CSAE WPS/2008-25

Combining Top-down and Bottom-up Accountability: Evidence from a Bribery Experiment*

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October 7, 2008

Abstract

Monitoring corruption typically relies on top-down interventions aimed at increasing the probability of external controls and the severity of punishment. An alternative approach to fighting corruption is to induce bottom-up pressure for reform. Recent studies have shown that both top-down and bottom-up mechanisms are rarely able to keep service providers accountable. This paper investigates the effectiveness of an accountability system that combines bottom-up monitoring and top-down auditing using data from a specifically designed bribery lab experiment. We compare "public officials" tendency to ask for bribes under: 1) no monitoring; 2) conventional top-down auditing, and 3) an accountability system which gives citizens the possibility to report corrupt officials, knowing that reports lead to formal punishment with some low probability (the same as in 2). The experimental results suggest that "combined" accountability systems can be highly effective in curbing corruption, even when citizens' "voice" leads to formal punishment with a relatively low probability. In contrast, pure top-down auditing may prove ineffective, especially in a weak institutional environment.

JEL Classification: D73, C91, D81, Z13
Key Words: Corruption, monitoring, bottom-up, experiment

*I am indebted to Abigail Barr, Klaus Abbink, Mikhail Drugov, Andrew Zeitlin, Pedro Vicente and audiences at the CSAE seminar, Oxford, the 2008 IMEBE meeting, Alicante, and the 2008 ESA European meeting, Lyon, for useful comments and suggestions. Finally, I aknowledge financial support from the George Webb Medley Fund, Oxford.

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1 Introduction

Monitoring corruption typically relies on top-down interventions aimed at increasing the probability of external controls and the severity of punishment. However, top-down accountability mechanisms are likely to fail to improve governance in countries where legal and judicial institutions are deficient, and public officials enjoy full discretionary power. An alternative approach to fighting corruption, which has received increasing attention among development economists and practitioners in recent years, is to induce bottom-up pressure for reform. However, the existing empirical evidence on the effectiveness of grass-roots accountability mechanisms is disappointing (see Banerjee, Deaton and Duflo, 2004, and Olken, 2007). It seems that while local communities and/or recipients of public services are in a position to better monitor public officials, they usually lack the power to enforce formal fines.

What if bottom-up monitoring were able to activate formal rule enforcement? Would a system based on monitoring coming from the bottom and fines following from the top be able to keep public servants accountable even in a weak institutional environment? This paper aims to answer this question by using data from a specifically designed bribery lab experiment.

Economic experiments present a clear advantage over other research approaches in the study of corruption. By simulating the environment in which corrupt decisions are made, experiments make it possible to directly *observe* corrupt behaviour, and investigate how agents respond to different incentive systems in a controlled setting. Therefore, economic experiments make it possible to overcome the problem of measuring corruption, as well as problems of endogeneity and lack of control, which tend to affect cross-country studies of corruption and field experiments. However, experimental results may suffer in terms of *external validity*, i.e. the ability to make predictions about the behaviour of individuals who live or interact with others and make decisions in the *real world*. Nevertheless, experimental data can be highly informative of individuals' responses to different sets of monetary and non-monetary incentives, and may therefore serve either as a diagnostic tool to dig into the microeconomic causes of the failure or success of an anti-corruption intervention, or as a pre-intervention tool to provide a first evaluation of how individuals may respond to alternative anti-corruption measures.[1]

[1] For a general discussion on the advantages of experimental economics in the study of policy reforms, see Cason and Mui (2003).

The bribery experiment employed in this paper tests the effectiveness of an anti-corruption accountability mechanism that combines bottom-up monitoring and top-down enforcement, as opposed to "pure" top-down auditing. The specific "combined" accountability mechanism simulates monitoring institutions such as complaints offices or "hot lines", which initiate formal investigations of wrongdoings on the part of service providers following citizens' anonymous denunciations.

I run the bribery experiment involving a total of 180 individuals. In the specific of the game, "public officials" had to decide whether and how much to demand from "private citizens" as a bribe in exchange for a corrupt service, and "private citizens" had to decide whether and how much to pay as a bribe. If a bribe was demanded and paid, the briber-bribee pair benefited, while "other members" of society suffered a monetary loss. I compare public "officials"' willingness to demand a bribe under: 1) no monitoring, 2) the presence of external controls, in the form of a fine applied with a low probability (set at 4 per cent), and 3) the presence of institutions that gave the citizens the possibility of formally "reporting" the corrupt officials, knowing that formal reports lead to the same probabilistic punishment described under 2.

Results from the game suggest that anti-corruption interventions that combine bottom-up monitoring and top-down rule enforcement can be highly effective in curbing corruption, even when citizens' "voice" leads to low-probability formal punishment. Indeed, the possibility for the citizens to report corrupt officials significantly reduced bribe-demanding behaviour in the game: 30 per cent of the officials decided to abstain from corruption in the combined accountability treatment against only 5 per cent in the no monitoring treatment. By contrast, the presence of controls coming exclusively from the top (with a low probability) did not significantly reduce the officials' tendency to demand bribes.

The experimental results contradict expectations of corruption behaviour based exclusively on monetary incentives. Given the design of the experiment, if the officials had only been concerned about the monetary gains and costs associated with corruption, we would have observed the same or a higher propensity to abstain from bribery under top-down auditing than under the combined accountability system – same if the officials were risk-neutral, and higher if the officials were sufficiently risk-averse. The fact that we obtain the opposite result suggests that non-monetary costs may also play a significant role in the individual decision to engage in or abstain from bribery, and, therefore, should possibly be exploited when designing anti-corruption interventions.

The paper is organized as follows: Section 2 reviews the recent literature on top-down and bottom-up accountability, Section 3 describes the experimental methodology and presents some theoretical predictions; Section 4 introduces the subject pool while Section 5 presents the empirical results. Finally, Section 6 concludes with a brief discussion of our findings.

