Does it matter who extorts? Extortion by competent and incompetent enforcers.*

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Abstract

This paper offers a novel explanation for extortion, which is the practice of demanding payments from compliant agents by law-enforcement officers. Namely, that extortion occurs due to the officer's incompetence, where the competence level is endogenous. Because competence improves enforcement, extortion affects deterrence directly by weakening agents' incentive to be compliant, and indirectly by affecting officers' incentives to become competent. Accordingly, the harmful effects of extortion on deterrence depend on whether the competent or incompetent officer extorts. We show that extortion by incompetent officers is the lesser of the two evils, compared to bribery.

Keywords: Bribery, Extortion, Uninformed Officer

JEL: K4, K42, L5

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1 Introduction

Corruption can undermine law enforcement because it allows non-compliant agents to reduce their sanctions by paying a bribe (Becker 1968, Becker and Stigler 1974). The literature on corruption has identified two broad categories of bribes (Burguet, Montalvo and Ganuza (2018)). The first type occurs when law-enforcement officers (henceforth, officers) accept a (smaller) bribe instead of sanctioning or fining those who are non-compliant. This form of bribery is *collusive* since both the officer and the non-complaint stand to gain by engaging in bribery. The second type of bribery, termed extortion, occurs when officers demand payments from compliant agents. Extortion, unlike bribery is *non-collusive* since the compliant do not gain by making this payment.

Collusive bribery (henceforth, bribery) is relatively easy to explain since both the non-compliant and the officer stand to gain (Tirole 1986). For example in several papers (Becker and Stigler (1974), Mookherjee and Png (1995), or Polinsky and Shavell (2001)) the bribe is smaller than the fine that should be imposed on the non-compliant agent, but greater than the reward that the officer receives for reporting that non-compliant agent. Similarly, in Samuel (2009) the officer gains by avoiding having to exert costly investigative effort. Thus, bribery is essentially a "Coasian side-payment" that benefits both parties.

The phenomenon of extortion is harder to explain because while the extortioner gains, the extorted only stands to loose. Accordingly, it is not clear why those who are compliant are willing to make extortion payments because within a bargaining framework, the "threat point" of refusing a bribe should always yield a payoff of 0 (unless the extortioner is able to "frame" a compliant agent). Hence, intuitively the compliant should never yield to extortion (see Mishra and Mookherjee (2013) for a discussion of these issues).

Formal and informal analyses of bribery have offered two explanations for the existence of extortion, in both of which extortion rents are only extracted after the officer is informed about the agent's actions or type - that is, whether compliant or not. Specifically, the first involves creating "hard" (verifiable) evidence to frame a compliant agent (i.e. framing). That is, the officer exerts enforcement effort and observes whether agent is compliant or not. If compliant, the officer threatens to frame the agent unless they are paid a bribe (Polinsky and Shavell 2001, Marjit et. al. 2000, Saha 2003). The second explanation involves suppression, as opposed to the creation, of hard evidence. Specifically, here upon exerting effort, the officer observes the agent's true actions (compliant/not compliant) or nothing. If the officer finds that the agent is compliant, he can threaten to suppress that evidence to deny benefits

to the compliant agents (Khalil, Lawarree and S. Yun, 2010).[1]

This paper offers a third explanation for extortion - *incompetence*. In order to be effective at enforcement, we argue that officers need to invest in costly human capital acquisition to become competent. Competence enables officers to more easily distinguish between compliant and non-compliant agents. However, if an officer is incompetent he or she may "harass" a compliant agent by apprehending them. This may take the form of of detaining a compliant agent for questioning or result in a delay in processing their permit, which is costly to the agent. Thus, the compliant may pay a bribe to avoid the threat of being harassed and its associated cost.

Such extortion due to incompetence differs from previous mechanisms of extortion in three critical ways. First, here extortion occurs (preemptively) during the investigative process and before it is known whether the agent is compliant or not. Second, because extortion occurs under imperfect information, the officer's extortionary demands could result in "screening." Finally, the possibility of extortion *itself* affects the officers' decision to become competent, which in turn effects the likelihood that extortion will occur. Further, since competence is generally desirable because it improves enforcement, by affecting competence extortion has another indirect affect on compliance.

To study this issue we develop a model in which officers choose whether or not to become competent, and agents choose whether or not to comply. Becoming competent enables an officer to easily establish whether the agent is compliant or not. These officers can therefore take bribes or demand extortion payments in accordance with the standard framework in the literature. Incompetent officers, however, do not know whether the agent is compliant or not unless they detain and investigate the agent more extensively. Thus, both compliant and non-compliant agents are detained. Since detention is costly (for both compliant and non-compliant agents) even compliant agents are willing to make extortion payments to avoid being detained.

Our main finding is that *it does matter whether the competent or the incompetent extort.* Specifically, somewhat counter-intuitively, we find that extortion by the incompetent should be tolerated, while bribery by the competent should not. Further, we show that for any policy that implements an equilibrium in which only the competent extort, there exists another policy in which only the incompetent officers extort that yields a higher level of

[1]For example, an officer may deny a license to a firm that has complied with the regulation, and claim that it didn't observe compliance. See also Acemoglu and Verdier (2000).

compliance. Thus, we show that *a compliance maximizing regulator may prefer to tolerate extortion from incompetent officers instead of allowing the competent to demand bribes.* As we discuss in the next section, these two findings differ in important ways from the extant literature on extortion.

Our paper is organized as follows. Following the introduction, we discuss our findings within the context of the extant literature. In section 3 we set up the model with corruption. Then we analyze compliance under various types of extortion and bribery, followed by a further policy analysis. The final section concludes.

2 A review of the literature

The results of our paper are noteworthy considering the extant literature on corruption and extortion, which is reviewed extensively in the survey by Burguet, Montalvo and Ganuza (2018). Inter alia, this literature examines two questions regarding extortion. First, whether a policy maker should prevent collusive bribery or extortion, especially if it is too costly to prevent both. Second, how should extortion be prevented, if it should be.

