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Mandar Oak

LEGALIZATION OF BRIBE GIVING WHEN BRIBE TYPE IS ENDOGENOUS

MANDAR OAK*

School of Economics, University of Adelaide
Level 3,10 Pulteney Street, SA 5005
Australia
E-mail: mandar.oak@adelaide.edu.au

Abstract

In a recent paper, Basu (2011) argues that for a class of bribes, called *harassment bribes*, legalization of bribe giving, but not bribe taking, will reduce bribery. We examine the applicability of Basu's insight in a realistically complex environment in which the type of the bribe—*harassment* or *non-harassment*—is endogenously determined, and it is not feasible to legalize the giving of non-harassment bribes. We find that in such environment Basu's proposal, in and of itself, yields mixed results: in one case it reduces even the prevalence of non-harassment bribes, and improves social welfare. However, in another case it is shown to be counter-productive, i.e., it reduces social welfare while failing to eliminate bribery. Our analysis finds parameter values which determine which of the two cases will prevail, and points to additional policies aimed at strengthening the legal institutions which, in conjunction with Basu's proposal, will help reduce bribery.

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***Keywords**:* Corruption, Bribery, Harassment Bribes, Non-Harassment Bribes

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1. Introduction

Bureaucrats demanding bribes in exchange for granting licenses, permits and various kinds of project approvals is a common phenomenon in many poorly governed societies. There is a large literature in economics studying various aspects of the practice of bribery, as well as the general phenomenon of corruption.[1] A recent thought provoking paper, Basu (2011), argues that the problem of bribery can be solved by its partial legalization, in particular, by making it legal to *give* a bribe but not to *receive* it. Basu's argument is simple, yet persuasive. He begins by observing that when the acts of giving as well as receiving a bribe are illegal, both the giver and the receiver have an incentive to conceal evidence regarding the act of bribery. This makes bribery cases hard to prosecute due to a lack of credible evidence. Now suppose that it were not illegal to give a bribe, and the bribe giver were instead offered a reward for disclosing evidence. In that case, the bribe giver, after getting his project approval in exchange for a bribe, will proceed to disclose evidence that a bribe had been paid. The prospect of such action on part of the giver will deter the bureaucrat from demanding a bribe in the first place.

Basu limits his proposal to a class of bribes he calls *harassment bribes*. A harassment bribe is one that is paid to get approval for a project that is compliant with the legal requirements and therefore entitles the applicant to undertake it.[2] In such cases a bribe is demanded because

[1]For a recent survey, see Olken and Pande (2011).

[2]We use the term "project" generically. It encompasses activities such as getting a passport or an export permit, bidding in a procurement contract as well as business projects in the usual sense of the term.

the bureaucrat controls the approval process and can therefore extract rents. Hence it can be said, unambiguously, that the applicant is a victim, and the bureaucrat, a perpetrator.

However, there is another class of bribes, the *non-harassment bribes*. A bribe may be called a non-harassment bribe if it is exchanged for obtaining approval for a non-compliant project. These are projects which, while in the private interest of the applicant, may be detrimental to social welfare. In such cases the bribe paying applicant is not a victim, but rather a co-perpetrator along with the receiver. Basu remarks that, for this very reason, his proposal should not be extended to the non-harassment bribes, even if, solely in terms of deterring bribery, it is equally effective in these cases.[3]

In this paper, we further explore the co-existence of these two classes of bribery and its implications for the efficacy of Basu's proposal. We show that there are cases where the distinction between harassment and non-harassment bribes is not only murky, but also endogenous. When that is the case, one has to analyze the implications of Basu's proposal on the strategic project choice as well as the decision to offer and receive bribes. Our analysis suggests caution in applying Basu's proposal: if applied just by itself, it can backfire in that it will reduce social welfare, without eliminating the instances of bribery! We then suggest other complementary policy interventions to accompany Basu's proposal to redress this perverse effect.

[3]This point is also made by Dufwenberg and Spagnolo (2012); we discuss this paper later.

Consider the following example which is representative of the type of situations we are interested in studying: suppose that an entrepreneur wants to set up a manufacturing plant at particular site. Before the plant is made operational, a set clearances need to be obtained from the relevant authorities to ensure that various compliance standards pertaining to design safety, environmental impact mitigation, etc. have been met with. The underlying rationale is that there are negative externalities associated with the operation of the plant and the compliance standards are designed to minimize them in the interest of social welfare. The bureaucrat has the requisite expertise in determining whether the project is indeed compliant, something a non-specialist observer (say, a court) cannot readily ascertain. If the plant design were compliant with the stipulated standards and yet a bribe had to be paid to obtain the approval, it would be termed a harassment bribe. If, on the other hand, the plant design were non-compliant, then the bribe would be classified as a non-harassment bribe. An external observer knowing only that a bribe was paid will not be able to decipher which type of bribe it is. Moreover, whether the entrepreneur builds the plant in a compliant or non-compliant mode will depend on factors such as the expected bribe demanded (for each type), the penalties associated with non-compliance, and the probability that non-compliance is detected. Likewise, the bureaucrat's decision regarding which type of plant to approve and what bribes to charge are strategic choices that depend on the legal regime.

It is often the case that instances of bribery, when brought to light, invoke scrutiny into the nature of the project. This may happen during the court case where necessary evidence related the project is gathered and analyzed, or due to public attention to the "scandal", as it typically unfolds in the media. If the project is found to be non-compliant, it is either scrapped or additional penalties are imposed on the person undertaking it.[4]

It follows that even if bribe giving were legal, and whistle blowing encouraged, the cost of doing so will depend on whether or not the project is compliant. In particular, the risk of non-compliance being revealed in the scrutiny following the bribery investigation makes it unattractive for the undertaker of a non-compliant project to report bribery. A person undertaking a compliant project, on the other hand, has nothing to fear from the scrutiny into the nature of the project. Given this, the bureaucrat can get away charging bribes for non-compliant projects. Thus, Basu's proposal will deter bribe taking on compliant projects but not on non-compliant projects.

