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Anti-corruption policy making, discretionary power and institutional quality: An experimental analysis

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ABSTRACT

We analyse policymakers' incentives to fight corruption under different institutional qualities. We find that 'public officials', even when non-corrupt, significantly distort anti-corruption institutions by choosing a lower detection probability when this probability applies to their own actions (legal equality), compared to a setting where it does not (legal inequality). More surprising perhaps is the finding that policy-makers do not choose a zero level of detection on average, even when it applies to them too. Finally, corruption is significantly lower when the detection probability is exogenously set, suggesting that the institutional power to choose detection can itself be corruptive.

1. Introduction

The fight against corruption has resulted in strikingly few success stories (Heeks and Mathisen, 2012; Mutebi, 2008). While there are many clear practical difficulties in this fight, part of the failure is explicable by the unwillingness of some governments to try to eliminate or even curb corruption (Fritzen, 2005). This is most likely to be a problem in weak institutional environments where the policy makers are themselves corrupt. A key issue in the fight against corruption is that 'anticorruption strategies are adopted and implemented in cooperation with the very predators who control the government and, in some cases, the anticorruption instruments themselves' (Mungiu-Pippidi, 2006: 87).

This paper describes the results of a framed laboratory experiment designed to analyse policy-makers' incentives to fight corruption under different institutional settings. The basic design of our repeated-game experiment is as follows. In the

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Control treatment, in each round, two randomly matched public officials, A and B, are entrusted with separate funds to be spent on (different) social projects. Each public official can embezzle some of the fund under their control. The amounts sent to the social projects are multiplied by 2 while the amounts embezzled by officials A and B are multiplied by 1. Thus embezzlement is socially inefficient. As there is no monitoring and punishment, the Control treatment mimics an institutional environment where there is total impunity regarding corruption.

There are three additional treatments with detection and punishment.[1] In the first treatment (Endogenous and Discretionary, ED), Public Official A has the power to choose a level of detection probability, which can take the following values: 0%, 5%, 10%, 15%, 20%, 25%, or 30%. Detection and punishment applies only to Public Official B. This is analogous to a weak institutional environment, with endogenous detection and discretionary punishment institutions; for example, where the judicial and police systems act in the service of the government (as opposed to the state). As a result, opposition leaders are jailed while government supporters are shielded from prosecution. In the second treatment (Endogenous and Non-Discretionary, END), Public Official A is again given the power to choose a level of detection probability but detection and punishment applies both to Public Official A and Public Official B. This situation can also be described as a weak institutional environment, with endogenous detection but non-discretionary punishment institutions, for example, when the judicial and police systems work independently, but under 'manipulable' monitoring and punishment institutions. In the third treatment (Exogenous and Non-Discretionary, XND), the probability of detection is set exogenously at 30% and applies to both public officials. This situation reflects a strong institutional environment, with non-discretionary punishment and exogenous detection and punishment mechanisms, for example, a state where the judicial and police systems work independently, under non-discretionary strong punishment laws.

The analyses in this paper focus on choices made by Public Official A, particularly in treatments where he/she has the power to choose the probability for detecting and punishing embezzlement. We find that Public Official As choose a weaker, though non-zero, anti-corruption policy in the Endogenous and Non-Discretionary treatment when they too are subject to its provisions, compared to the Endogenous and Discretionary treatment where they are not subject to its provisions. Defining corrupt and honest behaviour by a participant's actions in a given round, even an honest Public Official A will choose a weaker anti-corruption policy when it notionally applies to him too. We also find some evidence that corrupt decision makers in the Endogenous and Non-Discretionary treatment tend to impose a larger distortion than their corrupt counterparts in the Endogenous and Discretionary treatment, suggesting complementarity between two acts of corruption: embezzlement and institutional distortion. However, it is worth noting that in both the Endogenous and Discretionary and Endogenous and Non-Discretionary treatments, the choice of detection probability is significantly different from zero. This suggests that, despite the distortion caused by a weak institutional setting, there is some scope for anti-corruption law-making. The implications of our findings are therefore not entirely pessimistic and they should be of practical value and interest to both domestic and external anti-corruption actors in developing and transition countries. Finally, the level of corruption is found to be significantly lower when detection levels are exogenously set by the experimenter compared to the treatments with endogenous detection, suggesting that institutional power can be corruptive.

The expected result in this paper is the finding that people distort institutions when their own payoff is at risk. Yet this fact seems to have been neglected in thinking about anti-corruption policy formation as government incentives to fight corruption are typically taken for granted. In particular, we have a see-saw effect, where an improvement in one institutional dimension (equality before the law) leads to a negative effect in that detection and punishment institutions are weakened. It should be noted however that our other results are more surprising. First, honest officials who have no payment at stake due to higher detection risks, are not more severe towards corruption than corrupt officials in either of the endogenous treatments suggesting that an "honest" policy-maker may not necessarily be an anti-corruption champion. Second, we find a significant difference between honest officials in the Endogenous and Non-Discretionary and Endogenous and Discretionary treatments, with honest officials in the former treatment choosing a lower detection probability; which points to an unintended and undesirable consequence of equality before the law. Finally, the fact that some people will choose positive (and even high) probabilities is encouraging (see Appendix A for a theoretical justification); especially in the Endogenous and Non-Discretionary treatment where our policymakers are at risk from their own choice of detection level. This result may be explained by the fact that corruption is considered as "bad" and making no effort to fight it may provoke cognitive dissonance.[2]

The remainder of this paper proceeds as follows: Section 2 reviews the relevant literature and further motivates our work in its light; Section 3 outlines in full our experimental design; Section 4 presents our results, and Section 5 concludes.

2. Literature review

Our work is related to the sizeable experimental literature that has examined corruption and anti-corruption policies.[3] In particular, our work builds on a literature that investigates the role of monitoring and punishment; both in bribery and

[1] In case of embezzlement, a detected public official loses both their salary and the amount embezzled.

[2] Cognitive dissonance refers to cases where there is a conflict between beliefs (corruption is bad) and behaviour (I embezzle funds); thereby provoking some discomfort and related actions to reduce that discomfort.

[3] A comprehensive and relatively recent review of this literature is provided by Abbink and Serra (2012) while Rocha Menocal et al. (2015) review the broader literature on what works in anti-corruption.

embezzlement contexts. In a bribery experiment, Abbink et al. (2002) show that a small exogenous probability of detection (0.3%) combined with severe punishment (whereby detected subjects are excluded from the experiment without any payment) significantly reduces the likelihood of sending or accepting a bribe. Likewise, in a complex multi-stage embezzlement experiment with endogenous monitoring instead of an exogenous detection probability, Azfar and Nelson (2007) find that monitoring significantly discourages corrupt behaviour. Building on Azfar and Nelson (2007)'s design, Barr et al. (2009) show a relatively strong effect of detection and punishment on corruption. They find that a 44% increase in detection probability leads to a 27% decrease in embezzled resources. Using a natural field experiment in Indonesia, Olken (2007) finds that increasing the audit probability from 4% in the Control treatment to 100% reduces embezzlement of project expenditures by an average of 8%, suggesting low economic significance. Overall, these experiments suggest that monitoring and punishment can indeed curb corruption.