2 Top-down vs. Bottom-up Accountability

The 2004 World Development Report is entirely centered on the idea that development interventions would be more effective if poor people were put "at the centre of service provision, by enabling them to monitor and discipline service providers, by amplifying their voice in policy making, and by strengthening the incentives for providers to serve the poor". People's "voice" can take three main forms: 1) participation at the early stage of a project, in the form of consultation, 2) social pressure for reform, following disclosure of information on the operation of state institutions, and 3) direct monitoring of public policy-making and implementation. Anti-corruption bottom-up interventions typically belong to the third category.

The emphasis on community-driven development in general, and community -driven monitoring in particular, has grown in the last few years, following decades of top-down interventions that have often failed to reach the citizens most in need, especially in poorly governed countries (see World Bank, 2007). The top-down approach relies on monitoring and fining of service providers by public officials who belong to the same institutional hierarchy but have higher rankings. In environments where lack of transparency and weak incentives affect all institutional levels, the problem of *holding the monitors accountable* becomes crucial for any top-down approach to prove effective. If we restrict our attention to accountability in the public sector and corruption, we can easily recognize that in a country characterized by systemic corruption, and lacking a clear anti-corruption commitment from the very top of the bureaucratic hierarchy, any intervention aimed at increasing the probability of external auditing – for example by increasing the number of auditors and top-down controls – may paradoxically increase corruption, as more auditors could be bribed in exchange for turning a blind eye.

It has been argued (World Bank, 2007, and Banerjee and Duflo, 2005) that bottom-up, community-based monitoring can be more effective in curbing corruption for at least three reasons: 1) the beneficiaries of the public services provided by corrupt officials, *i.e.* the citizens, are likely to have

better information about the quality of the service provided, and also about corruption if a bribe is extracted from them; 2) citizens may have stronger incentives to monitor the providers of corrupt services, since they may suffer the costs of corruption directly, and 3) the possibility of being monitored by members of the local community may impose additional non-monetary costs to the public officials, through their fear of incurring social disapproval and/or informal fines. However, several factors can limit citizens' willingness and/or ability to express their "voice" and keep officials accountable. First of all, citizens may not have enough information on the quality of the service provided, the standard that such service should meet, or, more generally, their rights as beneficiaries of a public service.[2] Second, citizens/beneficiaries may be captured by local elites and give up their "voice", especially in a context of illiteracy, social conflict and general distrust in formal institutions. Third, grass-root monitoring may be subject to free-riding since, on the one hand, it requires effort from a sufficient number of citizens in order to prove effective, and, on the other, those who decide to monitor may suffer negative repercussions from corrupt officials. Finally, there needs to be some formal mechanism in place for the beneficiaries of a public service to be able to hold providers accountable.

Empirically, a number of recent studies have conducted randomized interventions to evaluate the effectiveness of either top-down or bottom-up accountability mechanisms, but not a combination of the two. On the "top-down only" side of the literature, the study by Kremer and Chen (2001) provides an example of how top-down auditing may be problematic due to lack of commitment on the part of the monitors. The authors document the failure of an intervention conducted in pre-schools in Kenya aimed at increasing teachers' school attendance through bonuses administered by the headmasters on the basis of the teachers' attendance. While the top-down system empowered headmasters to keep teachers accountable, it left headmasters un-accountable; as a result, headmasters frequently gave bonuses to teachers regardless of their monthly presence/absence rates, and often embezzled the resources that were to be used for bonuses. On the other hand, Duflo and Hanna (2005) report on the success of a top-down intervention conducted in non-formal schools in Rajasthan to reduce teachers' absence. Here, the monitoring of the teachers was implemented through the use of photo-cameras – teachers were required to have a photo taken, to-

[2] Reinnika and Svensson (2005) have shown that the availability of relevant information has a crucial impact on the citizens' willingness and ability to monitor public service providers.

gether with their students, at the beginning and the end of every school day – and was therefore immune to any form of collusion between the monitor and the monitored. Consequently, the probability for a teacher to be found and "reported" absent was equal to 100 per cent in the "treated" schools. However, despite the success of the intervention, the authors doubt that such a strong monitoring and incentive system could be applied to formal government schools, due to the strong opposition of teachers' associations.

The top-down auditing system evaluated by Olken (2007) also proved effective in reducing corruption in the form of missing expenses for the construction of a public road in Indonesia. Also in this case, the probability of monitoring was equal to 100 per cent, as the "treated" villages were informed that the road construction expenses would be closely monitored by local officials, under the supervision of the promoters and founders of the project. It should be noted that an auditing system that relies on a 100 per cent probability of detection is overly costly and therefore unlikely to be implemented on a large scale.

Turning to "bottom-up only" studies, Banerjee, Deaton and Duflo (2005) report on the ineffectiveness of a grass-root intervention aimed to monitor absence of health professionals in Rajasthan. A member of the local community was given the task of monitoring, once a week, the presence of the nurses assigned to the local health centre; yet the local monitoring system did not translate into lower absence rates, possibly because, as noted by the authors, it was not coupled with a system of formal rewards and/or fines, and the local monitors therefore lacked enforcement power. Olken (2007) compares the effectiveness of top-down auditing in a road construction project in Indonesia (mentioned above) and a bottom-up anti-corruption intervention that relied on citizens' participation in village-level meetings where project officials documented their expenses in relation to the use of public funds for the construction of local roads. The purpose of the grass-root intervention was to give citizens the opportunity to participate directly and express "voice" in the monitoring process. Here too, bottom-up monitoring was not coupled with any formal enforcement mechanism, and proved ineffective. Bjorkman and Svensson (2008) reach different conclusions after evaluating citizens' participation in village meetings in which relevant information with respect to local health services and outcomes was disclosed through the use of report cards. The meetings seemed to induce both an increase in the utilization of health facilities and an improvement in children health outcomes; the authors argue that this is the result of increased monitoring efforts by the community. As opposed to the village meetings studied in Olken (2007), the village meetings promoted by Bjorkman and Svensson were facilitated

by local NGOs and aimed at inducing community members, following the discussions, to jointly develop an "action plan" that established concrete ways to monitor health providers.