One strand of the literature finds that extortion and not bribery should be prevented (see Mishra and Mookherjee (2013) and the references in Khalil, Lawarree and S. Yun (2010). Consider a situation in which an agent must choose whether to comply and where compliance is costly and unobservable (Khalil, Lawarree and S. Yun, 2010). An officer is charged with obtaining evidence of the agent's compliance and rewarding compliant agents. If corrupt, officers threaten to suppress evidence of the agent's compliance unless they are bribed (extortion) or fabricate evidence to prove that the non-compliant agent is compliant.[2] A similar result arises in Vafai (2010) where extortion (collusion) takes place when the officer threatens to hide information favorable (unfavorable) to the agent. In these papers, extortion imposes a cost on compliant agents. Thus, because compliance is endogenous, extortion reduces marginal deterrence and lowers compliance whereas bribery does not necessarily affect compliance because it still imposes an, albeit smaller, sanction on a non-compliant agent. Thus, this strand of the literature finds that extortion must be prevented and bribery permitted (if given a choice between the two forms of corruption).

In other contexts, the literature finds that extortion must be allowed but bribery prevented. When officers are responsible for granting licenses to applicants from a pool of

[2]In Khalil, Lawarree and S. Yun (2010) the officer and the agent can together fabricate evidence.

potentially viable as well as non-viable projects a corrupt officer can collude with a non-viable project owner and award the license (bribery); and can potentially extort the owner of a viable project (extort) (Hong and Yin, 2018). Extortion, therefore, encourages officers to grant licenses to viable projects (which are welfare improving), but bribery encourages officers to grant licenses to non-viable (welfare reducing) projects. Thus, there are more viable projects when extortion is permitted, whereas there are more non-viable projects when bribery is permitted.

Likewise, De Chiara and Manna (2019) look at both forms of corruption in the context of the regulation of innovation, where the product of successful innovation needs to be authorized before its use. There are two types of regulation: strict and lenient authorization. Under strict authorization the officer can grant a permit only when there is conclusive evidence that the product is safe (this evidence is obtained only with some probability). Under lenient authorization the officer can grant a permit whenever it does not find evidence of harm. The first regime creates incentives for extortion wherein information favorable to the firm is suppressed, whereas the second creates incentives for bribery wherein information unfavorable to the firm is suppressed. As these authors show, under strict authorization, too few products are permitted and as a result there is under-investment in new products. Thus, since extortion encourages more production, this enhances efficiency as it allows more products to come to market. In contrast, under lenient authorization too many (harmful) products are permitted. Accordingly, bribery results in too much welfare reducing production. Thus, this second strand of the literature finds that extortion may be permitted but bribery prevented.

Whether extortion is better or worse than bribery depends on a core difference in these two strands of the literature; that is, whether compliance is a choice (action) or exogenous (type). When compliance is a choice (as in Khalil, Lawaree and Yun (2010)), then extortion affects marginal deterrence so that extortion is usually worse than bribery. Whereas, when compliance is a "type," (as in the second set of papers), then extortion allows the compliant types to produce, whereas bribery allows the non-compliant to produce. Because extortion permits those who should be allowed to produce to do so, but bribery allows those who should not be allowed to produce to do so, extortion does not reduce allocative efficiency as much as bribery. Thus, from this (second) perspective extortion is preferred to bribery.

In general when compliance is endogenous (i.e. "hidden action"), then extortion is worse than bribery, whereas when it is a (hidden) type then extortion is preferred to bribery *from*

an efficiency standpoint.[3] However, if the regulator's goal is to maximize compliance (and compliance endogenous), then extortion is usually worse than bribery because extortion penalizes compliant agents, while bribery still sanctions non-compliant agents.

Our paper extends and departs from this prior literature in two key ways. First, the extant literature assumes that the officers choose whether to extort *after* becoming informed about the agent's guilt or innocence (or as in the case of Dufwenberg and Spagnolo (2015) assume that all agents are compliant). The type of extortion present in the extant literature, therefore, translates to extortion by competent officers within our framework. In contrast, we acknowledge that incompetent (who are uninformed) may also extort, which as it turns out can have a positive effect on deterrence. Intuitively, because the incompetent do not know the compliance status of an agent, they indiscriminately extort both the compliant and the non-compliant. Although some compliant agents are thereby extorted (but are ultimately acquitted), criminals are also sanctioned and punished. Thus, extortion provides some deterrence, which would be lost when the incompetent do not extort. By ignoring the possibility that not all officers are equally competent and that extortion can be the product of such incompetence, the prior literature has overlooked this critical aspect of extortion.

Second, the literature focuses only on the effect of extortion on the behavior of agents (compliance), our paper also studies its impact on the behavior of officers. Accordingly, we identify a second effect because extortion (and harassment) affects the allocation of the investment in competence. That is, because it reduces the incentive to invest in competence - there is too little investment in competence. This competence effect indirectly then affects compliance (and allocative efficiency) in addition to the direct affect of extortion on compliance (via marginal deterrence) observed previously in the literature. Hence, it is not always clear whether extortion is beneficial (relative to bribery). To our knowledge, our paper is the first to study the allocative effect of extortion on both agents and officers.

Besides these, there are other reasons why it is important to study the link between extortion and incompetence. First, empirically there is ample evidence that the threat of unnecessary harassment encourages compliant agents to yield to extortion demands (Gambetta 2009). Extortion by competent officers can be deterred by suitable incentive mechanisms or immunity regimes (Mishra and Samuel 2018), but it is harder to identify policies

[3]This distinction is, of course, fundamental to the economics of information concerning hidden actions versus types. Here we note that hidden actions in the first stage translate into types in the subsequent stage (Laffont and Martimort, 2002).

that deter extortion by incompetent officers. Second, in the context of bribery, preemptive bribery which occurs (under imperfect information) before the officer has exerted effort to observe the agent's type, has very different implications than standard (ex-post) bribery (which occurs after, and only if, the officer has ascertained that the agent is not compliant) (Samuel 2009, Mishra and Samuel 2017, Motta 2009). Thus, it is natural and not surprising that extortion by incompetent officers has very different implications from extortion by competent officers.[4] Finally, it is worth noting that the effect of competence on compliance is also observed in Mishra and Samuel (2018). However, that paper did not study extortion. Thus, due to corruption and extortion this paper identifies equilibria not observed in that paper. We discuss this issue further in section 3.

3 The Model

Consider a model with two risk neutral players: agents and officers. An officer chooses whether to exert effort to become competent or not, $E \in \{0, 1\}$. The cost of becoming competent for an officer is e' where $e' \sim U[0, 1]$. A competent officer is perfectly informed about whether the agent is compliant or not.[5] The fraction of competent officers is θ, which is endogenous.

