



## Announced vs. surprise inspections with tipping-off

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### ABSTRACT

This paper analyzes a model in which a firm's compliance with regulation is monitored by a supervisor. The supervisor exerts costly, unobservable effort to raise his inspection intensity, which leads to moral hazard. A non-compliant firm may exert effort in avoidance to reduce the probability of sanction. The regulatory framework is such that inspections may be announced or unannounced. Our analysis derives novel results about the response of monitoring and avoidance to changes in inspection policies, as well as conditions under which a regulator who maximizes compliance prefers unannounced to announced inspections. When the supervisor is corruptible, unannounced inspections are susceptible to a tip-off from the supervisor to the firm in exchange for a bribe. To eliminate bribery, the regulator may reduce the frequency of inspections. However, in an example, we show that eliminating tipping-off may lead to lower compliance unless the supervisor's wage is raised.

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### 1. Introduction

Regulators face a choice between inspecting the agents under their supervision continuously and implementing occasional inspections. For instance, a recent report by the non-profit organization *Food and Water Watch* discusses the controversy surrounding the U.S. Department of Agriculture's (USDA) inspection policies of meat packing plants. Currently the USDA continuously inspects the meat packing process by stationing inspectors at each plant every day. However, perhaps due to budget cuts, the USDA plans to discontinue this continuous inspection process and instead conduct occasional inspections.<sup>1</sup> The USDA asserts that this change will result in \$250 million of direct savings for the industry and \$30 million of savings in government expenditure. Although the USDA claims that food safety will not be affected by this change, consumer and environmental protection groups such as Food and Water Watch contest their claim and argue that continuous inspections are necessary in order to enforce food safety standards (*Food and Water Watch, 2011*).

The debate surrounding the USDA's policy change suggests that even if continuous inspections maximize compliance, in most situations they will be too costly to implement. Indeed, a recent report on "Good regulatory practices" conducted for the World Bank states that blanket inspections of all facilities are usually impossible due to financial constraints (*Jacobs and Cordova, 2005*). Thus, cost constraints place limits on the ability of the regulator to conduct continuous inspections.

When inspections are occasional rather than continuous the regulator faces a further choice between letting individuals know ahead of time when an inspection is forthcoming and conducting surprise inspections. For example, airlines conduct continuous

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<sup>1</sup> Two recent articles in the *Huffington Post* provide an overview of the issues (*Almanza, 2012; Hauter, 2012*).

inspections by checking every passenger's ticket before allowing them to board. In contrast the Maryland Transit Authority conducts occasional, unannounced (i.e. surprise) inspections for passengers who board the Baltimore light rail.<sup>2</sup> Intuition suggests that surprise inspections may be more effective because they enable the regulator to catch the violator off-guard. However, a potential problem with surprise inspections is that if some of the officials in the regulatory agency are corrupt, they may tip off non-compliant individuals in advance, thereby spoiling the surprise (Chin, 1999). This tip-off will be particularly valuable to the individual if as a result he can more easily hide the evidence of his non-compliance.

There is evidence to suggest that corruption in the form of a tip-off may be a significant problem in regulatory settings. For example, the New York Department of Transportation conducts surprise inspections of school bus companies to test the road-worthiness of their buses. School-bus supervisors at the department of transportation in New York, however, were recently known to accept bribes from firms in exchange for informing them of an upcoming inspection. Firms were then able to hide the buses that were faulty in order to avoid being penalized. This story was recently reported in the *New York Times* (Von Zielbauer, 2009). Furthermore, in a study dealing primarily with the accounting industry, Sanchirico (2006) also points to the empirical relevance of detecting avoidance efforts and the resulting social costs.

The effectiveness of the alternative inspection regimes described above, whether continuous or occasional, surprise or announced, will be further confounded by moral hazard if the regulator needs to hire inspectors who must exert costly and unobservable effort in order to carry the inspections. Thus, for example, although the TSA conducts continuous inspections, the actual probability of detecting violators will be lowered if TSA officers shirk.

