

Anti-corruption policies: Lessons from the lab

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We review the existing laboratory experimental studies on corruption that have generated results with clear policy implications. We discuss experimental findings on the role that both monetary incentives and non-monetary motivations may play in corruption-decision making, and, hence, in the fight against corruption.

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1. Introduction

Two uncontroversial statements can be made about corruption. First, it is not a new phenomenon: corruption is found in every society and in every period of history. Second, corruption hinders growth and development. Although earlier research claimed that corruption may enhance efficiency and “grease the wheels of commerce” (Leff, 1964; Huntington, 1968)¹ empirical evidence shows that corruption has, without doubts, severe adverse effects on economic growth (Fisman and Svensson, 2007; Mauro 1995; Meon and Sekkat, 2005; Keefer and Knack, 1995), inequality and poverty (Gupta et al. 1998; Olken, 2006), and the allocation of public spending on education, health and public infrastructure (Reinikka and Svensson, 2004; Tanzi and Davoodi, 1997). Awareness of the dramatic effects that corruption has on a country's social and economic development has motivated theoretical and empirical investigations into its causes, with the ultimate aim to identify policy measures that might be successful in its mitigation.

Economic theories of corruption have focused on the design of institutions that, through monetary rewards and penalties, can prevent public officials from abusing their positions and thus causing harm to society as a result. The resulting models suggest that, when the private returns to corruption are high or when, due to weak institutions, the likelihood or consequences of detection are limited, individuals are more inclined to act corruptly. Furthermore, because finding a partner with whom to engage in a corrupt transaction and escaping detection or punishment becomes easier as the proportion of individuals who are corrupt increases, multiple equilibria involving different levels of corruption are likely to exist, and a country can find itself in a *corruption trap*.² Escaping such trap would require a “big push”, i.e. a combination of policies aimed at dramatically decreasing the expected return to corruption.

Economic models, while providing a basis for some policy debate, leave many questions unanswered. How do different incentive systems interact with each others? Do individuals, for instance, respond to an increase in the detection probability as they would respond to an equivalent (in terms of the expected cost of corruption) increase in penalties? More generally, should our attention be limited to formal institutions acting on incentive systems? Or should we also consider the possible role of informal institutions, social norms, and social preferences, as suggested by cultural anthropologists, and social psychologists?

Addressing these questions in the field is made virtually impossible by the secretive nature of corrupt transactions. Although empirical studies of corruption have proliferated in the last two decades, and

¹ For a comprehensive discussion of the (theoretical) arguments in favor and against corruption, see Bardhan (1997) and Klitgaard (1988).

² For examples of models of corruption with multiple equilibria, see: Cadot (1987), Andvig and Moene (1990) and Tirole (1996). Section 2 discusses models of corruption with strategic complementarities in more detail.

have identified a large set of economic, socio-cultural and institutional variables³ as significant determinants of corruption, they have mainly relied on cross-country data and subjective measures of corruption. There are many reasons to believe that the empirical findings generated by these studies cannot be used to draw conclusions about the design of effective anti-corruption policies. First, measurement error represents a serious limitation of these studies, which employ subjective indexes of country-level corruption. Moreover, such indexes cannot account for within-country and within-sector variations in the level and the nature of corrupt activities. Second, findings of different authors often contradict each other, possibly due to the employment of different conditioning sets in the empirical specifications, multicollinearity among the explanatory variables, and omitted variable bias.⁴ Third, findings concerning a number of factors that have been identified as important determinants of country-level corruption, such as the religion professed by the population and colonial heritage (see Treisman, 2000; and Serra, 2006), have no policy implication. Fourth, many factors that seem to be relevant in determining a country's level of corruption, for instance economic development and democratic institutions, are endogenous to the existing level of corruption. Finally, cross-country investigations give no insights into corruption decision-making at the individual level.

Micro-based investigations of corruption are rare, as collecting accurate data on individual decisions relating to acts of corruption is fraught with problems. Because such acts are illegal, surveys have an obvious drawback: respondents are inclined to distort the truth when asked direct questions on their involvement in corrupt transactions. This is why there are so few micro-level datasets relating to corruption, and why those datasets tend to be highly context-specific, and tend to relate to the “victims” rather than the “perpetrators” of corruption (see Svensson, 2003; Fisman and Svensson, 2007; Hunt, 2007; Hunt and Laszlo, 2011).⁵

In recent years, a few attempts have been made to cleverly measure and study corruption in the field. For example, researchers have compared administrative data on public funds obtained at different levels of the government (Reinnika and Svensson, 2004), or records of exported and imported goods produced by the exporting and importing country (Fisman and Wei, 2004), in an attempt to measure corruption as the “missing money”. Others have used data generated by corruption audits implemented by the government (Ferraz and Finan, 2008, 2011) or have identified corruption by exploiting

³ See Treisman (2000) for a review.

⁴ See Serra (2006) for an analysis of the robustness of the empirical findings generated by many different empirical studies.

⁵ While this approach can be informative as regards acts of corruption, it cannot, at the same time, provide informative data on beliefs about or attitudes towards corruption. This is because it depends on the manipulation or reinforcement of the respondents' beliefs and attitudes; respondents are encouraged to feel that their involvement in the acts they are being asked to report was unavoidable or justifiable and that they should be free of feelings of guilt or shame.

exogenous variations in the environment (Di Tella and Schargrodsky, 2003).⁶ Attempts to test different policy interventions have also been made through the use of carefully designed randomized control trials (Olken, 2007; Vicente, 2010).

Although the existing field studies have certainly increased our understanding of the functioning and the costs of corruption in a variety of settings, with only a few exceptions (Olken and Barron, 2009; Sequeira and Djankov, 2010; Sequeira, 2011), they have relied on indirect measures of corruption. Laboratory experiments by simulating the environment in which corrupt decisions are made, and by making it possible to directly observe corruption at the individual-decision level, can significantly contribute to the existing literature on corruption. In particular, experimental data generated in a controlled lab setting can be highly informative of individuals' responses to different sets of monetary and non-monetary incentives, and may therefore serve either as a diagnostic tool to dig into the microeconomic causes of the failure or success of an anti-corruption intervention, or as a pre-intervention tool to provide a first, relatively low-cost, evaluation of alternative anti-corruption measures that may then be brought into the field.