Agents choose whether to be compliant or not compliant, where $g' \sim U[0, G]$ is the distribution of gains from being non-compliant. An agent's compliance choice is private information, unless the officer is competent (in which case the agent's compliance status is observed by the officer). Accordingly, let α be the fraction of compliant agents. Then an incompetent officer's belief about the fraction of agents who are compliant is α.

Given these beliefs, officers then choose whether to further investigate the agent which involves detaining the agent temporarily. If the agent is non-compliant, the detention leads to information regarding the crime so that the agent is sanctioned $f > 0$ and the officer receives a reward of $r \leq f$ for reporting a criminal (with $r > 0$). Note that f may represent the expected fine, if the court system is imperfect and the possibility of a type 2 error is not zero. If a compliant agent is detained, she is eventually acquitted with certainty. However,

[4]Our paper is also related to the literature on enforcement and judicial errors more broadly (Dharmapala and Miceli 2012, Png 1986). But, since in our framework courts cannot make type 1 errors, we do not discuss this literature explicitly.

[5]This information is "soft" or unverifiable so that the officer is then free to continue the investigation or not.

acquittal comes at a positive cost cost $k < f$ which may represent the legal fees associated with proving her innocence. We define the detention of a compliant agent as *harassment*.[6] Finally, an officer who wrongfully detains a compliant agent is penalized $d > 0$.

Within the above framework we introduce bribery and extortion. An incompetent officer can demand a bribe b_i from agents. Since this officer is uninformed, compliant agents are effectively being extorted by being asked to pay a bribe. Besides these extortive payments demanded by incompetent officers, a competent officer can demand a bribe b_c from a non-compliant agent (to avoid the fine f), or an extortion payment x from compliant agent (to avoid being framed). These forms of bribery and extortion (by the competent) are similar to that found within the existing literature.

The timing of the game is as follows.

1. Officers realize their cost of acquiring competence (e') and choose whether to invest in competence or not.

2. Agents realize (and privately observe) g' and then choose whether to be compliant or not based on their beliefs about the fraction of competent officers (θ) .

3. An officer is randomly paired with an agent. Upon matching, the agent observes whether the officer is competent or incompetent.[7] Subsequently, there are two possibilities depending on the competence of the officer.

    a. If the officer chose to be competent, the officer immediately knows whether the agent is compliant or not and can demand a bribe, b_c, or an extortion payment x (respectively), in exchange for not pursuing the investigation further. If the bribe is accepted, the game ends. If it is rejected, the officer chooses whether to detain and report the non-compliant, who then receives the sanction f. Similarly, if the extortion payment is made, the game ends. If it is rejected, the officer chooses

[6]It is worth pointing out that the notion of harassment and incompetence can be applied in many other regulatory settings. For example, a competent consular officer can determine easily who should get a visa but the incompetent "harass" by reporting and endless evidence seeking.

[7]This is a simplifying assumption, otherwise, the game would involve signaling (because the officer's offer could signal their competence) and screening (which is present in our model). Since signaling games are complicated, and involve refinements, it would make the implications of extortion difficult to understand. We leave this extension to future work.

whether to detain and report the compliant agent. The compliant agent incurs a cost k to prove her innocence and the officer incurs a penalty d for the wrongful detention (harassment).

b. If the officer chose to be incompetent, the officer can detain the agent unless the agent pays b_i. If this bribe is paid, the game ends. If the agent refuses to pay a bribe, the officer chooses whether to detain and report the agent. If the officer reports the agent then non-compliant agents are sanctioned f and the officer receives r, while law-abiding agents incur a cost k to prove their innocence while the officer incurs a penalty d for harassment.

We solve for the perfect Bayesian Nash equilibrium of this game. Before doing so we wish to make a brief comment about an implicit assumption in the above game. We assume that the agents' compliance decisions and the officers' decision to become competent are not observed by the regulator. Thus, there is moral hazard that leads to unobservable types.[8]

The above game permits four possible corruption profiles or scenarios, which we now identify:

- **No extortion:** Law-abiders do not get extorted or pay bribes. Non-compliant agents pay bribes to either competent and incompetent officers (depending on with whom they are matched).
- **Extortion by incompetent:** Only incompetent officers demand extortion payments from compliant agents, the competent and incompetent demand bribes from non-compliant agents.
- **Extortion by competent:** Only the competent officers extort, and the incompetent and competent officers demand bribes from non-compliant agents. The incompetent harass the innocent who are forced to incur cost k to prove their innocence.
- **Full extortion:** Both competent and incompetent officers demand extortion payments and take bribes.

Where necessary these corruption profiles are denoted by the subscript n (no extortion), xi (extortion by incompetent), xc (extortion by competent) and x (full extortion).

[8] As is well known actions in the first stage lead to second-stage types (Laffont and Martimort, 2002).

Before proceeding we wish to make two remarks concerning these corruption profiles. First, since the focus of this paper is on extortion, although bribery does occur in some profiles, we identify these profiles solely according to whether extortion occurs and who extorts (competent/incompetent). Second, not all of these corruption profiles may be equilibrium profiles.[9] Specifically, any extortion demand by the officer must be credible in the sense that given the officers (prior) belief that the agent is compliant, the threat of detention (i.e. harassment) is credible. For a given α the threat of detention is credible if,

$$\alpha < \frac{r}{r+d}. \tag{1}$$

The preceding inequality, which ensures that harassment is individually rational for the officer, is critical because extortion occurs within the shadow of harassment. Since we wish to study extortion we focus only on equilibria in which this condition (1) is satisfied.[10] This must be contrasted with Mishra and Samuel (2018) who study equilibria where harassment may or may not be individually rational for the officer (i.e. where this condition may be violated). Thus, our paper identifies additional equilibria to those in Mishra and Samuel (in which harassment is rational) because here officers are also corruptible. As we show in section 4, this has implications for the regulator's policy.

Further, the threat of detention must be credible (i.e. sequentially rational) off the equilibrium path. Specifically, if a bribe demand is rejected, then (in stage 3) upon rejection, given the officer's (posterior) beliefs about the fraction of law-abiders (denoted by μ), the threat to detain the agent must be credible. That is, 1 must be satisfied given μ. If this condition is violated then the threat of detention is not credible and consequently neither is the threat of bribery. Thus, the violation of this condition prevents some strategy profiles from equilibrium play, yielding the following result.

