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The effects of externalities and framing on bribery in a petty corruption experiment

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Abstract Using a simple one-shot bribery game simulating petty corruption exchanges, we find evidence of a negative externality effect and a framing effect. When the losses suffered by third parties due to a bribe being offered and accepted are high and the game is presented as a petty corruption scenario instead of in abstract terms bribes are less likely to be offered. Higher negative externalities are also associated with less bribe acceptance. However, framing has no effect on bribe acceptance, indicating that the issue of artificiality may be of particular importance in bribery experiments.

Keywords Corruption · Economic experiment · Social preferences

JEL Classification D73 · C91 · Z13

1 Introduction

When thinking about corruption and its impact on both developed and developing economies we tend to envisage exchanges between public officials and businesses or entrepreneurs. However, especially in less developed countries, many corrupt transactions take place between public officials or service providers and ordinary citizens

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endeavoring to avoid fines and court summonses, jump queues, ascend waiting lists, and secure preferential services. These exchanges, while referred to as 'petty', are nevertheless a cause for concern as they harm others who are unable to engage in bribery themselves because they are simply too poor. Growing concerns over the inequities resulting from the coincidence of poverty and widespread petty corruption in developing countries are now fuelling a range of policy initiatives. However, as there is very little empirical evidence relating to how bribery decisions might be influenced, most of these initiatives have been designed with reference to theory alone (Svensson 2005).

This paper presents an experiment designed to address this situation by exploring one potentially important determinant of bribing behavior, namely intrinsic motivations. Specifically, it asks: does bribery occur whenever the extrinsic incentives are insufficient to keep individuals honest or do intrinsic motivations in the form of feelings of guilt associated with harming others and acting illegally also play a determining role?

Previous bribery experiments have looked for evidence of the role of intrinsic motivations by investigating the effects of negative externalities (Abbink et al. 2002; Cameron et al. 2009) and framing (Abbink and Hennig-Schmidt 2006) on bribe offering and acceptance. However, to our knowledge, only null findings have been returned. We could have been discouraged by this, but a careful review of the studies suggests that the null findings may relate to certain aspects of the experimental designs that, while salient to the issues being addressed by those experiments, may not be salient to the issue of petty corruption. So, having designed a simple petty corruption game, we too sought to identify the effects of negative externalities and framing and, unlike our predecessors, found evidence of both.

The paper has six sections. Following this introduction, Section 2 reviews several previous bribery experiments aimed at identifying framing and negative externality effects and explains why a design capturing the characteristics of petty corruption would differ. Section 3 presents our experimental design and predictions. Section 4 introduces our participants, and Section 5 presents our results. Finally, Section 6 reviews our findings and draws some tentative conclusions.

2 Framing and negative externality effects in previous bribery experiments

In 2002, Klaus Abbink, Bernd Irlenbusch, and Elke Renner (AIR below) conducted an experiment designed to investigate, among other things, whether individuals take account of the harm corrupt exchanges cause to others when deciding how to act. Their experiment involved a repeated, two-player, sequential game between a potential briber and bribee in which the briber had to decide whether and how much to offer as a bribe without knowing whether the bribee would be willing to grant him a higher payoff (simulating the provision of the corrupt service) in return. The bribee was free to reject the bribe, accept and grant the higher payoff, or accept but not grant the higher payoff. Under the negative externality treatment, whenever a bribe was offered and a higher payoff granted by a briber-bribee pair all the other briber-bribee pairs in the same session incurred a loss greater than the sum of the briber and bribee's private gains.

While AIR found evidence of trust and reciprocity between bribers and bribees and that the threat of punishment significantly reduced the incidence of bribery, they found no negative externality effect and, so, accepted the null hypothesis that individuals take no account of the harm that corrupt exchanges cause to others. But there could be an alternative explanation for the null finding. Within the context of the AIR game, conditional cooperators would not abstain from corruption unless they believed that others were doing likewise because the negative externalities were potentially reciprocal.[1] Another possible explanation is that the apparent importance of trust and reciprocity between bribers and bribees dominated the decision-making and suppressed any tendency for guilt associated with reducing the welfare of others to come to the fore.[2]

In a more recent study conducted in four different countries, Cameron et al. (2009) also found no evidence that larger negative externalities lead to less bribery. However, even if they had, it would have been difficult to ascribe the effect to intrinsic motivations.[3] In contrast to AIR, their experiment was one-shot, trust and reciprocity between briber and bribee played no role, bribery was very lucrative, and the individuals who suffered the negative externalities could not themselves engage in bribery but could punish at a cost to themselves those who did. Empowering those who suffered the negative externalities of bribery could have led to more punishment when externalities were high if the resulting increase in the desire to punish had outweighed the effect of having less to spend on punishment (owing to the higher negative externality) and, if this had been expected by the bribers and bribees, it could have led to a reduction in bribery even if bribers and bribees had not cared about the negative externalities.[4]