This article describes the existing laboratory experimental studies that have generated results with clear anti-corruption policy implications. Following this introduction, Section 2 presents insights from theoretical studies of corruption with respect to the design of effective anti-corruption policies; Section 3 briefly discusses advantages and disadvantages of studying corruption through laboratory experiments; Section 4 introduces the reality of corruption as a multi-facet phenomenon, appearing in many different forms, and therefore demanding to be studied through the design of many different experiments; Section 5 focuses on experimental studies testing the role that monetary incentives may play in corruption-decision making; Section 6 discusses experimental findings on the role that intrinsic motivations may play in the fight against corruption; Section 7 concludes with some final remarks.

2. Anti-corruption policies: Lessons from theory

Theoretically, given the money-maximizing nature of the agents that populate the “economic world”, economists would expect all individuals to choose against the public interest every time that the private benefits from doing so are larger than the corresponding costs. The natural question posed by economists, then, is not: “Why do *some* public officials behave corruptly?”, but “Why do not *all* public officials behave corruptly?”. The answer offered by the seminal work of Becker and Stigler (1974) and Rose-Ackerman (1975) points at the monetary incentives provided by a benevolent principal, whose primary objective is to design optimal institutions for the control of possible corrupt

⁶ For a comprehensive review and assessments of recent advances in the measurement and study of corruption in the field see Sequeira (2012) in this volume. See also Banerjee et al. (2009) and Olken and Pande (2011).

behavior on the part of subordinate agents in charge of the provision of services and goods to clients. Such optimal institutions rely on the establishment of rewards and penalties that render the expected returns to corrupt behavior lower than the returns to honest behavior. Hence, the emphasis on: 1) the wages paid to public officials, which they would lose in case of corruption, if detected; 2) the principal's monitoring capacity, which determines the probability of detection; and 3) the penalty imposed in case of corruption, which might go beyond the mere loss of the public sector job.⁷

Later studies have disregarded the assumption of the "honest" principal whose goal is to set the right incentives to prevent moral hazard on the part of subordinate public officials. Instead, they have modeled corruption as a frequency-dependent phenomenon subject to strategic complementarities; here, the control of corruption depends on the incentives embodied in *existing* institutions.⁸ As a result of the strategic complementarities existing in the costs associated with corruption, multiple corruption equilibria exist and a country could converge to the bad equilibrium, i.e., a "corruption trap" from which it is extremely difficult to escape. The main policy implication of these theories is that when corruption becomes systemic, i.e., when the bad equilibrium is reached, a "big push" is required to escape the trap, that is, a combination of policies acting on the actual probability of detection, the penalty associated with corruption, the wages of public officials, and individuals' general beliefs about the extent of corruption among both public officials and ordinary citizens. There are however two major obstacles to the implementation of a "big push", which is inherently top-down in nature: 1) the large costs involved; and 2) the necessity to have a corruption-free government committed to the fight against corruption. The latter is a necessary condition that is especially difficult to meet in societies where corruption is systemic and those at the government are the ones that can benefit most from corruption.

Taking aside the issue of government's commitment to the fight against corruption, recent theories have suggested that the costs of monitoring and prosecuting corruption could be lowered by creating incentives for (at least one of) the parties involved in the corrupt transaction to report wrong-doing (Rose-Ackerman, 1999). Leniency obviously plays a crucial role here. Within the anti-trust literature, studies of cartel agreements have investigated the effect of whistle-blowing and leniency on firms' propensity to break competition policy rules. The main result is that leniency, by increasing the risk of

⁷ The "fundamental answer" to the problem of corruption, according to Becker and Stigler (1974), would be to "raise the salaries of enforcers above what they could get elsewhere, by an amount that is inversely related to the probability of detection, and directly related to the size of the bribes and other benefits from malfesance" (p. 6). In other words, the effectiveness of increasing wages to lower individuals' incentives for corrupt behavior seems to be conditional on the probability of detection and the benefits obtainable through corruption.

⁸ There are many different reasons why one's decision to engage in or abstain from corruption might depend on the level of corruption in the society. First, in a corrupt society the costs of searching for and finding a potential partner in corruption are lower (Andvig and Moene, 1990). Second, given fixed governmental resources, the probability of being audited and detected is lower (Lui, 1986). Third, the probability of being fined once detected is also lower, since punishment could be avoided through bribery (Cadot, 1988). The model by Hauk and Saez Marti (2002) shows that the level of corruption in the society may also affect the inter-generational transmission of anti-corruption values.

whistle-blowing in case of default on the illegal agreement, may actually favor the enforcement of cartel agreements and even make some previously unfeasible illegal transactions possible (Buccirossi and Spagnolo, 2006; Spagnolo, 2004). In a similar vein, Lambsdorff and Nell (2007) and Lambsdorff (2009) propose the institution of asymmetric leniency and penalties for the parties involved in a bribery transaction. In particular, they show that the undesired opportunistic effects of leniency can be avoided by: 1) designing different sanctions for the suppliers of corrupt services (public officials) and the recipients of such services; 2) making the extent of such sanctions depend on whether the corrupt service was delivered after the payment of the bribe; and 3) granting leniency to the official only if he/she does not deliver the corrupt service, and to the recipient only if he/she received the corrupt service. In particular, Lambsdorff and Nell (2007) propose low sanctions for the actions of accepting a bribe and receiving a corrupt service after paying a bribe. Conversely, they advocate high sanctions for the actions of delivering a corrupt service and paying a bribe. Moreover, they show that leniency should be granted only to public officials that took a bribe but did not deliver a corrupt service, and to bribe-payers that did receive the service after paying a bribe.