The results generated by the existing accountability literature are controversial. Top-down auditing seems to be ineffective in holding officials accountable, unless detection takes place with a very high probability. However, this requires a large amount of resources and commitment at all levels of the bureaucratic machinery; consequently, it is unlikely to be effective in environments characterized by weak institutions and lack of political commitment. Bottom-up monitoring also seems to be generally ineffective in keeping public officials accountable, unless it is coupled with formal fining mechanisms.

Would an accountability system that combines monitoring coming from the "bottom" and formal fines following from the "top" be a more generally effective tool than "pure" bottom-up and "pure" top-down accountability systems? The present study addresses this question by analyzing "hard corruption data" generated by a specially designed laboratory bribery experiment.

3 Experimental methodology

Building on a bribery experiment introduced by Barr and Serra (2008), I designed a game in which "private citizens" and "public officials" strategically interact for the provision of a public service. Contrary to all previous bribery experiments (see Abbink 2006, for a review) in the game it is the public official (the bribee) and not the private citizen (the briber) who can initiate a corrupt transaction by demanding a bribe from a private citizen in exchange for the provision of a "corrupt" service.[3] This is the case in many bribery situations, especially in developing countries, where there is growing evidence that providers of public services frequently demand bribes of private citizens.

The game simulates the following situation. Imagine a private citizen who requires a service from a public official and imagine that the public official offers to provide the service quicker and/or better if the private citizen pays him a specified bribe. If the bribe is paid both the private citizen and

[3] In the seminal bribery experiment of Abbink, Irlenbush and Rennel (2002), it is the briber, i.e. a firm, that can initiate the transaction by offering a bribe to a public official in exchange for the provision of a corrupt service. The bribery games that followed (see Abbink, 2006, and Barr and Serra, 2008), kept the same, or a similar, briber-bribee setting.

the public official gain - the former gets a quicker and/or better service and the latter gets the bribe - but society as a whole may be worse off, either because the official's preferential treatment of the private citizen represents an inefficient allocation of resources, or because it leads to a reduction in access to or quality of the service provided to citizens who are not willing or not able to pay bribes.

In the specifics of the game, public officials and private citizens play in pairs, and each public official may demand a bribe from the citizen with whom he or she is paired in exchange for the provision of a service that generates monetary gains for the citizen. The official has to specify the amount of the bribe required, if any, and the private citizen has to decide whether and how much to pay as a bribe.[4] If a bribe is demanded and paid, the official-citizen pair benefits, whereas "other members of society" suffer a monetary loss. If a bribe is either not demanded or demanded but not paid, the private citizen receives the public service without any preferential treatment, and the other members of society do not suffer a monetary loss. Play is anonymous and one-shot.

It should be noted that the citizen in the game does not suffer the cost of corruption directly; on the contrary, he/she benefits from corruption, whereas other members of society are harmed by it.[5] In this way, the game simulates corruption in the form of collusive bribery rather than extortion, i.e. the case of a police officer asking for a bribe in exchange for the cancellation of a fine, or a public servant demanding a bribe in order to release a licence faster, or a teacher asking for informal payments in order to raise a student's marks, and so on and so fourth.

3.1 Experimental treatments and theoretical predictions

I conducted three different versions, or treatments, of the game: 1) a no monitoring treatment, 2) a top-down auditing treatment, and 3) a "combined accountability" treatment. In all treatments, the public official can demand a bribe b from the citizen in the exchange for a better and/or quicker service. The provision of the bribe imposes an administrative cost K on the

[4] As I will explain later, "citizens" played the game using the strategy elicitation method, i.e. they had to fill in a form in which they were asked to state whether they would be willing to pay any possible amount of the bribe, if demanded by the public official.

[5] The decision to make passive players, and not other briber-bribee pairs, suffer the costs of corruption follows Abbink (2005). In this way I exclude the possibility that the public official's decision to engage in bribery is motivated by negative reciprocity, i.e. by the desire to harm other briber-bribee pairs if he or she expects them to act corruptly.

official, and generates a monetary benefit V to the citizen, and a monetary loss, h, to each of the other members of society. If corruption does not take place, either because the official does not demand a bribe or because the citizen refuses to pay the bribe, the official receives a payoff equal to Y_p, the citizen gets a payoff equal to Y_c and the other members of society are unaffected by the transaction.[6]

In the no monitoring treatment, the public official's decision to demand a bribe is not subject to any formal monitoring, therefore corrupt officials are immune to formal fines. In the top-down monitoring treatment, if corruption takes place, the public official is subject to a formal fine F with probability p_e. In the combined accountability treatment, the citizen is given the possibility of anonymously reporting the corrupt official who demanded a bribe from her; if corruption had occurred (i.e. a bribe was demanded and paid) and the citizen reports the official, the official, but not the citizen, pays a fine F with some external probability, p_e– the same as under top-down auditing.[7] By exempting citizens from formal punishment we assume that a leniency program is in place, so that citizens do not suffer any cost from reporting the official (but, note, they also do not receive any monetary benefit from doing so).[8]

If we assume that individuals care only about their monetary payoffs, in all treatments citizens will be willing to pay any bribe which leave them better off, i.e. any bribe $b < V$;[9] assuming that public officials know this, they will demand the highest possible bribe of $(V - \varepsilon)$, where ε is the smallest possible positive amount, as long as this will give them a higher (actual or expected) payoff than the outside option Y_p.

Under no monitoring, the cost for the official to engage in corruption is fixed and equal to K, whereas under top-down auditing it also depends on the probability of detection p_e, the fine F, and the officials' risk-preferences. Under the combined accountability system, the total cost for the official to act corruptly also depends on the expected probability that the citizen will

[6] W set $Y_p = Y_c > Y_{other}$

[7] Note that citizens' reports lead to probabilistic punishment only if the corrupt transaction has occured. Here we assume that the act of demanding a bribe per se is not a corrupt act, and therefore cannot be punished, unless is followed by the provision of an illegal service. This design makes it possible to directly compare the effect of monitoring in the combined accountability treatment and in the top-down auditing treatment (where punishment can only happen if a bribe has been paid and the corrupt service has been delivered).

[8] Leniency is necessary in order to compare the effects of the top-down and the combined monitoring systems.