Turning to framing, Abbink and Hennig-Schmidt (2006)—AHS below—investigated the effects of framing the AIR game as a corrupt exchange between a firm and a public official. Drawing on Eckel and Grossman's (1996) and Loomes' (1999) discussions about the literature on framing effects,[5] AHS set out to compare behavior across the framed and unframed versions of the game and thereby identify the effects of 'social and psychological factors' (AHS, p. 104). They hypothesized that, as cor-

[1] Fischbacher et al. (2001) found that among Swiss subjects engaged in a public goods game, 50 percent were conditional cooperators.

[2] This second possibility might also apply to Abbink (2005) in which reducing the initial endowments of the innocent third parties who suffered losses when bribes were offered and accepted was found to have no effect.

[3] However, note that Cameron et al. (2009) did not set out to investigate the effects of intrinsic motivations.

[4] One could argue that, had intrinsic motivations come into play in this game, the other possible effects described above would have been irrelevant and bribery would have been lower when negative externalities were higher. However, there is a considerable body of evidence indicating that, when a potential punisher is present in a game, intrinsic motivations are crowded out (Fehr and List 2004; Fehr and Rockenbach 2003). So, the ability of the victim of bribery to punish in the Cameron et al. design renders it impossible to know whether the intrinsic motivations were there in the first place.

[5] Framing effects have been found in prisoners' dilemma games (Ross and Ward 1996; Liberman et al. 2004), public goods games (e.g., Andreoni 1995; Cookson 2000; Rege and Telle 2004), and dictator games (Eckel and Grossman 1996; Branas-Garza 2007).

ruption is illegal and viewed as immoral, subjects in the framed game would be less likely to engage in bribery. However, they found no significant framing effect.[6]

This null finding is consistent with there being no social and psychological factors at play in bribery games. However, once again, there is an alternative explanation: in accordance with Bardsley (2005), if the frame AHS applied appeared 'artificial' to their student subjects, it may have induced role play rather than triggering intrinsic desires to abstain from an immoral, corrupt-like act. While not referring to artificiality or role play, Cooper et al. (1999) clearly had similar effects in mind when they proposed that the size of a framing effect would depend on the extent of the subjects' direct experience with the context alluded to in the frame and found that framing a game involving strategic interactions by referring to subjects as "firms" and "planners" had a much stronger impact on the behavior of participating managers than that of participating students. And returning to bribery, while framing was not a treatment in the study, it is notable that Alatas et al. (2009) found significant differences in the behavior of students and public officials when each were engaged in the same bribery experiment framed as an exchange between a firm and a public official.

To summarize, efforts to identify negative-externality effects in bribery experiments have failed and this could be due to the roles played by trust and reciprocity within briber-bribee pairs, conditional cooperation or negative reciprocity between briber-bribee pairs and the ability of the victims of bribery to punish bribers and bribees given the experimental designs. And efforts to identify framing effects have also failed and this could be due to the mismatch between the frame applied and the life experiences of the experimental subjects.

However, an experiment designed to simulate a petty corruption scenario would not contain any of these elements. First, both sides of a petty corruption exchange tend to be executed more or less simultaneously rendering trust, reciprocity and repetition unimportant and excludable from the design.[7] Second, those who suffer the negative externalities that render petty corruption a cause for concern are unable to engage in bribery themselves and rarely have means at their disposal to punish those who do.[8] And third, the appropriate frame for a petty corruption experiment would refer to 'citizens' and 'officials' interacting with regard to the provision of a public service, rather than 'firms' and 'officials' interacting with regard to the granting of a license. As students are citizens, this frame is not inviting them to role play and abrogate responsibility for offering a bribe by arguing, to themselves at least, that they were simply doing what a business person would do. Rather, the petty corruption frame invites them to think about whether they themselves would engage in bribery were they to find themselves in a situation where it would be self serving to do so. Of course, this frame does not solve the artificiality problem applying to those in the

[6] Possibly as a result of this, subsequent bribery experiments, including Cameron et al. (op. cit.) and Bilotkach (2006) have been framed with no attempts to investigate framing effects.

[7] Consider, for example, the case where a hospital patient requires a change of linen and offers a bribe to a nurse in exchange for having it done immediately.

[8] Building on the example in footnote 8, one or more poor patients who cannot afford to bribe may be left in unchanged linen longer as a result of the bribery. Transparency International (2006) provides more examples.