However, a few experiments have highlighted possible negative behavioural effects of monitoring and punishment. In particular, Schulze and Frank (2003) conducted an experiment in which the probability of detection increases with the bribe taken. The risk rises from 0% for the lowest bribe to 67% for the two highest bribes. They find that 9.4% of subjects take no bribe in the Control treatment (with no monitoring) compared to only 0.9% in the treatment with monitoring and punishment. Additionally, with monitoring and punishment, subjects are more likely to choose the median bribe amount (compared to the lowest and the highest bribes), leading to a higher average bribe. The authors argue that monitoring and punishment deters subjects from the highest bribe levels (due to higher detection levels), but also crowds out intrinsic motivation for honesty or lowest bribe levels. In a one-shot bribery experiment, Serra (2012) finds that traditional monitoring and punishment (with a 4% detection risk) does not curb corruption significantly compared to a no-monitoring treatment. However, combining bottom-up monitoring (whistleblowing) and top-down auditing appears to have a negative effect on bribery. The author advances three possible reasons for this result: fear of social disapproval in the form of citizens' reports, aversion to betrayal, and/or erroneous attribution of a higher probability of punishment.

Institutional and organizational features have been shown to play a role in determining corruption outcomes. Abbink (2004) finds that staff rotation reduces the frequency of bribery. Relatedly, Schikora (2011) concludes that the 'four-eyes principle' actually increases corruption, all else being equal. Azfar and Nelson (2007) find that elected enforcement officers work harder at curbing corruption relative to those who are appointed to the role. Abbink and Ellman (2010) find that the use of intermediaries by aid donors to target beneficiaries can lead to increased embezzlement. Legal asymmetries in punishment for bribers and bribe takers have been studied in terms of collusive and harassment bribery with differing conclusions. Engel et al. (2013) conduct an experiment regarding the former type of bribery and conclude that legal asymmetries increase corruption by giving the briber a credible way to enforce the corrupt transaction. Abbink et al. (2014), however, find that in the context of harassment bribes, legal asymmetry can reduce corruption (though this effect is mitigated by the threat of retaliation). Makowsky and Wang (2015) show that an organization's shape is important in terms of embezzlement outcomes, in that an increase in the number of tiers is detrimental with regard to this type of corruption.

We contribute to this experimental literature on institutions and corruption in two ways. First, we analyse policy-makers' incentives to fight corruption. This has typically been put aside in the experimental literature on corruption, despite being of prime importance in successfully fighting corruption (Abbink and Serra, 2012).[4] Second, most developing and transition countries are characterized by weak institutional environments. Such an environment has typically been modelled in corruption experiments in a restrictive way, mainly by setting a low and exogenous detection probability (Abbink et al., 2002; Serra, 2012).[5] In contrast to previous studies, we create a richer institutional framework by disaggregating institutional quality into two concepts in our design—equality before the law and manipulability.[6]

Equality before the law is the principle that all persons should be treated the same before the law, without regard to wealth, social status, or political power. In weak institutional environments (in particular), equality before the law is unlikely to hold as a result of selective enforcement. Manipulability is the extent to which institutions can be manipulated. The less manipulable institutions are the more stable they can be. The concept of manipulability acknowledges the fact that developing countries are typically characterized by the ability of the elite to deliberately manipulate institutions to their advantage (North et al., 2009; Robinson and Acemoglu, 2008). The concept of manipulability is thus closely related to the idea of state capture as defined by Kaufmann and Kraay (2002: 30):

> *State capture is defined as the undue and illicit influence of the elite in shaping the laws, policies and regulations of the state. In its emphasis on the formulation and shaping of laws and regulations of the state, state capture departs from the conventional view of corruption which stresses bribery to influence the implementation of such laws and regulations.*

[4] For instance, in their chapter on anti-corruption policies in the lab, Abbink and Serra (2012: 5, 6) discussed strategies to fight corruption specifically abstracting from the problem of a government's commitment to such a fight.

[5] A notable example of endogenous detection probability is Berninghaus et al. (2013), where the probability of detection falls with the number of corrupt agents. Compared to Azfar and Nelson (2007) and Barr et al. (2009) who also implemented endogenous monitoring, our design is much simpler.

[6] Equality before the law and manipulability can be seen as specific aspects of two other concepts—enforcement and stability—used by Levitsky and Murillo (2009) to characterize institutional strength. Enforcement can be defined as the imposition of material, political, or reputational costs on non-compliance with the law. Stability can be defined as the extent to which institutions survive not only the test of time but also changes in the conditions under which they were initially created.

In our experimental framework, the move from ED to END is an improvement along the equality dimension holding manipulability constant. The move from either the Control treatment or XND to END constitutes an increase in manipulability, holding equality constant. Moving from any other treatment to END also opens the door to another form of corruption, namely abusing the public power to choose the strength of the anti-corruption policy in order to facilitate one's own embezzling. In other words, the END treatment allows for state capture.

3. Experimental design

In this section, we discuss the experimental procedures, followed by a description of the experimental treatments. Before doing so, it can be noted that a typical concern regarding lab experiments such as this one relates to external validity. A first concern is the artificiality of the setting which may stem from the fact that some field factors are omitted in the lab (Schram, 2005). However, according to Friedman and Sunder (1994, p.11), trying to replicate every aspect of the field in the lab is futile. The focus should be on finding the simplest laboratory environment that integrates the most interesting aspects of the field environment (as done when building e.g. theoretical models). Second, a distinction between "qualitative" and "quantitative" external validity is relevant; and as most lab experiments aim to investigate comparative statics, attention should focus mainly on qualitative external validity (Camerer, 2014; Kessler and Vesterlund, 2014).[7] Third, the problem of external validity extends to any empirical results obtained from the analysis of data collected in a specific context (Falk and Heckman, 2009; Kessler and Vesterlund, 2014). Furthermore, experimental economics has proved to be most useful in at least three situations which all apply in the context of studying corruption (see Armantier and Boly, 2012). The first is when relevant naturally-occurring or observational data are not available or are very challenging to obtain. The second situation is when one wishes to identify the micro-determinants of corrupt behaviour and anti-corruption policymaking, which remain essentially unanswered due to scarce observational data. Third, lab experiments provide a cost effective "wind tunnel" for anti-corruption policymaking in this regard (Dusek et al., 2005; Abbink, 2006). Finally, it is worth noting the findings of Armantier and Boly (2013) who directly addressed this issue by comparing results from a field experiment in Burkina Faso and lab experiments in Burkina Faso and Canada. Their results suggest external validity of lab experiments on corruption, although additional studies are desirable.