In a world where project types are endogenously chosen, the analysis above has interesting implications for the entrepreneur's and bureaucrat's behavior. Since the bureaucrat no longer makes any money on

[4]For instance, at the time of writing, a bribery scandal has surfaced regarding sale of helicopters to the Indian Air Force by an Italian firm. The media has been scrutinizing, among other things, whether the specification standards were tweaked in favor of the bribe giving party. Even while the inquiry is underway, the Ministry of Defense has moved to scrap the contract and withhold payment, including for three helicopters already delivered. See http://online.wsj.com/article/SB10001424127887323495104578309862700328672.html

the compliant projects, he would try to make it relatively more attractive for the entrepreneur to undertake the project in a non-compliant mode. He could do it in two ways: one, by reducing the rate of bribe charged; and two, by making it relatively more difficult to obtain an approval on a compliant project.

The second possibility is a realistic one in a complex environment where time delays arise naturally and requests for additional information are commonplace. In such a world it is difficult to detect whether the particular delay is genuine or not. Anecdotal evidence suggests that the practice of bureaucrats "sitting on a file" till speed money is paid is a common practice in many countries. We build on this observation to argue that a similar tactic could be employed by a bureaucrat to delay the approval of compliant projects while expediting the approval of non-compliant projects. When such delays are costly, the entrepreneur will prefer to do the project in a non-compliant mode.

Hence, in a complex environment, it is possible for a bureaucrat to employ tactics to counter Basu's proposal by making non-compliant projects relatively more attractive. When such tactics are successfully deployed, Basu's proposal will not only fail to eliminate bribery but will also increase the incidence of non-compliant projects, and thereby reduce social welfare! [5]

[5]Allowing each project to be done in a compliant or non-compliant mode is a modeling convention. An alternative formulation, which leads to similar results, is to have a population of entrepreneurs endowed with potential projects—some compliant, others non-compliant. In this case, the bureaucrat's tactics will bias the pool of projects that are undertaken in favor of non-compliant projects.

One could argue, from a purely mechanism design point of view, that the government should credibly commit to not revoking the approval granted to a non-compliant project of the whistle-blower, or that it should pay extra compensation to the entrepreneur in the event such project is scrapped. This is easier said than done; there are serious economic and political costs that make such a policy time-inconsistent.

This point is well articulated in Dufwenberg and Spagnolo (2012). They write, regarding the case of non-harassment bribes, that

> The policy maker must be ready, in principle, to not revoke illegally awarded licenses which the license holders report ... The game theorist in us objects that this does not matter; along the equilibrium path no licenses are ever awarded. But the practical economist in us feels troubled ... Would it be ethically and politically defensible to sanction such arrangements, even counterfactually? Of course not.

They proceed to argue that the non-compliant license holder could be compensated (for revocation of the license) in order to restore his incentive to report bribery. However, the same ethical and political feasibility objections may equally apply to the case of paying compensation for the loss suffered on account of revoking an illegal project. We submit that the feasibility of either non-revocation, or compensation upon revocation, depends on the specific context. The scenario we are interested in studying is one where such mechanisms are deemed to be infeasible on practical grounds.

In the next section we develop a stylized model of the interaction between an entrepreneur and a bureaucrat in which project type as well as bribe rates are determined endogenously. Section 3 further enriches the model to allow the entrepreneur to report bribery and to appeal the non-approval of the project by the bureaucrat. The equilibrium of the model and its properties are studied in Section 4. Section 5 concludes with a discussion of the key contributions of our paper.

2. The Model

We propose the following model to study the strategic interaction between an entrepreneur and a bureaucrat. The entrepreneur has a project that generates revenue $v \geq 0$, which is his private information. To do the project, the entrepreneur must incur a fixed cost $c > 0$. Furthermore, the project can be done in a *compliant* mode or a *non-compliant* mode. To do the project in a compliant mode the entrepreneur must incur an additional cost $x > 0$. Assume that the social damage caused by a non-compliant project exceeds x and therefore it is socially optimal that if a project is done, it is done in the compliant mode.[6] A bureaucrat is entrusted with the task of checking whether the project is compliant and is supposed to approve only the compliant projects. The bureaucrat is an expert in judging compliance and it is difficult for an external observer to determine whether the project is compliant or not. In particular, we assume that for the entrepreneur to appeal and overturn the bureaucrat's decision he must incur high legal and time costs.

[6]This assumption justifies the existence the compliance process in the first place.

The bureaucrat can be of one of two types - corrupt or honest. Let $\lambda \in (0,1)$ denote the probability that the bureaucrat is corrupt. While the model is more general, we are mainly interested in analyzing situations prone to high bribery, so we assume $\lambda > 1/2$ and will typically deal with cases where it is close to 1. We do not explicitly model the behavior of the honest bureaucrat—we simply assume that he approves only the compliant projects, and does so without any bribe. The corrupt bureaucrat, on the other hand, charges bribes b_n and b_c for approving the non-compliant and compliant projects, respectively.[7]

We want to think of the bureaucrat as a long-run player interacting with a series of entrepreneurs. We therefore assume that he is able to ex-ante commit to the bribe rates b_n and b_c, and that these are perfectly known to the entrepreneurs. The entrepreneur decides whether or not to undertake the project upon observing v and with the knowledge of the parameters λ, b_n and b_c. The random variable v has cdf F and corresponding pdf f on support $[0, \bar{v})$. As in many contract theory papers, we will assume that F is log concave. This implies, among other things, that the hazard rate $f/1-F$ is non-decreasing in v.