'public servant' role and, this being the case, we should expect the effect of framing on 'public servants' behavior to be less marked than the effect of framing on 'private citizen' behavior.

3 Experimental design, predictions and treatments

3.1 A simple bribery game

The game involves 5 'citizens', 5 'public officials' and 5 'other members of society'. 'Citizens' and 'officials' play in pairs. Each 'private citizen' receives an initial endowment, Y_c, and may offer to pay a 'bribe', b, in exchange for a corrupt service, the value of which to him is V. If he offers a bribe, regardless of its magnitude and whether it is accepted, he incurs a cost E. This represents the expected cost of being caught and punished.[9] So, the 'private citizen's' final payoff, F_c, equals: Y_c if he does not offer a bribe; $Y_c - E + V - b$ if he offers a bribe that is accepted; and $Y_c - E$ if he offers a bribe that is rejected.

Each 'public official' receives an initial endowment of Y_p. If he accepts a bribe he automatically has to supply the corrupt service and incur a cost, K. This represents the sum of the expected cost of being caught and punished, the cost of supplying the service, and the cost of efforts made to reduce the likelihood of capture.[10] So, the 'public official's' final payoff, F_p, is: Y_p if he is not offered a bribe or he is offered but does not accept a bribe; and $Y_p - K + b$ if he accepts a bribe.

Finally, each 'other member of society' receives an initial endowment, Y_o, and incurs a cost, h for every bribe offered and accepted. So, each 'other member of society's' final payoff is $F_o = Y_o - N_c h$, where $N_c \in \{1, \ldots, 5\}$ is the number of citizen-official pairs who offer and accept bribes. This could have introduced interdependence between individuals' decisions within sessions, since some individuals may engage in or abstain from corruption conditional on their expectations concerning the number of other briber-bribee pairs choosing to act corruptly. Alternatively, we could have followed Cameron et al. (2009) and had each act of bribery affect only one, distinct 'other members of society'. We decided to adopt the former because, in the real world, bribery often harms many (often unidentifiable) individuals.[11]

If all 'public officials' and 'private citizens' are selfish money-maximizers, and we treat play as sequential, this game has the following sub-game perfect equilibrium: each 'public official' will accept any bribe that leaves him better off, i.e., he will accept any $b > K$, and will be indifferent between accepting and rejecting $b = K$; assuming 'private citizens' know this, they will all offer bribes of $K + \mu$, where μ is a small positive amount; and all bribes ($= K + \mu$) will be accepted, so each 'other

[9] We chose to make this cost deterministic to reduce the potential impact of risk preferences on behavior.

[10] Again, we chose to make this cost deterministic to reduce the potential impact of risk attitudes on behavior.

[11] Below, we check if our results are robust to clustering the data by experimental session in order to account for this possible within-session interdependency.

member of society' will suffer the maximum possible negative externality of $5h$. We will refer to this as the selfish money maximizing equilibrium or SMME below.[12]

Note that, in addition to being one shot, having an SMME in which everyone is corrupt, and including passive victims, this game deviates from AIR's and AHS's in one last detail. We do not triple the bribes offered by the bribers before passing them on to the bribees. AIR's and AHS's rationale for this multiplication was that the marginal utility of any given bribe was likely to be greater for a public official than for a business person, due to the latter being richer. Given that our game is more analogous to acts of petty corruption, this rationale does not apply as there is little evidence to suggest that public service providers are significantly poorer than service recipients in developing countries. So, we leave bribes unaltered when passing them between bribers and bribees.

3.2 Predicting externality and framing effects with reference to social preferences

One way of modeling the impact on behavior of social preferences of the type described above is to assume that a 'public official' who causes harm to others or engages in an act that she perceives as immoral suffers a psychological cost, $M_p = M_p(h, s)$ with $M_p > 0$ if $h > 0$, $dM_p/dh > 0$, $dM_p/ds > 0$, and where s captures the degree to which the act is perceived as immoral. Similarly, a 'private citizen' who causes harm to others or engages in an act that she perceives as immoral suffers a cost, $M_c = M_c(h, s)$ with $M_c > 0$ if $h > 0$, $dM_c/dh > 0$, $dM_c/ds > 0$. Now, leaving all other aspects of the game unchanged and assuming no other social preferences, we can make a number of predictions.

Prediction 1 'Public officials' will now only accept $b > K + M_p(h, s)$. So, an increase in either h or s will lead to an increase in the 'public officials' minimum acceptable bribes.