[9] Citizens will be indefferent between paying and not paying a bribe equal to V.

file a report against him, which I indicate with $\widehat{p}_c$.[10]

Given the theoretical framework above, we can make the following general predictions:

Prediction 1. The higher the probability of detection and the higher the anti-corruption fine, the greater the effectiveness of top-down auditing and the combination of top-down and bottom-up monitoring in curbing corruption as opposed to no monitoring.[11]

Prediction 2. Since the official's expected probability of being fined is lower under the combined accountability system than under top-down auditing,[12] *top-down auditing is more effective in preventing corruption than is the combined accountability mechanism.*

Prediction 3. All public officials for whom the gains from corruption are greater than the outside option will engage in bribery and will demand the highest possible bribe that the citizens would be willing to pay, i.e. a bribe equal to $(V-\varepsilon)$; the citizens will pay the bribe, and all other members of society will suffer the highest possible monetary loss.[13]

Prediction 4. We expect to observe no differences in the bribe demanded by *corrupt officials* under no monitoring, top-down auditing and combined accountability.

3.2 Non-monetary costs activated by bottom-up monitoring

Non-monetary costs may affect the public officials' decision to engage in bribery. The experimental results presented by Barr and Serra (2008) show that intrinsic motivations for not harming others or for not engaging in an illegal or immoral activity could significantly reduce individuals' tendency to engage in corruption. In the context of the bribery game presented in

[10] If the official expects the citizen to report him with certainty, *i.e.* $\widehat{p}_c = 1$, the monetary incentives associated with corruption under the combined accountability system are the same as under top-down auditing. If instead the official expects the citizen to not report him with certainty, *i.e.* $\widehat{p}_c = 0$, the monetary incentives associated with corruption under the combined accountability system are the same as under no monitoring.

[11] Assuming that agents are risk-neutral, corruption occurs under no monitoring if $V > K$, under top-down auditing if $V > \frac{K+p_eS}{(1-p_e)}$ and under the combined accountability system if $V > \frac{K+\widetilde{p}_c p_e S}{(1-\widetilde{p}_c p_e)}$.

[12] It is the same only if the official expects that the citizen will report him with certainty.

[13] This constitutes the Subgame-Perfect Nash Equilibrium of the game if we treat play as sequential and if we assume that when individuals are indifferent between honesty and corruption they choose honesty. If this were not the case, the Subgame-Perfect Nash Equilibrium would be for the official to demand either V or $(V-\varepsilon)$.

this paper, the intrinsic motivations studied by Barr and Serra (2008) would have the same effect on bribery behaviour no matter the monitoring system in place and, therefore, could not be responsible for behavioral differences between the accountability treatments. However, intrinsically motivated public officials may suffer additional or larger non-monetary costs under bottom-up monitoring because of the possibility of being reported by a citizen; such costs may, for instance, be caused by the fear of receiving direct social disapproval in the form of formal reports as this may generate worse feelings of shame or guilt. Alternatively, public officials may anticipate the non-monetary cost that they would suffer if they were "betrayed" by the citizen to whom they delivered the corrupt service. A few recent experimental studies have pointed to the existence of betrayal costs in interactions which rely (at least partially) on trust; betrayal averse individuals may be less willing to take a chance on another individual being trustworthy, rather than taking a chance on a random device (see Bohnet and Zeckhauser, 2003, and Bohnet et al., 2008). Our last prediction follows:

Prediction 5. If individuals suffer sufficiently large non-monetary costs when facing the possibility of being reported by their corruption partner**,** *the combined accountability system may be more effective than top-down auditing in preventing corruption.*[14]

3.3 Parametrization and Summary of Predictions

In the game I set:

$Y_o = Y_c = 35$

$K = 5$

$V = 15$

In the top-down and the bottom-up monitoring treatments we set:

$p_e = 0.04$

$S = 10$

The monetary cost generated on the other members of society is:

$h = 4$

The external probability of punishment and the amount of the fine are set relatively low to simulate a weak institutional environment. As discussed previously, Olken (2007) has documented the effectiveness of a high probability of formal detection (equal to unity) in the field. However, weak

[14] The official's knowledge of the upper limit of the probability of detection (being 0.04) excludes the possibility that ambiguity aversion could also be an additional reason for corruption to be less likely to occur under combined than under top-down monitoring.

legal and judicial institutions, and lack of political commitment in the fight against corruption, especially in highly corrupt countries, make a high probability of detection and/or severe punishment often unfeasible or too costly to implement.[15]

In the combined accountability treatment I set: 1) the reporting the official is not costly to the citizen;[16] 2) the probability of punishment activated by the citizen's report is the same as the probability of punishment under top-down monitoring,[17] and 3) the citizen and the other members of society do not gain financially from the citizen's report, nor from the eventual punishment of the official. Moreover, the citizen's decision to report the official is independent of the size of the bribe. Such a design allows the exclusion of strategic motives from the official's decision concerning the amount of the bribe, if any. In other words, it is exclusively the official's decision to demand a bribe, and not the specific amount demanded, that may or may not induce the citizen to file a report. This implies that the fear of being reported plays no role in the official's decision with respect to the specific size of the bribe.[18]

Given our parameterization, if individuals are purely self-interested and risk-neutral, we should observe no differences in the officials' (and the citizen's) bribery behaviour under no monitoring, top-down monitoring and bottom-up monitoring.[19] In all treatments, all self-interested public officials will demand a bribe equal to 14 and all citizens will pay the bribe.[20] If individuals are risk-averse, we ought to observe less corruption under top-down auditing than under the combined accountability system. If, instead, public

[15] Experimentally, the effectiveness of severe external punishment has been documented by Abbink, Irlenbush and Renner (2002) in a repeated bribery game, where the briber - a firm - could initiate a corrupt transaction by offering a bribe to a public official. Contrary to the present study, their game was centered on trust and reciprocity between the briber and the bribee, and simulated a long-term corrupt relationship. Moreover, in Abbink, Irlenbush and Renner (2002) the first-mover was the briber (a "firm") rather than the bribee (a "public official").

[16] In this way, I aim to simulate the best-case scenario, where citizens have full information on how to whistle-blow, and a leniancy program is in place.