First we write down a game where there is no legal enforcement whatsoever. That is, we assume that it is not possible for a third party to detect whether bribes exchanged hands, nor is it possible to determine whether the project was compliant. The timing of the game is as follows:

[7]We will later examine the possibility for the corrupt bureaucrat to block one type of projects, in particular, the compliant projects. Our formulation can accommodate such strategy by setting the bribe demanded for approving the compliant projects to infinity.

1. Nature draws project type v which is observed only by the entrepreneur; it also draws bureaucrat type honest/corrupt which is observed only by the bureaucrat.
2. The corrupt bureaucrat sets bribe rates b_n, b_c as preconditions for approving the non-compliant and compliant projects, respectively.
3. The entrepreneur decides whether or not to do the project. If he decides to do the project, he decides whether or not to be compliant.
4. The bureaucrat observes the project type and decides whether or not to approve it.

We assume both players to be risk-neutral; their expected payoffs are as follows: If the entrepreneur does the project in the compliant mode he gets expected payoff

$$\begin{aligned} \pi^E(\text{comply}) &\equiv \lambda \cdot (v - c - x - b_c) + (1 - \lambda) \cdot (v - c - x) \qquad (1) \\ &\equiv v - c - x - \lambda b_c. \end{aligned}$$

If the entrepreneur does the project in the non-compliant mode he gets expected payoff

$$\begin{aligned} \pi^E(\text{not comply}) &\equiv \lambda \cdot (v - c - b_{nc}) + (1 - \lambda) \cdot (-c) \qquad (2) \\ &\equiv \lambda v - \lambda b_n - c. \end{aligned}$$

The second term in equation (2) captures the idea that if the bureaucrat is honest then he will block the non-compliant project and the

entrepreneur will have to suffer the loss equal to his sunk fixed cost c. We normalize the payoff to the entrepreneur from not undertaking the project to 0.

The (corrupt) bureaucrat's expected payoff is given by

$$\pi^B(b_n, b_c) = b_n \cdot \Pr(\text{comply}|b_n, b_c) + b_c \cdot \Pr(\text{not comply}|b_n, b_c) \quad (3)$$

where $\Pr(\text{comply}|b_n, b_c)$ and $\Pr(\text{not comply}|b_n, b_c)]$ denote the probabilities that the bureaucrat assigns to getting compliant and non-compliant projects, respectively. Obviously,

$$\Pr(\text{comply}|b_n, b_c) + \Pr(\text{not comply}|b_n, b_c) + \Pr(\text{no project}|b_n, b_c) = 1.$$

2.1. **Equilibrium.** We look for the sub-game perfect equilibrium of the "Bribery Game" game, which we solve for using backward induction. Formally, we have:

Definition 1 (**Equilibrium of the Bribery Game**). *An equilibrium of the game is defined by the following strategies.*

(1) *Bureaucrat's Project Approval Strategy: For each project type, it describes whether to approve the project and the bribe charged for each type* (b_n, b_c)*;*
(2) *Entrepreneur's Strategy: For any given value* v*, and given the bureaucrat's strategy it describes which type of project to undertake*

such that i) given the realized project value v *the entrepreneur strategy is a best response to the bureaucrat's strategy, and ii) the bureaucrat's*

strategy is chosen optimally correctly anticipating the entrepreneur's best response.

We will now characterize the equilibrium of the Bribery Game using backward induction.

2.1.1. *Entrepreneur's Problem.* The entrepreneur takes b_n and b_c as given and chooses whether or not to do the project, and if the project is to be done, whether or not to comply. The entrepreneur will do the project only if

$$\max\{\pi^E(\text{comply}), \pi^E(\text{not comply})\} \geq 0,$$

i.e.,

$$v \geq \max\{\frac{c}{\lambda} + b_n, c + x + \lambda b_c\}. \tag{4}$$

Let us define

$$\frac{c}{\lambda} + b_n \equiv v^3(b_n) \tag{5}$$

and

$$c + x + \lambda b_c \equiv v^2(b_c). \tag{6}$$

Moreover, he will comply (conditional on doing the project) only if

$$\pi^E(\text{comply}) \geq \pi^E(\text{not comply}),$$

i.e., only if

$$v \geq \frac{x}{1-\lambda} + \frac{\lambda}{1-\lambda} \cdot (b_c - b_n) \equiv v^1(b_n, b_c). \tag{7}$$

Given b_n and b_c the entrepreneur's optimal strategy can be summarized as follows:

$$\begin{array}{llll} \text{if} & v > v^1 & \text{then do a compliant project} & (8) \\ \text{if} & v \in [v^3, v^1] & \text{then do a non-compliant project} & \\ \text{if} & v < v^3 & \text{then don't do the project} & \end{array}$$

For any pair (b_n, b_c) we can compute Pr(comply $|b_n, b_c$), Pr(not comply $|b_n, b_c$) and Pr(no project $|b_n, b_c$) using the cdf F.

2.1.2. *Bureaucrat's Problem.* The bureaucrat's problem is

$$\text{Max}_{b_n, b_c} \ \Pr(\text{not comply}|b_n, b_c) \cdot b_n + \Pr(\text{comply } |b_n, b_c) \cdot b_c \quad (9)$$

where Pr(comply $|b_n, b_c$), Pr(not comply $|b_n, b_c$) are computed from the entrepreneur's best response as described in (8).

2.2. **Characterization of Equilibria.** Depending on the parameter values, the Bribery Game has either a separating equilibrium or a pooling equilibrium. We now characterize these equilibria and describe the conditions under which they exist.

2.2.1. *Case I: Separating Equilibrium.* To solve for the equilibrium of the game we consider various possible solutions to the bureaucrat's problem (9). First consider the case where

$$0 < v^1 \equiv \frac{x}{1-\lambda} + \frac{\lambda}{1-\lambda} \cdot (b_c - b_n) < \bar{v} \quad (10)$$

It follows that $0 < v^3 < v^2$.