Another strategy to fight corruption in the presence of strategic complementarities (taking aside, once again, the problem of government's commitment to such fight) has been shown to be increasing uncertainty with respect to the corruptibility of one's potential partner in corruption, for example by introducing staff rotation in public offices. Ryvkin and Serra (2012) show that when agents are uncertain about the corruptibility of their potential corruption partner, they are less likely to engage in corruption, and society is less likely to end up in a systemic corruption trap.

Since the seminal work of Shleifer and Vishny (1993), how corruption is "organized" has also been recognized as an important determinant of both the existing level of corruption and how damaging corruption is to a country's economy and to society as a whole. Shleifer and Vishny consider the case of a client needing two permits or complementary inputs, and compares three possible scenarios: 1) the case where an agency acts as a "monopolist" in the provision of both inputs (or two agencies act as a "joint monopolist"); 2) the case where different agencies act as independent monopolist for the provision of one of the two inputs; and 3) the case where different agencies compete for the provision of each input. The authors note that "the level of bribes is the lowest in the third case, intermediate in the first, and the highest in the second [...] The result is obvious: in the first case the suppliers of the complementary inputs collude to maximize the total value of bribes, but in the second they do not" (p. 607). The study of Shleifer and Vishny had a significant impact on the subsequent literature on corruption⁹ and the design of anti-corruption policies. With respect to latter in particular, their

⁹ For a review of the literature and additional insights of the effect of competition on both corruption of public officials and clients' incentives to conform to the law, see Drugov (2010).

conclusions called for the introduction of competition among public offices for the provision of a given license or of complementary licenses.¹⁰

An additional aspect of the organization of corruption, which seems to affect both the pervasiveness of corruption and the effectiveness of anti-corruption policies, is the presence of agents that act as intermediaries between potential bribers and public officials. The theoretical investigations of Bjorvatan et al. (2005), Bose and Gangopadhyay (2009), and Hasker and Okten (2008) suggest that, by eliminating uncertainty with respect to whom and how much to bribe, by reducing the risk of breaching of corrupt deals and by lowering the chances of detection, intermediaries facilitate corruption, reduce welfare and render anti-corruption policies less effective. Whether, in order to reduce corruption, the use intermediaries for the provision of public services should be regulated or prohibited is still an open question.

So far, our review of the theoretical literature on corruption has shown that individuals are more inclined to act corruptly when the existing institutions render the expected private returns to corruption higher than the returns to honesty. This is the economists' view. In contrast, cultural anthropologists and social psychologists argue that an agent's choice between honesty and corruption depends on two kinds of rationale: external incentives – the probability of being caught, the severity of both formal punishment and social sanctions; and intrinsic motivations – the feelings of shame and guilt associated with rule- or norm-breaking, which in turn depend on personal beliefs relating to the moral values which sustain the norm of honesty. Intrinsic motivations result from the internalization of social norms through primary and secondary socialization (Benedict, 1934; Grusec and Kuczynski, 1997). Not being corrupt can be thought of as a social norm, a rule of behavior which is enforced internally by guilt and externally by social disapproval and social sanctions that result in feelings of shame. However, norms vary across societies. So, an act that, in one society, is regarded as socially reprehensible may be acceptable in another. For example, the exchange of a bribe for a service may be seen as dishonest or corrupt in one country, while being viewed as a gift-exchange which obeys the social norm of reciprocity elsewhere (see Varese, 2000).

The identification of intrinsic motivations as possible causes of corruption, as compared to the incentive systems highlighted by economists, suggests the implementation of different anti-corruption policies aimed at changing the “value systems” rather than the “incentive systems” existing in a society (Bardhan, 2006). Changes in value systems call for education campaigns generating awareness about the existence and the costs of corruption, and encouraging the display of social

¹⁰ This policy conclusion applies especially to the case of “corruption without theft”, i.e. instances of coercive corruption involving officials extorting bribes to do what “they are supposed to do”. In the case of “corruption without theft”, i.e. instances of collusive corruption involving officials receiving bribes to do “what they are not supposed to do”, i.e. the provision of illegal services, competition between different offices might have undesired consequences, because, by reducing the size of the bribe, it might allow more clients to benefit from corruption, ultimately resulting in larger negative externalities imposed on society.

disapproval towards episodes of corruption either personally experienced or brought to light by the media. The emphasis on non-monetary incentives in the fight against corruption also motivates the implementation of reforms in the selection of public officials, where more weight should be given to screening for intrinsically motivated individuals.

In the next sections of this article, we will discuss the experimental investigations of corruption that have tested in the lab some of the policies advocated by theoretical studies.

3. Testing anti-corruption policies in the lab

The advantages of studying anti-corruption policies in the laboratory are numerous. First, by simulating the environment in which corrupt decisions are made, experiments make it possible to directly observe corrupt behavior. Second, by studying corrupt behavior in a controlled setting, experiments make it possible to investigate how agents respond to different incentive systems without the confounds generated by omitted variables and simultaneously occurring events. Third, by manipulating the environment in a perfectly controlled manner, experimental findings are not compromised by endogeneity and the possibility of reverse causation. Fourth, by comparing the response of different agents to the same incentive systems, and by varying the extent to which corrupt behavior harms others and/or is perceived as immoral, lab experiments make it possible to identify the role that intrinsic motivations may play in corruption decision-making. Finally, by relying on a relatively low amount of money, lab experiments can serve as a useful low-cost diagnostic tool to pre-test the effectiveness of alternative anti-corruption policies before they are brought to the field.

