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The power of words in a petty corruption experiment

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Abstract

Following a recent recommendation by Transparency International, we set up a controlled laboratory experiment to gauge the impact of a specific type of grassroots participation on petty corruption. Participants play a simple one-shot, three-person bribery game which, depending on the treatment, either gives or does not give passive third parties who suffer from corruption the opportunity to send a publicly visible message to the potential bribers and bribees. We find that bribes are less likely to be offered in the presence of messaging opportunities. This may be attributed to an increase in the bribe-givers' non-monetary costs of acting corruptly. However, messaging opportunities have no effect on bribe acceptances. We provide a theoretical justification for this null effect, based on the bribe-takers' beliefs that the passive parties inherently value the chance to have a voice.

Keywords: Petty corruption, Bribery game, Communication, Experiments

JEL Classification: D73, C92, D02, D91

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1 Introduction

Corruption is a pervasive and widespread phenomenon that negatively affects economic performance.¹ Traditionally, it is thought that exogenous top-down interventions—in which the legal system detects corrupt transactions and punishes the involved persons with a high probability—are the only feasible means of discouraging corruption. Although several empirical and field studies have found that the threat of external audit reduces corruption (see, e.g., Olken, 2007; Avis et al., 2018; Zamboni and Litschig, 2018), the mere implementation of formal enforcement mechanisms, increasing the expected cost of corruption, may not be particularly effective because, in highly corrupted societies, too many people have a positive stake in the “crooked status quo” (Jain, 2019).

Following the release of the 2018 Corruption Perceptions Index, which shows that anti-corruption efforts stalled in most of the 180 surveyed countries,² Transparency International has highlighted the importance of free speech and an open and engaged civil society in curbing corruption. Enabling citizens to speak out against a corrupt act shifts attention from grand to petty corruption, namely to everyday life, small-scale bribes that are most harmful to ordinary people. In this paper, we focus exactly on such petty bribes and on the importance of grassroots participation to the fight against corruption. Petty corruption will take the form of collusive bribery that, while benefiting the briber-bribee pairs, generates negative externalities to other members of the society.³ We ask whether collusive petty corruption can be decreased through empowering the other members of society that suffer from it with the possibility of sending free-form text messages, together with emoticons, to the corrupt parties. Hence, we give a “voice” to those who do not participate in the corrupt transaction, but pay a cost for it because, for instance, they receive slower and/or lower quality service.

Two main reasons account for the importance of communication and increased citizen participation in the fight against corruption. First, ordinary citizens are likely to be better informed about corrupt transactions as compared to central government bureaucrats. Second, the parties involved in the corrupt transaction may suffer higher non-monetary

¹Empirical evidence indicates that corruption is detrimental to economic growth and development (Méon and Sekkat, 2005), distorts the composition of government expenditure (Reinikka and Svensson, 2004), and increases poverty and income inequality (Gupta et al., 2002).

²Two-thirds of the surveyed countries score below 50 out of 100 and the average score is 43. See https://www.transparency.org/news/pressrelease/corruption_perceptions_index_2018.

³Collusive bribery occurs when a person offers a bribe to a public official in exchange for a payment of duties or a benefit such as the access to or the faster delivery of basic goods and services in places like hospitals, schools, and police departments. Collusive bribery must be distinguished from harassment or coercive bribery, in which it is the public official that demands a bribe from the private citizen in return for a favor so that the briber is himself a victim of extortion.

or “moral” costs when they know to be under the scrutiny of other members of their community, for instance, because they dislike receiving expressions of disapproval and informal social sanctions.

Given the type of research question we want to address and because most corrupt transactions are secretive by nature and thus difficult to measure reliably, we follow a growing number of studies that use laboratory experiments—and lab based corruption games—to measure corrupt behavior (see Abbink and Serra, 2012, for a review). Relying on laboratory experiments allows assessing how individuals react to specific anti-corruption policies without the confounds caused by omitted variables and unwanted or spurious events. It could be claimed that corruption laboratory experiments lack external validity because their results cannot be generalized to real-world settings. While we acknowledge that the level of corruption can differ when moving from the lab to the field, we are interested not in levels, but in comparative statics with respect to the impact of a specific type of communication on corrupt behavior. The external validity of qualitative results from lab experiments on corruption has been investigated and corroborated by Armantier and Boly (2013).⁴

We build on the bribery game introduced by Barr and Serra (2009), which wants to mimic the following petty corruption situation. Imagine a private citizen endeavoring to secure a preferential treatment such as a speedier admission to hospital. For this reason, he offers a bribe to a public official, who must then decide whether or not to accept the bribe. If a bribe is offered and accepted, the briber-bribee pair benefits (the former obtains a quicker service and the latter gets the bribe), but a third member of society suffers a monetary loss because, e.g., the preferential treatment granted to the citizen leads to an inequitable allocation of resources. We assess the impact of public knowledge of messaging opportunities for the other members of society by comparing how bribes offered and bribes accepted change in two different treatments: a treatment where the other member of society is just a passive player (like in Barr and Serra, 2009), and another treatment where the other member of society, having learned of the private citizen’s and the public official’s decisions, is allowed to send them a costless text message which, together with a happy, neutral, or sad face (emoticon), is posted on a public bulletin board (visible to all participants). Our principal hypothesis is that anticipated negative written messages and concerns about negative social judgement can increase the moral costs (loss of utility due to guilt and/or shame) associated with

⁴Worthy of note is that, in a bribery game similar to ours and with a sample of students coming from 40 different countries, Barr and Serra (2010) show that the level of corruption displayed by the undergraduates in the laboratory correlates with the level of corruption in the participants’ home country, as measured by Transparency International’s Corruption Perception Index.

corrupt behavior and thus reduce the frequency of corrupt transactions.⁵

There are a number of experimental studies documenting how symbolic non-monetary punishment in general, and expressions of disapproval in particular, influence behavior. More specifically, it has been shown that if people are given the opportunity to express their disapproval of the others' choices, they reduce costly punishment in ultimatum games (Xiao and Houser, 2005) and increase cooperation in public goods games (e.g., Masclet et al., 2003; Rege and Telle, 2004; Koukoulis and Levati, 2019). People are also found to respond positively to the possibility of judgment by others in the sense that they act in a fairer manner when they anticipate disapproval from those who suffer from their actions (e.g., Ellingsen and Johannesson, 2008; Xiao and Houser, 2009).

As to the corruption literature, the experimental evidence about the role of non-monetary incentives for bribers and bribees is scarce but rapidly expanding in the last decade. Here it is important to distinguish between experiments aimed at testing whether moral costs are actually at play in a bribery game and experiments that exploit the presence of moral costs to reduce the frequency of corrupt transactions. The former group of experiments includes Abbink et al. (2002), Barr and Serra (2009), Drugov et al. (2014), and Banerjee (2016). Abbink et al. (2002) find no evidence of moral costs associated with corrupt behavior. In their experiment, however, bribers and bribees are the very same individuals suffering from the corrupt actions and thus the null finding can be attributed to negative reciprocity. Barr and Serra (2009) are the first to test whether bribers and bribees suffer moral costs from harming others by introducing, in a one-shot bribery game, passive members of society who cannot engage in bribery but suffer a monetary loss for any corrupt transaction. Their data indicate that corruption is lower, the higher the negative externalities suffered by the passive members, which the authors interpret as supporting the hypothesis that people bear a moral cost when they cause harm to others or engage in acts perceived as immoral. Drugov et al. (2014) introduce intermediaries in a modified version of Barr and Serra's (2009) design and find that intermediaries facilitate corruption because their presence lowers the moral costs of bribers and bribees. Banerjee (2016) provides further evidence that moral costs are at

⁵Many psychologists consider guilt and shame as negatively valenced moral emotions that prevent socially detrimental behavior and promote moral actions (see, e.g., Tangney, 1995; Tangney et al., 2007). Although in the literature the two terms are often used interchangeably, common definitions of guilt involve a concern for harming others and for violating societal or personal standards, whereas shame is an internal reaction to others' judgements and is associated with feelings of worthlessness and a damaged self-image (e.g., Fessler, 2004; Day and Bobocel, 2013). In the present paper, we do not intend to determine whether the possibility of being confronted with a public disapproving message causes corrupt individuals to feel more guilt or more shame. Either negative emotion can raise the non-monetary costs associated with corruption.

work when bribers and bribees are made aware of operating under a corruption setting and feel entitled to their earnings. The article by Banerjee and Mitra (2018) falls into the second group of experiments—those “manipulating” moral costs. They let subjects go through a four-week ethics course before participating in a harassment bribery game with the specific aim of raising the moral cost of demanding a bribe. Ethics education is found to affect the likelihood of bribe demand, although its effect is short-lived.