As we can see from figure (1), the probabilities corresponding to the entrepreneur's project choices are as follows:

- Pr(no project $|b_n, b_c) = F(v^3) \equiv F(\frac{c}{\lambda} + b_n)$
- Pr(comply $|b_n, b_c) = 1 - F(v^1) \equiv 1 - F(\frac{x}{1-\lambda} + \frac{\lambda}{1-\lambda} \cdot (b_c - b_n))$
- Pr(not comply $|b_n, b_c) = F(v^1) - F(v^3) \equiv F(\frac{x}{1-\lambda} + \frac{\lambda}{1-\lambda} \cdot (b_c - b_n)) - F(\frac{c}{\lambda} + b_n)$

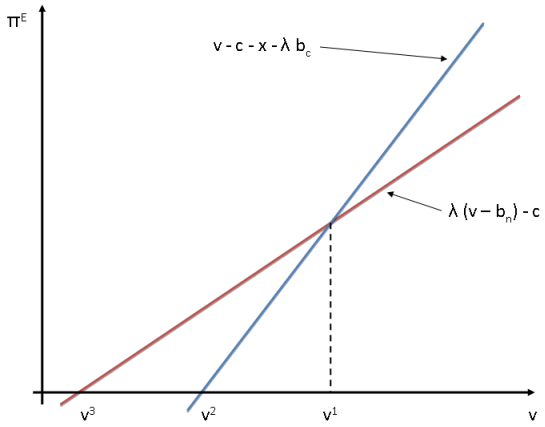

FIGURE 1. Separating Equilibrium

The bureaucrat's expected payoff is

$$\pi^B(b_n, b_c) = [1 - F(v^1(b_n, b_c)] \cdot b_c + [F(v^1(b_n, b_c) - F(v^3(b_n)] \cdot b_n \quad (11)$$

The first order necessary conditions for maximum with respect to b_c is given by

$$\frac{\partial \pi^B(b_n, b_c)}{\partial b_c} = 0$$

which yields

$$\frac{\lambda}{1-\lambda} f(v^1)(b_c - b_n) = 1 - F(v^1),$$

i.e.,

$$(b_c - b_n) = \frac{1-\lambda}{\lambda} \cdot \frac{1 - F(v^1)}{f(v^1)}. \tag{12}$$

Similarly, the first order necessary conditions for maximum with respect to b_n is given by

$$\frac{\partial \pi^B(b_n, b_c)}{\partial b_n} = 0$$

which, when combined with equation (12) yields

$$b_n = \frac{1 - F(v^3)}{f(v^3)}. \tag{13}$$

Under the assumption of log concavity of F the above conditions (12) and (13) are sufficient as well. Let b_c^* and b_n^* denote the optimal bribe rates and let π^{*B} denote the maximal expected payoff of the bureaucrat.

Example 1. *Let us consider a simple example where v follows an exponential distribution with parameter $\theta(> 0)$. It follows that $F(v) = 1 - e^{-\frac{1}{\theta} \cdot v}$ and $f(v) = \frac{1}{\theta} \cdot e^{-\frac{1}{\theta} \cdot v}$. A very convenient property of the exponential distribution is that the hazard rate $H \equiv f/1 - F$ is constant, in fact it is $1/\theta$.*

Using equations (12) and (13) we obtain,

$$b_n^* = \theta.$$

Plugging this into the FOC wrt b_c we get

$$b_c^* = \frac{\theta}{\lambda}.$$

For this equilibrium we require that $0 < v^3 < v^2$. It can be verified that this condition holds when

$$\lambda > \frac{c}{c+x}.$$

2.2.2. *Case II: Pooling on Comply.* Another possibility is that $0 < v^2 < v^3$ so the only projects that come up for approval are compliant types.

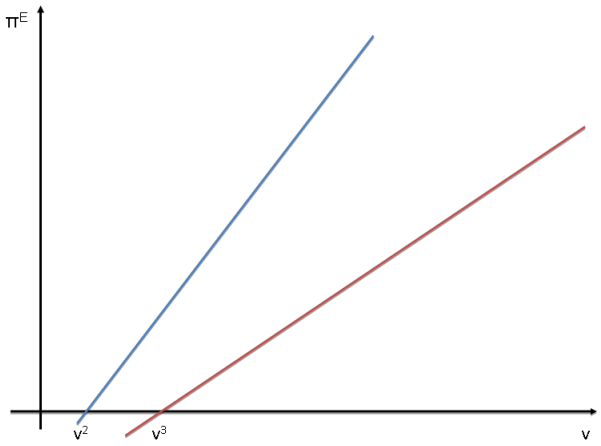

FIGURE 2. Pooling Equilibrium

Hence we have

- $\Pr(\text{no project}) = F(v^2) \equiv F(c + x + \lambda b_c)$
- $\Pr(\text{comply}) = 1 - F(v^2) \equiv 1 - F(c + x + \lambda b_c)$

- Pr(not comply) = 0

The bureaucrat's expected payoff is

$$\pi^E = [1 - F(v^2)]b_c.$$

The first order condition yields

$$b_c = \frac{1}{\lambda} \cdot \frac{1 - F(v^2)}{f(v^2)}. \tag{14}$$

Example 2. *(contd from Exp 1) For the case of exponential distribution, equation (14)*

$$b_c^* = \frac{\theta}{\lambda}.$$

This case holds when $0 < v^2 < v^3$ *i.e. when*

$$\lambda < \frac{c}{c + x}.$$

For the rest of the paper we will focus on the case of the Separating Equilibrium (Case I), since it corresponds to the situation we are mainly interested in studying, i.e., one where there is a sufficiently high proportion of corrupt bureaucrats (λ is high).