3.1. Procedure

Our framed lab experiment was conducted at the Busara Centre for Behavioural Economics in Nairobi, Kenya. The subjects were recruited primarily from the University of Nairobi and came from a variety of study fields. At the beginning of each session, the instructions were read aloud and subjects were invited to ask clarification questions. After this, their understanding of the task at hand was tested with comprehension questions displayed, and answered, on individual computer screens. These comprehension questions had to be answered correctly before the participant could progress to the decision making phase of the experiment. Each session lasted about one hour.

In our experiment, we model embezzlement, which occurs when the embezzler misuses (typically for private gains) another party's money or property, to which they have legal access but not legal ownership; for example, when public funds are captured by officials or politicians. In Uganda, Svensson and Renikka (2004) show that during 1991–1995, schools received, on average only 13% of funds disbursed by the Ugandan government; while most schools received nothing. The bulk of the school grant was captured by local officials (and politicians). Likewise, in Chad, Gauthier and Wane (2009) show that while the regional administration is officially allocated 60% of the ministry's non-wage recurrent expenditures, only 18% actually reached the regions and only 1% reached the health centres, which are the frontline providers and the entry point for the population. Francken et al. (2009) also find evidence of embezzlement in public funds destined for schools in Madagascar. In Indonesia, Suryadarma and Yamauchi (2013) find that only 69% of disbursements were actually received by the intended beneficiaries of an anti-poverty program. In all cases above, embezzlers clearly undermine economic development by diverting resources allocated to education, health or poverty-reduction programs.

Specifically, the experiment is based on a sequential-move game with two players, called Public Official A and Public Official B.[8] Each subject kept the same role throughout the experiment. At the beginning of each round, new pairs (consisting of one Public Official A and one Public Official B) were formed randomly. Participants entered their decisions on computer terminals. Public Official As were unaware of the identity or decision of their matched partner for the first 20 rounds. Even if participants were to encounter someone that they had already been matched with, they would have no way of knowing

[7] Qualitative external validity only requires the direction of a causal effect to extend beyond the lab, whereas quantitative external validity additionally needs the causal effect be of similar size inside and outside the lab.

[8] The use of framed instructions in corruption experiments is common (see e.g. Cameron et al., 2009; Armantier and Boly, 2013 ; Abbink et al., 2014; Banerjee and Mitra, 2018). We follow the same approach as corruption differs from other crimes in that it involves public malfeasance. By using the label of "public official" and having a charity or NGO serve as the third party who stands to be harmed by the public officials' actions, we operationalize this important aspect of the "real world" phenomenon we are interested in. However, there is a debate in the literature as to whether corruption experiments should be framed or neutral. For example, Abbink and Hennig-Schmidt (2006) do not find any significant difference between context-free and in-context presentation of experimental tasks in a corruption experiment while Barr and Serra (2009) find some framing effects only for subjects in a specific role (citizens)

this. During the experiment, the payoffs were measured in Experimental Currency Units (ECU). At the end of the experiment, the amount in ECU was converted into Kenyan Shillings at the rate of 8 ECU = 1 KSh.

In each round, both Public Official A and Public Official B receive a salary of 1,140 ECU. In addition, they are both allocated funds amounting to 2280 ECU, to spend on 'social projects'. Public Official A, the first mover, must then choose between keeping 0 ECU and keeping 760 ECU from the allocated funds. The amount of ECU that they choose to keep is transferred to their private account. The remainder (2280 less the amount kept) is multiplied by 2, converted into Kenyan Shillings, and sent to a recipient, called Recipient 1, that is randomly drawn from a list of local Non-Governmental Organizations (NGOs) and local charity funds.[9]

Public Official B makes their decisions only after observing the decisions made by Public Official A. In contrast to Public Official A, Public Official B can keep any whole number between 0 and 2280 ECU from their allocated funds. The amount that Public Official B chooses to keep is transferred to their private account. The remainder (2280 less the amount kept) is multiplied by 2, converted into Kenyan Shillings, and sent to a recipient, called Recipient 2 that is different from Recipient 1 and is also randomly drawn from a list of local NGOs and local charity funds.[10]

The experiment consisted of 40 rounds. In the first 20 rounds, Public Official A receives no information about the choice made by Public Official B. From round 21 onwards, Public Official A was able to observe the amount that was transferred to Recipient 2 by Public Official B. After completing all 40 rounds, all subjects were asked to fill in a questionnaire demographic survey, which included questions on, inter alia, age, gender, monthly expenses, and education.

3.2. Treatments

Our objective is to better understand the workings of detection and punishment as an anti-corruption measure. To do so, we conducted four experimental treatments, three of which include detection and punishment. If a public official's embezzlement is detected then the public official loses both their salary and the amount embezzled. In the Control treatment, Public Official A and Public Official B make their decisions in the absence of any detection and punishment institutions following the game described above.

In the second treatment (ED), Public Official A is given the power to choose a level of detection probability, which can take one of the following values: 0%, 5%, 10%, 15%, 20%, 25%, or 30%. However, detection and punishment institutions apply only to Public Official B, thereby breaking the principle of equality before the law. In other words, Public Official A can be corrupt with impunity while Public Official B faces the prospect of detection and punishment. As a result, detection is endogenously chosen and punishment is discretionary. The choices made by Public Official A relative to embezzlement and the level of detection are observed by Public Official B before they make their decision; while Public Official A observes the choices made by Public Official B only after round 20.[11] If detected, Public Official B loses both their salary and the amount of social funds embezzled.

In the third treatment (END), Public Official A is again given the power to choose a level of detection probability (from among the values above) but detection and punishment apply both to Public Official A and B. So while the principle of equality before the law is respected, the monitoring and punishment institutions are chosen by Public Official A, and are therefore open to manipulation. If detected, Public Official A and/or Public Official B lose both their salary and the amount embezzled. Independent and separate draws are carried out for Public Official A and for Public Official B. This means that one of the public officials can be detected and punished, while the other is not. As in the second treatment, Public Official B observes the choices made by Public Official A relative to embezzlement and the level of detection.

In the fourth treatment (XND), the probability of detection is set exogenously at 30% and applies to both public officials. As a result, the detection and punishment policy is stable throughout and cannot be manipulated by Public Official A as in ED and END treatments. Independent and separate draws are carried out for Public Official A and for Public Official B. This treatment therefore also features equality before the law in terms of process, if not in terms of outcomes.