The most common critique to corruption lab experiments (and lab experiments in general) is that, by relying (usually) on the behavior of university students in controlled environments, they may suffer in terms of external validity, i.e. the ability to make predictions about the behavior of individuals who live or interact with others, and make decisions in the real world. Although proving the external validity of lab experiments on corruption is beyond the scope of this article, we will mention two studies that directly and indirectly (respectively) address the external validity issue.¹¹

Armantier and Boly (2011) show that corruption “can be studied in the lab” by comparing the results generated by a lab experiment conducted in Montreal with the results of a lab experiment conducted in Burkina Faso, and, most importantly, a field experiment also conducted in Burkina Faso and employing non-student participants who were unaware of being part of a study on corruption. The results show striking similarities in the participants’ corrupt behavior and responses to different sets of

¹¹ For a comprehensive discussion of the external validity of lab experiments on corruption, see Armantier and Boly (2012) in this volume. For a more general discussion of the external validity of laboratory experiments, see Camerer (2011), and Kessler and Vesterlund (2011).

incentives in the lab and in the field in Burkina Faso. The comparison between behavior in the lab in Montreal and both the lab and the field in Burkina Faso is also remarkable: with only one exception, both the direction and size of the treatment effects obtained in Montreal are not significantly different from the direction and size of the treatment effects obtained in Burkina Faso.

Barr and Serra (2010) conducted a bribery experiment employing a sample of Oxford university students coming from over 40 countries characterized by markedly different levels of corruption. The experimental findings show that the behavior of the undergraduate students in the game can be predicted by the level of corruption in the students' home countries, as proxied by Transparency International's Corruption Perception Index. This suggests that the way participants played the bribery game reflected the anti-corruption social norms and values that they internalized in the countries where they grew up. The authors were able to replicate their findings with a different sample of students two years after the first round of experimental sessions, and controlling for a number of characteristics of the students' home countries. The fact that corruption in the game correlates with corruption in the participants' home countries can be interpreted as an indication that the setting reproduced in the lab is indeed measuring individuals' propensities to engage in corruption in “real life.”

4. Different kinds of corruption, different experimental designs

Since corruption has many facets, experimentalists have modeled it in many different ways. Not surprisingly, a unifying paradigm has not emerged, since each scholar approaches the subject with a different scenario in mind. The policy instruments investigated in these studies also vary broadly. While this diversity is certainly a strength of this literature, it also means that we are still some distance away from a deep understanding of the workings of different policy measures to combat corruption. When there are studies analyzing similar policies, the results are not always consistent.

We now briefly discuss two design choices that are made in most corruption experiments, but that are made very differently across the different studies, depending on the research question an author has in mind, or as a matter of personal preference.¹²

4.1 Who should suffer the negative externalities from corrupt behavior?

A design feature that is common to most corruption experiments (with few exceptions) is that the corrupt act carries some negative externalities to others. This seems reasonable because the damage that corruption does to society is precisely why we want to combat it. Just how the damage to “society”

¹² A design choice that is not discussed in this section but that will be discussed at length in Section 6.1. concerns presenting experimental participants with neutrally framed or corruption-framed instructions.

or “the public” is implemented differs widely. Sometimes it is done by deducting payoffs from all other subjects in a session, who then act as “the public” (Abbink, Irlenbusch, and Renner, 2002; AIR hereafter) or by adding another set of participants who are not involved in the game (Barr and Serra, 2009; Cameron et al., 2009). Sometimes the experimenter promises to give money to a charity, but to withhold some of this payment for each corrupt act committed by the subjects (Lambsdorff and Frank, 2010). All these methods have their pros and cons. Using other players as the public, as in AIR, emphasizes the social dilemma character of corruption. This adds a layer of reciprocity: If players believe that everybody else is corrupt, then they might not want to suffer from everybody else’s corruption while being honest themselves. This added layer of reciprocity may be desired or unwanted, depending on the research question. If it is not wanted, the effect can be avoided by inviting an extra set of subjects who are passive in the experiment (or perform a task unrelated to it). Corruption by active players inflicts harm on those passive victims. This is a clean way to implement negative externalities and players need not form beliefs about other active players’ choices. The downside is that extra subject need to be paid without collecting data from them, hence the procedure is less cost-effective. In addition active subjects may be motivated by relative payoffs between them and the passive subjects, which may influence their behavior. Using charities as the target for the negative externalities has the advantage that the damages that corrupt behavior does to the public well-being (here: a good cause) is very salient. Harm is done by reducing a donation that would otherwise be made. We may thus expect the strongest behavioral effects here. The cost of this is that some control is lost: We do not know a subject’s attitude towards a particular charity. Some might even be controversial, like charities with some political agenda (e.g. Greenpeace). Neither do we know subjects’ donation behavior outside the experiment, which can at least be used as an excuse not to care (“I have already given \$10 to the Red Cross last week” or “I’m corrupt now and give later”). Still, if this control is not needed and a rather in-your-face way of implementing the damages is wanted, then this method is a good choice.

4.2 One-shot or repeated? Partner or stranger matching?

In the experimental methodology several matching protocols are used. The two most prominent ones are one-shot and repeated games. In a one-shot game participants interact and make their corruption decisions only once, whereas in a repeated game participants make the same decision a given number or times. While the former protocol simulates situations in which potential bribers and bribees interact only once,¹³ the latter simulates potentially corrupt transactions that take place on a regular basis.¹⁴ Within the realm of repeated games, we can distinguish between partner and stranger matching. In a partner matching the same players play the same game together (or against each other) repeatedly over many repetitions (rounds). In a strangers matching, subjects play the game repeatedly, but are re-

¹³ Think of the case of a citizen applying for a drivers’ license or a visa.