2.3. **Legal Recourse against Non-approval of Projects.** In the preceding analysis we simply assumed that the bureaucrat sets the bribe as a precondition for approving a project and the entrepreneur must pay it. Is it credible for the bureaucrat to hold up the approval of a compliant project if no bribe is paid? The answer depends on the options available to the entrepreneur in the event of non-approval. Suppose that there is a provision to appeal the bureaucrat's decision

but such appeal is costly. In particular, let $L > 0$ denote the cost in terms of money, time and other hassles associated with appealing the decision. The assumption commonplace in the bribery literature is that L is sufficiently high and non-reimbursable. This is precisely the reason behind the prevalence of *harassment bribes*: due to the high costs of appealing his decision the bureaucrat is able to *harass* the entrepreneur into paying a bribe even when the project is compliant. We will be making the same assumption here. In the later of part our analysis we show that L pays an important role in determining the efficacy of Basu's proposal.

We can formally incorporate the cost of appeal into our analysis by simply adding a constraint to the bureaucrat's problem requiring that $b_c \leq L$. If the solution to the problem is in the interior (which happens when L is high, and which is our assumption here) it will be characterized, as before, by equations (12) and (13).[8]

3. Legal Recourse against Bribery

In order to understand how various legal regimes impact bribery we extend our analysis by enriching the strategy set of the entrepreneur in the following ways: one, we allow for the possibility that the entrepreneur can provide evidence against the bureaucrat for taking a bribe; and two, as discussed above, we allow for the possibility that the entrepreneur can appeal the bureaucrat's decision to not approve

[8]In case of corner solution we will have $b_c^* = L$ and b_n^* is suitably changed to meet the FOCs. This holds under the tie-breaking assumption that if indifferent between paying a bribe and appealing the bureaucrat's decision, the entrepreneur pays the bribe. Alternatively, one could assume that the bribe charged is ε less than L.

the project. To this end we modify the original game; the first four stages are as described before, however, we then have

5. The entrepreneur decides whether or not to pay the bribe.
6. If the project is not approved, the entrepreneur decides whether to appeal the bureaucrat's decision. In case the bureaucrat was paid a bribe, the entrepreneur decides whether or not to report evidence regarding the bribe paid.

We shall call this new game the *Modified* Bribery Game. The equilibrium of this modified game is given as follows.

Definition 2 (**Equilibrium of the Modified Bribery Game**). *An equilibrium of the game is defined by the following collection of strategies.*

(1) *Bureaucrat's Project Approval Strategy: For each project type, it describes whether to approve the project and the bribe charged for each type* (b_n, b_c)*;*
(2) *Entrepreneur's Strategy: For any given value of* v *and given the bureaucrat's strategy, the entrepreneur's strategy is comprised of* i*) a project choice function describing which type of project to undertake and whether to pay the demanded bribe,* ii*) a decision whether to report the bribe, and* iii*) a decision whether to appeal the bureaucrat's decision in the event of non-approval*

such that i*) the entrepreneur's strategy is a best response to the bureaucrat's strategy given the realized project value* v*, and* ii*) the bureaucrat's strategy is chosen optimally correctly anticipating the entrepreneur's strategy.*

For simplicity sake we assume that the evidence, when provided by the entrepreneur, is credible enough to lead to a successful prosecution. This assumption has also been made in other papers on the topic. Our analysis will remain qualitatively unchanged if we were to assume that the report of bribery by the entrepreneur leads to an increased probability of successful prosecution. It should also be noted that since our paper shows the potential limitations of Basu's proposal, the assumption we make here is the most favorable to his case, and therefore strengthens our conclusions.

If, subsequent to the appeal, it was found out that a compliant project was not approved, the bureaucrat is fined a finite amount $D > 0$ and the entrepreneur is allowed to proceed with the project.[9] If the project was found to be non-compliant, then it is not allowed to proceed and the bureaucrat is charged no fine.

We now describe the payoffs accruing to the entrepreneur and the bureaucrat from the report of bribery. These will depend on the legal regime.

3.1. **Bribe Giving and Taking Illegal.** Suppose it is illegal to give or receive bribes; specifically, let T^E and T^B (both > 0) denote the penalties imposed on the two parties if it is found out that bribe exchanged hands. Since $b_c^* \leq L$, the equilibrium outcome characterized in the preceding section continues to be the outcome of the modified game. To see this, note that having paid a bribe, it is never in the interest of the entrepreneur to report it, since his payoff will be reduced

[9]We take the value of D as exogenously given.

by T^E. Anticipating this, the bureaucrat will be able to charge a bribe without any risk of being reported.

This analysis formalizes a key intuition regarding why bribery persists. When faced with a bribe seeking bureaucrat the entrepreneur has two options: *i*) he could refuse to pay and then appeal the bureaucrat's decision to dis-approve the project; or *ii*) he could pay the bribe in return for approval and then report the bureaucrat to the authorities. When the first option is expensive (L high) and second option involves the reporter being *punished rather than rewarded* then neither option is attractive for the entrepreneur and he ends up paying the bribe![10]

To sum up, we can summarize the preceding analysis in the form of the following proposition.

Proposition 1. *When both bribe giving and taking are illegal, the following strategies describe the equilibrium of the modified bribery game:*

(1) *The bureaucrat sets bribe rates b_c^* and b_n^* given by conditions (12) and (13)*
(2) *The entrepreneur's optimal strategy is given by condition (8)*
(3) *The entrepreneur chooses to not report the bribery*

3.2. **De-criminalizing Bribe Giving.** We now turn to the proposal put forward in Basu (2011), namely "keep the taking of a bribe illegal but decriminalize the act of giving a bribe." To represent this proposal, we continue to have $T^B > 0$ but now we have $T^E \in [-b, 0)$, i.e. the entrepreneur, in return for reporting the bribe, receives a compensation

[10]Even if the first option were more accessible (L low) there will still be bribery (though the bribes will be small, i.e. less than L) as long as it is illegal to give bribes.

rather than a punishment.[11] The question is: how does this policy affect the equilibrium of our game?