[17] This is a simplification, which is instrumental to providing a clean comparison of top-down and combined monitoring.

[18] Once again, this is a simplification that allows us to conduct the cleanest possible comparison of the public officials decision to engage in corruption under top-down and combined monitoring.

[19] Public officials in the game could only demand round figures as bribes.

[20] This is the Subgame-Perfect Nash Equilibrium bribe, assuming that when citizens are indefferent between honesty and corruption, they choose honesty. If this were not the case, a bribe equal to 15 could be the Subgame Perfect Nash Equilibium.

officials are intrinsically motivated and fear social disapproval or betrayal from their partner in corruption, we may observe less corruption under the combined accountability system than under top-down auditing.

4 Experimental participants

I run four sessions per monitoring treatment, involving 15 subjects per session. The 12 experimental sessions are summarized in Table 1.

- Table 1 here -

A total of 180 Oxford University students participated in the experimental sessions. The recruitment of participants started during the last week of October 2007 by means of advertisements in colleges and departments, using mailing lists, colleges' weekly newsletters and posters. I conducted the experiments during November 2007 in seminar rooms in the Department of Economics, Oxford University, using pen and paper.

Each session of the game was played by 5 "public officials", 5 "private citizens" and 5 "other members of society". Students were randomly allocated the roles of public official, private citizen and other member of society at the beginning of the session, and maintained their roles during the game. Although "officials" and "citizens" were randomly paired in the game, nobody knew who was playing with whom. Each participant only knew his or her own role and had to decide how to play the game individually and independently from the other participants. Decisions were recorded by the participants on specifically designed forms behind privacy screens, in order to assure anonymity.

Participants played the game with an experimental currency called Gilpet, where the conversion rate between Gilpet and pounds sterling was 5:1. I used the "strategy elicitation method" to record the bribe-paying decisions of the "citizens" in the game. Each student in this role had to answer 21 questions on a form; the first 20 questions asked whether they would pay or not pay any possible bribe (equal to 1, 2, 3, up to 20) demanded by the public official.[21] The last question asked whether they would report or not report the public official, if he or she demanded a bribe from them.

[21] The maximum possible bribe in the game was at 20, rather than 15, in order to check for cognitive mistakes in the game. None of the 60 students who played in the role of public officials demanded a bribe larger than 15, and none of the students in the role of private citizens stated on their decision form that they would be willing to pay a bribe larger than 15.

In the monitoring treatments detection was implemented through the extraction of one marble from a sack containing one red marble and 24 green marbles. The extraction of the red marble would imply punishment of all the officials who demanded a bribe, if the bribe was paid by the citizens. When reading the instructions of the game under the top-down and bottom-up monitoring, the students were shown the 25 marbles and told how detection would take place during the game.[22]

After participating in the experiment, the students were asked to fill in a questionnaire, while I computed their payoffs and converted them into Pounds. Each session lasted about one hour and the average payoff from the game was £10, which included a show-up fee of £3.[23] In each of the sessions the random draw led to the selection of a green rather than the red marble. So none of the participants were fined for engaging in corruption.

- Table 2 here -

Table 2 shows age, gender and other relevant demographic characteristics of the 180 participants. The age ranged between 18 and 36; however, only 5 per cent of the participants were older than 30. The proportions of graduate and undergraduate students were roughly the same, whereas we had more male than female participants (61 vs. 39 per cent). Only a very small proportion (four per cent) of students were married, and 31 per cent considered themselves a "religious person".[24] In terms of the discipline of study, we tried to recruit students from most Oxford departments by using official mailing lists. However, almost all participants were students of Social Sciences. Economists represent 32 per cent of the subject pool; the remaining participants are mainly students of Sociology, Politics, International Relations and Law.[25]

[22] The instructions, the decision forms and all the visual aids used in the game are available on request.

[23] An amount of £10 corresponds to the standard hourly rate for a research assistant in Oxford.

[24] We asked our participants whether, independent of their specific religious affiliation (if any), they considered themselves a "religious person" or not. We also have information about the students' specific religious affiliation: 52% of the students do not belong to any religious affiliation, 16% are Protestant and 12% are Roman Catholic. The remaining 20% constitutes Buddhists, Hindus, Muslims and Ortodox Christians.

[25] The division of participants into sessions was on a first-come, first-serve basis. Each participant stated his or her first three choices with respect to the available experimental sessions, and was allocated to a specific session taking into account these stated preferences and the sessions' availability.

5 Results

5.1 The Public Officials

Figures 1 and 2, and Table 3 give a first overview of the public officials' decision to engage in corruption.

- Figure 1 here -

Only five per cent of the officials abstained from corruption when there was no monitoring system in place; the proportion of "honest" officials rose to 10 per cent under top-down auditing, and reached 30 per cent under the combined monitoring system.

The first column of Table 3 shows that while the difference in the proportion of "honest" officials under no monitoring and top-down auditing is not statistically significant, the difference between no monitoring and combined accountability is, according to both the Chi square test and the Fisher's exact test, suggesting that non-monetary costs activated by bottom-up monitoring played a significant role in the officials' decision to demand a bribe.

- Figure 2 here -

Figure 2 and the second column of Table 3 provide information on the amount of the bribe demanded in each of the three monitoring treatments. Under no monitoring only 10 per cent demanded the Subgame-Perfect bribe of 14, whereas about 60 per cent demanded a bribe equal to 10; this is the bribe that gives the citizen and the official the same final payoff. The remaining 30 per cent of the officials demanded either a bribe greater than 10 but lower than 14 or a bribe lower than 10.

Under top-down auditing the modal bribe is equal to 14, with 35 per cent of the officials demanding such a bribe. There was also a small fraction of officials who demanded a bribe equal to 15, *i.e.* the bribe which would leave a self-interested citizen indifferent between paying and not paying the bribe. 45 per cent of the officials demanded a bribe lower than 14; in particular, 20 per cent demanded 10, and an additional 20 per cent demanded an amount between 10 and 14. Given that in this treatment public officials are subject to the risk of detection, while citizens are not, demanding a bribe between 10 and 14 may also reflect the fact that officials considered as appropriate a bribe that compensated them for the risk incurred and was, therefore, greater than the "split-the-pie" bribe of 10.