Prediction 2 Any 'public official' for whom $M_p(h, s) > b_{\max} - K$, where $b_{\max}$ is the maximum possible bribe in the game, will always reject. So, if $M_p \sim F(\cdot)$, over some range of h and s, the proportion of 'public officials' who reject all possible bribes, $1 - F(b_{\max} - K)$, will increase following an increase in either h or s, or *both*.

Prediction 3 A 'private citizen' who believes $M_p \sim \hat{F}(\cdot)$ will offer no bribe if the net total private value of the corrupt service is insufficient to cover the sum of his own and his best guess of the 'public official's' psychological costs, i.e., if $M_c(h, s) + \hat{M}_p(h, s) > V - K - E$, where $\hat{M}_p$ satisfies the first order condition $V - K - \hat{M}_p = \hat{F}(\hat{M}_p)/\hat{f}(\hat{M}_p)$. So, as long as $d\hat{M}_p/dh = 0$ and $d\hat{M}_p/ds = 0$ (this would apply for most common probability distributions), an increase in either h or s, or both, would lead to an increase in the proportion of 'private citizens' choosing not to bribe.

[12] In AIR's and AHS's experiments the SMME involved no bribery because trust was a prerequisite to offering a bribe. In Cameron et al. (2009) the SMME involved the maximum possible bribe because the value of the corrupt service increased proportionately with the bribe offered. By setting the SMME bribe at neither zero nor the maximum possible amount, we reduce the likelihood of our findings being due to participant errors alone.

Prediction 4 If $M_c(h, s) + \hat{M}_p < V - K - E$, the 'private citizen' will offer a bribe of $K + \hat{M}_p + \mu$. So, if we assume that $d\hat{M}_p/dh > 0$ and $d\hat{M}_p/ds > 0$, an increase in h or s, or *both*, will lead to an increase in the bribes offered by 'private citizens'.

Above, we assume that neither bribers nor bribees are inequality averse. If we assume that they are averse to inequality between themselves, Predictions 2 and 3 remain intact, while Predictions 1 and 4 may change: inequality aversion could induce the citizen to offer a bribe that equalizes the citizen's and the official's payoffs, and the official to reject any bribes that lead to a lower payoff for herself compared to the citizen.[13] Therefore, inequality aversion could suppress any treatment effects on the size of the bribes offered and accepted.

3.3 Parameterization, treatments, and practical details

In our experiment we used a fictitious currency called a Gilpet (G1 = £0.20, approximately $0.35 at the time of the experiment), set $Y_c = Y_p =$ G35, $Y_o =$ G25, $V =$ G16, $E =$ G1, $K =$ G5, and, for reasons that will be explained below, set h equal to either G1 or G4. 'Private citizens' could choose any $b \in$ {G1, G2, G3, ..., G20} and 'public officials', instead of responding only to the particular bribe offered to them, had to state whether they would accept or reject each of the possible bribes, $b \in$ {G1, G2, G3, ..., G20}, while knowing that whichever one of their responses turned out to be pertinent would determine their earnings. This full strategy elicitation enabled us to identify 'public officials' who would reject any possible bribe and minimum acceptable bribes for the others.[14]

We varied the magnitude of h, the negative externality caused by a bribe being offered and accepted, setting it either low, $h = h_L =$ G1, so bribery was Pareto-improving, or high, $h = h_H =$ G4, so bribery was Pareto-worsening. This contrasts with AIR who compared a treatment involving Pareto-worsening negative externalities with a control in which there was no externality at all. Arguably, *ceteris paribus*, a significant externality effect is less likely to be observed within our experiment.

The magnitude of s was perturbed by applying the frame. To set $s = s_H$ the game was described as above. To set $s = s_L < s_H$ the game was explained in abstract terms: those taking the 'private citizen' role were referred to as 'Player As', those taking the 'public official' role were referred to as 'Player Bs', 'other members of society' were referred to as 'Player Cs', bribes were simply referred to as 'offers', and no mention was made of corrupt services.

[13] If an official would feel guilty for earning more than the citizen, he could also reject bribes that give him a higher payoff than the citizen (see Fehr and Schmidt 1999).

[14] It has been argued that strategy elicitation might affect observed behavior. However, empirical evidence is mixed. While Güth et al. (2001), Schotter et al. (1994) and Brosig et al. (2003) find that strategy elicitation methods might induce significantly different behavior to natural elicitation methods, using different experimental designs, Cason and Mui (1998), Brandts and Charness (2000) and Oxoby and McLeish (2004) find no differences. The complexity of the experiment may be a crucial factor: strategy elicitation seems least distortionary in simple games (Brandts and Charness 2000). Our game is simple so any distortionary effects are likely to be small and are likely to apply similarly to all treatments.