Carefully controlled evaluations of the impact of community-based monitoring and grassroots participation on corruption are equally limited and the findings are mixed. In a randomized field experiment, conducted in Indonesian villages, Olken (2007) allows the involved villagers to leave anonymous comments on a road project that was being undertaken in that period. He finds that this type of grassroots monitoring does not decrease corruption due, mainly, to free-rider problems and elite capture.⁶ We note, however, that Olken (2007) measures corruption by comparing an estimate of the project cost (prepared by a team of engineers) to what was reported by the villagers rather than by considering directly the decisions of potential bribers and bribees. Recent laboratory experiments assessing the effectiveness of grassroots participation include Ryvkin et al. (2017) and Salmon and Serra (2017). Ryvkin et al. (2017) investigate the efficacy of the “I Paid a Bribe” website, an anti-corruption platform where people can report their experience of harassment bribery. The authors allow participants to post on a public bulletin board the bribes that they were, eventually, asked to pay, and find that this kind of reporting is efficient only when posts disclose information not only about the size of the bribe, but also about the specific location of the office that requested it. In Ryvkin et al.’s study, it is the bribe-giver (not a third party) who can leave posts and communication is numerical, and not—as in our experiment—verbal and free-form.⁷ A limited form of communication—consisting of emoticons—has been used also by Salmon and Serra (2017), who investigate the impact of social observability and culture on corruption. In Salmon and Serra (2017), the emoticons are seen in private by the corrupt individual and are not displayed to all participants, as it is the case in our experiment.⁸

Our study is also tangentially related to a growing stream of laboratory experi-

⁶A statistically significant reduction in corruption is observed only when the comment forms were distributed via schools, completely bypassing village officials who may have been involved in the project.

⁷There exists evidence that the form of communication affects the results. In public goods settings, for instance, it has been shown that numerical communication is not as effective as free-form verbal communication for boosting cooperation (Brosig et al., 2003). The form of messages (free or pre-specified) is also found to affect people’s aversion to lying (Charness and Dufwenberg, 2010).

⁸It is worth mentioning the study by Serra (2012) that shows, in a bribery experiment, the efficacy in curbing corruption of a combined accountability system where citizens can report corrupt officials (bottom-up monitoring), knowing that reporting will activate formal (top-down) monetary sanctions with some small probability.

ments investigating individuals’ willingness to blow the whistle on wrongdoing. Standard whistle-blowing systems, where the briber can blow the whistle and report to the authorities, have been implemented by, e.g., Abbink et al. (2014) and Engel et al. (2016), who show that the possibility of blowing the whistle has a strong deterrence effect on one-shot illegal transactions, especially if the ensuing punishment is asymmetric (i.e., affects only the bribee). Butler et al. (forthcoming) investigate how monetary and non-monetary incentives affect employees’ willingness to blow the whistle against their managers. Non-monetary incentives take the form of public scrutiny to which whistle-blowers are exposed. Their most important finding is that public scrutiny increases whistle-blowing when the negative externalities caused by fraud are visible to the public.

To our knowledge, there are no studies that examine, in a carefully controlled laboratory experiment, whether communication opportunities given to the passive members of society, who suffer from corruption being no part of it, affect the propensity to offer and accept bribes.

The remainder of the paper is organized as follows. Section 2 is devoted to the description of the experiment: it introduces the bribery game, describes our treatments, states our behavioral predictions, and provides details on the employed experimental procedures. Section 3 reports our experimental results. Section 4 discusses the results and considers potential explanations. Section 5 offers concluding remarks.

2 The experiment

2.1 The bribery game and experimental treatments

To assess whether providing passive members of society with a “voice” has an effect on potential bribe-givers and bribe-takers, we use a three-player sequential move game based on Barr and Serra’s (2009) bribery game. The three players in a group are: a private citizen, a public official, and an other member of society, which we call C , O , and MS , respectively. At the beginning of the experiment, C and O are each endowed with 36 ECU (Experimental Currency Unit) and MS with 30 ECU.⁹

The first mover is the private citizen C , who has to decide whether or not to offer a bribe to the public official in exchange for a service which is worth 20 ECU to him. If C does not offer the bribe, the game ends immediately and each player earns his initial

⁹The exchange rate between ECU and euro is set at 1 ECU = €0.40 for all participants. Following Barr and Serra (2010), the other member of society receives a lower initial endowment, compared to citizen and official, to mimic situations where there are individuals who cannot afford to pay a bribe.

endowment. If C decides to offer a bribe, he has to specify the bribe amount, b , by choosing an integer value between 6 and 18, i.e., $b \in [6, 18]$. Offering a bribe implies a small fixed cost of 1 ECU for C ; this can be viewed as the cost of being caught.¹⁰

If a bribe b is offered, the public official O is the second mover and has to decide whether to accept or reject b . If O rejects b , the game ends with the official and the other member of society earning their initial endowment and the citizen losing 1 ECU. If O accepts b , he has to deliver the service without delay and to pay a cost of 5 ECU, which can be interpreted as a small penalty in terms of time and effort needed to supply a quicker service and/or, like for the citizen, as the cost of being caught. If the bribe is offered and accepted (i.e., the corrupt transaction takes place), the other member of society MS suffers a loss of 14 ECU, which is subtracted from his initial endowment.¹¹

Hence, denoting by π_C , π_O , and π_{MS} the monetary payoffs (in ECU) of, respectively, private citizen, public official and other member of society, we have

- $\pi_C = 36$, $\pi_O = 36$, $\pi_{MS} = 30$ if C does not offer a bribe;
- $\pi_C = 36 - 1 = 35$, $\pi_O = 36$, and $\pi_{MS} = 30$ if C offers a bribe b and O rejects it;
- $\pi_C = 36 - 1 + 20 - b = 55 - b$, $\pi_O = 36 - 5 + b = 31 + b$, and $\pi_{MS} = 30 - 14 = 16$ if C offers a bribe b and O accepts it.

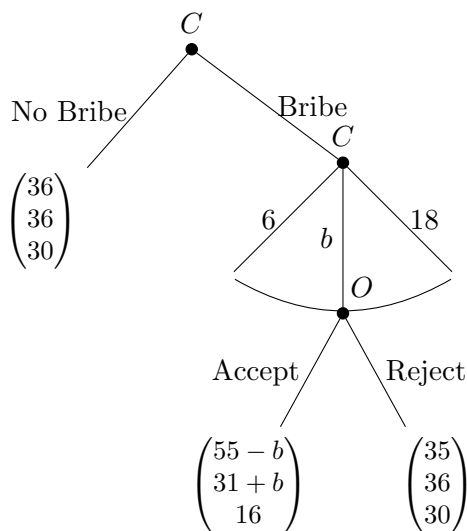
The structure of the game and the players' payoffs—which are common knowledge—are summarized in Figure 1.

The parameter values were chosen to guarantee that the total net benefit of C and O (namely the difference between the sum of C 's and O 's earnings when a bribe is offered and accepted and the sum of their earnings when a bribe is not offered) satisfies two conditions. First, it is positive so as to exclude ambiguous cases of indifference. Second, it is equal to the loss suffered by MS . The latter condition ensures that social welfare (defined as the sum of the three players' payoffs) does not vary according to whether C and O engage in corrupt behavior or C behaves honestly, it equals 102 in any case.

¹⁰In line with Barr and Serra (2009; 2010), we assume that this cost is deterministic to mitigate the potential impact of risk attitudes on behavior.

¹¹Having only one other member of society who suffers from the corrupt act performed by C and O in his group parallels the experimental designs of, e.g., Cameron et al. (2009) and Salmon and Serra (2017) and distinguishes our game from the one originally proposed by Barr and Serra (2009). In the latter, each other member of society is negatively affected by every act of bribery carried out in a session; thus the decision to offer and accept a bribe may depend on beliefs about the other bribers' and bribees' behavior. This interdependence across individual decisions within a session is removed by requiring, as we do, that each corrupt transaction affects one, distinct other member of society.

Figure 1: The bribery game tree



Thus, if C expects O to accept an offered bribe, the decisions to offer and accept a bribe should not be based on efficiency considerations.¹²

As the experiment is designed to simulate a petty corruption scenario, in which one does not typically expect to be stopped by the same traffic officer or to encounter the same clerk at a government office on multiple occasions, the play is one-shot. Implementing a one-shot game allows us to exclude, by design, all issues related to repeated games like learning, strategic reputation-building, and correlated decisions.

Assuming that C and O are monetary payoff maximizers and that this is common knowledge, this bribery game has a unique subgame perfect Nash equilibrium: the public official O will accept any bribe greater than 5; knowing this, the private citizen C will offer the smallest feasible bribe, namely $b = 6$. Hence, the equilibrium payoffs are $\pi_C^* = 49$, $\pi_O^* = 37$, and $\pi_{MS}^* = 16$.

We conduct two treatments of this game that differ depending on whether or not the other members of society have communication opportunities. In the message treatment, each other member of society—after viewing his own payoff—is given the chance to post on a public bulletin board a text message addressed to his matched citizen and official, concurrently with an emoticon in the form of a happy, neutral, or sad face. In the baseline treatment, the other member of society has no such possibility.

¹²It has been shown that the propensity to engage in corrupt behavior may depend on whether the bribe is welfare-enhancing or welfare-reducing (Cameron et al., 2009).

2.2 Behavioral predictions

The theoretical prediction put forth in the previous subsection assumes that individuals are purely self-interested and rational in a game-theoretic sense. However, on the basis of previous studies on corruption, we can assume that the parties involved in the corrupt transaction suffer a psychological moral cost—such as guilt or shame—when they behave selfishly and, hence, bribing occurs. Let $m_i > 0$ be i 's moral cost of bribe offering for $i = C$ and bribe accepting for $i = O$, and suppose that i 's utility is linearly decreasing in m_i :

$$(1) \quad U_i = \pi_i - m_i \quad i = \{C, O\}$$

where we assume $m_i = 0$ in the case of no bribe.