¹⁴ Think of the case of a firm subject to pollution-related inspections every year.

matched to different opponents every round. In many lab experiments the choice of a matching protocol is motivated by game-theoretic considerations, e.g. whether the experimenter wants to test a theory that has been formulated for one-shot games, or whether reputation building or supergame strategies are the interest of study. In corruption experiments the choice is often determined by the concrete real-life scenario the experimenter has in mind. In a procurement situation, for example, the supplier and the purchasing agent are often interacting with one another in many exchanges over an extended time. For modeling a situation like this a partner matching is the more suitable choice. One-shot experiments come closest to a situation in which the exchange takes place between strangers, which is often the case in petty corruption. Reputation building or supergame strategies are ruled out. Their practical advantage is that they are very easy to implement and just as convenient to run with pen and paper as in a computerized laboratory. This is a tremendous advantage if the experiment shall be conducted in developing countries, where access to labs might be limited. However, subjects have no opportunity to learn during play, so one-shot experiments are prone to noise through miscomprehension and only very simple games can be played. Random matching is a kind of a compromise. It resembles a strangers encounter in the sense that the matching partner in one round is unlikely to be the partner of the previous or the next round. Learning is still possible, reputation building is not. The downside is that a computerized laboratory is usually required, and only the matching groups can be considered independent observations, such that they tend to be more data-intensive than partners or one-shot experiments.

5. Fighting corruption through monetary incentives

In this section we review some of the institutional factors that have been discussed theoretically and in the anti-corruption debate and that have been put to experimental tests. We shall begin with the most straightforward instrument, the penalty that is attached to it when discovered. We then discuss experiments that have looked at various forms of monitoring by either clients or third parties. Further, low public sector wages have been suggested as a possible source of widespread corruption, and we review the experimental studies that have addressed the question. Then, we summarize experiments that have tested institutional rearrangements, like staff rotation or the four-eyes principle. Finally, we look at the experimental evidence on “the industrial organization of corruption” and the efficacy of whistle-blowing.

5.1 Probability of punishment and exogenous sanctions

Bribery is almost everywhere a criminal act that carries penalties when discovered, but the likelihood of detection as well as the consequences vary dramatically across the world. Hence it seems straightforward to look at the effects of punishment in the lab, where this measure can easily be

studied in a controlled manner. That penalties deter corruption is far from obvious. Sanctions may be counterproductive, since external incentives can crowd out intrinsic motivation. Instead of being a question of right or wrong, the decision problem becomes a calculation of risks and rewards.

Some of the earliest studies in the literature devote treatments to this issue. AIR introduce exogenous penalties to their bribery game. At the first stage of this game, the first mover decides on whether, and if so how much, to transfer to the second mover, who represents the public official. If he transfers a positive amount, he pays a small “transfer fee” standing for the initiation costs of the briber when he approaches the civil servant. The fee is paid in any case, even if the official rejects the bribe.

The second mover is then asked whether she accepts or rejects the transfer. If she rejects, the transfer is not performed; both accounts remain unchanged apart from the first mover paying the small transfer fee. If the official accepts, then the transfer is carried out. At the second stage, the second mover, representing the public official, has to make a binary decision between two alternatives. The corrupt one is much more favorable to the firm, but harms the public. The honest option is slightly better for the official, and does not harm the public. The experiment consists of 30 repetitions (rounds) of this scenario.

The effect of a severe punishment of discovered corrupt acts is analyzed in a treatment called *sudden death*. In every round there is a very small (only 0.3%) probability of discovery in case of an accepted transfer. If discovered, both the briber and the official are disqualified, i.e. they lose all earnings and are excluded from further play. This novel way of modeling a penalty captures the nature of the threat in a long-term corrupt relationship. Each case is relatively unlikely to be discovered, but being caught once is enough to trigger severe consequences. So the overall probability of sanctions is much higher. In the data the authors observe a strong deterrent effect of punishment. Both bribe offers and manipulative choices were reduced by one third. This is so despite the very low per-round probability and the finding that subjects tend to underestimate the cumulative probability of getting caught over the 30 rounds of the experiment (this underestimation has been elicited in incentivized post-experimental questionnaires). Policy implications of this result are two-fold. First, severe penalties may not be an innovative or original approach to curbing corruption, but they are nevertheless effective. Second, public awareness campaigns could address the frequent underestimation of the threat of being caught. If officials and their clients were more aware of the fact that the overall probability of discovery matters, not the danger from a single act, they would probably be less inclined to engage in long-term corruption.

Schulze and Frank (2003, SF hereafter) report another experiment testing how the risk of detection affects corrupt behavior. The experiment is based on the corruption experiment first reported in Frank and Schulze (2000). Unlike the interactive game by AIR, these authors study an individual decision framework with elements of a field experiment. Instead of recruiting participants to show up in the

laboratory, the authors conduct their experiment in front of a lecture theatre in which the university film club is showing a movie. Students attending the show are confronted with a fictitious decision situation, in which they have to choose a plumber to retrieve a banknote that has fallen into a drain pipe. The banknote is the film club's property and the subject acts on behalf of the club. There is a list of plumbers, whose offers consist of a price and a bribe; the higher the price the higher the bribe.

SF add the risk of an exogenous penalty to the original design by Frank and Schulze (2000). The more expensive the firm they choose (hence the higher the bribe they take) the more likely detection becomes. In the parameterization chosen by the authors the probability of detection was quite high, up to two thirds in case of the two highest offers. In contrast to AIR the detection mechanism does not reduce the frequency of bribery. The penalty only shifts the distribution of offers taken, towards lower offers but away from very high offers and also away from perfectly honest choices. Hence there is some evidence for a crowding out of intrinsic motivation. With the introduction of the lottery the choice of offer becomes a trade-off between chances and risks, with the highest expected returns being earned in the middle of the range. Moral considerations are less important.

The results of the two studies seem to contradict each other. Exogenous penalties were strong deterrents in the first, but not in the second study, although the probability of detection was much higher in SF's setting. However, some differences in the experimental protocol could explain the absence of a strong deterrent effect. AIR's experiment was a conventional laboratory setup. A subject who was penalized would have wasted 1-2 hours and go home without payment (except for a nominal show-up fee). In SF's design the penalty was also the loss of any payment, but subjects were recruited ad-hoc and involved only for a short time. Thus, they may not have perceived the loss as equally severe. Further, SF paid only one randomly selected subject at all, so not being paid was what they would expect to happen as the normal outcome anyway. Of course, until further evidence is gathered these explanations have to remain speculation.