3.3. Detection and punishment mechanism

The monitoring mechanism is implemented as follows. A random number between 1 and 100 is generated after the public officials have made their decisions. In the treatments where both public officials are subject to the mechanism, separate and independent draws are made for each person. If the chosen (or exogenously given) probability is 30% and the randomly generated number falls between 1 and 30 then one's decision to keep some positive amount of the social funds is detected. If detected, punishment is automatic and means that for that specific round the public official receives no salary and loses

[9] As discussed by Abbink and Serra (2012), the use of NGOs or charities as recipients of non-embezzled funds is a useful way to model the negative impact of corruption on public well-being. There are, however, two potential issues. First, there may be some loss of control regarding a subject attitude towards a particular NGO or charity. To mitigate this effect, we simply informed the subject that the local NGO would be drawn randomly from a list. Second, subjects' donation behaviour outside the experiment is unknown, if the subject had already given to a charity recently or if he/she decides to be corrupt in the experiment and give later. This may, however, be a non-optimal choice given the multiplicative factor in our experiment.

[10] We chose two different recipients, one for Public Official A and another for Public Official B, in order to make sure that A's choice does not substitute for the choice made by B or influence its marginal effect (see e.g. Francois, 2000, 2003 for further theorizing as to why such issues may matter, but in a slightly different context).

[11] While embezzlement may not be directly observed in real life, income-related changes (people living outside their means) are typically observed.

Table 1
Details of the detection mechanism.

Probability values (%)	Numbers are generated between 1 and 100	
	Randomly generated numbers for which a player loses both their salary and the amount of the social fund kept.	Randomly generated numbers for which a player retains both their salary and the amount of the social fund kept.
0	Never	Always
5	1,..., 5	6,..., 100
10	1,..., 10	11,..., 100
15	1,..., 15	16,..., 100
20	1,..., 20	21,..., 100
25	1,..., 25	26,..., 100
30	1,..., 30	31,..., 100

Source: Authors' illustration.

the embezzled funds. This does not affect the payoffs in future or past rounds. If the randomly generated number falls between 31 and 100 then the public official in question retains both the salary and the amount kept. Table 1 summarizes the monitoring mechanism according to the probability values. The monitoring mechanism is identical in all three treatments with detection and punishment. In the Control and XND treatments the value is exogenously set at 0% and 30% respectively.

3.4. Participants and payoffs

In total, 262 subjects participated in the four treatments; half (131) as Public Official A and the other half as Public Official B. Precisely 64 subjects participated in the Control treatment, 64 in the ED treatment, 68 in the END treatment, and 66 in the XND treatment. Out of the 40 periods, only one period was chosen at random to compute a subject's final payoff. For those in the role of Public Official A, the average earnings (including the salary and the embezzled funds) were 196 KSh in the Control treatment, 208 KSh in the ED treatment, 194 KSh in the END treatment, and 145 KSh in the XND treatment. Given that 40% of our public official As reported a monthly income of less than 5000 KSh and 19% a monthly income of less than 2000 KSh these are meaningful stakes and significant returns for an hour or so of work. For those serving as Public Official B, the average earnings (including the salary and the embezzled funds) were 292 KSh in the Control treatment, 307 KSh in the ED treatment, 306 KSh in the END treatment, and 185 KSh in the XND treatment. In addition, each subject received a fixed payment of 400 KSh for their participation.

Two NGOs, Green Belt Movement and Impacting Youth Trust (Mathare), were randomly selected from a list of local NGOs and served as Recipient 1 and Recipient 2 respectively. They received 48,285 KSh and 58,900 KSh respectively. These amounts were computed as the total of the amounts sent to Recipient 1 (Recipient 2) by Public Official As (Public Official Bs), using one randomly selected period per subject and the exchange rate of 8 ECU = 1 KSh. Participants were notified when these payments had been made and invited to view documentary evidence of the payments.

4. Results

In this paper, we are interested in the choices of Public Official A. In particular, we are interested in Public Official A's choice regarding the strength of the anti-corruption policy. We analyse only the first 20 periods, in which Public Official A receives no information about the choice and identity of Public Official B.[12] We start by giving some theoretical predictions before presenting subject pool characteristics. We then conduct statistical tests, typically using Chi-square tests for the binary corruption decision and Mann–Whitney tests for the choices of detection levels. Finally, we use regression analysis to analyse Public Official As' decisions. We report regression results obtained from including only the treatments, and those obtained from including additional covariates in different columns. In addition to standard the standard characteristics of age, gender and dummies capturing whether the student is an economics major and their own experience of corruption, we include "Own means of transportation" as a proxy for subjects' assets (or wealth) as it is plausible that this can have an impact on the decision to embezzle funds or not. Wealthier students in developing countries would typically own bicycles, motorcycles or even cars depending on family wealth. We discuss only the results obtained with covariates included, noting that they do not change when only treatments are included. All specifications include round fixed effects to allow for the possibility that decisions vary over the course of the experiment.

4.1. Subject pool

Table 2 presents summary statistics regarding the basic characteristics of the Public Official As in our subject pool. The participants in each treatment are on average 21 years old and in their second year of study. There are some differences

[12] From period 21 onwards, Public Official A was able to observe the amount that was transferred to Recipient 2 by Public Official B, creating endogeneity and interdependency.

Table 2
Summary statistics of Public Official A characteristics.

Variables	Control Mean(SD)	ED Mean(SD)	END Mean(SD)	XND Mean(SD)	Kruskal–Wallis (*p*-value)
Age	21.56	21.09	20.97	20.67	0.2941
	(1.97)	(2.19)	(1.62)	(2.06)	
Gender (1 if male)	0.44	0.50	0.56	0.64	0.4237
	(0.50)	(0.51)	(0.50)	(0.49)	
Economics major	0.44	0.38	0.44	0.52	0.7314
	(0.50)	(0.49)	(0.50)	(0.51)	
Has been asked for a bribe (0 if Never)	0.59	0.66	0.62	0.73	0.6918
	(0.50)	(0.48)	(0.49)	(0.45)	
Owns means of transportation	0.09	0.03	0.00	0.15	0.0717
	(0.30)	(0.18)	(0.00)	(0.36)	
Observations	32	32	34	33	

Source: Authors' calculations based on data from the experiment.

across the treatments in terms of the gender composition. Gender has been found by some researchers to be important for corrupt behaviour and attitudes to corruption (Dollar et al., 2001; Frank et al., 2011; Rivas 2013). Thus, while this difference is not as pronounced between ED and END as it is with these treatments and the exogenous treatments, it will be important to control for the effect of gender in our regression analysis.