Consider the second mover, O . Given the monetary payoffs in our experimental game, O will accept a bribe of amount b if his utility from accepting b , i.e. $31 + b - m_O$, is not lower than his utility from rejecting it, i.e. 36. This yields:

$$m_O \leq b - 5.$$

Recall that, in the experiment, we set $b \in [6, 18]$. Hence, if $m_O \leq 1$, O will accept any bribe. On the other hand, if $m_O > 13$, rejecting a bribe is always preferable. For $m_O \in (1, 13]$, the public official's likelihood to accept the bribe depends on its amount: the lower b , the more likely it is that O will not accept it.

Turning to the first mover, we reasonably assume that if C decides to offer a bribe, he expects the official to accept it. Then, C will offer a bribe of amount b if his utility from offering b , i.e. $55 - b - m_C$, is not lower than his utility from not offering it, i.e. 36. This implies that C will offer a positive bribe whenever

$$m_C \leq 19 - b.$$

For the parameters of our experiment, C will always offer a bribe if $m_C \leq 1$ and never offer it if $m_C > 13$. For $m_C \in (1, 13]$, C may decide to offer a bribe b satisfying $b \leq 19 - m_C$. Hence, the higher m_C , the lower the bribe amount that C should offer.

Our main hypothesis is that the prospect of receiving a publicly visible negative message from the other member of society increases the level of guilt and/or shame experienced by corrupt individuals, thereby shifting the moral cost of engaging in corruption upward. This shift, *ceteris paribus*, will make more likely for C not to offer

a bribe and for O not to accept a bribe when it is offered. The rationale behind this hypothesis is provided by previous studies showing that individuals dislike receiving expressions of disapproval (Rege and Telle, 2004; Ellingsen and Johannesson, 2008; Xiao and Houser, 2009) and care for social judgement and social reputation (Andreoni and Bernheim, 2009; Salmon and Serra, 2017). Assuming no other social preferences, this gives us the following set of testable predictions.¹³

Prediction 1 (a) The proportion of private citizens who offer a bribe is lower in the message treatment than in the baseline treatment. (b) The offered bribes are of more modest amount in the message treatment.

Prediction 2 (a) The proportion of public officials who accept a bribe is lower in the message treatment than in the baseline treatment. (b) Low bribe amounts are more likely to be rejected in the message treatment.

2.3 Procedures

The experiment was programmed in z-Tree (Fischbacher, 2007) and conducted at VELE (Verona Experimental Laboratory in Economics). The participants—undergraduate students in various fields from the University of Verona—were recruited using Greiner’s (2015) ORSEE software. Upon entering the laboratory, they were randomly assigned to visually isolated computer terminals and received written instructions, which were also read aloud by an experimenter (the same in all sessions). The experiment started only after each participant had correctly answered a series of control questions.¹⁴

Following a number of previous studies (e.g., Cameron et al., 2009; Abbink et al., 2014; Banerjee, 2016; Ryvkin et al., 2017) as well as Alekseev et al.’s (2017) recommendation, we used corruption-loaded language. By this means, we could evoke those kinds of emotions and moral considerations inherent in corrupt transactions and simulate a real-life petty corruption exchange.

In the message treatment, each other member of society—after having learned the choices of citizen and official in his own group—could use a text box to type in his message, whose length could not exceed 500 characters including spaces. The other member of society had a maximum of four minutes to compose his message, but it was at his discretion to send the message, together with the emoticon, ahead of the deadline.

¹³In Appendix A, we extend the analysis to include social preferences and show that the predictions remain unchanged.

¹⁴Appendix B contains a translation of the instructions (originally in Italian) for the message treatment as well as the set of control questions.

The form of the message was free; the only restriction to its content was that its sender could not identify himself. To enforce compliance with this restriction, all messages were screened before being posted on the electronic bulletin board visible to all participants in a session.¹⁵ The private citizens and the public officials knew that (i) the other members of society would have the possibility to post publicly visible free-form text messages and emoticons and (ii) they themselves would be able to identify the message and emoticon sent by their matched other member of society.

While we suppose that the presence of messages *per se* causes a loss of utility by increasing the moral cost of engaging in corruption, we deemed important to test whether expectation-based guilt aversion (Charness and Dufwenberg, 2006; Battigalli and Dufwenberg, 2007) would also explain the alleged effect of messaging opportunities. If the decision makers think that the other members of society expect less corrupt behavior in the message treatment than in the baseline, bribe offers/acceptances may be lower in the presence of messaging opportunities because the decision makers dislike letting down others' payoff expectations. To check whether this is the case, we elicited first and second order beliefs.¹⁶ Specifically, in both treatments, while the private citizens and the public officials were making their choices in the bribery game, the other members of society responded to a set of questions related to their beliefs about the decisions of their matched partners.¹⁷ After they made their choices in the game, each private citizen and each public official was asked (second-order belief questions) about what their matched other member of society was expecting from them.¹⁸ We gave participants a financial incentive to report beliefs accurately. We paid them €1 if all their beliefs turned out to be correct and nothing in all other cases. Incentives in the belief task were kept small relative to incentives in the bribery game to avoid hedging (see, e.g., Blanco et al., 2010).

To verify if messaging opportunities increase the moral costs associated with corrupt behavior, we asked all participants (whatever their role), as part of a post-experiment questionnaire (reproduced in Appendix B), to report the emotions that the private citizen and the public official could have experienced when the former offered a bribe and the

¹⁵Improper messages were to be screened out and their sender was supposed to be given a warning for misconduct, but as a matter of fact such a thing never happened.

¹⁶We preferred using this widely accepted belief-elicitation method for testing guilt-aversion, although its reliability has been debated (Ellingsen et al., 2010; Khalmetski, 2016).

¹⁷In particular, the first question each *MS* was asked to answer was: "Do you expect the private citizen to offer a bribe?". In case of an affirmative answer, the following two questions appeared on *MS*'s computer screen: "How much do you expect the private citizen to offer?", "Do you think that the public official will accept such an amount?".

¹⁸Each participant in the role of *C* and *O* was first asked to guess whether *MS* expected *C* to offer a bribe or not. Then, if he guessed that *MS* was expecting *C* to offer a bribe, he was asked to guess: (i) the amount that *MS* expected *C* to offer and (ii) if *MS* expected *O* to accept this amount.

latter accepted it. Participants had to indicate on an 11-point scale the likelihood that a corrupt citizen and a corrupt official would feel each of the following emotions: guilt, shame, happiness, gratitude, indifference, dissatisfaction, and surprise. The seven different emotions appeared on the same screen, but their order was randomized across subjects. Our objective was to examine whether engaging in corruption induces more feelings of guilt and shame in the message treatment compared to the baseline. The list contains a greater number of emotions (both positive and negative) in order to reduce potential demand effects of having only guilt and shame.

The post-experiment questionnaire also included (i) a hypothetical dictator game as a measure of altruism and (ii) a self-reported measure of risk attitudes from the German Socio-Economic Panel (SOEP). In the hypothetical dictator game, each participant was asked to divide €20 between himself and a hypothetical recipient. Ben-Ner et al. (2008) provide evidence that the behavior of dictators playing with hypothetical money is, on average, not significantly different from that of dictators in conventional experiments with actual money. The SOEP question asked respondents to indicate their willingness to take risks in general. Participants rated their willingness on an 11-point scale ranging from 0 (not at all willing to take risks) to 10 (very willing to take risks). The behavioral validity of this survey risk measure has been confirmed by Dohmen et al. (2011).

We used a between-subjects design, i.e., each subject was exposed to only one of the two treatments. Overall, we ran eleven sessions with a total of 288 participants. Six sessions were devoted to the baseline treatment (with 27 participants per session) and five sessions to the message treatment (with 24 to 27 participants per session).¹⁹ Each session lasted about 60 minutes. Averaging over all sessions, mean earnings amounted to €16.63 (inclusive of a €3 show-up fee).

3 Results

3.1 Assessing the quality of randomization between treatments

We begin our analysis by verifying that the random assignment of students to treatments was effective. This check is important because corrupt behavior has been found to depend on personal characteristics—such as gender (Atalas et al., 2009)—and individual preferences—such as religion, political orientation, and risk attitudes (Berninghaus et al., 2013; North et al., 2013).

¹⁹A software crash occurred at the end of a session devoted to the message treatment. As a consequence, we lost emotion data from 8 groups.

Table 1: Mean (and standard deviation) of participants' characteristics and preferences.