5.2. Penalties with endogenous risk

AIR and SF have modeled detection and penalties in a very simplistic way, as an exogenous lottery in which probabilities and penalties were fixed and known beforehand. Recently scholars have also analyzed more specific settings of punishment. Berninghaus et al (2009) design an experiment in which there are multiple equilibria, honest or corrupt. Corruption is thus seen as a coordination game. The game focuses on the behavior of public officials only. Their clients, the bribers, are simulated by the computer.

In their game a number of public officials simultaneously choose between a safe (honest) and a risky (corrupt) option. The safe option returns a fixed payoff, the risky option either a high payoff (if the corrupt act is not discovered) or zero (if the official gets caught). The probability of getting caught

depends on the number of corrupt officials: The more officials are corrupt, the more likely it is for each official to get away with it. This captures the empirical observation that in societies in which corruption is endemic corrupt officials have less to fear than in societies in which it is socially condemned. The constellation creates two pure strategy equilibria. If no-one else is corrupt, then the threat of getting caught is too great and corruption becomes unprofitable. So the best response is not to take bribes either. If sufficiently many other officials take bribes, then the probability of getting caught becomes low enough to make the corrupt choice advantageous. Hence there are two pure strategy equilibria in which either no-one or everyone is corrupt.

The design of the experiment does not allow for a control treatment without punishment, since the removal of the risky option would not leave any decision problem. However, the authors do study various determinants of corrupt choices by eliciting risk attitudes and beliefs. In addition, they add a treatment in which they do not inform subjects about the exact probabilities to check whether ambiguity (uncertainty without known probabilities) is treated differently from risk (uncertainty with known probability). The findings are that (1) risk aversion does not predict a subject's propensity of becoming corrupt very well, (2) beliefs are a much stronger factor than risk attitudes, and (3) ambiguity reduces corruption substantially. These findings have policy implications, despite the study's character as a piece of fundamental research. While public officials' risk attitudes are difficult to control and it is notoriously hard to assess objective probabilities about both the fraction of corrupt officials and the likelihood of detection, policy-makers can make an effort to manipulate the beliefs of officials about these figures, for example through public awareness campaigns or high-profile court cases.

5.3 Endogenous vs. exogenous penalties

In the study by Berninghaus et al (2009) penalties were exogenous lotteries, but the probabilities with which officials were punished were endogenously determined through the players' behavior. Serra (2011) uses a design that shares this feature, but in a completely different setting. In her game a public official can ask for a bribe at the first stage of the game. At the second stage the client can decide whether or not to pay it. If the client meets the official's demand, the decision favorable to the client is automatically implemented. The two-stage setup is similar to AIR, but there is no element of reciprocity involved: The official has no option to take the bribe and then not to decide in favor of the client. The corrupt option inflicts negative externalities on the citizens, in this case these are passive players who are not involved in the game.

Serra (2011) involves two treatments: In one treatment there is a probability of 4% that an official is punished when he or she demands a bribe. This treatment stands for a top-down approach to fighting corruption: There is an authority that routinely audits officials, and with some exogenous probability a

corrupt one is found. In a second treatment this top-down approach is combined with a bottom-up component. If the official demands a bribe, the client can, at no cost, report this to the authorities. Only if the client does so, is the lottery played out. The probability of getting caught is still 4%. Note that this means the overall probability of a penalty for the official cannot be greater in the “combined” than in the top-down treatment, and is likely to be smaller (it is equal only if the client expects every client to report a bribe demand). Surprisingly, bribe demands are substantially less frequent in the bottom-up treatment, despite the lower threat of receiving a penalty. Several conjectures could explain this phenomenon. It could be that officials psychologically perceive the threat to be higher because it comes from two sources, the reporting client and the exogenous lottery, and fail to consider that the requirement of two conditions actually reduces the danger. Or they might feel that the human counterpart has stronger powers through the possibility of reporting, though such a feeling would be illusionary. Possibly shame plays a role: The client can express disagreement by reporting while still receiving the benefits of the corrupt exchange. The data from the experiment do not allow disentangling the different explanations, so specific designs are needed.

5.4 Monitoring by humans

Monitoring by humans instead of exogenous lotteries has been introduced by Azfar and Nelson (2007), in an experimental design that was later also adapted by Barr et al (2009). The experimental game models an embezzlement scenario. The game is a rather complex multi-stage game with eight players in different roles. At the outset of each round three of the eight players are randomly selected as candidates for the role of an executive. After short campaign speeches the other five players elect one of them. Another player is appointed to monitor the executive. The remaining six players are voters for the rest of the round. The executive receives a number of valuable “tiles” to distribute among the voters, plus a number of worthless tiles. The exact number of valuable tiles is only known to the executive. The executive chooses six of the tiles to be distributed among the voters, which can be valuable or worthless tiles at his discretion. Choosing worthless tiles constitutes embezzlement in the game.

The monitor can, at a cost, check some of the tiles that the executive has kept. If valuable tiles are exposed, then they become worthless. At the end of the round the voters elect an executive (and in half of the sessions also a monitor) for the following round. The current executive and monitor are challenged by one randomly selected voter. After brief campaign speeches the voters choose one of the candidates. The next round then follows exactly the same structure as the previous one.

The nature of monitoring is different from Serra’s (2011) setting. The clients (here: voters) do not monitor the official directly, but elect a monitor from a set of candidates. This creates conflicting incentives. On the one hand, monitoring is costly; hence the monitor gets higher payoffs if he checks

fewer tiles. On the other hand, the role of the monitor is more lucrative than that of a voter, so he wants to appear vigilant.

In the two studies many treatment variations are conducted, some of them change features of the monitoring regime. In one variation the monitor is elected, in the other one he is appointed by the executive, which creates a possible conflict of interest. The probability of the monitor discovering a valuable tile is also varied by changing the number of worthless tiles. The wage level of the monitors was varied across sessions, to test whether higher wages provide a stronger incentive for vigilance.