The answers to the post-experiment questionnaire suggest that our subjects were well acquainted with corruption, knew the legal situation in Kenya regarding bribery, and felt that corruption by government officials is morally questionable. Of participants in the role of Public Official A, 65% have paid a bribe in some circumstance. The most common bribery situations our subjects have encountered are having to pay a bribe to avoid problems with the police (17%) and to get an identity document (15%). Further, 69% believe that some government officials are involved in corruption in their country and 27% believe that all of them are engaged in such activities.

Our post-experiment survey also included questions on corruption. The majority of our subjects (60%) most often hear about corruption in the context of politicians and bureaucrats with the bulk of the remainder (31%) most commonly being aware of corruption in terms of harassment of ordinary people for basic services. Eighty-six per cent of people understood that 'if caught, both the bribe giver and taker are committing an illegal act', while 8% thought that only the briber taker is breaking the law. Taken together this confirms that almost all of our subjects knew that bribe-taking is legally prohibited in their country. Finally, 95% of our subjects agreed that 'it is always wrong for a government official to take a bribe.'

We begin by briefly describing and analysing the patterns in Public Official As' corrupt behaviour before moving on to the main focus of the paper: an analysis of the choice of detection probability.

4.2. Corrupt behaviour

Public Official As faced a binary corruption choice, as he/she could embezzle either 0 ECU or 760 ECU. They could either embezzle a third of the social fund under their control or they could take nothing for themselves.

Assuming deterrence is effective in curbing corrupt behaviour, we expect the level of corrupt behaviour to be the same in the Control and the ED treatment given that the probability of detection and punishment is zero for Public Official A in both cases. In the END treatment, the level of corruption will depend on the level of detection chosen by Public Official A who is herself subject to detection and punishment. As shown in Appendix A, in the END treatment, detection needs only to be below a certain level but not necessarily equal to zero in order for a Public Official A to expect positive rewards from embezzlement. Assuming a positive level of detection, we expect to see a lower level of corruption in the END treatment, compared to the Control or ED treatments. Finally, we expect corruption to be lowest in the XND treatment where the probability of detection is 30%. In summary, we anticipate $C(Control) = C(ED) > C(END) > C(XND)$, where C(.) is the expected level of corruption.

The share of corrupt decisions in the Control, ED, END, and XND treatments are respectively 57%, 74%, 74%, and 60%.[13] Two things are noteworthy. First, the lowest proportion of corrupt decisions is to be found in our Control treatment, where there was no chance of detection and punishment. The second least corrupt institutional setting was the XND treatment, where the detection probability was exogenously given. We find no significant difference between the Control and XND treatments (p-value = 0.421, chi-square test). Although seemingly puzzling in light of the findings of Abbink et al. (2002) and others, there are several possible explanations.

First, several studies have shown that monitoring and punishment can destroy intrinsic motivation; and that this crowding out effect can be larger than its disciplining effects (see e.g. Gneezy and Rustichini, 2000; Fehr and Falk, 2002; Fehr and Rockenbach, 2003; Falk and Kosfeld, 2006). The similar level of embezzlement in the Control and the XND treatment

[13] In the Control, ED, END, and XND treatments, there are respectively 5, 1, 1, and 5 officials who are always honest; 18, 18, 21, and 24 officials who are occasionally corrupt; and 9, 13, 12, and 4 officials who are always corrupt.

could be explained by the fact intrinsic motivation is at play and at its strongest in the Control treatment where there is no monitoring and punishment. This may be strengthened by the restriction that Public Official A could embezzle only 0 ECU or 760 ECU from the allocated funds (amounting to 2280 ECU).[14] However, in the XND treatment, the level of detection (set at 30%) is such that the crowding out effects of monitoring are large enough to cancel out its disciplining effects; leading to the same level of corruption as in the Control treatment. Such a result could suggest an inverted U-shape for the effects of exogenous monitoring and punishment on corruption but we do not have enough data to verify such a claim.

Furthermore, the absence of effects on monitoring is not unheard of. For example, Gërxhani and Schram (2006) find that tax evasion in Albania is not affected by the audit probability. Moving from a 16.67% detection rate to 50%, resulted in a tax evasion decrease from 11% to 10%. However, the same levels of detection in the Netherlands led to a meaningful decrease in tax evasion from 58% to 39%. This is explained by the fact that Albanians were already very compliant when detection was weak. An additional treatment with no audit in Albania also resulted in high levels of compliance. Armantier and Boly (2013) also find a similar result in their corruption experiments conducted in Ouagadougou (Burkina Faso) and Montreal (Canada). In the Control treatments of their lab experiments (where there was no monitoring), 48.5% of subjects accepted bribes in Ouagadougou, compared to 66.7% of subjects in Montreal. So the lack of monitoring effects may be partly explain by the already low level of corruption in our Control treatment, which significantly departs from profit-maximization behaviour typically found in developed countries. This is an issue that future research could fruitfully examine. A further explanation for this seemingly anomalous result is provided by Banerjee and Mitra (2018). They show that a high detection probability (0.4) and a small fine has no effect on bribe taking behaviour, compared to a treatment with no monitoring. Such a result can be related to ours, assuming that the penalty in the XND treatment (losing salary and embezzlement in one round that may not be selected for the purposes of payment) was not seen as high. Finally, it should be noted that the comparison between our treatments with exogenous detection is not central to our focus in this paper.

Relative to the Control treatment, corruption is significantly higher in the ED treatment (at the 1% level, p-value = 0.000, chi-square test) as well as in the END treatment (p-value = 0.000, chi-square test). Compared to the XND treatment, we find that corruption is significantly higher both in the ED treatment (at the 1% level, p-value = 0.000, chi-square test) and in the END treatment (at the 1% level, p-value = 0.000, chi-square test).

The second thing to note is that the share of corrupt decisions seems to be the same, at 74%, in both ED and END. We find no statistically significant difference between the two institutional frameworks (p-value = 0.985, chi-square test). Recall that the move from ED to END represents an improvement in the equality-before-the-law dimension of institutional quality holding manipulability constant. This improvement in equality does not change the corrupt behaviour of Public Official A.