Table 1 Experimental design: sessions and treatments

	$s = s_L$ (abstract frame)	$s = s_H$ (corruption frame)
$h = h_L =$ G1 (negative externalities low)	3 sessions (45 subjects, 15 in each role)	3 sessions (45 subjects, 15 in each role)
$h = h_H =$ G4 (negative externalities high)	3 sessions (45 subjects, 15 in each role)	4 sessions (60 subjects, 20 in each role)

We conducted 13 sessions each involving 5 'citizens', 5 'officials' and 5 'other members of society'. Table 1 shows the distribution of the sessions with respect to h and s. All the sessions took place during the final quarter of 2005 in seminar rooms in the Department of Economics, Oxford University. In every session the participants were seated at well spaced desks. The game was explained verbally by one of the authors (the same in all sessions) following a predefined script and using visual aids in the form of overhead projector slides. Each participant received two tables showing how various possible decision combinations would lead to particular final payoffs for each player-type. The participants expressed their decisions on specially designed forms which they completed behind privacy screens. No talking was allowed.[15]

Once the game was completed, the participants' payoffs were calculated and a show-up fee of £3 ($5.29) was added. In the meantime, the participants filled out a questionnaire.[16]

4 Experimental participants

The 195 participants were all students at the University of Oxford. Some signed up at a stall set up by us at an event at the start of the academic year designed to facilitate recruitment by various activity-based groups. The remainder contacted us having seen promotional posters and leaflets advertising the study or having received e-mails through their departmental or college mailing lists.

The ages of the participants ranged from 18 to 44 years, with the average age being just under 24 years. Just over half of the students were female. All the major world religions were represented, although less than one third of the sample described themselves as religious. Fifteen percent were only children. Just under one third were studying economics. Despite the random assignment, the participants under the high externality treatment were marginally but significantly older (24.40 as compared to 23.22 years). According to Chi-squared and t-tests, none of the other characteristics varied significantly across assigned roles.

[15] The "other members of society" simply waited while 'citizens' and 'officials' made their decisions.

[16] The experimental scripts, visual aids, questionnaires and forms are available from the authors.

5 Results

The findings relating to our four hypotheses are presented in Figs. 1 and 2, and Tables 2 and 3. The figures contain histograms showing the frequencies with which each of the possible bribes was offered and the frequencies with which each of the possible minimum acceptable bribes was observed. Note that those offering or accepting no bribe have been placed at the right-hand end of the histograms. For 'public officials' this is because, given the math of the game, accepting no bribe implies a minimum acceptable bribe greater than 20. So, by placing 'no bribe' on the right, we ensure that the total psychological cost implied by each possible decision increases as we move to the right. We do the same for bribes offered in order to be consistent.

5.1 Externality effects

In Fig. 1 and Table 2 we investigate the effects of changing the magnitude of the negative externality. The upper panels of Fig. 1 and Table 2 report the behavior of the 'private citizens'. The lower panels report the behavior of the 'public officials'. The graphs relate to the full sample, pooled across abstract and framed treatments.

Figure 1 suggests that, in accordance with Prediction 3, when the externalities are high, fewer 'citizens' offer bribes and fewer 'officials' are willing to accept bribes. Note the strong mode at G10 in the distribution of the bribe offered. A bribe of G10, if accepted, leads to equivalent final payoffs for the 'private citizen' and 'public official' or, put another way, it divides the net return to corruption equally between the two parties. Referring back to the model, offering a bribe of G10 is consistent with the 'private citizens' believing that the 'public officials' need G4 to compensate them for the psychological costs associated with engaging in bribery. However, that 37 percent of the private citizens should share this belief seems unrealistic. That the 'private citizens' were and expected the 'public officials' to be inequality averse is a more likely explanation. And, as discussed in Sect. 3.2, the existence of inequality aversion reduces the likelihood of finding evidence supporting Prediction 4 by reducing the observed effect of a higher s and h on the bribes offered. Turning to the minimum acceptable bribes, we see a much weaker mode at the equitable division bribe of G10.[17] This mode, weak as it is, indicates that the equitable division could have been a reference point for some 'public officials'. However, by deriving the MAB from strategy data we have reduced the likelihood of this compromising our ability to test Prediction 1.

Table 2 presents tests for externality effects based on the pooled sample and the abstract and framed sub-samples. Every t- and Chi-squared test is conducted, first, assuming independence across subjects and, second, allowing for interdependence within sessions by clustering. In accordance with Predictions 2 and 3, in the pooled samples both 'officials' and 'citizens' are significantly (5% level when independence assumed, 10% when observations are clustered by session) less likely to engage in bribery when the externality is high. In accordance with Prediction 4, the mean bribe

[17] Similarly, in Ultimatum Games in which strategy elicitation is applied to the responder, a strong mode is usually seen at the equitable offer, while minimum acceptable offers vary substantially.