	Baseline				Message			
	All	<i>C</i>	<i>O</i>	<i>MS</i>	All	<i>C</i>	<i>O</i>	<i>MS</i>
Male	0.33 (0.47)	0.35 (0.48)	0.28 (0.45)	0.37 (0.49)	0.33 (0.47)	0.31 (0.47)	0.43 (0.50)	0.26 (0.45)
Economics	0.41 (0.49)	0.44 (0.50)	0.39 (0.49)	0.41 (0.50)	0.44 (0.50)	0.50 (0.51)	0.36 (0.48)	0.45 (0.50)
Catholic	0.61 (0.49)	0.69 (0.47)	0.54 (0.50)	0.61 (0.49)	0.61 (0.49)	0.67 (0.48)	0.62 (0.49)	0.55 (0.50)
Age	21.59 (2.23)	21.41 (1.98)	21.57 (2.70)	21.78 (1.95)	21.71 (2.35)	21.38 (1.87)	21.98 (2.21)	21.76 (2.86)
Political orientation	4.61 (1.97)	4.83 (2.11)	4.31 (1.81)	4.69 (1.98)	4.83 (2.02)	4.93 (1.96)	4.88 (2.14)	4.67 (1.98)
Risk attitude	5.73 (2.18)	5.93 (2.14)	5.70 (2.22)	5.56 (2.21)	5.87 (2.16)	5.50 (2.00)	5.93 (2.17)	6.19 (2.29)
Altruism	7.51 (3.06)	7.67 (2.91)	7.50 (3.17)	7.35 (3.16)	8.22 (2.97)	8.50 (2.62)	7.45 (3.56)	8.71 (2.53)
Obs.	162	54	54	54	126	42	42	42

Table 1 reports summary statistics of demographic characteristics and individual preferences of our sample, divided by treatment and role. Overall, about one-third of the participants are male, which reflects the gender composition of our subject pool. Approximately forty percent of the participants are majoring in economics and about three-fifths are Catholic. The average age is around 21, which is not surprising given that subjects are recruited from the undergraduate student population. The average political orientation, ranging from 0 (extreme left) to 10 (extreme right), is 4.61 in the baseline treatment and 4.83 in the message treatment, thus indicating a moderately left-leaning sample. Based on the participants' responses to the SOEP question, the risk attitude (on a 0–10 scale) is, on average, 5.73 in the baseline treatment and 5.87 in the message treatment. Finally, average donations in the hypothetical dictator game, which we interpret as a measure of altruism, amount to slightly less than half of the endowment in both treatments.

Since we find no significant differences in the demographics and preferences of participants assigned to the message treatment compared to those assigned to the baseline treatment, we can conclude that randomization worked.²⁰

²⁰According to a series of χ^2 tests, we find no differences in gender, field of study, and religion between treatments (p-values equal to 1.000, 1.000, and 0.696, respectively). Similarly, a series of Wilcoxon rank-sum tests does not reveal any differences in age, political orientation, and risk attitude (p-values equal to 0.693, 0.371, and 0.574, respectively). Notably, no significant differences are detected between treatments also when considering separately the demographic characteristics and the individual

Table 2: Behavior in the bribery game.

Panel A: Proportions of bribe offer and acceptance			
	Baseline (B)	Message (M)	M vs. B (p-value)
Bribe Offer	83.33%	61.90%	0.018
Bribe Acceptance	62.22%	69.23%	0.551

Panel B: Mean (and standard deviation) of bribe amounts			
	Baseline (B)	Message (M)	M vs. B (p-value)
Bribe Amount > 0	8.80 (2.29)	8.88 (2.01)	0.894
Bribe Amount	7.33 (3.91)	5.50 (4.46)	0.082

Note: Bribe amounts are expressed in ECU, excluding and including zero offers. Proportions (means) are compared using χ^2 (Wilcoxon rank-sum) tests.

3.2 Overall effect of messages

Table 2 provides a snapshot of our experimental data. Panel A shows the tendency of individuals to act corruptly, divided by treatment and role. Panel B displays summary statistics (means and standard deviations) of offered bribes. A visual inspection of Panel A reveals two noteworthy features. First, the messaging opportunities granted to the other members of society act as a deterrent to bribe offer. While 83.33% of private citizens offer a bribe in the baseline treatment, only 61.90% do so in the message treatment and the difference is statistically significant (χ^2 test, p-value=0.018). Second, the proportions of accepted bribes by public officials do not differ across treatments (62.22% in the message treatment vs 69.23% in the baseline; χ^2 test, p-value=0.551). In the next subsections, we will employ regression analysis to examine separately the decisions of private citizens and public officials and to thoroughly test the predictions presented in Section 2.2.²¹

Herein, we consider the entire sample of 192 decision makers, i.e., we pool the private citizen and public official data, to assess the overall effect of the presence of messages. In particular, Table 3 reports estimates from logit regressions where the dependent vari-

preferences of participants in each role. The only exception is that the other members of society are more altruistic in the message treatment than in the baseline (Wilcoxon rank-sum test, p-value=0.008). All p-values in the paper are two-tailed.

²¹Regressions are preferable to non-parametric tests as they allow us to see the impact of messaging opportunities on individual behavior while controlling for the heterogeneity of the participants in terms of demographics and preferences.

Table 3: Logit regressions examining the decision to act corruptly.

	(1)	(2)	(3)	(4)
Message	-0.692** (0.314)	-0.774** (0.333)	-1.124** (0.485)	-1.060** (0.502)
Male		0.135 (0.408)		0.102 (0.410)
Economics		-0.130 (0.426)		-0.083 (0.424)
Catholic		0.442 (0.381)		0.414 (0.379)
Age		-0.038 (0.077)		-0.044 (0.077)
Political orientation		0.155* (0.085)		0.153* (0.085)
Risk attitude		0.062 (0.082)		0.058 (0.083)
Altruism		-0.142** (0.055)		-0.140** (0.055)
Public Official	-1.159*** (0.314)	-1.257*** (0.332)	-1.535*** (0.457)	-1.505*** (0.479)
Public Official*Message			0.762 (0.639)	0.521 (0.678)
Constant	1.374*** (0.275)	2.075 (1.775)	1.609*** (0.366)	2.383 (1.830)
Obs.	192	192	192	192
Pseudo R ²	0.0733	0.1289	0.0789	0.1312

Note: Robust standard errors are reported in parentheses. *, **, *** denote significance at 10%, 5%, and 1% level, respectively.

able is a dummy equal to 1 if the participant engaged in corruption by either offering or accepting a bribe. All regressions include a role dummy which takes the value of 1 if the respondent played in the role of public official. The overall effect of messaging opportunities is assessed in isolation (column (1)) and controlling for demographic characteristics and individual preferences (column (2)). In both cases, the coefficient of “Message” is negative and significant, meaning that empowering the other members of society with messaging opportunities succeeds in reducing corruption.²²

The insignificant interaction term between the role dummy and the treatment dummy in specifications (3) and (4) of Table 3 indicates that the overall effect is driven by the private citizens, which we turn to in the next subsection.

²²The effect of messages on the decision to act corruptly is negative and significant even when estimations are performed with robust standard errors clustered at the group level. Results remain qualitatively unchanged if probit, rather than logit, regressions are used.

3.3 Analysis of the private citizen data

Table 4 displays the results of several regressions aimed at examining the propensity of private citizens to offer a bribe in the two treatments and the determinants of their behavior. The first two columns take the decision to offer a bribe as dependent variable and present estimates from logit regressions. The coefficient of “Message” in column (1) is negative and significant, confirming that private citizens are significantly less likely to offer a bribe in the message treatment than in the baseline. This holds true even if we add controls for participants’ demographics and preferences (see column (2)). Among the added control variables, “Risk attitude” and “Altruism” have an impact on the likelihood of offering a bribe. More specifically, higher willingness to take risk is associated with a higher probability of bribe offers (which is not surprising since the citizens receive a slightly lower payoff if the matched public official rejects the offered bribe) and more altruistic participants are less inclined to offer a bribe (which somehow reflects the citizens’ concern for the other members of society).

Columns (3) to (8) in Table 4 are devoted to the analysis of bribe amounts (the summary statistics are presented in Table 2, Panel B). The OLS estimates in columns (3) and (4), which consider only positive bribe offers, do not indicate any statistically significant effect of “Message” on bribe amounts. However, since a smaller number of observations are included in the considered subsample, this result may be due to low statistical power. As Prediction 1 concerns both the offered bribe amounts and the private citizens’ propensity to offer a bribe, we deemed appropriate to estimate OLS models where the dependent variable (i.e., bribe amounts) includes zeros—namely citizens who did not offer any bribe. By this means, we can not only increase the sample size and thus the power of the analysis, but also assess how the presence of messaging opportunities affects the offered bribes while simultaneously taking account of the citizens’ choice between bribing and not bribing. The resulting estimates, displayed in columns (5) and (6) of Table 4, show that the coefficient of “Message” is negative and significant, meaning that, when the full sample of private citizens is used and regardless of whether control variables are excluded (column (5)) or included (column (6)), private citizens in the message treatment—compared to those in the baseline—offer lower bribes or refrain from corruption more often. Of all the regressors, only the coefficient of “Risk attitude” is positive and significant at the 10% level. These results are confirmed by Tobit regressions (reported in columns (7) and (8)) in which the dependent variable is left-censored at 0 and right-censored at 18. In accordance with Hypothesis 1, we state:

Result 1. Empowering the other members of society with the possibility of sending a

Table 4: Regressions examining the behavior of private citizens.

	Bribe Offer Logit		Bribe Amount > 0 OLS		Bribe Amount OLS		Bribe Amount Tobit	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Message	-1.124** (0.487)	-0.948* (0.547)	0.085 (0.520)	-0.091 (0.529)	-1.833** (0.892)	-1.521* (0.882)	-2.591** (1.232)	-2.129* (1.162)
Male		0.634 (0.883)		0.276 (0.801)		1.433 (1.223)		1.840 (1.576)
Economics		-0.351 (0.687)		0.032 (0.743)		-0.469 (1.120)		-0.624 (1.496)
Catholic		0.942 (0.636)		-0.927 (0.676)		0.490 (0.991)		0.916 (1.325)
Age		-0.007 (0.168)		-0.034 (0.165)		-0.043 (0.257)		-0.052 (0.342)
Political orientation		0.093 (0.141)		0.251* (0.131)		0.298 (0.197)		0.340 (0.257)
Risk attitude		0.303** (0.147)		-0.039 (0.129)		0.384* (0.211)		0.540* (0.284)
Altruism		-0.213* (0.115)		0.131 (0.089)		-0.099 (0.129)		-0.171 (0.162)
Constant	1.609*** (0.367)	0.782 (3.543)	8.800*** (0.343)	8.098** (3.593)	7.333*** (0.533)	4.672 (5.299)	6.896*** (0.707)	3.470 (6.973)
Obs.	96	96	71	71	96	96	96	96
Pseudo R ²	0.0511	0.1777					0.0097	0.0316
R ²			0.0004	0.0933	0.0448	0.1443		

Note: Robust standard errors are reported in parentheses. *, **, *** denote significance at 10%, 5%, and 1% level, respectively.

publicly visible message to the decision makers in their group **(a)** decreases the likelihood that the private citizens offer a bribe and **(b)** reduces the offered bribes.