To further examine Public Official A's decision regarding corruption, we use a random-effects Logit model. The dependent variable (Corrupt choice) takes a value of 1 if the public official chose to embezzle some of the funds entrusted to them and 0 otherwise. Also, recall that A does not observes the choices made by Public Official B for the 20 first rounds that we are analysing in this paper. Columns 1 and 4 of Table 3 presents the results. Column 1 includes only the treatments while Column 4 includes additional covariates. We discuss the results reported in Column 4 in Table 3. They show that there are significant differences in the propensity to be corrupt between the Control treatment and both the ED and END treatments at the 5% level. The result indicates that obtaining institutional power can increase the propensity to embezzle, in line with the psychological finding that power can corrupt by leading people to place greater importance on their self-interests (see e.g. DeCelles et al., 2012). In the ED treatment, Public Official A is given institutional power while being shielded from punishment. This may be taken as encouragement to be corrupt. In the END treatment, Public Official A may set the detection probability to 0 in order to shield themselves from punishment. In comparing the equality of coefficients between the XND treatment and the ED treatment, we find that the null hypothesis can be rejected at the 1% level (p-value = 0.009). A similar result is found when comparing the XND and the END treatments (p-value = 0.009). No significant difference is found between the ED and the END treatment (p-value = 0.9196); or between the Control and the XND treatments (p-value = 0.572). We include control variables for age, gender and having a history of experience with bribery. With the exception of age at the 10% level, these controls are not significant. Pursuing a major in Economics predicts corrupt behaviour significantly at the 10% level (see e.g. Frank and Schulze 2000).

4.3. Choice of detection probability

Summary statistics regarding the probability of detection and punishment chosen by Public Official A are given in Table 4. Recall that the detection rate is exogenously set at 0% and 30% in the Control and XND treatments respectively.

Using individuals' average choices as independent units of observations, we find that the average detection probability chosen in the ED treatment is significantly greater than 0% and significantly lower than 30% despite detection being costless for and not applicable to Public Official A (1% level, one-sample t-test). When public officials have the ability to set an anti-corruption policy that will not apply to themselves but will constrain the corrupt activities of others, they choose a non-zero level of detection and punishment but they do not impose the most stringent restriction possible. This could perhaps be on account of considerations of fairness or cultural expectations regarding the acceptability and necessity of corruption. Similarly, the average detection probability in the END treatment, 10.5%, is significantly higher than 0% and significantly

[14] Allowing the embezzlement of a larger amount would have likely resulted in a higher level of embezzlement.

Table 3
Regression analysis - Public Official A's choices.

	Treatments variables only			Additional controls		
	Corrupt choice (Logit)	Detection choice - main effects (Tobit)	Detection choice - full model (Tobit)	Corrupt choice (Logit)	Detection choice - main effects (Tobit)	Detection choice - full model (Tobit)
	(1)	(2)	(3)	(4)	(5)	(6)
Control	Baseline			Baseline		
ED	1.639**	Baseline	Baseline	1.658**	Baseline	Baseline
	[0.819]			[0.821]		
END	1.584**	−8.361***	−9.362***	1.582**	−7.949***	−8.827***
	[0.787]	[3.021]	[3.303]	[0.788]	[2.966]	[3.250]
XND	−0.278			−0.464		
	[0.792]			[0.822]		
A's behaviour (Corrupt = 1)			−1.068		−0.413	−1.048
			[1.298]		[0.891]	[1.301]
END # A's behaviour (Corrupt = 1)			1.351			1.194
			[1.785]			[1.783]
Age				−0.242*	0.653	0.651
				[0.140]	[0.784]	[0.786]
Gender (1 if male)				−0.463	−3.703	−3.721
				[0.571]	[2.978]	[2.986]
Economics as major				1.030*	−3.406	−3.419
				[0.554]	[2.999]	[3.007]
Asked for a bribe (0 if never)				−0.418	1.789	1.835
				[0.570]	[3.100]	[3.109]
Owns means of transportation				0.262	−4.268	−4.258
				[0.987]	[12.426]	[12.460]
Constant	0.787	41.385***	17.095***	5.848*	28.070	4.755
	[0.604]	[10.725]	[2.379]	[3.185]	[20.427]	[17.388]
Lnsig2u/Sigma_u constant	2.295***	11.959***	11.989***	2.273***	11.541***	11.574***
	[0.217]	[1.222]	[1.226]	[0.218]	[1.180]	[1.184]
Sigma_e constant		9.849***	9.844***		9.760***	9.756***
		[0.256]	[0.256]		[0.254]	[0.254]
Round fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2620	1320	1320	2620	1320	1320
Subjects	131	66	66	131	66	66

Source: Authors' illustration from own data.
Note: standard errors in square brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4
Probability of detection chosen by treatment and type.

Treatment	Type	Mean detection probability (%)	Standard deviation
ED	Overall	17.21	7.33
	Honest	16.51	7.99
	Corrupt	17.34	6.68
END	Overall	10.52	6.36
	Honest	12.58	7.08
	Corrupt	11.41	7.20

Source: Authors' calculations based on data from the experiment.

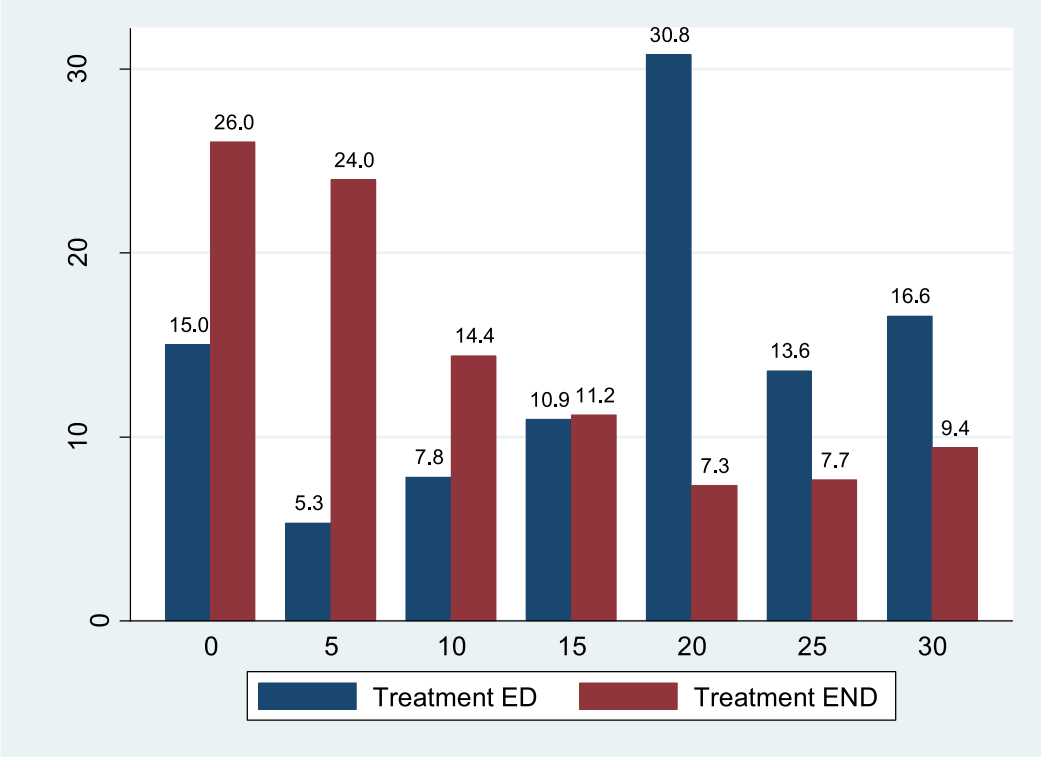

Fig. 1. Disaggregated probability choices, by treatment
Source: Authors' calculations based on data from the experiment.