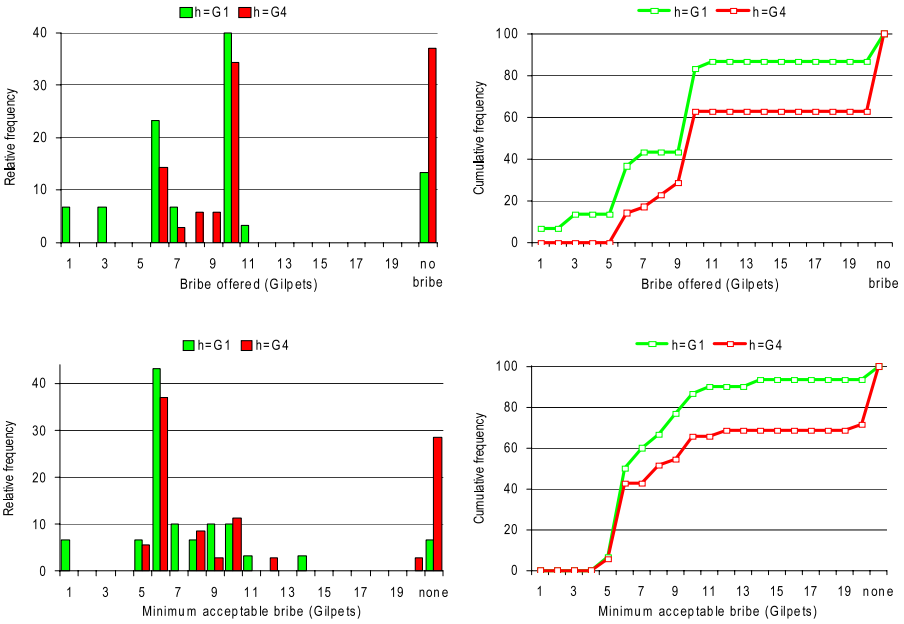

Fig. 1 The effect of negative externalities on bribes offered and minimum acceptable bribes

offered, conditional on offering a bribe, is higher when the negative externality is high. However, this effect is only significant (10% level) according to the t-test, the power of which may be questionable given the non-normality of our data, and is not significant according to a non-parametric, rank-sum test. The higher mean MAB, conditional on accepting at least one of the possible bribes, when the negative externality is higher also concurs with Prediction 1, but is not statistically significant.

Table 2 also shows that, when the game was presented in abstract form, the higher negative externality induced 'citizens' to offer significantly larger bribes (5% level according to the clustered t-test and the rank-sum test). However, it did not induce significantly more citizens to abstain from bribery. In contrast, when the game was framed, the higher negative externality did induce a significantly higher proportion of 'citizens' to abstain from offering bribes (5% level when independence assumed, 10% when observations are clustered). However, those who chose to bribe did not offer higher bribes, possibly because of a selection effect. Turning to the 'officials', when the game was presented in abstract form, a smaller proportion of 'officials' accepted bribes in the high externality treatment, although this result is significant (10% level) only when independence is assumed. Further, while the average MAB conditional on accepting a bribe is greater in the high externality treatment when the game was not framed, it is not significantly so. Finally, under the corruption frame the higher externality was associated with neither a significant decline in the proportion of 'officials' accepting a bribe nor a significant increase in the MAB.

Table 2 Externality effects

		Full sample		**Abstract form**		**Corruption frame**	
	Full sample pooled	Low externality $h = \text{G1}$	High externality $h = \text{G4}$	Low externality $h = \text{G1}$, $s = s_L$	High externality $h = \text{G4}$, $s = s_L$	Low externality $h = \text{G1}$, $s = s_H$	High externality $h = \text{G4}$,
Private Citizens							
Offered no bribe	26.15%	13.33%	37.14%	6.67%	13.33%	20.00%	55.00%
Observations	(65)	(30)	(35)	(15)	(15)	(15)	(20)
Chi-squared tests p-values		**0.029**		0.543		**0.036**	
Clustered Chi-squared tests p-values		**0.099**		0.617		**0.070**	
Mean bribe offered	8.04	7.5	8.68	6.5	8.85	8.67	8.44
Observations	(48)	(26)	(22)	(14)	(13)	(12)	(9)
t-tests (one tailed) p-values		**0.055**		**0.008**		0.415	
Clustered t-tests (one tailed) p-values		**0.086**		**0.012**		0.579	
Rank-sum tests (two-tailed) p-values		0.332		**0.032**		0.304	
Public Officials							
Accepted no bribe	18.46%	6.67%	28.57%	0.00%	20.00%	13.33%	35.00%
Observations	(65)	(30)	(35)	(15)	(15)	(15)	(20)
Chi-squared tests p-values		**0.023**		**0.068**		0.147	
Clustered Chi-squared tests p-values		**0.037**		0.133		0.147	
Mean minimum acceptable bribe	7.54	7.39	7.72	7.6	7.92	7.15	7.53
Observations	(53)	(28)	(25)	(15)	(12)	(13)	(13)
t-tests (one tailed) p-values		0.33		0.379		0.374	
Clustered t-tests (one tailed) p-values		0.338		0.415		0.354	
Rank-sum tests (two-tailed) p-values		0.909		0.672		0.509	