The previous discussion raises several important questions regarding the optimal choice of an inspection regime when supervisory effort is non-contractible, firms can hide evidence, and corruption can occur in the form of inspectors tipping off the firms that they are hired to supervise. Specifically, under these circumstances an important question to address is whether a compliance maximizing regulator will prefer occasional or continuous inspections. Second, if inspections are occasional, should they be announced or unannounced? Third, how does bribery and tipping-off affect compliance under these different inspection regimes? Fourth, how does bribery affect the regulator's choice of inspection regimes (i.e. the frequency of inspections, and whether announced or surprise)? And, fifth what policies can the regulator employ in order to eliminate bribery, assuming that eliminating bribery is desirable?

To study these issues we develop a Principal–Supervisor–Agent model of inspection regimes where bribery and tipping-off can weaken the power of unannounced inspections. To our knowledge ours is the first paper to formally model tipping-off with bribery. In the model, the principal is a compliance maximizing regulator who must hire supervisors in order to inspect the agents or firms, and fine the ones that are found to be non-compliant. The regulator chooses the frequency of inspections, that is, whether inspections will be continuous or occasional, and whether the inspection regime will be announced or unannounced. Taking this regulatory environment as given, the firm and the supervisor then play a simultaneous move game in which the firm chooses its level of concealment (i.e. avoidance), while the supervisor chooses the level of monitoring effort. Following Malik (1990), the probability of detecting a firm's non-compliance is increasing in monitoring effort and decreasing in the firm's level of avoidance. However, in contrast to Malik the regulator faces a moral hazard problem because the supervisor's monitoring effort is non-contractible.<sup>3</sup> Thus, our model distinguishes the probability of scheduling an inspection from the probability of successful detection, conditional on an inspection being scheduled.

We show that conflating the probability of detection with the probability of scheduling an inspection, along with the assumption of observable inspection effort that is retained in previous models, are not innocuous. Indeed, as a result of moral hazard, in our model the probability of detection will typically be less than one even when an inspection is scheduled. Thus, similar to Mookherjee and Png (1995) the regulator must rely on the supervisor's wage to influence the probability of successful inspection. Furthermore, another difference with previous models is our analysis of corruption, also made possible by the introduction of a supervisor susceptible to moral hazard.

When supervisors are incorruptible, we show that as long as the supervisor's equilibrium effort is sufficiently elastic with respect to an increase in the inspection frequency, a compliance maximizing regulator will implement a continuous inspection regime. Otherwise, a compliance maximizing regulator will choose to implement a surprise, occasional, inspection regime. If inspectors are corrupt, we show that whenever a compliance maximizing regulator prefers an unannounced inspection to an announced inspection regime, the firm will have an incentive to pay the supervisor a bribe in order to receive a tip-off. The payment of a bribe effectively converts an unannounced inspection regime into an announced regime and will always lower compliance. Thus, under an unannounced regime, bribery will generally prevent the regulator from achieving the desired level of compliance. Interestingly, we show that under some conditions the regulator can eliminate bribery by lowering the frequency with which inspections are conducted. Intuitively, lowering the frequency of inspections reduces the benefits of receiving a tip-off, thereby lowering the incentives for bribery. Thus, even when there are no penalties for bribery, bribery can be eliminated by choosing the appropriate frequency of inspections. Furthermore, we show that although inspections must be less frequent in order to eliminate bribery, under some conditions overall compliance may be raised compared to the regime that allows for corruption. However, in general it is not excluded that the regulator will always prefer to allow bribery. We provide numerical examples in which the frequency of inspections and the supervisor's wage act as substitutes in the expression for expected compliance. In this case, any level of compliance that would prevail under bribery can be achieved without bribery by lowering the frequency of inspections and raising the wage.

Our findings regarding the regulator's choice of inspection regimes are related to other recent studies. Lazear (2006) shows that from a regulatory standpoint, neither surprise nor announced inspections are unambiguously preferred. In Lazear's model,

<sup>2</sup> Similarly, while the Transportation Security Administration (TSA) inspects every traveler, the New York City subway randomly subjects passengers to search.

<sup>3</sup> In further contrast our paper distinguishes between surprise and announced inspections, whereas Malik only studies the impact of the firm's concealment activity on compliance.

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