Lemma 1 *If $d > 0$,*

a. there does not exist any (perfect Bayesian) equilibrium in which the competent officer extorts,

b. in any equilibrium in which extortion occurs the incompetent demand k from all agents

[9]Further, these profiles are not strictly strategy profiles since they do not specify the complete set of strategies for every sub-game.

[10]That is, we wish to focus on countries or regions where deterrence is low.

and incompetent officers cannot utilize the bribe or extortion payment to fully screen between compliant and non-compliant agents.

Proof. First, since the competent immediately observe an agent's type, (a) follows trivially. Specifically, consider the case where the competent officer demands $x > 0$. Such a demand is not credible since if the compliant agent were to reject it, the officer would not investigate further since his (expected) payoff is $-d$.

Next consider claim (b) that if extortion occurs it will occur when $x_i = b_i = k$. We prove this claim by contradiction. That is, assume that $f \geq x_i > k$, then such a demand will always be rejected by the compliant, but could be accepted by the non-compliant with some positive probability p. In this case, if the agent accepts the extortion demand, then the officer's posterior belief that the agent is non-compliant is 1. But, if the agent rejects then the officer's posterior belief whether the agent is compliant is,

$$\frac{\alpha}{\alpha + (1-\alpha)(1-p)} \equiv \mu,$$

for any given p.

In this case there are two possible equilibria. A pure strategy equilibrium (with $p = 1$) and a mixed strategy equilibrium with $p < 1$. We consider each in turn.

If $p = 1$ (i.e. if the non-compliant always accept bribe demands), then the officer's posterior belief upon rejection (μ) is that the agent is compliant with certainty. This in turn implies that the officer should not detain the agent when d is positive since he believes that he will receive $-d$ with certainty. However, in this case the non-compliant will choose to deviate and reject the bribe demand. Thus, p cannot be equal to 1 - that is, the officer cannot choose an equilibrium in which both extortion occurs and where she can fully screen between compliant and non-compliant agents.

If $p < 1$, then the above beliefs can be sustained in equilibrium for some appropriate values of p (see appendix). However, even in this case that there is no extortion because the compliant always reject bribe demands . Further, there is only partial screening in the sense that if the agent rejects the demand the officer only sometimes knows whether the agent is non-compliant.

■

Inter-alia, lemma (1) reveals the critical importance of d in determining the possible equilibria. Specifically, whether a competent officer extorts depends on whether or not d

is positive. If $d > 0$, then the officer's beliefs about the agent's compliance will determine whether the threat to extort is credible. If $d = 0$, then an incompetent officer can always credibly demand a bribe payment $b_i = f$.[11] In our main analysis we focus on the case with $d > 0$ and characterize the case for with $d = 0$ in an online appendix.

Given the importance of this parameter, it is worth contextualizing it further before proceeding to identify the equilibria of our framework. The parameter d may be viewed as the sanctions for harassment (or more broadly sanctions for committing type-1 errors). These sanctions may be internal penalties, loss of promotions, etc., or external if imposed by a strong system of torts.[12]

Since $d > 0$ we know from Lemma 1 that only the incompetent will extort (if at all). Extortion by the incompetent is in some sense done out of "ignorance" because they do not know whether an agent is compliant or non-compliant, and therefore, they demand a bribe b_i from both compliant and non-compliant citizens. From lemma (1) we know that the incompetent do not screen, hence if the compliant pay bribes, b_i must equal k. Finally, lemma (1) also implies that $b_c = f$ when $d > 0$. Hence, let $b_c^* = f$ and $b_i^* = k$. Accordingly, demanding a bribe is incentive compatible for the incompetent if, given their (equilibrium) beliefs concerning the fraction of compliant agents α,

$$k \geq r - \alpha(r + d). \tag{2}$$

When condition (2) is satisfied, both compliant and non-compliant agents will accept the bribe demand from the incompetent officer, and the non-compliant will accept the bribe demand from the competent officer. Hence, an agent who gains g' from being non-compliant will do so if and only if,

$$g' - \theta f - (1 - \theta)k \geq -(1 - \theta)k.$$

Using g to denote the marginal agent who is indifferent between compliance and non-compliance, the previous equation simplifies to,

$$g' \geq \theta f \equiv g. \tag{3}$$

[11] We wish to note that if $x > f$, then all agents reject the bribe and if $x < k$ then all accept the bribe. In both cases there is no screening and the posterior belief upon rejection is the same as the prior, α.

[12] Of course, in many jurisdictions officers enjoy considerably immunity from committing type-1 errors. This issue is analyzed in depth in Mishra and Samuel (2018) who do not consider the relationship between bribery and extortion relate to competence and immunity polices.

Since the compliant pay k only when they encounter an incompetent agent, and the non-compliant agents pay a fine f in the form of a bribe, enforcement is diluted to the extent that the fraction of competent officers fall short of 1.

Turning to the officers' competence decisions, an officer with cost e' chooses to become competent if and only if,

$$(1-\alpha)f - e' \geq k.$$

Using e to denote an officer who is indifferent between becoming competent and remaining incompetent, the previous equation simplifies to,

$$e' \leq (1-\alpha)f - k \equiv e. \tag{4}$$

Equations (3) and (4) allow us to characterize the best responses of the agents and officers, where given our distributional assumptions $\theta = e$ and $\alpha = g$. Let $\gamma_{xi}(e)$ represent the agents' best response to the officers' competence choices, then from (3)

$$\gamma_{xi}(e) = ef.$$

Similarly, let $\epsilon_{xi}(g)$ represent the officers' best response to the agents' compliance decisions. Then from (4) it follows that,

$$\epsilon_{xi}(g) = (1 - \frac{g}{G})f - k.$$

These best responses are graphed in figures 1 and 2.