Before proceeding, we must conjecture the likely implications of reported bribery. In a wide range of settings it seems plausible that such a report will lead to further investigations, even media scrutiny, with all evidence pertaining to the case being brought to light. If this were to be the case, it seems reasonable to assume that the court will be able to learn whether or not the project was compliant.

As discussed in the Introduction, there are practical as well as ethical considerations which lead us to make the following assumption.

> **Assumption:** *If the entrepreneur reports bribery, the subsequent investigation reveals the project type. If found non-compliant, the project is not allowed to proceed.*

It follows that the net payoff to the entrepreneur from reporting a bribe is positive if the underlying project was compliant but negative if the underlying project was non-compliant. Formally we can see, since $T^E < 0$, that

$$v - c - x - b_c - T^E > v - c - x - b_c \tag{15}$$

where the left hand side shows the payoff to an entrepreneur with a compliant project from reporting the bribe while the right hand side

[11] $|T^E| \leq b$ captures Basu's idea that the entrepreneur, upon reporting evidence, is paid a compensation out of the amount recovered from the bribe he had paid to the bureaucrat. This amount will typically be smaller than b in utility equivalent units due to the transactions costs associated with the legal proceedings.

shows the payoff from remaining silent. On the other hand, we have

$$-c - b_n - T^E < v - c - b_n \tag{16}$$

where the left hand side corresponds to the payoff to an entrepreneur with a non-compliant project from reporting the bribe. This is a negative number since $T^E \leq -b$ whereas, from participation constraint of the entrepreneur, the right hand side payoff is positive.[12]

Given equations (15) and (16), the bureaucrat will anticipate that a compliant entrepreneur will report bribery but a non-compliant entrepreneur will not do so. It therefore becomes costly for the bureaucrat to demand a bribe for a compliant project but not for a non-compliant project. This means two things: *i*) as long as $T^B > b$, when faced with a compliant project the bureaucrat will not find it in his interest to charge a bribe, but also *ii*) he would rather have a non-compliant project submitted to him than a compliant one. Whether the bureaucrat will be able to discourage the entrepreneur from submitting a compliant project depends on whether it is credible for him to hold back the approval compliant projects which, in turn, depends on the cost of legal recourse against a wrongful disapproval, L, as well as the penalty, D, imposed on the bureaucrat for not approving a compliant project.

In the following section we work out the strategic behavior of the entrepreneur and the bureaucrat when bribe giving is de-criminalized.

[12]Moreover, there may be reputation costs, even fines payable the entrepreneur from the revelation that he tried to undertake a non-compliant project. While we do not incorporate them here, it is easy to see that they will further strengthen the inequality (16) by making the LHS even smaller.

4. Bribery Game when Bribe Giving is De-criminalized

As argued above, with the de-criminalization of bribe giving, the bureaucrat will not find it in his interest to charge bribes on compliant projects. However, he can still charge bribes for approving non-compliant projects since it is not in the interest of the entrepreneur to report such bribes. Assume for a moment that the types of projects were *exogenous*, i.e., some were compliant and other non-compliant. In this case, the bureaucrat will find it in his interest to approve, without any bribe, the compliant projects while continuing to charge an optimally set bribe $b_n > 0$ for the non-compliant projects. Hence, if project types were exogenously given, Basu's proposal will, as intended by the author, eliminate harassment bribes but not affect non-harassment bribes. With this benchmark in mind, let us study the case where project types are endogenously chosen.

When project type is endogenous, the bureaucrat has two strategies available to him.

Strategy 1: Approve compliant projects without any bribe, i.e., $b_c = 0$; set b_n to maximize the expected payoff.

Strategy 2: Do not approve compliant projects; set b_n to maximize the expected payoff.

Whether the equilibrium has the bureaucrat choosing strategy 1 or 2 has profound implications for the efficiency properties of the outcome: strategy 1 makes the compliant projects relatively more attractive thereby inducing a *favorable* selection towards the more efficient type of projects; strategy 2, on the other hand, makes the non-compliant

projects more attractive thereby inducing an *unfavorable* selection towards the inefficient type of projects.

To determine whether the bureaucrat will choose strategy 1 or 2 we will now study his expected payoffs to each strategy when followed by the best response by the entrepreneur..

4.1. **Expected Payoff under Strategy 1.** The model developed in Section 3 can be readily used to study this sub-game by adding a further constraint, namely $b_c = 0$. The entrepreneur's optimal strategy is the same as the one described in equation (8) with the values v^1, v^2 and v^3 described in equations (5), (6) and (7) used to obtain the following:

- $\Pr(\text{no project } | b_n, b_c = 0) = F(v^3(b_n)) \equiv F(\frac{c}{\lambda} + b_n)$
- $\Pr(\text{comply } | b_n, b_c = 0) = 1 - F(v^1(b_n, 0)) \equiv 1 - F(\frac{x - \lambda b_n}{1-\lambda})$
- $\Pr(\text{not comply } | b_n, b_c = 0) = F(v^1(b_n, 0)) - F(v^3(b_n))$
  $\equiv F(\frac{x-\lambda b_n}{1-\lambda}) - F(\frac{c}{\lambda} + b_n)$

The bureaucrat's problem is

$$\text{Max}_{b_n} \pi^{B1}(b_n) = [F(v^1(b_n, 0)) - F(v^3(b_n))] \cdot b_n \tag{17}$$

and the FOC is given by the equation

$$b_n = \frac{F(v^1) - F(v^3)}{\frac{\lambda}{1-\lambda} f(v^1) + f(v^3)}. \tag{18}$$

Let b_n^{*1} denote the solution to the above equation and let π^{*B1} denote the bureaucrat's maximal payoff under strategy 1. Comparing equations (13) and (18) gives us the following lemma:

Lemma 1. *In the modified bribery game where bribe giving is legalized, the optimal bribe rate for non-harassment bribe under Strategy 1 is lower than the corresponding rate when bribe giving is not legalized, i.e.,* $b_n^{*1} < b_n^*$.