- Table 3 here -

Under the combined monitoring system the modal bribe corresponds to zero; 30 per cent of the officials decided to abstain from corruption. 30 per cent of the officials demanded either 14 or 15, and 20 per cent demanded 10.[26] An additional 10 per cent of the officials demanded a bribe equal to 9, and a further 10 per cent demanded a bribe equal to 11. In summary, the bribe demanded by "corrupt" public officials is, on average, lowest under no monitoring and highest under top-down auditing; however, the differences in the bribe demanded across the monitoring treatments are not statistically significant.

To summarize, descriptive statistics and non-parametric tests suggest that combined accountability system simulated in the experiment significantly reduced the fraction of officials who decided to engage in corruption. By contrast, top-down auditing proved ineffective. The monitoring system in place did not seem to affect the size of the bribe demanded by the officials who decided to engage in bribery. Moreover, the distribution of the bribes demanded suggests high diversity in terms of individual motivations and social preferences.

In what follows I check the robustness of these preliminary results to the inclusion of a number of additional controls in the analysis. We do this by conducting parametric analyses of the official's decision to demand a bribe and the amount of the bribe demanded, as reported in Table 4 and Table 5. All regressions are clustered across experimental sessions.

- Table 4 here -

Columns (1) and (2) of Table 4 report results from probit regressions in which the dependent variable is a dummy equal to 1 for the public officials who demanded a bribe; the estimates show that the specific combined accountability system reduced the probability of a public official demanding a bribe by about 30 per cent, whereas the presence of only top-down auditing did not affect bribe-demanding behaviour.[27] These results confirm that it

[26] Note that the official's decision to demand a bribe equal to 10 cannot be the result of strategic motives, since the officials are aware that the citizen's decision to report the official is independent from the specific amount of the bribe demanded.

[27] The instructions of the game in each treatment were presented either by using a corruption frame or in abstract terms (referring to the participants as Player As, Player Bs and Player Cs, and the bribe as a "monetary transfer"). Framing the game as bribery did not affect the officials' decision to demand a bribe and did not generate differential impacts of the monitoring treatments on the decision to demand a bribe.

is the combination of the non-monetary costs activated by bottom-up monitoring and the monetary costs activated by top-down auditing, but not the monetary costs alone, which succeeded in hampering corruption.

Among the participants' individual characteristics, the results reported in Table 4 show that being an economics students and being older increased and decreased respectively the likelihood of demanding a bribe. The result obtained for the religion variable was unexpected: students who considered themselves "religious" were more likely to demand a bribe.[28]

- Table 5 here -

Table 5 presents estimates from OLS regressions on the amount of the bribe demanded by the public officials. Columns (1) and (2) restrict the sample to the officials who decided to engage in corruption, whereas columns (3) and (4) include the officials who "demanded" zero bribes. The results presented in the first column suggest that top-down induced corrupt officials to demand a higher bribe than no monitoring, confirming that, while under no monitoring officials tended to demand the split-the-pie bribe of 10, when subject to the risk of being fined, they considered it appropriate to demand a bribe larger than 10 to compensate for the risk. The combined monitoring dummy also presents a positive coefficient, but is not statistically significant.

Columns (3) and (4) of Table 5 present results from OLS regressions on the size of the bribe demanded by all public officials, including those who decided to abstain from corruption and therefore "demanded" zero. A positive coefficient in these regressions reflects public officials' propensity to both engage in corruption and demand a high bribe, whereas a negative coefficient reflects public officials' propensity to demand a low bribe or abstain from corruption. Top-down monitoring presents a positive coefficient, although not statistically significant, whereas combined monitoring keeps a negative and significant coefficient.[29]

[28] Controlling for the respondent being Protestant, Catholic, or atheist, decreases the significance of "being religious", whereas none of the religious affiliations has an effect on the likelihood of a public official engaging in corruption. The limited number of observations does not allow testing for the interaction between each religious affiliation and "being religious". In any case, our result on religion should be taken with caution, since the proxy used in the analysis might capture factors related to the socio-economic backgrounds of the students.

[29] Note that conducting OLS regressions on the amount of the bribe, without taking into account the officials' selection into bribe-demanding, is especially problematic in this context, since some individual characteristics and some experimental treatments may induce officials either to demand zero – which would result in a negative coefficient – or to

5.2 The Private Citizens

In our setting, the private citizens are never subject to formal punishment, and therefore the monitoring system in place should have no influence on their decision to engage in corruption and pay the bribe demanded, if any, by a corrupt public official.

- Figure 3 here -

Figure 3 and the first column of Table 6 confirm that the monitoring system in place had no effect on the citizen's willingness to pay a bribe; we observed no significant difference between the proportions of citizens who were willing to engage in corruption under no monitoring, top-down and combined monitoring.

- Table 6 here -

Next, I look at the maximum bribe that the citizens would be willing to pay. Since I employed the strategy elicitation method when registering the citizens' bribery preferences in the game, for each participant we are able to observe the range of bribes that would "corrupt" them. Figure 4 reports the maximum value of these bribes, ranging from zero for the "uncorruptible" citizens, to 15 for the "most corruptible ones", in each of the three monitoring systems.[30]

- Figure 4 here -

Figure 5 and the second column of Table 6 show that the top-down monitoring system made the citizens willing to pay a significantly larger bribe than when no monitoring was in place. Since only the officials faced the risk of being fined, we can interpret this result as evidence of the citizen's willingness to pay a larger bribe to compensate for the official's exposure to the risk of being detected and fined.

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demand a large bribe – which would result in a positive coefficient. Ideally we would need to estimate a Heckman selection model where the amount of the bribe demanded is conditional on the official's selection into corruption; however we lack variables that identify uniquely the officials' decision to engage in bribery. I anticipated that the "religious person" variable would be strongly associated with abstaining from bribery and planned to use this as an identifier. However, the unexpected result that "religious people" are more likely to engage in corruption in the game left us with not a single variable that should, arguably, be included in the probit and excluded from the second stage linear regression for bribe amount.

