.

References

1. G. S. Becker, 1968. Crime and Punishment: An Economic Approach, Journal of Political Economy 76, 169-217.

2. G. S. Becker and G. J. Stigler, 1974. Law Enforcement, Malfeasance and Compensation of Enforcers, Journal of Legal Studies 3, 1-18.

3. D. Besanko and D. F. Spulber, 1989. Delegated Law Enforcement and Noncooperative Behavior, Journal of Law, Economics and Organization 5, 25-52.

4. D. D. Friedman, 1984. Efficient Institutions for the Private Enforcement of Law, Journal of Legal Studies 13, 379-397.

5. D. D. Friedman, 1999. Why Not Hang Them All: The Virtues of Inefficient Punishment, Journal of Political Economy 107 (Supplement), S259-S269.

6. N. Garoupa, 1997a, The Theory of Optimal Law Enforcement, Journal of Economic Surveys 11, 267-295.

7. N. Garoupa, 1997b. A Note on Private Enforcement and Type I Error, International Review of Law and Economics 17, 423-429.

8. N. Garoupa, 2000. Optimal Probability and Magnitude of Fines, European Economic Review, Forthcoming.

9. N. Garoupa and D. Klerman, 2000a. Corruption and Private Law Enforcement, mimeo.

10. N. Garoupa and D. Klerman, 2000b. Corruption and the Optimal Use of Nonmonetary Sanctions, mimeo.

11. M. Gradstein, 1993. Rent Seeking and the Provision of Public Goods, Economic Journal 103, 1236-1243.

12. W. M. Landes and R. A. Posner, 1975. The Private Enforcement of Law, Journal of Legal Studies 4, 1-46.

13. A. M. Polinsky, 1980. Private versus Public Enforcement of Fines, Journal of Legal Studies 9, 105-127.

14. A. M. Polinsky and S. Shavell, 1984. The Optimal Use of Fines and Imprisonment, Journal of Public Economics 24, 89-99.

15. A. M. Polinsky and S. Shavell, 1991. A Note on Optimal Fines when Wealth Varies Among Individuals, American Economic Review 81, 618-621.

16. A. M. Polinsky and S. Shavell, 2000. The Economic Theory of Public Enforcement of Law, Journal of Economic Literature 38, 45-76.

17. S. Shavell, 1993. The Optimal Structure of Law Enforcement, Journal of Law and Economics 36, 255-287.

18. Wall Street Journal, 1985. Review and Outlook (Editorial): SEC Bounty Hunters?, Wall Street Journal, May 9, 19991, A14.

Proof of Propositions

Proof of Proposition 1

The first-order conditions of the optimization problem are:

$$W_p = (h - pf)f - x_1 = 0$$

$$W_f = (h - pf)p \geq 0$$

As Becker demonstrated, the optimal fine is maximal, F. See proof in Garoupa (1997a) for technical details. The second-order condition is satisfied:

$$W_{pp} = -F^2 < 0$$

and so the optimal probability follows.□.

Proof of Proposition 2

The first-order conditions of this problem are:

$$\Pi_p = \int_{pf}^{1} f db + (\alpha h - pf) f - x_1 = 0$$

$$\Pi_f = \int_{pf}^{1} p db + (\alpha h - pf) p > 0$$

and the optimal fine must be maximal for any h. The second-order condition is satisfied:

$$\Pi_{pp} = -2F^2 < 0$$

so the optimal probability follows.□

Proof of Proposition 3

The first-order condition of this problem are:

$$U_p = [(1 - \sigma + \sigma\alpha)h - pf]f + \int_{pf}^{1} \sigma f db - x_1 = 0$$

$$U_f = [(1 - \sigma + \sigma\alpha)h - pf]p + \int_{pf}^{1} \sigma p db > 0$$

and the optimal fine is maximal for any σ. The second-order condition is satisfied:

$$U_{pp} = -(1 + \sigma)F^2 < 0$$

so the optimal probability follows.□.

Proof of Proposition 4

Solving the first-order condition of this problem:

$$R_p = \int_{pf}^{1} \gamma db - \gamma pf - x = 0$$

and the second-order condition is satisfied given the assumptions of the model:

$$R_{pp} = -2\gamma f < 0$$

so the probability follows.□

Proof of Proposition 5

The first-order conditions of this problem are:

$$U_\gamma = U_p(\hat{p})\hat{p}_\gamma = 0$$

$$U_f = [(1 - \sigma + \sigma\alpha)h - \hat{p}f]\hat{p} + \int_{\hat{p}f}^{1} \sigma\hat{p}db + U_p(\hat{p})\hat{p}_f > 0$$

and the optimal fine is maximal because the reward γ is set so that the probability chosen by the private agency $\hat{p}$ is optimal from the government's viewpoint.□

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