Alternatively, if condition (2) is violated then the incompetent choose not to extort. Note that a necessary condition for this equilibrium to arise is $r > k$. [13] In this case citizens commit a crime if and only if, $g' - f\theta - (1-\theta)f \geq -(1-\theta)k$, or

$$g' \geq f - (1-\theta)k \equiv g_n. \tag{5}$$

Similarly, in this case an officer chooses to become competent if and only if $\alpha(-d)+(1-\alpha)r \leq \alpha(0) + (1-\alpha)f - e'$, or

$$e' \leq (1-\alpha)(f-r) + \alpha d. \tag{6}$$

Equations (5) and (6) can be used to characterize the best response of the agents and officers when the incompetent do not extort. Specifically,

$$\gamma_n(e) = f - (1-e)k$$

[13] This condition is implied when condition (2) is violated because when (2) is violated, $r > k$.

and

$$\epsilon_n(g) = (1 - \frac{g}{G})(f - r) + \frac{g}{G}d.$$

Using these best responses, we now characterize the equilibrium in this case where competent officers do not extort.

Proposition 1 *Depending on the value of d incompetent officers may choose to extort in equilibrium.*

a. *If d is neither too small or large, specifically if*

$$d \in [\frac{r(kf + G) - kf^2 - kG}{f(f - k)}, \frac{r(kf + G)}{f(f - k)}] \equiv [d_2, d_1]$$

then we have a ***Incompetent Extortion*** *equilibrium in which competent officers demand bribes $b_c = f$ and incompetent officers demand $b_i = k$ from both compliant and non-compliant agents, and the equilibrium levels of compliance and competence are*

$$g^*_{xi} = min\{\frac{Gf(f - k)}{G + f^2}, f\}$$

and

$$e^*_{xi} = min\{\frac{G(f - k)}{G + f^2}, 1\}.$$

b. *If*

$$d \leq \frac{r(G - f + k) - k(G + k(f - r))}{(k + 1)(f - k)} \equiv d_3$$

then we have a ***No Extortion*** *equilibrium in which only the competent demand a bribe $b = f$, and the incompetent officers detain both compliant and non-compliant citizens so there is harassment but no extortion. In this equilibrium, the equilibrium level of compliance and competence are,*

$$g^*_n = \min\{\frac{G(f - k + k(f - r))}{G + k(f - r - d)}, f\}$$

and

$$e^*_n = \min\{\frac{G(f - r) - (f - k)(f - r + d)}{G + k(f - r - d)}, 1\}$$

For sufficiently small d, these two pure strategy equilibrium may co-exist with a third mixed strategy equilibrium wherein there is no extortion, but both the competent and incompetent demand bribes and the incompetent officer's bribes are rejected with some probability. In this equilibrium, the equilibrium level of compliance and competence are,

$$g^*_M = \min\{\frac{G(f - k)r}{Gr - dfk}, f\}$$

and

$$e_M^* = \min\{\frac{df(f-k)}{Gr - dfk}, 1\}.$$

Proof. The solution to $\gamma_{xi}(e)$ and $\epsilon_{xi}(g)$ yield g_{xi}^*, e_{xi}^*. If the value of e at this solution is greater than 1, then $e_{xi}^* = 1$ and $g_{xi}^* = f$. In this case, the equilibrium occurs at a "corner." Assuming an interior solution, the equilibrium beliefs that result from this solution must also satisfy (2) and (1). That is, at $\alpha = \frac{g_{xi}^*}{G}$

$$(1-\alpha)r - \alpha d \leq k$$

and also satisfy (1). These two conditions require that,

$$\frac{r}{r+d} \geq \frac{g_{xi}^*}{G} \geq \frac{r-k}{r+d}.$$

Or,

$$\frac{r}{r+d} > \frac{f(f-k)}{G+f^2} > \frac{r}{r+d} - \frac{k}{r+d}.$$

Solving for d in the chain of inequalities yields the upper and lower bounds on d in part (a) of this proposition. If instead the solution is interior, then the following chain of inequalities must be satisfied instead,

$$\frac{r}{r+d} \geq \frac{f-k}{G} \geq \frac{r-k}{r+d}.$$

When $k \geq (1-\alpha)r - \alpha d$ is violated in equilibrium then $\gamma_n(e)$ and $\epsilon_n(g)$ determine the equilibrium values e_n^* and g_n^*. If the value of e is greater than 1 at this solution, then $e_n^* = 1$ and $g_n^* = f$. For this pair to be an equilibrium it must satisfy the requirement that,

$$k < (1-\alpha)r - \alpha d$$

at g_n^*, which yields,

$$d \leq \frac{r(G-f+k) - k(G+k(f-r))}{(k+1)(f-k)} \equiv d_3$$

Clearly, both sets of conditions on d may be satisfied simultaneously, in which case there will be multiple equilibria.

Finally, if d is sufficiently small, then there exists a mixed strategy equilibrium, which is specified in the appendix. ■

Several insights can be gleaned from this proposition. First, if d is sufficiently large, then neither bribery nor extortion arises in equilibrium because the threat of an arrest or detention as implied by condition (1) is not credible. Hence, these two equilibria arise only

when d is positive but not too large. Second, there always exists a range over which an incompetent officer extorts because $d < \frac{r(kf+G)}{f(f-k)}$ is sufficient for such an equilibrium and since $f > k$, the right hand side of this inequality is always positive. Thus, as long as d is in a small positive neighborhood of 0, the incompetent will extort and the competent will demand bribes. Thus, extortion occurs in equilibrium whenever d is too small.[14] However, third, even for small positive values of d the existence of the pure strategy bribery equilibrium is not guaranteed. Specifically, observe that $d_1 > d_2$, but d_2 and d_3 may be either positive or negative. Indeed, if G is sufficiently small then both d_2 and d_3 are negative so that a Incompetent extortion equilibrium exists (and is the unique equilibrium) for all $d < d_1$ and a bribery equilibrium never arises. Fourth, multiple pure strategy equilibrium may arise for some range of d. For example, if $d_1 > d_3 > d_2$, then the Incompetent Extortion equilibrium is unique for $d \in [d_3, d_1]$, and bribery equilibrium is unique for $d < d_2$ and for $d \in [d_3, d_2]$ both equilibria arise.

An important implication of the previous set of insights that compliance will not vary monotonically or continuously in d. Specifically, in the No Extortion equilibrium compliant agents are harassed by incompetent officers (and must pay k to prove their innocence) whereas in the Incompetent Extortion equilibrium k is extorted from them. Thus, they pay k regardless of which equilibrium arises. However, d has a different impact in each equilibrium because in the former the incompetent harass the compliant and so incompetent officers incur d *on the equilibrium path*, whereas in the latter (Incompetent Extortion equilibrium) d is never incurred (in equilibrium). Thus, while d impacts the equilibrium level of compliance in the No Extortion equilibrium it does not do so in the Incompetent Extortion equilibrium. Accordingly, compliance may rise or fall with d.