Also, the implications for overall efficiency can be easily discerned using above lemma, equation (12) and the fact that $b_c^{*1} = 0$. Since the price paid on compliant projects falls more steeply than those for the non-compliant projects, we can ascertain the following.

Proposition 2. *When bribe giving is legalized, the equilibrium outcome under Strategy 1 yields a higher fraction of socially efficient projects compared to the equilibrium outcome when both giving and taking bribes are illegal.*

4.2. **Expected Payoff under Strategy 2.** To analyze the sub-game following Strategy 2 by the bureaucrat, we must look at the optimal strategy of the entrepreneur, in particular, at his decision as to whether or not to appeal the non-approval of a compliant project. Since the cost associated with doing a compliant project is already sunk, the optimal decision is simply

$$\begin{aligned} &\text{if} \quad v > L \quad \text{then appeal the non-approval} \\ &\text{if} \quad v \leq L \quad \text{then do not appeal the non-approval} \end{aligned} \tag{19}$$

In the event that $v > L$, the entrepreneur's expected payoff from a compliant project is

$$\lambda(v - c - x - L) + (1 - \lambda)(v - c - x)$$

which simplifies to $v - c - x - \lambda L$. On the other hand, the expected payoff from a non-compliant project is, as before, $\lambda(v - b_n) - c$. Comparing the two, conditional on $v > L$, the entrepreneur will do a compliant project if

$$v > \frac{x - \lambda b_n + \lambda L}{1 - \lambda}.$$

The bureaucrat's non-approval decision will get appealed by the entrepreneur if *i*) the entrepreneur does a compliant project, and *ii*) $v > L$. That is, if

$$v > \max\{L, \frac{x - \lambda b_n + \lambda L}{1 - \lambda}\} \equiv \bar{v}^A(b_n; L). \tag{20}$$

The entrepreneur will prefer to do a non-compliant project if

$$\lambda(v - b_n) - c > \max\{v - c - x - \lambda L, (1 - \lambda)v - c - x, 0\}. \tag{21}$$

The above inequality states that the entrepreneur will do a non-compliant project if the payoff from such a project exceeds the payoff from a compliant project, followed by either an appeal or a non appeal of the non-approval decision, and is positive. Comparing the LHS with the first term yields

$$v < \frac{x - \lambda b_n + \lambda L}{1 - \lambda} \equiv \bar{v}^B(b_n; L). \tag{22}$$

Comparing the LHS with the second and third terms we get

$$v > \max\{\frac{x-\lambda b_n}{1-2\lambda}, b_n + \frac{\lambda}{c}\} \equiv \underline{v}^B(b_n). \tag{23}$$

To summarize, the entrepreneur's project choice decision in response to the bureaucrat following Strategy 2 is given by

$$\begin{array}{lll} \text{if} & v > \bar{v}^B & \text{then do a compliant project} \\ \text{if} & v \in [\underline{v}^B, \bar{v}^B] & \text{then do a non-compliant project} \\ \text{if} & v < \bar{v}^B & \text{then don't do the project} \end{array} \tag{24}$$

and his optimal appeal strategy is given by

$$\text{Appeal the non-approval of the compliant project iff } v > \bar{v}^A \tag{25}$$

Given the entrepreneur's optimal strategy as defined above we can now write the expected payoff of the bureaucrat as

$$\pi^{B2}(b_n; L) = [F(\bar{v}^B(b_n; L) - F(\underline{v}^B(b_n)] \cdot b_n - [1 - F(\bar{v}^A(b_n; L)] \cdot D. \tag{26}$$

Let $\pi^{*B2}(L)$ denote the maximal expected payoff and $b_n^{*2}(L)$ the optimal bribe rate. It follows that

Lemma 2. *Under strategy 2, the maximal expected payoff of the bureaucrat, $\pi^{*B2}(b_n, L)$ is increasing in L, the cost of the appeals process.*

Proof. L enters the objective function via terms $\bar{v}^A$ and $\bar{v}^B$. Both terms are increasing in L and the objective function is also increasing in them. It follows that the maximum value of the objective function increases in L. □

The above lemma is intuitively straightforward: when the appeals process is expensive, the corrupt bureaucrat is able to get away charging a higher bribe since the probability of him being reported is low.

In order to determine the bureaucrat's optimal choice between strategy 1 and strategy 2 we must look at the expected payoffs given by equations (17) and (26). Comparing these equations we get the following result.

Proposition 3. *The exists a value $\bar{L}$ such that the equilibrium of the modified bribery game when bribe giving is legalized is characterized as following.*

(1) *If $L \leq \bar{L}$ then the equilibrium strategies are: i) the bureaucrat uses Strategy 1, i.e. he sets $b_c = 0$, and sets $b_n = b_n^{*1}$ to maximize (17); ii) the entrepreneur's strategy is as given in (8).*
(2) *If $L > \bar{L}$ then the equilibrium strategies are: i) the bureaucrat uses Strategy 2, i.e., he approves only non-compliant projects, and sets $b_n = b_n^{*2}$ to maximize (26); ii) the entrepreneur's strategy is as described in (24) and (25).*

Proof. See appendix. □

The above Proposition establishes our main result: if the cost of appealing the non-approval decision of the bureaucrat is sufficiently large ($L > \bar{L}$) then Basu's proposal will backfire: it will lead to the bureaucrat stalling the compliant projects and thereby creating incentives for the entrepreneur to do non-compliant projects which will not only facilitate bribe by taking, but also involve a loss in social welfare. It also

suggests that a reduction in L, i.e., bringing it below $\bar{L}$, when done in conjunction with Basu's proposal, can lead to an improvement in social welfare as well as a reduction in bribery.