The experimental results show a strong effect of monitoring in discouraging corrupt behavior. Executives embezzled less when there were fewer worthless tiles, such that it was harder to them to hide embezzlement from the monitor. Executives were keen to avoid detection, since executives found embezzling were rarely re-elected. Higher wages for executives also reduced corruption. Azfar and Nelson (2007) found no significant difference whether the monitor was elected, despite the finding that elected monitors are more vigilant than appointed ones, Barr et al (2009) did. These findings do not contradict each other; the effect may just have been too weak to show up in the original study. Direct comparisons are difficult because the two studies use radically different subject pools. The original study was conducted as a conventional laboratory experiment with university students. Barr et al (2009) conduct their experiment with health workers in Ethiopia, many of which face similar situations in their daily life. This is meant to increase the external validity of the results.

5.5 Public officials' wages and corruption

It is often casually argued that public officials in developing countries are easily corruptible because they are poorly paid and therefore have strong incentives to top up their earnings with bribes. Empirical support has been found by Van Rijkeghem and Weder (2001) in an econometric study. The authors find that higher salaries do lead to lower corruption. The explanations for this effect are hard to disentangle in empirical data. Variations in officials' pay across countries or sectors will always come together with variations in other potentially important factors, institutional or cultural. Experiments allow, within wide limits, to change relative wages between officials and other members of society in a controlled way.¹⁵

Several experimental studies have examined the effect of officials' wages on corrupt behavior. Abbink (2005) asks whether fairness considerations could be the driver for a bribery reducing effect of high wages. This was a hypothesis put forward by van Rijkeghem and Weder (2001), which could not be conclusively tested in the empirical data. Abbink (2005) uses the set-up by AIR with one

¹⁵ The effects of absolute changes in wages can also be changed to some extent. Of course, if an official is so poorly paid that he *must* accept bribes in order to sustain his existence, this is harder to replicate in the laboratory.

modification: The negative externalities from corrupt acts are not inflicted on the other players in the game, but on a separate set of subjects who carry out a task unrelated to the experiment. The wage that these workers are paid is varied across two treatments. In one condition it is set so low that the workers will always earn less than the officials, in the other treatments they are paid so much that even if maximum damage is inflicted on them, they will earn more than officials and bribers. So if fairness considerations matter, more corruption should be observed in the high-wage treatment. However, the results show no such effect: Both bribes and corrupt decisions do not show any significant difference.

This result could mean that fairness considerations are indeed irrelevant. However, it is also possible that Abbink's (2005) manipulation was just too subtle for treatment effects to show up. First, as in AIR, damages were spread over a large number of people, with each worker suffering only little from each single corrupt decision. Already in AIR this setting failed to produce strong effects. Second, the author focused on the fairness considerations of the officials, not the bribers, and did not inform the clients about the wage level. Third, the workers were seated in a separate room, so players may have been tempted to ignore them. So maybe the non-result from this experiment should be interpreted with caution.

A recent study by van Veldhuizen (2011) indeed challenges Abbink's (2005) lack of results. The author also studies the AIR setting with some adaptations. The negative externalities are not inflicted on other subjects, but they are deducted from a donation the experimenter makes to a charity of the subject's choice. Further, the payoff that the officials can earn in the game is changed, hence varying the relative payoffs between bribers and officials. This variation has a profound effect: Corrupt decisions made by highly paid officials are down by more than a third compared to their low-payoff counterparts. The relationship between the two players in a pair is much more intense than the relationship players have with the workers in Abbink's (2005) setting. Hence relative payoffs are much more salient and perceived fairness (or unfairness) a much stronger driving force.

Several studies also found wage effects in other settings. Both Azfar and Nelson (2003) and Barr et al (2004) vary the wage of the executives in their game described earlier, and find that higher-paid executives tend to embezzle less. So Abbink's lack of evidence cannot be generalized.

Armantier and Boly (2011) test the wage hypothesis in a combined lab and field experiment. In their field experiment they make use of the exam grading practices in Burkina Faso, where high school exams are marked by independent graders hired on an ad-hoc basis. For the field experiment they set up an exam-grading session (which was for real). Graders were given 20 exam papers each and had to check them for spelling mistakes. The experimenters added a banknote to one of the papers, accompanied by a note saying "Please find few mistakes in my exam". The authors also conducted a comparable experiment using conventional laboratory methodology and a conventional student

subject pool in Canada. The main differences between the two experiments were that the Canadian students knew that they were participating in an experiment, and they knew that it was about a bribery scenario. Care was taken that the same circumstances as in the field could be replicated without using deception. In one treatment variation different wages were used for both the lab and the field graders. In both the lab and the field higher-paid graders were less likely to accept bribes.

Though the evidence is not unambiguous, public officials' wages seem to have an influence on their corruptibility. The majority of studies examining wages find that paying fair salaries to officials decreases bribe-taking, only Abbink (2005) does not. Of course, the set of positive results does not imply that paying more will work always and everywhere. It still seems to depend on the particular circumstances. However, the fact that results have been found in a variety of settings should be seen as encouraging.

5.6 Institutional arrangements to fight corruption

In this section we look at two experimental studies that test institutional rearrangements that have been suggested to combat bribery. Abbink (2004) tests the instrument of staff rotation. Under this regime officials change their jobs and offices frequently to make the development of long-term personal relationships between officials and their clients more difficult. The German government introduced this instrument in the late nineties for sensitive areas.

Staff rotation is straightforward to test in the laboratory; all it takes is a switch from partners to strangers matching. Abbink (2004) adds a treatment with random re-matching of officials and clients to the design by AIR and compares it to the corresponding treatment of the original study. In the experiment staff rotation is tremendously effective. The average number of corrupt choices falls by almost two-thirds. This is a stronger effect than all other treatment variations in this series of experiments, and, judged by itself, provide a strong recommendation to implement this scheme more frequently. Of course, the experiment focuses solely on the bribery-reducing effect of rotation mechanisms. It does not take into account practical costs of staff rotation, like higher training costs, efficiency losses due to inexperienced staff, or dissatisfaction of workers who are forced to move offices frequently. Thus the instrument should be considered only for sensitive areas.