4 Policy Analysis

The equilibria identified in the previous section clearly depend on key policy parameters such as d and f, inter-alia. Hence, by choosing these parameters a regulator can implement an equilibrium and affect the overall level of compliance and competence. This raises several policy questions. First, will a compliance maximizing regulator want to eliminate bribery or extortion (when extortion is due to incompetence)? Second, which equilibrium (from propositions 1 and 2) will a compliance maximizing regulator wish to implement? Third, does it matter whether the extortionist is competent or incompetent?

[14] We are grateful to an anonymous referee for encouraging us to emphasize this issue.

To address these questions, we first compare the levels of compliance across these four regimes in the following proposition. Before proceeding, we note that we do not include the mixed strategy equilibrium in the following analysis because, as shown in the appendix, compliance in it is always lower than compliance in the No Extortion equilibrium.

Proposition 2 *If for a given set of parameters both the Incompetent Extortion and No Extortion equilibrium co-exist, then compliance in the Incompetent Extortion equilibrium is always higher than compliance in the No Extortion equilibrium.*

Proof. We prove this claim by construction. Consider a case where $d_2 < d_3 < d_1$. Note that this case occurs as long as $r > k$ and if k is sufficiently small. Then *given some set of parameters* r, f, k, and $d \in [d_2, d_3]$ both the Incompetent Extortion and the No Extortion equilibrium co-exist. However, by construction the level of compliance in the Incompetent Extortion equilibrium must satisfy,

$$\frac{r-k}{r+d} < \alpha < \frac{r}{r+d},$$

and the level of compliance in the No Extortion equilibrium must satisfy,

$$\alpha < \frac{r-k}{r+d} < \frac{r}{r+d}.$$

Thus, the level of compliance in the No Extortion equilibrium is lower than the level in the Incompetent Extortion equilibrium. ■

Proposition 2 identifies a core insight of this paper: whether extortion is worse than bribery depends on who extorts, the competent or the incompetent. Specifically, we show that an equilibrium in which the incompetent extort is preferred to one with only bribery (the No extortion equilibrium). Recall that the literature has shown that when compliance is endogenous, extortion is worse than bribery (especially from a compliance standpoint). Here we show that extortion is actually preferred to bribery *even when compliance is endogenous* as long as it is the incompetent who are extorting.[15] Intuitively, if extortion were not possible, then when compliance (α) is large officers want to become competent because the payoff from incompetence ($(1-\alpha)r - \alpha d$) is low in the no extortion equilibrium. But, when extortion is possible, then officers can extort k and need not incur the cost d. Accordingly, when α is large then k will be greater than $(1-\alpha)r - \alpha d$, so that in such an equilibrium officers resort

[15]Importantly, this is true even when there is no loss of deterrence from the bribe because the officer has all the bargaining power and demands f.

to extortion. Thus, the Incompetent Extortion equilibrium is associated with a higher level of compliance.[16]

The preceding analysis shows that allowing the incompetent to extort is preferred to bribery. A natural follow up to this analysis is whether extortion by the incompetent is worse than extortion by competent officers. In the current framework, the competent never extort in equilibrium because they are fully informed (so extortion results in the penalty d, which they always wish to avoid). However, there are many societies in which extortioners rarely get punished so that d is virtually 0. If that is the case, then in equilibrium the competent will extort while the incompetent may demand a bribe of f (which is only accepted by the non-compliant). It is straightforward to observe that in this equilibrium, in which both competent and incompetent officers extort k, compliance is always $f - k$. That is, because regardless of whom they encounter, the compliant are always extorted and must either pay k or incur it in court, while the non-compliant always pay a bribe f, compliance is always the net difference in the benefit of complying versus not $(f - k)$ and does not depend on the fraction of competent officers. However, when only the incompetent extort, the level of compliance is increasing in competence, because fewer incompetent officers reduces the extortion costs of compliant agents. Thus, if there are few competent officers, compliance may be lower in the Incompetent Extortion equilibrium (proposition 1) relative to the Competent Extortion equilibrium. Accordingly, from a compliance standpoint it is not always clear whether extortion by the incompetent is worse than extortion by competent officers.[17] Or equivalently, it is not clear whether an equilibrium when $d = 0$ will yield a higher level of compliance than one where $d > 0$ in which only the incompetent (may) extort.[18]

Although for a given set of parameters compliance may be higher or lower when $d = 0$

[16]Note that while this is true when both equilibria co-exist for a given set of parameters, in general compliance in the Incompetent Extortion equilibrium need not be lower than compliance in the No Extortion equilibrium. This can easily be observed by comparing figure 1 and 2 and noting that the intersection of the two best responses need not be above or below the other.

[17]This can also be observed by noting that the intersection of the best response in figure 1 can be above or below $g = f - k$. A complete analysis of the case with $d = 0$ is provided in an online appendix available upon request.

[18]By conducting a similar exercise we can compare the equilibrium compliance in the Competent Extortion equilibrium with the No Extortion equilibrium. Compliance in the Competent Extortion equilibrium is $f-k$, whereas in the No Extortion equilibrium it is $f-(1-\theta)k \geq f-k$ for any θ. Hence extortion by the competent always yields a lower level of compliance than no extortion at all.

relative to when $d > 0$, it can be shown that the highest level of compliance (i.e. the maximal element) in a regime without immunity ($d > 0$) is always greater than the highest level of compliance with full immunity ($d = 0$). The following proposition characterizes this result.