5. Discussion

In this paper we revisit a simple yet persuasive proposal forwarded by Basu (2011) to eliminate bribery. Under his proposal, the bribe giver is incentivized to report bribery thereby discouraging the bribe taker from demanding it in the first place. This is reminiscent of whistle-blower protection studied elsewhere in the literature [see, for instance, Spagnolo (2008)]. We show that while this proposal works as intended in the case of harassment bribes, in a more complex world where harassment and non-harassment bribes coexist, and are endogenously determined, one must exercise caution in applying Basu's proposal.

Our analysis shows that the root cause behind the prevalence of bribery is the bureaucrat's monopoly power on the granting of approvals. If there is little recourse against his decisions, or if the recourse is very costly, then the entrepreneur will find it optimal to pay the bribe. Moreover, even when bribe giving is legalized, the bureaucrat can still extract bribes by encouraging non-compliant projects since the entrepreneur will not report bribery on such projects due to the penalties involved. In such an environment Basu's proposal backfires: bribery persists and there is an increase in the non-compliant projects.

Our analysis, therefore, suggests that the key factor determining the efficacy of Basu's proposal is access to the appeals process in the event of non-approval. Improving legal infrastructure whereby the costs of

such appeals are reduced can, in conjunction with Basu's proposal, lead to a significant reduction in the prevalence of bribery as well as an improvement in social welfare.

At a more general level, our analysis contributes to a nuanced understanding of bureaucratic power in influencing the client's behavior in a setting where the bureaucrat is a long term player. A recent paper by Abbink, et al (2012) experimentally tests the implications of Basu's proposal when the bureaucrat and the bribe giver are involved in a long-run interaction. They find that the prospect of future retaliation by the bureaucrat can undermine the efficacy of Basu's proposal by discouraging reporting. Our analysis suggests that even in the absence of repeated interaction, a long-run bureaucrat can credibly influence bribe givers' behavior by making compliant projects relatively unattractive, and thereby ensuring that he can continue to collect bribes without the risk of reporting.

References

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Appendix

Proof of Proposition 3. The discussion in subsections 4.1 and 4.2 characterized the best response of the entrepreneur following the bureaucrat choosing Strategies 1 and 2, respectively, and the corresponding expected payoffs of the bureaucrat. We need to establish that the equilibrium expected payoff from Strategy 2 is greater than (is less than) that from Strategy 1 when L is large (small). Since π^{B2} is monotonically increasing in L and π^{B1} is independent of L, it follows that for values of L below (above) some threshold $\bar{L}$, the equilibrium outcome has the bureaucrat choosing strategy 1 (2).

As stated in equation (21), when the bureaucrat chooses Strategy 2 the entrepreneur will prefer to do a non-compliant project if

$$\lambda(v - b_n) - c > \max\{v - c - x - \lambda L, (1-\lambda)v - c - x, 0\}$$

Comparing the three terms on the RHS of the above inequality we can see that the max is attained at $(1-\lambda)v - c - x$ only if $v \in (\frac{c+x}{1-\lambda}, L)$. For $L < \frac{c+x}{1-\lambda}$, this will never hold.[13] Hence for small values of L, we have $\underline{v}^B(b_n) = b_n + \lambda/c$ which is same as $v^3(b_n, 0)$. Hence, from equation (26), as $L \to 0$ the expected payoff of the bureaucrat under Strategy 2 is

$$[F(\bar{v}^B(b_n; L)) - F(v^3(b_n))] \cdot b_n \; - \; [1 - F(\bar{v}^A(b_n; L))] \cdot D.$$

[13]Since we are mainly interested in cases where λ is large, this condition is met without requiring L to be too small.

Also, as $L \to 0$ we have

$$\bar{v}^B(b_n; L) \equiv \frac{x - \lambda b_n + \lambda L}{1 - \lambda} \to \frac{x - \lambda b_n}{1 - \lambda} \equiv v^1(b_n, 0)$$

and similarly, $\bar{v}^A \to v^1(b_n, 0)$, and therefore

$$[1 - F(\bar{v}^A(b_n; L))] \to [1 - F(v^1(b_n, 0))] > 0.$$

Hence, from equations (17) and (26) we can see that as $L \to 0$

$$\pi^{B2}(b_n; L) \ \to \ \pi^{B1}(b_n) - [1 - F(v^1(b_n, 0)] \cdot D \ < \ \pi^{*B1}.$$

On the other hand as $L \to \infty$, we have $\bar{v}^A, \bar{v}^B \to \infty$, and therefore we have

$$\pi^{B2}(b_n; L) \to [1 - F(\underline{v}^B(b_n))] \cdot b_n.$$

Compare it with the entrepreneur's objective function under Strategy 1 which is

$$\pi^{B1}(b_n) = [F(v^1(b_n, 0)) - F(v^3(b_n))] \cdot b_n.$$

Note that the entrepreneur's optimal choice under Strategy 1, b_n^{*1}, must be such that $x - \lambda b_n^{*1} > 0$, which combined the fact that $1 - 2\lambda < 0$, yields $\underline{v}^B(b_n^{*1}) = v^3(b_n^{*1}, 0)$. Hence, when $L \to \infty$ the bureaucrat can always choose $b_n^2 = b^{*1}$ which will yield him a payoff

$$\pi^{B2}(b_n^{*1}; L) \to [1 - F(v^3(b_n^{*1}))] \cdot b_n^{*1} \ > \pi^{*B1}.$$

It therefore follows that as $L \to \infty$ we have

$$\pi^{*B2}(L) \ \geq \ \pi^{B2}(b_n^{*1}; L) \ > \ \pi^{*B1}.$$

We can see from equation (26) that π^{B2} is a monotonically increasing function of L, and from equation (17) that π^{B1} is a constant in L. Hence it follows that there exists a threshold $\bar{L}$ such that for $L \leq \bar{L}$ it is optimal for the bureaucrat to choose Strategy 1 and for $L > \bar{L}$ it is optimal for him to choose strategy 2. □