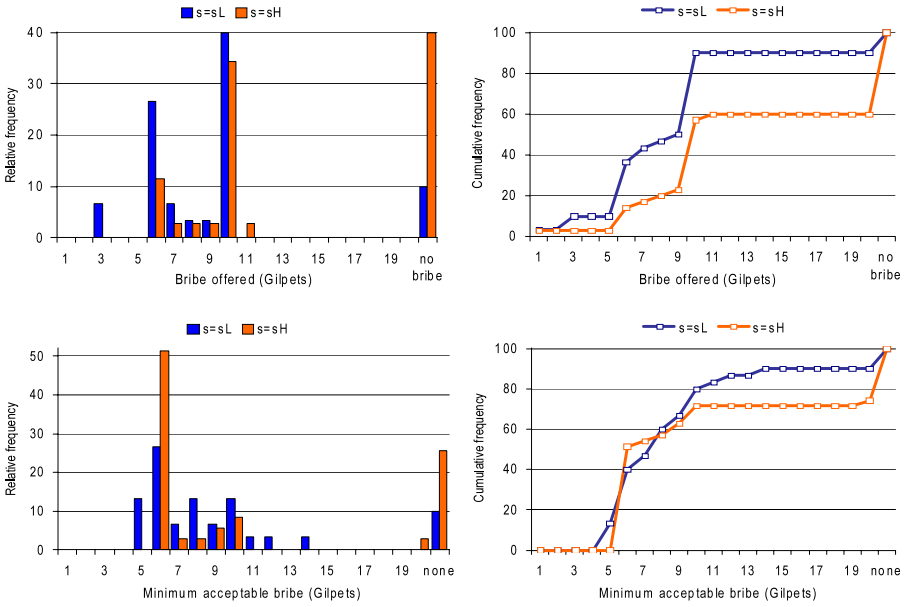

Fig. 2 The effect of framing on bribes offered and minimum acceptable bribes

5.2 Framing effects

In Fig. 2 and Table 3 we investigate the effects of framing on bribe offering and bribe acceptance. The graphs are based on the full sample, pooled across the low and high externality treatments. Figure 2 suggests the existence of framing effects on the 'citizens' decision to offer a bribe and, to a less extent, on the 'officials' willingness to accept a bribe.

In Table 3 we test for framing effects based on the pooled sample and the low and high externality sub-samples. In accordance with Prediction 3, in the pooled sample 'citizens' were significantly (1% level when independence assumed, 5% when observations clustered within sessions) less likely to offer bribes when the corruption frame was applied. In accordance with Prediction 4, conditional on offering a bribe at all, a higher mean bribe was offered when the game was framed. However, this effect is insignificant.

When the externality was low, framing the game induced 'citizens' to offer significantly (5% level when independence assumed, 10% level when the observations are clustered) larger bribes. However, the resulting moral costs were not large enough to induce significantly more to abstain from corruption. In contrast, when the externality was high, framing the game was sufficient to significantly reduce the proportion of 'citizens' who chose to engage in bribery (5% level when independence is assumed, 10% when the observations are clustered). However, those who chose to bribe nevertheless did not increase the bribes they offered, again, possibly because of a selection effect.

In the lower panel of Table 3, we see that in accordance with Prediction 2, the proportion of 'public servants' who reject all bribes is higher under the framed treatment.