Proposition 3 *For any given regime with full immunity, there exists another regime without immunity in which compliance is higher.*

Proof. First, consider the function $\gamma_\rho(e)$ for $\rho = \{xi, n, xc, x\}$. Observe that the highest achievable level of compliance in the equilibria where $d > 0$ is f, which is always greater than the highest achievable compliance when $d = 0$ (which is $f - k$). To ensure that such an equilibrium can always be implemented, consider a regime with $d = 0$ with compliance $g \leq f - k$. Comparing this level of compliance to one where $d > 0$ so that d is in the range specified in proposition 1 (a). Recall that this range is always non-empty so that such a d can always be chosen. This d implements the Incompetent extortion Equilibrium so that $e^* = e^*_{xi}$. Next choose f so that $G + f^2 > G(f - k)$. Then compliance in this new regime is f which must be higher than the level of compliance at $d = 0$. ■

An immediate implication of this proposition is that *a regulator will always implement less than full immunity ($d > 0$) and as a consequence allow possible extortion by the incompetent.* The intuition behind this striking result is worth exploring.[19] When only the incompetent extort, the negative effect of extortion can be eliminated by raising competence. But, when the competent extort then raising competence cannot eliminate extortion and its associated detrimental effect on compliance. Thus, extortion by the incompetent is the "lesser of the two evils."

This last result is worth contrasting with Mishra and Samuel (2018). In that paper an equilibrium with full immunity ($d = 0$) need not be worse than one with no immunity. In contrast, here an equilibrium with full immunity is always worse than one with no immunity (in the sense described above). This arises because here when $d = 0$ the competent extort which weakens deterrence, whereas when officers are incorruptible this effect does not arise.

Finally, we turn our attention to some key comparative static results, which are identified in the following proposition.

[19]The result here is similar to a "domination theorem" due to Dasgupta and Maskin (2008), in the context of selecting voting rule. Similarly, in Mishra (2002), the maximal elements of different hierarchical structures are compared, while choosing optimal enforcement policies.

Proposition 4 *In both equilibria identified in proposition 1, compliance is increasing in f and decreasing in k. Compliance is increasing in d only in the No Extortion equilibrium, whereas it is unaffected by d in the incompetent extortion equilibrium.*

The results concerning f and k are straightforward within the context of the standard enforcement framework. The effect of d, however, is more interesting. When extortion occurs, then penalties to officers who harass compliant agents never matter, hence d does not effect compliance or competence. Thus, it is only when extortion never occurs (i.e. the No Extortion equilibrium), that d can affect compliance. However, if d is raised too high (above d_3) the No Extortion equilibrium may be eliminated, in which case again d has no affect on compliance. Thus, it suggests that penalties for harassment need to constructed carefully in order to make them effective.

We conclude this discussion by offering some insight into welfare maximizing policies. A-priori it is not obvious whether a welfare maximizing regulator will prefer extortion by the incompetent or bribery. In an equilibrium with only bribery, the incentive to become competent is strong whereas when the incompetent can extort, the incentive for competence is weak. But, as a result competence costs will higher in the former equilibrium. Further, since the incompetent do provide some deterrence (because they demand payments from non-compliant citizens), deterrence is not fully compromised. Accordingly, it may be also may be welfare-maximizing to allow the incompetent to extort.

To illustrate this idea we provide the following example in which welfare is higher in an incompetent extortion equilibrium rather than in a bribery equilibrium.

Example 1 *Consider a utilitarian welfare function,*

$$\frac{1}{G}\int_{g_i^*}^{G}(g'-h)dg' - \int_{1}^{e_i^*} e'de'.$$

Note that all bribes and extortion payments are transfers from citizen to officer and are therefore not present in the welfare function. Further, h represents the harm from the criminal action.

Let $d = 0.01, G = 8, k = 0.2, r = 0.8$. At these values it can be shown that both the Incompetent Extortion and No Extortion equilibria are feasible (and co-exist). At $h = 9$ there is under-deterrence in the sense all activity should be prohibited, but since enforcement is costly, it cannot be eliminated and so the harm must be minimized. In this case, welfare in

the Incompetent Extortion equilibrium is -3.38 *whereas under the No Extortion equilibrium it is lower* (-3.4)*.*

Thus, this example illustrates that bribery is not necessarily preferred to extortion.

Similarly, welfare maximization need not imply that $e^* = 1$. Indeed, the presence of extortion by the incompetent may imply that the solution to the regulator's maximization problem is less than full competence by officers (i.e. $e^* < 1$). Intuitively, when $e^* < 1$ competence costs are lower than when $e^* = 1$ and further since even the incompetent do sanction some criminals they do provide some deterrence, but at a lower cost than the competent. Thus, a welfare maximizing regulator may, in this context, favor a less-than-fully competent bureaucracy.

5 Conclusion

This paper offers a model in which extortion occurs before the officer has determined whether an agent is non-compliant or compliant, in contrast to the rest of the literature where extortion occurs after and only when the officer has determined whether the agent is compliant. Here officers can make credible threats to extort because they have the ability to apprehend and detain agents (both criminal and compliant) during the investigative process. As long as there is some cost to apprehending compliant agents, competent officers never extort. Incompetent agents, however, do not observe the agent's compliance decisions. Thus, they can commit to further investigate the agent if their beliefs that the agent is non-compliant are sufficiently high. Since this investigative process incurs a cost on agents (even when they are compliant), which we refer to as "harassment," compliant agents are willing to make an extortion payment to avoid these costs. Thus, extortion occurs even though the officer cannot frame the agent in contrast to Polinsky and Shavell (2001) or Khalil, Lawaree and Yun (2010).

The main implication of allowing extortionists to be either competent or incompetent is that the prevalence of extortion depends on whether the officer has chosen to become competent. Furthermore, extortion itself will affect the decision of the officer to become competent, which may have long term effects on compliance. This result is particularly interesting in light of Gambetta's (2009) empirical study which finds that corrupt bureaucrats often chose to be incompetent at their work in order to prove to non-compliant agents that they "lack better alternatives," and therefore will not renege on their corrupt transactions. While we do not explore this angle explicitly (i.e. hold-up), our model suggests that extortion

(in addition to bribery) will affect the officer's decision to become incompetent.

Our model offers insight regarding whether extortion, bribery, or harassment is the lesser or worse of the three evils. As we show in proposition 2 an Incompetent Extortion equilibrium always yields a higher level of compliance than a No Extortion equilibrium *for a given set of parameters*. However, more generally in our framework No Extortion need not be worse than Incompetent Extortion for different parameter values. This finding must be contrasted with Polinsky and Shavell (2001) who find that extortion is the lesser of the two evils (compared to harassment or framing). The distinction arises between our result and theirs because of the competence effect. That is, in the No Extortion equilibrium the incentive for competence is stronger, which benefits compliance. Thus, this result further highlights the importance of understanding the effect of extortion on officers' decisions.