In the simple model developed in Section 2.2, we hypothesize that the prospect of receiving written disapproval from others increases the moral cost of engaging in corruption. We expect therefore that, when faced with a corrupt act, private citizens feel more guilt and/or shame in the message treatment than in the baseline. The emotion data support this expectation. In particular, citizens in the message treatment—compared to citizens in the baseline—report that corrupt citizens are more likely to have feelings of guilt and shame: on a 0–10 scale, mean guilt is 5.47 in the message treatment ($SD = 2.77$) and 4.44 in the baseline ($SD = 2.84$); mean shame is 5.03 in the message treatment ($SD = 2.87$) and 4.07 in the baseline ($SD = 2.98$). Wilcoxon rank-sum tests show that the difference between the message and the baseline sample is significant at the 10% level for guilt ($p\text{-value} = 0.087$) and insignificant for shame ($p\text{-value} = 0.119$). The self-reported ratings of the other five emotions ascribed to corrupt citizens remain substantially the same between the two treatments. No difference between treatments is observed when we look at the emotions that citizens attribute to corrupt officials.

Finally, we turn to the analysis of the private citizens’ elicited second-order beliefs, namely their beliefs about what the other members of society expect from the decision makers, to assess whether the observed effect of messaging opportunities on citizens’ behavior is attributable to expectation-based guilt aversion. The top panel of Table 5 (Panel A) shows that private citizens in the message treatment—compared to those in the baseline—think that the other members of society expect less bribe offers, less bribe acceptances, and lower bribe amounts. Yet, as the p -values reported in the last column of Table 5 indicate, none of the differences is statistically significant. Thus, private citizens’ second-order beliefs are inconsistent with an explanation of Result 1 based on expectation-based guilt aversion.

3.4 Analysis of the public official data

To test Prediction 2, we conduct a regression analysis on public officials’ acceptance rates (the proportions of accepted bribes by treatment are shown in Table 2, Panel A). Table 6 reports logit regressions on the probability of accepting a bribe. In columns (1) and (2) we employ the same specifications as in the first two columns of Table 4, while also controlling for the bribe amount which is included as a dummy variable, “Low Bribe”, taking the value 1 if $b \in [6, 7]$. Both when excluding and including control variables, the coefficient of “Message” is not significant, confirming that—in contrast with part (a) of

Table 5: Summary statistics of elicited beliefs.

Panel A: Second-order beliefs of private citizens			
	Baseline (B)	Message (M)	M vs. B (p-value)
<i>Proportions of bribe offer and acceptance</i>			
Bribe Offer	94.44%	85.71%	0.145
Bribe Acceptance	82.35%	80.56%	0.831
<i>Mean (and standard deviation) of bribe amount</i>			
Bribe Amount > 0	8.73 (3.12)	8.33 (2.28)	0.860
Bribe Amount	8.24 (3.64)	7.14 (3.62)	0.365
Panel B: Second-order beliefs of public officials			
	Baseline (B)	Message (M)	M vs. B (p-value)
<i>Proportions of bribe offer and acceptance</i>			
Bribe Offer	96.30%	92.86%	0.452
Bribe Acceptance	94.23%	94.87%	0.894
<i>Mean (and standard deviation) of bribe amount</i>			
Bribe Amount > 0	8.27 (2.57)	8.97 (2.11)	0.074
Bribe Amount	7.96 (2.97)	8.18 (3.27)	0.228
Panel C: First-order beliefs of other members of society			
	Baseline (B)	Message (M)	M vs. B (p-value)
<i>Proportions of bribe offer and acceptance</i>			
Bribe Offer	85.19%	90.48%	0.437
Bribe Acceptance	95.65%	86.84%	0.146
<i>Mean (and standard deviation) of bribe amount</i>			
Bribe Amount > 0	8.87 (2.69)	9.24 (2.95)	0.644
Bribe Amount	7.56 (4.03)	8.36 (3.93)	0.408

Note: Bribe amounts are expressed in ECU, excluding and including zero offers. Proportions (means) are compared using χ^2 (Wilcoxon rank-sum) tests.

Table 6: Logit regressions examining the behavior of public officials.

	Bribe Acceptance			
	(1)	(2)	(3)	(4)
Message	0.133 (0.579)	0.231 (0.705)	0.197 (0.711)	0.323 (0.798)
Male		0.004 (0.873)		0.052 (0.912)
Economics		0.758 (0.835)		0.725 (0.832)
Catholic		-0.485 (0.983)		-0.471 (0.987)
Age		-0.180 (0.110)		-0.178 (0.110)
Political orientation		0.345 (0.216)		0.350 (0.217)
Risk attitude		-0.140 (0.115)		-0.138 (0.114)
Altruism		-0.210 (0.128)		-0.209 (0.127)
Low bribe	-1.945*** (0.582)	-2.297*** (0.719)	-1.883*** (0.702)	-2.201*** (0.808)
Low bribe*Message			-0.197 (1.253)	-0.346 (1.546)
Constant	1.214*** (0.412)	6.150** (2.941)	1.190*** (0.435)	6.044** (3.022)
Obs	71	71	71	71
Pseudo R ²	0.1307	0.2380	0.1387	0.2644

Note: Robust standard errors are reported in parentheses. *, **, *** denote significance at 10%, 5%, and 1% level, respectively.

Prediction 2—messaging opportunities do not affect the officials’ propensity to accept a bribe. All control variables are not significant, except for “Low bribe” whose estimated coefficient is negative and significant, indicating that bribes equal to 6 or 7 ECU are accepted less often than bribes above 7 ECU. To test part (b) of Prediction 2, according to which low bribes are less likely to be accepted in the message treatment than in the baseline, we add an interaction term between “Low bribe” and the treatment dummy (see columns (3) and (4)). It turns out that messaging opportunities decrease the probability of accepting low bribes, but not in a statistically significant way. Hence, contrary to Prediction 2, we state:

Result 2. Empowering the other members of society with the possibility of sending a publicly visible message to the decision makers in their group **(a)** does not affect acceptance rates and **(b)** leaves the probability of accepting low bribes unchanged.

In an attempt to explain this null result, we look at the public officials’ emotion data, namely at the emotions that, according to the public officials, corrupt citizens and corrupt officials are supposed to experience. The reported likelihood that a corrupt official would feel guilt or shame is found not to be influenced by messaging opportunities: mean guilt is 5.21 in the message treatment ($SD = 3.23$) and 5.44 in the baseline ($SD = 2.93$); mean shame is 4.62 in the message treatment ($SD = 3.21$) and 4.93 in the baseline ($SD = 2.93$). Neither difference is statistically significant (Wilcoxon rank-sum tests, p-values equal 0.756 and 0.659 for guilt and shame, respectively). Also the ratings of the other five emotions attributed to corrupt officials do not change with the treatment and the same holds if we consider the emotions that officials attribute to corrupt citizens.

Panel B of Table 5 summarizes the officials’ second-order beliefs. Although public officials think that the other members of society expect private citizens to act less corruptly (i.e., to offer bribes less frequently) and public officials to act slightly more corruptly (i.e., to accept bribes slightly more often) in the presence than in the absence of messaging opportunities, these differences are not statistically significant (the p-values are shown in the last column of Table 5). The officials’ second-order beliefs about the bribe amounts are higher in the message treatment than in the baseline, and weakly significantly so when amounts do not include zeros.

3.5 Analysis of the other member of society data

We conclude this section by reporting on the messages sent by the other members of society and on their first-order beliefs.²³ We draw on Xiao and Houser (2005, 2009) to evaluate the emotional content of the free-form text messages. We recruited two message evaluators from the undergraduate student body at the University of Verona. These evaluators—after having read the experimental instructions, but being unaware of the choices made by the citizens and the officials—were asked to classify each message based on the valence of its content: positive, neutral, or negative. Messages are classified according to the most popular classification chosen by the evaluators. The classification was unanimous in 39 of 41 cases. The remaining two cases were determined by our own evaluations.

Table 7 classifies the messages on the basis of their emotional content and shows the type of emoticon sent, separately for each possible outcome. When a bribe is not offered, the vast majority of other members of society sent a message classified as positive (73.33%) and a happy emoticon (81.25%), thus expressing approval for the honest

²³Although sending a message was not mandatory, 41 subjects out of 42 (i.e., 98%) actually took advantage of this opportunity. All subjects sent an emoticon.

Table 7: Message classification and types of emoticons sent by the other members of society in the message treatment.