[30] Note that paying a bribe equal to 15 would give the citizen a payoff of 35, i.e. the same as the outside option.

6 Conclusions

In the last decade development practitioners, policy-makers and academics have given increasing attention to grass-root development interventions aimed at raising citizens' participation in the planning, implementation and monitoring stages of public spending and service delivery. The failure of decades of top-down anti-corruption interventions in countries characterized by systemic corruption has induced development institutions such as the World Bank to advocate the implementation of grass-root bottom-up interventions also in the fight against corruption. However, the implementation of bottom-up monitoring systems in a number of contexts has provided discouraging evidence on the ability of the recipients of public services to hold service providers accountable.

In this paper I asked whether, by coupling bottom-up monitoring with a formal top-down enforcement mechanism, we are able to generate a local accountability system that can be effective in curbing corruption even in a weak institutional environment, where formal auditing takes place with a very low probability. I addressed this question by conducting a specifically designed bribery experiment. The "combined" accountability setting employed in the experiment simulates a monitoring system that: 1) gives citizens the possibility to report corrupt officials, and 2) uses existing or new institutions to investigate officials who have been reported (with some, even low, probability) and fine them if they are found to be corrupt. The underlying assumption is that citizens have perfect information on how to report corrupt officials and what the consequences of formal reports would be.[31]

In the game, "private citizens" and "public officials" interacted for the provision of a public service, and the "officials" could offer to provide a better or quicker service in exchange for a bribe. We explored the officials' decision to engage in bribery when they were either: 1) subject to no monitoring, 2) subject to a four per cent probability of being detected and fined, and 3) subject to the possibility of being reported by the citizens, knowing that a report would activate formal punishment with a four per cent probability.

Findings from the experiment suggest that the "combined" accountability system simulated in the game could be highly effective in curbing corruption, even in a weak institutional environment where both the probability

[31] Lack of information is often a crucial obstacle to the activation of bottom-up monitoring; for instance, Deininger and Mpuga (2005) show that in Uganda the most important reason for households not reporting acts of corruption is their lack of knowledge of the relevant procedures.

of formal punishment and the fine are low; the experimental results confirm that, by contrast, "pure" top-down auditing may be ineffective in such environment. We argue that the reason for the specific accountability system employed being a more effective anti-corruption tool than top-down auditing is to be found in the presence of additional non-monetary costs which are activated by bottom-up monitoring, not by top-down auditing. Based on these results, we argue that such non-monetary costs should be given more attention when evaluating the desirability and expected effectiveness of alternative anti-corruption tools.

Future research should test whether our result holds also in a well functioning institutional environment, i.e. when the external probability of detection is significantly larger than four per cent, or whether the stronger economic costs associated with corruption end up crowding out the intrinsic costs activated by bottom-up monitoring.

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Figure 1: Public Official's decision to demand a bribe