lower than 30% (1% level, one-sample *t*-test). Public officials who have the power to set an anti-corruption policy that will directly impinge on their own ability to be corrupt do not, on average, choose to set the probability of detection and punishment to zero. We will discuss the implications of these findings more fully in the concluding section but it is worth noting in situ that the first of these findings is somewhat disappointing in terms of anti-corruption efforts whereas the second finding is encouraging.

While interesting, these simple comparisons do not quite answer our central research question: Do actors with the ability to manipulate anti-corruption policies do so when their own corrupt activities will be subject to the monitoring and punishment mechanism that they select? To answer this question, we must compare the probability choices made under END and ED. Fig. 1 shows that low levels of probability (15% and below) are the most frequent choices in the END treatment (up to 75.59% of choices), while these low levels account for only 39.06% of choices in the ED treatment. A chi-square test confirms that the choices of detection probabilities are significantly different between the two treatments (p-value = 0.000).

It can be noted that in the END treatment a detection probability of 25% or greater was chosen about 17% of the time. Such possibly puzzling behaviour may be explained by the fact that corruption is considered as "bad" and making no effort to fight it may provoke cognitive dissonance (see Festinger 1957). It may also be the result of subjects engaging in some risk-seeking behaviour or self-punishment (the so called Dobby effect) due to feelings of guilt or regret for having engaged in embezzlement (see e.g. Nelissen and Zeelenberg 2009).

The average chosen level of monitoring is 17.21% in the ED treatment and 10.52% in the END treatment. We find that the probability of detection is significantly lower in the ED treatment compared to the END treatment at the 1% level

(p-value = 0.000, two-sided Mann–Whitney). This fall of nearly 7 percentage points is sizeable given that the possibilities (discretely) range from 0% to 30%, and given the level of the averages in each treatment. Moving from END to ED would increase the strength of the anti-corruption policy by around 70% (i.e. on average the chosen probability of detection increases from around 10% to around 17%). A similar result is found by comparing medians. The median probability choices in the ED treatment is 19.5, while the median in the END treatment is 11.62. The difference is significant at the 1% level (p-value = 0.001, Median test).

We therefore conclude that there exists a statistically significant and economically meaningful distortion in anti-corruption policy-making brought about by a weak institutional framework. Specifically, it is the interaction of manipulability and equality before the law that leads to worse policy outcomes. Policy makers do not change their embezzlement behaviour when they too are subject to their policy's provisions. Rather, they exploit the manipulability of their institutional setting to opt for a weaker policy. This institutional distortion is sizeable but not complete in that we do see a non-zero level of anti-corruption monitoring in the END treatment. This is somewhat in line with our theoretical predictions and may explain why, even in countries that are considered very corrupt, some anti-corruption efforts can be observed. But given that even low levels of monitoring have been found to be effective deterrents, this is an encouraging finding that should be of interest to all parties to anti-corruption, institutional reform, and development efforts. Furthermore, our results support the idea that shielding the decision maker from punishment or allowing them to shield themselves (at least temporarily) can provide the incentives needed for them to put into place stricter anti-corruption measures that will benefit society as a whole. Recall that the decision makers in our ED and END treatments are equally likely to be corrupt. Thus, if the goal is to reduce the number of corrupt officials, allowing the decision makers to 'opt out' of their own policy can be considered as a second best solution.[15]

An interesting analysis is to see if the choice of detection level varies according to the choices (corrupt or honest) of Public Official A. As these decisions can vary across rounds for the same individual, in each round we categorise a participant as corrupt or honest based on their behaviour in that round. In the ED treatment, corrupt Public Official As choose a detection level (17.34%), which is similar to that of honest Public Official As (16.51%). Likewise, in the END treatment, corrupt officials choose a similar detection level to that chosen by honest officials (11.41% versus 12.58%). To analyse the difference between honest and corrupt officials in the same treatment, we use Wilcoxon signed rank sum tests pairing the same individual's average detection probability when they were corrupt and when they were honest. The differences are not statistically significant in the ED treatment (17.34% when corrupt vs 16.51% when honest) or in the END treatment (12.58% when honest vs 11.41% when corrupt).[16]

However, corrupt Public Official As choose a higher detection level in the ED treatment (17.34%) compared to their corrupt counterparts in the END treatment (11.41%) and the difference is significant at the 1% level (two-sided Mann–Whitney). Thus, corrupt officials tend to distort policy to a greater extent when the policy constrains their own actions. Intentionally, distorting a policy that is in the public's interest so that one can continue to act corruptly is in itself a corrupt act. This self-serving distortion fits the definition of state capture offered by Kaufmann and Kraay (2002). Thus, these findings can be taken as evidence of complementarity between two acts of corruption: embezzlement and institutional distortion. The observed behaviour is also in line with previous results suggesting that people who are assigned institutional powers will tend to abuse those powers for their self-interest (see e.g. DeCelles et al., 2012; Kipnis 1972; Kipnis et al., 1980).

In addition, honest Public Official As choose a higher detection level in the ED (16.51%) compared to their honest counterparts in the END treatment (12.58%); and the difference is significant at the 10% level (p-value = 0.061, two-sided Mann–Whitney). This shows that even policy makers who have not embezzled and therefore have nothing to fear from the detection and punishment mechanism choose a lower probability in the END treatment than in the ED treatment. This may be an unintended consequence of equality before the law in the presence of manipulable institutions. This weak institutional setting causes even honest policy makers to make socially inferior choices. We suspect that this can be explained by the fact that very few officials are fully honest (one in the ED and END treatments; amounting to about 3% in each treatment), while the majority (56% in the ED treatment and 62% in the END treatment) are corrupt in some periods and honest in other periods. Such 'switchers' may feel some level of understanding and leniency towards corruption even when they are not partaking themselves in a given period.