	Message			Emoticon		
	Positive	Neutral	Negative	😊	😐	😞
No Bribe	73.33%	13.33%	13.33%	81.25%	18.75%	-
Bribe Offered and Rejected	37.50%	25.00%	37.50%	87.50%	-	12.50%
Bribe Offered and Accepted	11.11%	27.78%	61.11%	5.56%	27.78%	66.67%

behavior of the co-players. The happy emoticon was used most frequently (87.50% of the cases) also when a bribe is offered and rejected. On the contrary, when a bribe is offered and accepted, 61.11% of other members of society sent a message classified as negative and 66.67% an emoticon with a sad face.

The beliefs of the other members of society about the behavior of their matched citizen and official are displayed in the bottom panel of Table 5 (Panel C). From the p-values in the last column, there is no significant difference in bribe offers, bribe acceptances, and bribe amounts between treatments. Hence, the other members of society do not anticipate any effect of messages on behavior in the bribery game. This suggests that they do not expect messaging opportunities to raise the private citizens' and the public officials' moral costs. Indeed, their emotion data indicate that the passive members of society expect neither private citizens nor public officials in the message treatment to feel more guilt and shame than private citizens and public officials in the baseline.

4 Discussion

The goal of this study was to test whether collusive petty corruption can be reduced by giving a voice to the passive third parties who suffer losses due to corrupt exchanges.

The first key finding is that, in accordance with Prediction 1, private citizens in the message treatment—compared to those in the baseline treatment—are less likely to offer a bribe and, when they do so, they offer lower bribe amounts. The data on emotions indicate that the private citizens, confronted with a corrupt act, report a significantly higher level of guilt in the message treatment than in the baseline. This supports our hypothesis that allowing passive parties to voice their potential grievances increases the citizens' moral costs of engaging in corruption.

The second key finding is that, contrary to Prediction 2, participants in the public official role remain unaffected by the treatment: both the proportion of bribe acceptances and the accepted bribe amounts do not react to the presence of messaging opportunities.

We provide two explanations for this. The first is based on Bardsley’s (2005) “artificiality hypothesis” and has been suggested by Barr and Serra (2009), who found differential effects of framing for participants in the role of private citizens and public officials. According to these authors, student participants—being citizens—can enter into the citizen role easily and be prompted by the employed corruption-frame to think of what they themselves would do were they in the situation of offering a bribe. Conversely, students may find it difficult to step into the public official’s shoes and may look at their role as artificial. It is exactly because of this artificiality that, as the self-reported emotion data indicate, public official participants may have failed to feel more guilty and shameful when the other members of society could send messages. Essentially, this hypothesis suggests that the increase in the decision makers’ moral cost of engaging in corruption, which should be induced by the presence of messaging opportunities, depends on the perceived artificiality of the faced situation.

A second and, in our opinion, more plausible explanation for the null effect of messaging opportunities on the public officials’ behavior is that public officials thought that the harmed other members of society (i.e., those who are worse off due to the occurrence of a corrupt act) valued ‘having a voice’ by itself. There exist a few studies documenting that the opportunity for voice promotes the acceptance of unfavourable decisions (Xiao and Houser, 2005; Ong et al., 2012; Koukoulis and Levati, 2019). Under this view, the moral costs do not rise in the message treatment for the countervailing effect of the voice opportunity itself. Formally, it is as if the non-monetary cost component of utility function (1), namely m_i , could be decomposed into two parts: one (denoted by μ_i) representing i ’s intrinsic moral concerns and the other (denoted by ϵ_i) representing i ’s beliefs about the degree to which the other member of society feels satisfied from sending a message. We suppose that $\frac{\partial m_i}{\partial \mu_i} > 0$, whereas $\frac{\partial m_i}{\partial \epsilon_i} < 0$. In the most simplest way, we can set $m_i = \mu_i - \epsilon_i \mathbb{1}$, where $\mathbb{1}$ is an indicator function taking value 1 if the other member of society can send a message and 0 otherwise. Then, Eq. (1) can be written as

$$(2) \quad U_i = \pi_i - \mu_i + \epsilon_i \mathbb{1}.$$

Given our experimental parameters, accepting a bribe of amount b is preferable to rejecting it whenever

$$b - 5 - \mu_i + \epsilon_i \mathbb{1} \geq 0.$$

In the message treatment, both μ_i and ϵ_i may increase so that the final effect on m_i depends on the relative strength of the two terms. If the variation in μ_i is equal to or smaller than the variation in ϵ_i , then it is well possible that bribery decisions are

unaffected by the treatment.

To verify the plausibility of this explanation, in the last session of the message treatment we asked the decision makers whether they thought that the other member of society felt better after sending the message. The overwhelming majority of participants in the public official role (71%) thought so, whereas only 29% of participants in the private citizen role agreed with the posed question.

5 Concluding remarks

Fighting petty corruption by means of mere top-down interventions has proved unsuccessful so far. In an attempt to improve the existing situation, Transparency International has advocated citizen participation as an effective way to curb corruption. In this paper, we present an experiment designed to study the effectiveness of a specific grassroots anti-corruption intervention that gives a voice to passive members of society who suffer from corruption without being part of it. More specifically, the passive members are given the opportunity to send free-form text messages, concurrently with emoticons, to the actors that can engage in corrupt transactions. Since the messages are posted on a publicly visible bulletin board, potential bribers and potential bribees are exposed to the possibility of receiving verbal disapproval and negative social judgment. On the basis of previous laboratory research documenting that anticipated disapproval and concerns about social judgement promote fair exchange, we predicted that providing third parties with messaging opportunities increases the moral cost experienced by bribe-givers and bribe-takers, thereby reducing the frequency of corrupt transactions.

The results indicate that the proposed intervention is effective in reducing corruption. This is attributable to the behavior of the private citizens who are found to offer bribes significantly less frequently in the presence than in the absence of messaging opportunities. The analysis of the self-reported emotion data shows that private citizens in the message treatment—compared to private citizens in the baseline—assign significantly higher ratings of guilt to a corrupt citizen. The elicited second-order beliefs suggest that this variation in guilt levels cannot be accounted for by changes in payoff expectations. This evidence shows that giving a voice to the other members of society, *per se*, has an effect on the private citizens' moral costs of offering a bribe.

As to the public officials, their behavior as well as their moral costs—as measured by the (self-reported) ratings of guilt and shame in response to corrupt actions—remain unaffected by the other members of society's voice. We provide a theoretical justification for this null finding based on the officials' beliefs that the passive parties feel better when

they can express their disapproval to the decision makers. Such beliefs ‘crowd out’ the increase in the moral costs of accepting a bribe.

While we are unable to identify the causes of this differential effect of a voice on citizens’ and officials’ behavior with certainty, a plausible explanation—that we leave for future research—is that the weight a person places on the possibility that having a voice is valuable in itself depends on whether or not that person initiates the corrupt action. Putting it in different words, the increase in moral costs induced by messaging opportunities may be driven by the degree of responsibility that people feel for the harm caused to society by their corrupt behavior. While private citizens, making the first move, feel directly responsible for causing harm to passive third parties, this is less so for public officials that, coming into play only if the private citizens offer a bribe, tend to attach more importance to the possibility that passive parties feel better by sending a message than to the prospect of receiving an informal social sanction.

Overall, our study provides evidence for the important role of communication opportunities granted to ordinary citizens in the fight against corruption, at the same time motivating further research to investigate the reasons for the differential effect of such opportunities on bribers’ and bribees’ behavior.

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Appendix A. Behavioral predictions with social preferences

In this Appendix we show that the behavioral predictions obtained in Section 2.2 continue to hold if we assume that agents, besides bearing a non-monetary cost from engaging in corruption, have social preferences: they care about the others, albeit to a lower degree compared to themselves. In particular, we suppose that each decision maker assigns weight one to his own utility and weight smaller than one to the others' utilities, which is the simplest way of modelling social preferences (Andreoni and Miller, 2002; Charness and Rabin, 2002).

Let $\alpha_C < 1$, $\alpha_O < 1$, $\alpha_{MS} < 1$ represent, respectively, the weight placed by the public official on the private citizen's utility, the weight placed by the private citizen on the public official's utility, and the weight placed by both the citizen and the official on the other member of society's utility. For simplicity, we assume that the two decision makers care equally for the other member of society, although this may not be necessarily true. Player i 's ($i = \{C, O\}$) utility function can then be written as

$$U_i = (\pi_i - m_i) + \alpha_j (\pi_j - E_i(m_j)) + \alpha_{MS} (\pi_{MS}) \quad j = \{C, O\}, j \neq i$$

where $E_i(m_j)$ stands for i 's expectations about the moral cost suffered by corrupted player j .