Our paper also offers insight into whether extortion by competent officers is worse than extortion by the incompetent, an issue that has not yet been investigated in this literature. As we show in proposition 3, compliance can always be raised by eliminating extortion by the competent, while allowing extortion by the incompetent. Accordingly, when choosing to permit either competent and incompetent extortionists, somewhat surprisingly, incompetent extortionists are the lesser of the two evils. Thus, extortion by incompetent officers presents very different issues than the type of extortion by competent officers that has been studied in the extant literature.

We conclude by offering a few thoughts regarding the limitations of our paper and ideas for extending this work. First, we assumed that the officer always demands a bribe. However, bribes may instead be offered by the citizen. When the citizen can offer a bribe, the bribe becomes a signal of the agent's compliance, therefore, the game becomes a signaling game. As is well known signaling games admit several equilibria, however, in an appendix we show that only one equilibrium survives the divinity criterion.[20] Second, as we noted in the policy discussion, welfare may be higher in an equilibrium in which the incompetent extort. Thus, whether extortion is welfare reducing depends on whether the competent or the incompetent extort. We leave it to future work to study the relationship between welfare maximization, competence and extortion more closely.

[20] Available upon request.

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6 Figures

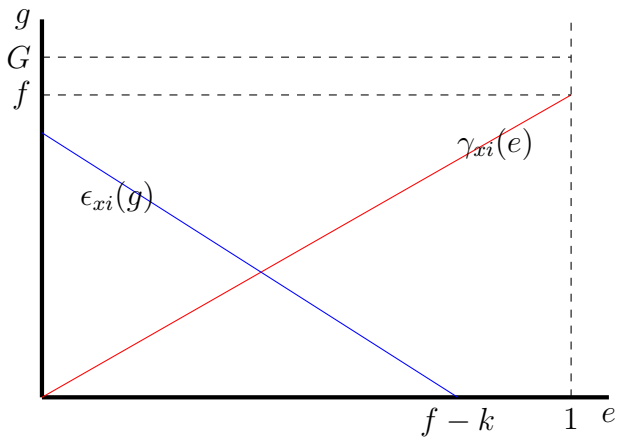

Figure 1: Incompetent Extortion equilibrium

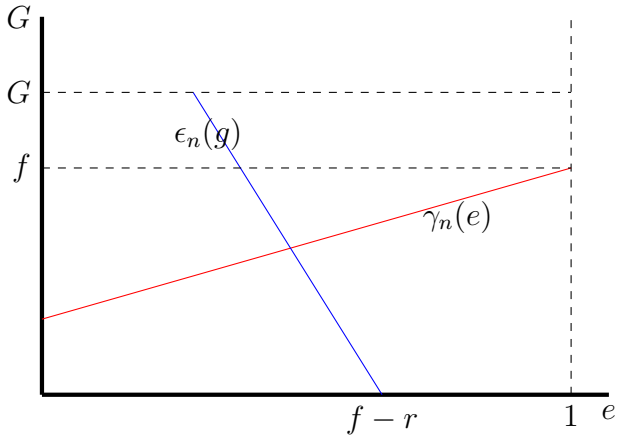

Figure 2: No extortion equilibrium .

7 Appendix

In this appendix we provide a complete characterization of the mixed strategy equilibrium identified in lemma 1 and proposition 1.

Recall that $p = prob(Accept|Noncompliant)$, and $1 - p = prob(Reject|Noncompliant)$ and consider the case where $p < 1$; i.e. where the non-compliant play a non-degenerate mixed strategy. Then, via Bayes rule,

$$prob(compliant|Reject) = \frac{\alpha}{\alpha + (1-\alpha)(1-p)} \equiv \mu.$$

That is, μ is defined as the posterior probability that the agent is compliant (upon rejection). The strategy p is an equilibrium if the officer is indifferent between going to court or not; that is, if

$$r(1-\mu) - \mu d = 0.$$

A straightforward calculation shows that,

$$p^* = 1 - \frac{\alpha d}{(1-\alpha)r}.$$

At this strategy, the non-compliant agents' expected payoff is,

$$(1-\alpha)[px + (1-p)qr] - \alpha q d,$$

which simplifies to,

$$\frac{x(r(1-\alpha) - d\alpha)}{r}.$$

Clearly, this expression is increasing in x. Thus, an officer who chooses to be incompetent will always choose $x = f$.

At these equilibrium values the best response of the citizens is: $\gamma_M(e) = f - (1-e)k$, while the best response of the officers is $\epsilon_M(g) = \frac{d\alpha f}{r}$. Solving these two equations yields g_M^* and e_M^* in proposition 1.

We now ensure that the beliefs generated by these equilibrium values are consistent with the conditions necessary for this equilibrium. At this equilibrium value of α, the officer's expected payoff from this strategy must be larger than demanding a bribe of k which would be accepted with certainty by both types. That is,

$$(1-\alpha)(r + \mu(f-r) - \alpha d) > k$$

at $\alpha = \frac{g_M^*}{G}$. And, at this same α reporting must be credible; that is,

$$(1-\alpha)r - \alpha d > 0.$$

A few steps of algebra shows that the first condition is satisfied if,

$$d \leq \frac{r(G-f)}{f(1+k)},$$

while the second condition is satisfied if,

$$d < \frac{r(G-f+k)}{f(1+k)-1}.$$

Since the first condition is stronger than the second, it follows that if d is sufficiently small this mixed strategy exists.

Claim 1 *Compliance in the No Extortion equilibrium (identified in proposition 1) is always higher than compliance in the mixed strategy equilibrium.*

Proof. The proof follows from two facts: (1) that $\gamma_N(e) = \gamma_M(e) = f - (1-e)k$ and (2) compliance is increasing in e. Hence, if we show that $\epsilon_M(g) < \epsilon_n(g)$ for the relevant parameter space, then it follows that compliance in the No Extortion equilibrium is higher than compliance in the mixed strategy equilibrium.

Recall, $\alpha = g/G$. Then, a few steps of algebra shows that,

$$\epsilon_M(g) = \alpha\frac{df}{r} < \epsilon_n(g) = (1-\alpha)(f-r) + \alpha d$$

if and only if,

$$\alpha < \frac{r}{r+d},$$

which is always satisfied in any equilibrium. Hence, it follows that $g_M^* < g_n^*$.

■