We now proceed to a regression analysis. As the anti-corruption policy had to be chosen from a restricted range of discrete values, we employ a random-effects two-sided Tobit model for our regression analysis of Public Official A's choice regarding said policy.[17] Columns 2 and 3 include only the treatments while columns 5 and 6 include additional controls. We discuss results from columns 5 and 6 of Table 3, which are consistent with the results of the statistical tests. We find that an honest official in the END treatment chooses a lower detection probability that an honest official in the ED treatment and the difference is a statistically significant at the 1% level (Column 5). In Column 5, we can also see that, overall, a corrupt official tends to choose a lower detection level compared to an honest official, though the effect is not statistically significant. Column 6 includes an interaction term between END and Public Official A's behaviour. We can see that a corrupt official tends to choose a lower detection level compared to an honest official in the ED treatment, though the effect is

[15] Of course, many people would argue that the rule of law has intrinsic value and there are also studies that find that it is important for development outcomes. For example, Rodrik et al. (2004) conclude that the rule of law is beneficial in terms of income levels.

[16] Note that with this approach, we lose observations for individuals that were always honest or always corrupt in the 20 rounds we are studying.

[17] Using Linear or Ordered Probit panel data models (random effects) give similar results.

not statistically significant (p-value = 0.420). Similarly, by computing the difference between average marginal effects, no significant difference is found between an honest and a corrupt official in the END treatment (p-value = 0.905). Overall, the Tobit models indicate a weaker anti-corruption policy in the END treatment. However, we find no significant difference between honest and corrupt officials in the choice of detection level either overall or within treatments.

By comparing the average marginal effects of being corrupt across treatments ED and END, we find that corrupt officials set a significantly lower detection level in the END treatment compared to corrupt officials in the ED treatment (p-value = 0.011), again suggesting complementarity between embezzlement and institutional distortion as two acts of corruption.[18] Finally, honest officials in the END treatment choose a significantly lower detection level than honest officials in the ED treatment (p-value = 0.007). The additional control variables in the Tobit regressions are typically not significant at conventional levels.

5. Conclusion

This experiment analyses policymakers' incentives to fight corruption using detection and punishment as an anti-corruption instrument. There are four treatments in which the institutional environments vary along two dimensions—equality before the law and manipulability. Equality before the law is the principle that everyone should be treated the same before the law, while manipulability refers the extent to which institutions can be manipulated by decision makers.

We find that, if given the institutional power to do so, policy makers will distort the anti-corruption instrument to reduce levels of detection when said instrument impinges, through legal equality, on their own ability to act corruptly. The magnitude of the distortion is considerable, amounting to about 70% of the average detection level chosen when the detection probability does not apply to the policy maker. Even honest policy makers enact less stringent detection levels when they notionally apply to their own actions. Yet, it is important to note that, when institutions are manipulable, policy makers do not choose a zero level of detection, even when their own corrupt actions can be detected and punished. Corrupt policy makers in the END treatment choose a less stringent monitoring level than their corrupt counterparts in the ED treatment when the mechanism also threatens their own payoff. As embezzlement and weaker anti-corruption mechanisms are both contrary to the public good, this shows that corruption can beget further acts of corruption.

Policymakers were equally corrupt in both settings. Given that a lower probability of detection and punishment has been found to increase corruption (Abbink et al., 2002; Schulze and Frank, 2003; Olken, 2007; Hanna et al., 2011), assuming the social goal is to reduce corruption, one might be tempted to evaluate the desirability of legal equality based on the outcome with regard to the choice of probability of detection.[19] However, Boly et al. (2017) study the corruption decisions of Public Official B and show that in the END treatment higher detection levels do not deter Public Official B from embezzling when Public Official A is corrupt. In the ED treatment, Boly et al. (2017) do find a deterrent effect even if Public Official A is corrupt. Taken together, these results suggest that legal equality alone is insufficient in the fight against corruption and may even be counterproductive in some situations.

Standard caveats regarding the need for further and complementary evidence of course apply to our conclusions. In particular, anonymity between Public Official A and Public Official B may not hold in the field. Another important caveat, and one that is addressed in a companion paper, Boly et al. (2017), is that the corrupt actions of the policy maker and the institutional setting may (interactively) mitigate the effectiveness of anti-corruption policies. Even so, the implications of our findings are mostly encouraging for those invested in anti-corruption efforts in emerging and developing economies, where institutional frameworks are often viewed as weak by the standards of developed countries. Encouraging the enactment of anti-corruption policies may lead to laws with some teeth, even if the law makers themselves stand to lose. An understanding of policymakers' incentives and a willingness to let them swim through their own net (even temporarily) may serve to strengthen anti-corruption laws, possibly leading to lower levels of corruption in a society. In this regard, an interesting and potentially important avenue for further research could build on our framework and investigate whether specific 'opt-out' rules for policy makers have the power to lead to stronger anti-corruption efforts.

Appendix A: theoretical predictions

In this section, we discuss some theoretical predictions based on a simple model of expected utility. We focus on the END treatment, in which detection also applies to Public Official A (as shown below, the ED treatment can be seen as a special case). We assume that an official A decides to embezzle if:

$$(1-p)U(E+S)+pU(0) > U(S,\ v) \tag{1}$$

Where p is the probability of detection, U a utility function, E the amount embezzled, S the salary received, and v intrinsic motivation for honesty.[20] Official A receives 0 (i.e. loses both salary and amount embezzled) in case of detection and we

[18] This analysis was performed using the Stata command "margins" after the regression command.

[19] Some of the 74% of corrupt Public Official As may be caught in the END treatment when the probability of detection is non-zero, but this confers no social benefit as in the case of detection the funds (and salaries) are returned to the experimenter.

[20] v exists only when Public Official A is honest.

assume $U(0) = 0$. As a result, an official will be corrupt if:

$$p < 1 - \frac{U(S, v)}{U(E + S)} \tag{2}$$

The decision to embezzle or not will depend on p and v, given that S and E are known in our experiment. If we assume that officials are risk-neutral and U is additively separable, Eq. (2) becomes:

$$p < 1 - \frac{S + v}{E + S} \tag{3}$$

- If $(1 - p)E - pS < v$, indicating that intrinsic motivation is sufficiently high compared to the expected benefits from embezzlement, there will be no embezzlement.
- If $(1 - p)E - pS > v$, meaning that intrinsic motivation is low, there will be embezzlement.

We use additional assumptions to obtain predictions from our experimental design. For example, let's assume $v = 0$, Eq. (3) boils down to:

$$p < 1 - \frac{S}{E + S}$$

Given that $E = \frac{1}{3}S$ in our design, Public Official A will be corrupt if:

$$p < \frac{1}{4}$$

Relaxing the risk-neutrality assumption would not change the results, except that the right-hand side of the inequality will be lower. This simple model indicates that detection needs only to be below a certain level but not necessarily equal to zero in order for a Public Official A to expect positive rewards from embezzlement in the END treatment.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2018.05.007.

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