Starting, once again, with the second mover, given the monetary payoffs in our game, if O accepts a bribe of amount b , his utility is $(31 + b - m_O) + \alpha_C (55 - b - E_O(m_C)) + \alpha_{MS}16$, whereas if O rejects it, his utility is $36 + \alpha_C (35 - E_O(m_C)) + \alpha_{MS}30$. Since C has chosen to offer a bribe, it is reasonable to assume that O , whatever his choice, expects C to bear the moral cost. O will prefer accepting b to rejecting it if

$$(31 + b - m_O) + \alpha_C (55 - b - E_O(m_C)) + \alpha_{MS}16 \geq 36 + \alpha_C (35 - E_O(m_C)) + \alpha_{MS}30$$

which implies the following inequality

$$b - 5 - m_O + \alpha_C (20 - b) - \alpha_{MS}14 \geq 0.$$

We hypothesize an upward shift in m_O if MS can send a message. For fixed values of b , α_C , and α_{MS} , the increase in m_O makes it less attractive for O to accept b . Additionally, given m_O , α_C , and α_{MS} , the lower b , the more likely O is not to accept it because of $\alpha_C < 1$

Turning to the first mover, let us suppose (as we did in Section 2.2) that C expects O

to accept b , if offered. Thus, C 's utility is $(55 - b - m_c) + \alpha_O(31 + b - E_C(m_O)) + \alpha_{MS}16$ if he offers a bribe b and $36 + \alpha_O36 + \alpha_{MS}30$ if he does not offer a bribe. C will find it profitable to offer a bribe if

$$(55 - b - m_c) + \alpha_O(31 + b - E_C(m_O)) + \alpha_{MS}16 \geq 36 + \alpha_O36 + \alpha_{MS}30$$

yielding

$$19 - b - m_c + \alpha_O(b - 5 - E_C(m_O)) - \alpha_{MS}14 \geq 0.$$

If, as we suppose, messaging opportunities for MS cause an increase in m_c , this increase will, ceteris paribus (i.e., fixed $b, \alpha_O, E_C(m_O)$, and α_{MS}), make a bribe offer less attractive to C .

Note that in this simple model with social preferences, allowing MS to send a message may also lead to an increase in α_{MS} , i.e., in the weight a decision maker places on the other member of society's utility (see, e.g., Salmon and Serra, 2017). This would further discourage C to offer a bribe and O to accept it.

Appendix B. Experimental instructions and questionnaire

This appendix reports the instructions (originally in Italian) that we used for the message treatment, the control questions that participants were required to answer before the experiment started, and the post-experiment questionnaire. The instructions for the baseline treatment were adapted accordingly and are available upon request.

Instructions

General

Welcome! You are about to participate in an experiment funded by the Department of Economics at the University of Verona and the Frankfurt School of Finance and Management. Please switch off your mobile and remain silent. It is strictly forbidden to talk to the other participants. Raise your hand whenever you have a question and one of the experimenters will come to your aid.

You will receive €3.00 for having shown up on time and, beyond this, you can earn more money. Your earnings will depend on your decisions and/or on the decisions of other participants. Read these instructions carefully to understand how your decisions and the other participants' decisions affect your earnings. All the decisions you make and information you provide will be treated as confidential and will be used for scientific purposes only. Your name will not be in any way associated with the data collected in the experiment. During the experiment, we shall not speak of euros but of ECUs (Experimental Currency Units). ECUs are converted to euros at the following exchange rate: 1 ECU = €0.40.

The €3.00 show-up fee and any additional amounts of money you may earn will be paid to you in cash at the end of the experiment. Payments are carried out privately, i.e., the others will not be aware of your earnings.

Detailed information on the experiment

There are three types of participants: Private Citizens, Public Officials, and Other Members of Society. At the beginning of the experiment, you will be randomly assigned to one of these three types and will be informed whether you are a Private Citizen, a Public Official, or an Other Member of Society.

Group formation

A Private Citizen, a Public Official, and an Other Member of Society will be matched together and interact with one another just once. You will therefore be part of a group of three participants. No one will know the identity of the persons with whom he/she is matched.

Initial endowment

Each type of participant will receive an initial endowment. Each Private Citizen will get 36 ECUs, each Public Official 36 ECUs, and each Other Member of Society 30 ECUs.

Decisions to be made and related earnings

Every Private Citizen wishes to receive a public service. To get a better or quicker service, the Private Citizen may try to offer a bribe to a Public Official. If the Private Citizen decides to offer a bribe, then he/she has to choose the amount to offer. The Public Official then has two options: he/she can accept the bribe or reject it. The earnings of the Other Member of Society are unaffected if a bribe is either not offered or offered and rejected. Instead, if a bribe is offered and accepted, this has a negative effect on the Other Member of Society who—after learning the decisions of the Private Citizen and the Public Official—will have the chance to send them a message.

Let us see in details how the experiment proceeds.

Stage 1: Offer or not of a bribe by the Private Citizen

The Private Citizen has to first decide whether or not to offer a bribe to the Public Official in his/her group.

- If the Private Citizen DOES NOT OFFER a bribe, the play ends and each person in the group receives his/her initial endowment: the Private Citizen earns 36 ECUs, the Public Official earns 36 ECUs, and the Other Member of Society earns 30 ECUs.
- If the Private Citizen OFFERS a bribe, then he/she has to decide on the amount to be offered as a bribe. This amount can be any integer between 6 ECUs and 18 ECUs, that is it can be 6, 7, . . . , 17, 18 ECUs. The play moves to stage 2.

Stage 2: Acceptance or rejection of the bribe by the Public Official

If the Private Citizen in his/her group offers a bribe, the Public Official is informed about the bribe amount and has to decide whether to accept or reject the proposed

bribe.

- If the Public Official ACCEPTS the bribe, the Private Citizen earns 55 ECUs minus the bribe, the Public Official earns 31 ECUs plus the bribe, and the Other Member of Society suffers a loss of 14 ECUs and thus earns $(30 - 14 =)$ 16 ECUs.
- If the Public Official REJECTS the bribe, the Private Citizen earns 35 ECUs, whereas the Public Official and the Other Member of Society receive their initial endowment, i.e. the Public Official earns 36 ECUs and the Other Member of Society earns 30 ECUs.

Stage 3: Sending of a message by the Other Member of Society

The Other Member of Society has no option but to accept the others' decisions. However, after learning the decisions of the Private Citizen and—if a bribe is offered—of the Public Official in his/her group, the Other Member of Society will have the opportunity to send them a message expressing his/her approval, indifference, or disapproval of the choice they made. Simultaneously, he/she has to send one of the following emoticons: happy face 😊, neutral face 😐, or sad face ☹. In the message, whose length can be up to 500 characters including spaces, the Other Member of Society can write whatever he/she wants, but is not allowed to identify him/herself (that is, he/she cannot reveal his/her real name, nickname, or any other identifying feature such as hair color or seat number). A message violating this rule will be blocked and will not be sent. The Other Member of Society has four minutes to write his/her message, but he/she is free to send it ahead of time. A clock will inform him/her of the remaining time.

The emoticon and the message (if satisfying the aforementioned rule) sent by each Other Member of Society will be posted on a bulletin board—the computer's screen—and will be visible to all participants. Private Citizens and Public Officials will also be informed about the message and the emoticon sent by the Other Member of Society in their group.

The earnings of the three types of participants are summarized in the table below:

	Private Citizen earns	Public Official earns	Other Member of Society earns
Private Citizen does NOT offer a bribe	36	36	30
Private Citizen OFFERS a bribe and Public Official ACCEPTS it	$55 - \text{bribe}$	$31 + \text{bribe}$	$30 - 14 = 16$
Private Citizen OFFERS a bribe and Public Official REJECTS it	35	36	30

Information you will receive

At the end of the experiment, you will be informed about your own earnings in ECUs and Euros. Additionally, if you are a Private Citizen and you offered a bribe, you will be informed about the decision of the Public Official you are matched with.

You should remain quietly seated throughout the experiment. Please raise your hand now if you have questions. Click “OK” (on your computer screen) when you are finished with the instructions. Before starting the experiment, we will ask you to answer some questions to ensure that you understand the rules of the experiment.

Control questions

(These control questions should help you test your understanding of the experiment. The numbers used in all the questions were selected arbitrarily. They are not intended to suggest how you might decide during the experiment.)

(1) Suppose that the Private Citizen does not offer a bribe to the Public Official.

- (a) Which is the Private Citizen’s earning?
- (b) Which is the Public Official’s earning?
- (c) Which is the Other Member of Society’s earning?

(2) Suppose that the Private Citizen offers a bribe equal to 8 ECUs to the Public Official and the Public Official accepts the bribe.

- (a) Which is the Private Citizen’s earning?
- (b) Which is the Public Official’s earning?
- (c) Which is the Other Member of Society’s earning?

(3) Suppose that the Private Citizen offers a bribe equal to 8 ECUs to the Public Official and the Public Official rejects the bribe.

- (a) Which is the Private Citizen’s earning?
- (b) Which is the Public Official’s earning?
- (c) Which is the Other Member of Society’s earning?

Post-experiment questionnaire

(Before we proceed with the payment, we kindly ask you to answer some questions about yourself. Most of the questions are descriptive, and your responses will be kept completely confidential.)

1. What is your age? ...
2. What is your gender?
 - Male
 - Female
3. What is your major?
 - Chemistry, Biology, Pharmacy
 - Engineering
 - Economics
 - Law
 - Literature, Philosophy, History, Human Sciences
 - Medicine, Dentistry
 - Physics, Mathematics, Computer Science
 - Communications Studies
 - Psychology
 - Languages
 - Physical Education
 - Other
4. What is your religion?
 - Roman Catholic
 - Protestant
 - Jewish
 - Muslim
 - Hindu
 - Buddhist
 - Atheist
 - Other
5. Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? (0 = unwilling to take risks; 10 = fully prepared to take risks)

6. In general, how do you consider your political orientation? (0 = extreme left; 10 = extreme right)
7. Suppose you are given €20 and you have to decide how to split them with another person. How much would you keep for yourself and how much would you give to the other person?

me	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
other	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

8. Please think back to the situation in the experiment where the Private Citizen can try to offer a bribe to the Public Official and the Public Official, if offered a bribe, can accept or reject it. To offer and accept a bribe has negative consequences for the Other Member of Society. Suppose that the Private Citizen offers the bribe and the Public Official accepts it.