Table 3 Framing effects

	Full sample pooled	Full sample: Abstract frame $s = s_L$	Full sample: Corruption frame $s = s_H$	Low externalities: Abstract frame $s = s_L$, $h =$ G1	Low externalities: Corruption frame $S = s_H$, $h =$ G1	High externalities: Abstract frame $s = s_L$, $h =$ G4	High externalities: externalities frame $s = s_H$, $h =$ G4
Private Citizens							
Offered no bribe	26.15%	10.00%	40.00%	6.67%	20.00%	13.33%	55.00%
Observations	65	30	35	15	15	15	20
Chi-squared tests p-values		**0.006**		0.283		**0.012**	
Clustered Chi-squared tests p-values		**0.038**		0.308		**0.056**	
Mean bribe offered	8.04	7.62	8.57	6.3	8.67	8.84	8.44
Observations	48	27	21	14	12	13	9
t-tests (one tailed) p-values		0.104		**0.034**		0.300	
Clustered t-tests (one tailed) p-values		0.143		**0.051**		0.402	
rank-sum tests (two-tailed) p-values		0.151		**0.040**		0.532	
Public Servants							
Accepted no bribe	18.46%	10.00%	25.71%	0.00%	13.33%	20.00%	35.00%
Observations	65	30	35	15	15	15	20
Chi-squared tests p-values		0.104		0.143		0.331	
Clustered Chi-squared tests p-values		0.135		0.143		0.331	
Mean minimum acceptable bribe	7.54	7.74	7.34	7.6	7.15	7.92	7.54
Observations	53	27	26	15	13	12	13
t-tests (one tailed) p-values		0.703		0.295		0.387	
Clustered t-tests (one tailed) p-values		0.693		0.295		0.387	
rank-sum tests (two-tailed) p-values		0.372		0.789		0.362	

However, in accordance with our expectations relating to artificiality this effect is insignificant in both the pooled sample and each of the sub-samples. Finally and also in accordance with our expectations relating to artificiality, the effect of the frame on the MAB is both inconsistent with Prediction 1 and insignificant.[18]

6 Summary and discussion

We find evidence of both an externality effect and a framing effect within the context of a bribery game aimed at investigating petty corruption. When the game was framed as a petty corruption scenario and the negative externalities suffered by innocent victims when bribes change hands were high, subjects in the 'private citizen' role were less likely to offer bribes, although when only one of these treatments was applied, they tended to raise the bribe they offered rather than choosing to abstain. When the game was presented in abstract form, increasing the negative externalities suffered by innocent victims also increased the likelihood that subjects in the 'public official' role would reject all bribes, although, here, the evidence was weaker. Framing did not affect 'public officials' behavior and also appeared to suppress the externality effect.

The findings relating to subjects in the 'private citizen' role are consistent with a simple model of bribery in the presence of a preference for abstaining from actions that do harm to others and may be considered immoral. For subjects in the 'public official' role, the anticipated absence of a framing effect and the absence of an externality effect in the presence of framing, is consistent with the petty corruption frame appearing artificial to student subjects.

Our findings stand in contrast to those of experimental studies focused on bribery exchanges between 'firms' and 'public officials'. We assign our success relative to AHS in identifying a framing effect on briber behavior to the fact that the petty corruption frame would have seemed less artificial to student subjects than AHS's business-license frame. And we assign our success relative to AIR in identifying an externality effect to the fact that our game design precluded any role for positive reciprocity *within* briber-bribee pairs and for negative reciprocity (expectation-based) *between* briber-bribee pairs. However, we note that both our frame and our game design would not have been appropriate for the analysis of the corrupt scenario that AIR and AHS had in mind.

If one takes the appropriateness of the designs and frames to each of the scenarios as given and temporarily puts aside concerns about artificiality, one could tentatively conclude that, while a preference for not doing harm to others and for not behaving illegally might reduce a citizen's tendency to engage in petty corruption the same preference is unlikely to come into play when it is a business person contemplating bribery and when the others in question are his or her competitors. This seems entirely reasonable. However, concerns about artificiality require further investigation.

[18] Similar results were returned by Probit analyses based on the various sub-samples to which the Chi-squared tests were applied above, taking bribe offering or acceptance as the dependent variable and treatment dummies and the individual characteristics presented in Section 4 as independent variables, and clustering by session.

Finally, we wish to draw attention to an element of our design that may not accord with real instances of petty corruption: in the game our subjects knew exactly how much harm they were causing others, while in real life it remains unclear whether and how much harm is caused to others by petty corruption and it is, therefore, all too easy for individuals, intent on improving their own lot, to turn a blind eye. Taking this observation in conjunction with our findings we can draw two tentative policy conclusions from our analysis. First, there is a need for more, scientific research into the externality effects associated with *real* petty corruption. And, second, assuming that this research found evidence of negative externalities, campaigns designed to raise awareness about the harm petty corruption causes others could reduce citizen engagement in petty corruption and, possibly, cause them to seek other ways to improve the public services they receive.

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