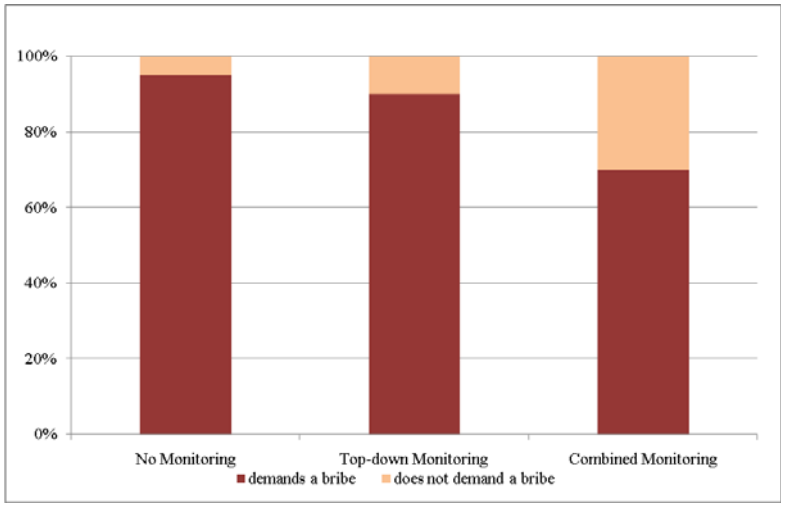

Figure 2: Amount of the bribe demanded

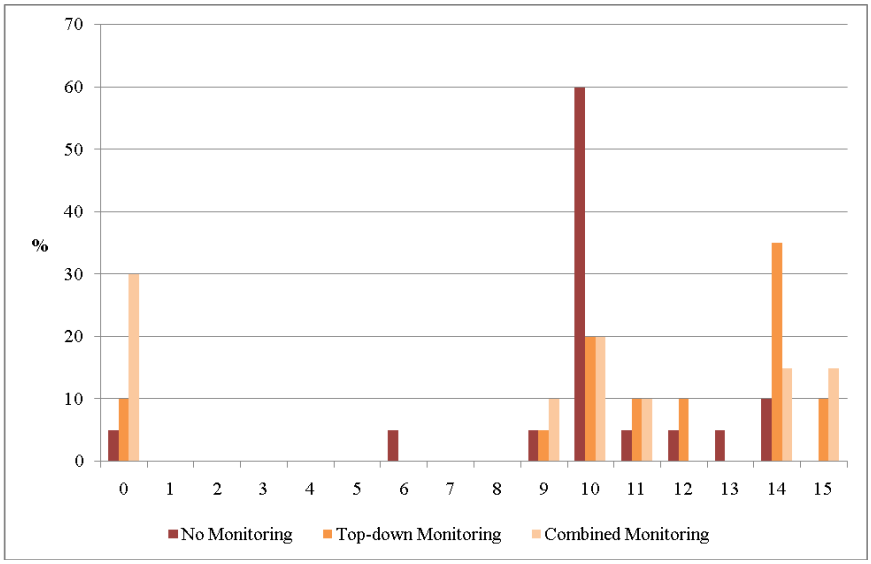

Figure 3: Citizen's decision to pay a bribe

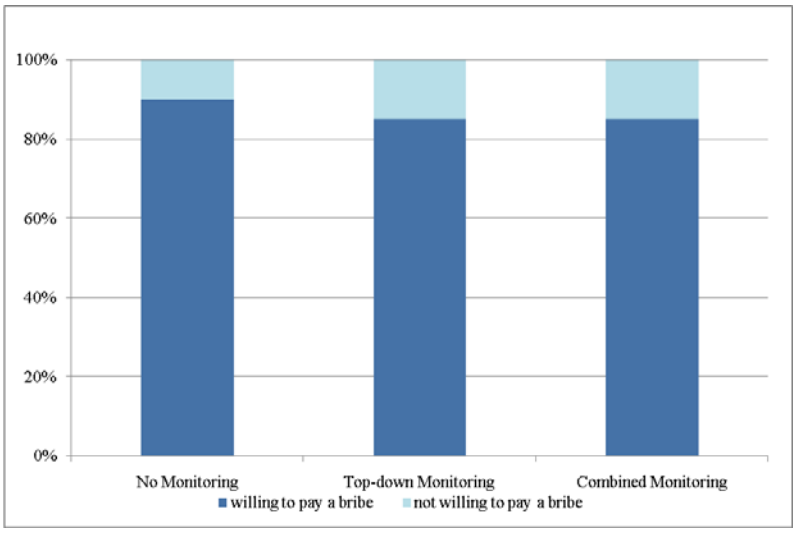

Figure 4: Maximum bribe payable by the citizen

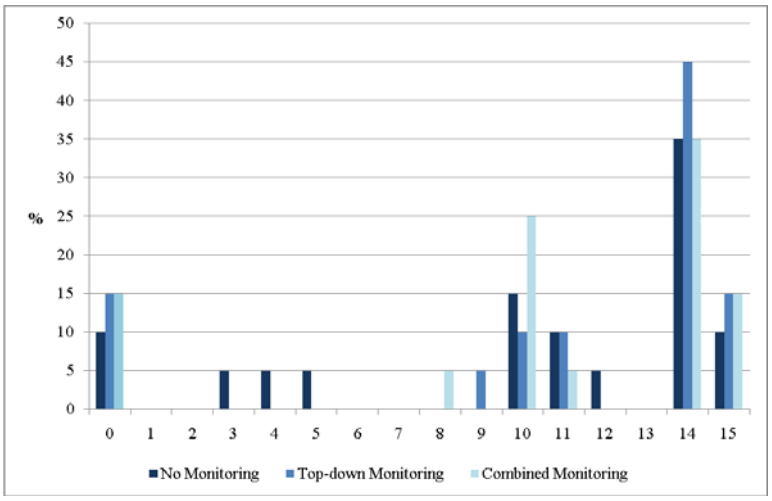

Table 1: Experimental sessions

	Sessions
No external punishment	4 sessions (60 participants)
External punishment (p=0.04)	4 sessions (60 participants)
Bottom-up monitoring (citizens' reports and p=0.04)	4 sessions (60 participants)

Table 2: Participants' characteristics

	Mean or proportion	**Standard Deviation**	**Minimum**	**Maximum**
Graduate student	0.52			
Age (years)	22.53	3.93	18	36
Female	0.39			
Married	0.04			
Economics student	0.32			
Described self as religious	0.31			

Table 3: The official's decision to demand a bribe

	Did not demand a bribe	Mean bribe
FULL SAMPLE		
No Monitoring (NM)	5%	10.47
Top-Down Monitoring (TM)	10%	12.39
"Combined" Monitoring (CM)	30%	11.93
p-values: TM vs. NM	0.55 (0.50)	0.32
p-values: CM vs. NM	**0.04 (0.05)**	0.29
p-values: CM vs. TM	0.11 (0.12)	0.28

Note: Comparisons of the proportions of officials who did not demand a bribe are based on one-tail Chi-Square p-values. Fisher exact test p-values in parentheses. Comparisons of mean bribes are based on ttest p-values.

Table 4: The official's decision to demand a bribe

Probit estimation

	Dependent variable: Dummy variable equal to 1 if the official demanded a bribe	
	(1)	(2)
Top-down	-0.08	-0.13
	[0.493]	[0.279]
"Combined"	-0.28	-0.32
	[0.028]**	[0.032]**
Female		0.05
		[0.535]
Age		-0.01
		[0.192]
"Religious person"		0.11
		[0.064]*
Economist		0.12
		[0.080]*
Observations	60	60
Pseudo R-squared	0.105	0.179

Note: the p values (in brackets) correspond to robust standard errors, which have been adjusted to account for clustering within sessions. We report marginal effects of continuous variables and the effect of a change from 0 to 1 for dichotomous variables. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: The bribe demanded

	Dependent variable: Amount of the bribe demanded			
	OLS on selected sample		OLS on full sample	
	(1)	(2)	(3)	(4)
Top-down	1.92	1.74	1.20	0.64
	[0.003]***	[0.018]**	[0.195]	[0.631]
"Combined"	1.45	1.23	-1.60	-2.01
	[0.227]	[0.324]	[0.086]*	[0.093]*
Female		-1.25		-0.89
		[0.047]**		[0.519]
Age		-0.08		-0.23
		[0.210]		[0.235]
"Religious person"		0.14		1.35
		[0.843]		[0.317]
Economist		-0.44		0.77
		[0.587]		[0.542]
Constant	10.47	12.98	9.95	14.94
	[0.000]***	[0.000]***	[0.000]***	[0.005]***
Observations	51	51	60	60
R-squared	0.152	0.252	0.063	0.124

Note: the p values (in brackets) correspond to robust standard errors, which have been adjusted to account for clustering within sessions. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: The citizen's willingness to pay a bribe

	Willing to pay a bribe	Maximum payable bribe
No Monitoring (NM)	90%	11.33
Top-Down Monitoring (TM)	85%	13.06
"Combined" Monitoring (CM)	85%	12.5
p-values: TD vs. NM	0.63 (0.50)	**0.05**
p-values: CM vs. NM	0.63 (0.50)	0.15
p-values: CM vs. TM	1 (0.70)	0.22