In your opinion, what is the probability that the **Private Citizen** felt any of the following emotions while making his/her choice? Please indicate such probability on a 0 to 10 scale, where 0 means “Very unlikely” and 10 means “Very Likely”.

- guilt
- shame
- happiness
- gratitude
- indifference
- dissatisfaction
- surprise

In your opinion, what is the probability that the **Public Official** felt any of the following emotions while making his/her choice? Please indicate such probability on a 0 to 10 scale, where 0 means “Very unlikely” and 10 means “Very Likely”.

[The participants saw the same list of emotions given above.]

References

- Abbink, K., Dasgupta, U., Gangadharan, L., Jain, T., 2014. Letting the briber go free: an experiment on mitigating harassment bribes. *Journal of Public Economics*, 111, 17–28.
- Abbink, K., Serra, D., 2012. Anti-corruption policies: lessons from the lab. In: Serra, D., Wantchekon, L. (Eds.), *New Advances in Experimental Research on Corruption*. Emerald Group Publishing, Bingley, United Kingdom, pp. 77–115.
- Abbink, K., Irlenbusch, B., Renner, E., 2002. An experimental bribery game. *Journal of Law, Economics, and Organization*, 18, 428–454.
- Alatas, V., Cameron, L., Chaudhuri, A., Erkal, N., Gangadharan, L., 2009. Gender, culture, and corruption: insights from an experimental analysis. *Southern Economic Journal*, 75, 663–680.
- Alekseev, A., Charness, G., Gneezy, U., 2017. Experimental methods: when and why contextual instructions are important. *Journal of Economic Behavior & Organization*, 134, 48–59.
- Andreoni, J., Bernheim, B.D., 2009. Social image and the 50–50 norm: a theoretical and experimental analysis of audience effects. *Econometrica*, 77, 1607–1636.
- Andreoni, J., Miller, J., 2002. Giving according to GARP: an experimental test of the consistency of preferences for altruism. *Econometrica*, 70, 737–753.
- Armantier, O., Boly, A., 2013. Comparing corruption in the laboratory and in the field in Burkina Faso and in Canada. *The Economic Journal*, 123, 1168–1187.
- Avis, E., Ferraz, C., Finan, F., 2018. Do government audits reduce corruption? Estimating the impacts of exposing corrupt politicians. *Journal of Political Economy*, 126, 1912–1964.
- Banerjee, R., 2016. On the interpretation of bribery in a laboratory corruption game: moral frames and social norms. *Experimental Economics*, 19, 240–267.
- Banerjee, R., Mitra, A., 2018. On monetary and non-monetary interventions to combat corruption. *Journal of Economic Behavior & Organization*, 149, 332–355.
- Bardsley, N., 2005. Experimental economics and the artificiality of alteration. *Journal of Economic Methodology*, 12, 239–251.

- Barr, A., Serra, D., 2009. The effects of externalities and framing on bribery in a petty corruption experiment. *Experimental Economics*, 12, 488–503.
- Barr, A., Serra, D., 2010. Corruption and culture: an experimental analysis. *Journal of Public Economics*, 94, 862–869.
- Battigalli, P., Dufwenberg, M., 2007. Guilt in games. *American Economic Review, Papers and Proceedings*, 97, 170–176.
- Ben-Ner, A., Kramer, A., Levy, O., 2008. Economic and hypothetical dictator game experiments: incentive effects at the individual level. *Journal of Socio-Economics*, 37, 1775–1784.
- Berninghaus, S. K., Haller, S., Krüger, T., Neumann, T., Schosser, S., Vogt, B., 2013. Risk attitude, beliefs, and information in a corruption game: an experimental analysis. *Journal of Economic Psychology*, 34, 46–60.
- Blanco, M., Engelmann, D., Koch, A.K., Normann, H.-T., 2010. Belief elicitation in experiments: is there a hedging problem?. *Experimental Economics*, 13, 412–438.
- Brosig, J., Weimann, J., Ockenfels, A., 2003. The effect of communication media on cooperation. *German Economic Review*, 4, 217–241.
- Butler, J.V., Serra, D., Spagnolo, G., forthcoming. Motivating whistleblowers. *Management Science*.
- Cameron, L., Chaudhuri, A., Erkal, N., Gangadharan, L., 2009. Propensities to engage in and punish corrupt behavior: experimental evidence from Australia, India, Indonesia and Singapore. *Journal of Public Economics*, 93, 843–851.
- Charness, G., Dufwenberg, M., 2006. Promises and partnership. *Econometrica*, 74, 1579–1601.
- Charness, G., Dufwenberg, M., 2010. Bare promises: an experiment. *Economics Letters*, 107, 281–283.
- Charness, G., Rabin, M., 2002. Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, 117, 817–869.
- Day, M.V., Bobocel, D.R., 2013. The weight of a guilty conscience: subjective body weight as an embodiment of guilt. *PloS one*, 8, e69546.

- Dohmen, T., Huffman, D., Schupp, J., Falk, A., Sunde, U., Wagner, G.G., 2011. Individual risk attitudes: measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, 9, 522–550.
- Drugov, M., Hamman, J., Serra, D., 2014. Intermediaries in corruption: an experiment. *Experimental Economics*, 17, 78–99.
- Ellingsen, T., Johannesson, M., 2008. Anticipated verbal feedback induces altruistic behavior. *Evolution and Human Behavior*, 29, 100–105.
- Ellingsen, T., Johannesson, M., Tjøtta, S., Torsvik, G., 2010. Testing guilt aversion. *Games and Economic Behavior*, 68, 95–107.
- Engel, C., Goerg, S.J., Yu, G., 2016. Symmetric vs. asymmetric punishment regimes for collusive bribery. *American Law and Economics Review*, 18, 506–556.
- Fessler, D.M.T., 2004. Shame in two cultures: implications for evolutionary approaches. *Journal of Cognition and Culture*, 4, 207–262.
- Fischbacher, U., 2007. z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10, 171–178.
- Greiner, B., 2015. Subject pool recruitment procedures: organizing experiments with ORSEE. *Journal of the Economic Science Association*, 1, 114–125.
- Gupta, S., Davoodi, H., Alonso-Terme, R., 2002. Does corruption affect income inequality and poverty?. *Economics of governance*, 3, 23–45.
- Jain, A.K., 2019. Corruption. Killing the beast. In: Jane, E. (Ed.), *Corruption, Social Sciences and the Law: Exploration across the Discipline*. Routledge, Chapter 13.
- Khalmetski, K., 2016. Testing guilt aversion with an exogenous shift in beliefs. *Games and Economic Behavior*, 97, 110–119.
- Koukoulis, A., Levati, M.V., 2019. An experiment investigating the spillover effects of communication opportunities. *Journal of Economic Behavior & Organization*, 158, 147–157.
- Masclet, D., Noussair, C., Tucker, S., Villeval, M.-C., 2003. Monetary and nonmonetary punishment in the voluntary contributions mechanism. *American Economic Review*, 93, 366–380.

- Méon, P.G., Sekkat, K., 2005. Does corruption grease or sand the wheels of growth?. *Public Choice*, 122, 69–97.
- North, C.M., Orman, W.H., Gwin, C.R., 2013. Religion, corruption, and the rule of law. *Journal of Money, Credit and Banking*, 45, 757–779.
- Olken, B.A., 2007. Monitoring corruption: evidence from a field experiment in Indonesia. *Journal of political Economy*, 115, 200–249.
- Ong, Q., Riyanto, Y.E., Sheffrin, S.M., 2012. How does voice matter? Evidence from the ultimatum game. *Experimental Economics*, 15, 604–621.
- Rege, M., Telle, K., 2004. The impact of social approval and framing on cooperation in public good situations. *Journal of Public Economics*, 88, 1625–1644.
- Reinikka, R., Svensson, J., 2004. Local capture: evidence from a central government transfer program in Uganda. *The Quarterly Journal of Economics*, 119, 679–705.
- Ryvkin, D., Serra, D., Tremewan, J., 2017. *I paid a bribe*: an experiment on information sharing and extortionary corruption. *European Economic Review*, 94, 1–22.
- Salmon, T.C., Serra, D., 2017. Corruption, social judgment and culture: an experiment. *Journal of Economic Behavior & Organization*, 142, 64–78.
- Serra, D., 2012. Combining top-down and bottom-up accountability: evidence from a bribery experiment. *Journal of Law, Economics, and Organization*, 28, 569–587.
- Tangney, J.P., 1995. Recent advances in the empirical study of shame and guilt. *American Behavioral Scientist*, 38, 1132–1145.
- Tangney, J.P., Stuewig, J., Mashek, D.J., 2007. Moral emotions and moral behavior. *Annual Review of Psychology*, 58, 345–372.
- Xiao, E., Houser, D., 2005. Emotion expression in human punishment behavior. *Proceedings of the National Academy of Sciences*, 102, 7398–7401.
- Xiao, E., Houser, D., 2009. Avoiding the sharp tongue: anticipated written messages promote fair economic exchange. *Journal of Economic Psychology*, 30, 393–404.
- Zamboni, Y., Litschig, S., 2018. Audit risk and rent extraction: evidence from a randomized evaluation in Brazil. *Journal of Development Economics*, 134, 133–149.