Schickora (2011a) tests another instrument that is frequently put forward as a remedy for bribery. He considers the *four-eye principle*, which implies that decisions in sensitive areas of public service should always be made by more than one official. The four-eyes principle is a prominent tool much discussed in the literature (e.g. Pörting and Vahlenkamp 1998, Hussein 2005, Rieger 2005, Wiehen 2005), but it is ex-ante not unambiguous that it will produce the desired effect. The idea is that two officials would serve as monitors for each other, and this might serve as a deterrent for both the officials and the bribers. Even if both officials are potentially corrupt, bribery might become less

attractive, because two officials need to be bribed (or share a given bribe), which increases the costs of a corrupt service (or makes it less attractive for officials). However, it could even be counterproductive if officials are somewhere on the borderline between honest and corrupt and they might encourage each other.

The experimental methodology allows not only to figure out the overall effect of the instrument, but also to disentangle the mechanisms with which the instruments work. Schickora (2011a)'s experiment comprises four main treatments in which two effects can be examined: First, there is the *bribe-splitting* effect, meaning that since a given bribe has to be shared between two officials, corruption becomes economically less attractive and should reduce corruption. The second effect is the *group-decision* effect, which can go either way. It could have a bribery-reducing effect if the officials favoring honesty are more persuasive (in particular since the non-corrupt option was the default in case of disagreement). It could, however, also be the case that group members encourage each other to go for the corrupt choice.

As an experimental paradigm Schickora (2011a) uses AIR's game with minor modifications. The treatments testing the four-eyes principle involves officials being represented by either individual players or groups of two subjects who had to make a joint decision with the option of free communication. This variation is combined with a manipulation of the marginal payoff. In one of the group treatments the officials had to share the bribe, in the other this was compensated for in the experimental design. This manipulation allows for disentangling bribe-splitting and group decision effects.

Schickora (2011a) finds that, surprisingly, the overall effect of the four-eye principle is detrimental – both bribe transfers and corrupt decisions are higher in the group treatment. The experiment indeed reveals a bribe-splitting effect, which reduces bribery, but this is over-compensated by a group-decision effect towards higher corruption. This is explained by a persuasive-argument theory put forward by Pruitt (1970). Since taking bribes and reciprocating on them is the more lucrative option, this argument becomes persuasive and dominates moral concerns in the discussion. Arguments concerning own material gains are more aggressive than arguments about the common good and are easier taken up by persons undecided between the two. Thus the experiment suggests caution when implementing the four-eye principle in reality. Of course, a single experiment can never be conclusive proof for or against the effectiveness of an anti-corruption instrument. But it does suggest that there are factors undermining the working of the four-eye principle.

5.7 The industrial organization of corruption

There are no experimental studies, to the best of our knowledge, investigating the industrial organization of corruption, i.e. whether competition among different public offices for the provision of the same good reduces corruption as predicted by Shleifer and Vishny (1993).

Drugov, Hamman and Serra (2011, DHS below) experimentally investigate the role that intermediaries might play in corrupt transactions. They ask whether intermediaries facilitate corruption by eliminating uncertainty, and by lowering the moral or psychological cost that potential bribers and bribees might suffer when engaging in corruption. They use data generated by a specifically designed laboratory experiment that simulates corrupt transactions between “private citizens” and “public officials”. While the transaction benefits a citizen-official pair, it generates negative externalities on an “other member of society”. By conducting different versions of the game, in which they alter the degree of uncertainty and/or the presence of the intermediary, DHS were able to isolate the moral cost-reducing role that intermediaries may play in corruption exchanges.

The experimental results confirm that the presence of the intermediary significantly increases corruption. While DHS find evidence that this increase is partly driven by the elimination of uncertainty, there is more to the role of the intermediary. In particular, the data suggest that the presence of the intermediary leads to a reduction in the moral or psychological costs of both private citizens and public officials, and thus further increases corruption. The authors argue that these findings have implications with respect to possible policies concerning the legitimacy of the use of intermediation for the provision of public goods or services. Whether the services provided by intermediaries should be prohibited is an open question. Lambsdorff (2011) rightly argues that prohibiting the use of intermediation would eliminate the benefits provided by honest intermediaries; moreover, it is likely that intermediaries would keep operating informally and illegally. On the other hand, DHS’s findings suggest that rendering the use of intermediaries for the provision of public services illegal would eliminate one of the channels through which corrupt intermediaries seem to operate, i.e. the reduction of the moral costs associated with corruption of potential bribers and bribees, and therefore could reduce the demand for corrupt intermediaries.

5.8 Whistle-blowing and bottom-up mechanisms

Although whistle-blowing and leniency policies have been investigated in the context of cartel agreements and anti-trust, their study in the context of corrupt exchanges represents a recent field of research.

As discussed in Section 2, as a possible solution against the opportunistic effects that whistle-blowing might have, Lambsdorff and Nell (2007) proposed the institution of asymmetric leniency and

penalties for the parties involved in a bribery transaction. Schikora (2011b) tests Lambsdorff and Nell (2007)'s theory in the laboratory.¹⁶ In the specifics of the experiment, two players, a potential briber and a potential bribee, interact for the provision of a service; both briber and bribee can initiate a corrupt transaction by either offering or demanding a bribe at different stages of the game. Similarly to the original AIR's design, if a bribe is paid, the bribee (i.e., the public official) can either reciprocate by choosing an action that favors the briber, or not reciprocate and choose an action that benefits himself or herself. As in AIR, reciprocating represents the corrupt action and therefore generates negative externalities on other (6 randomly selected) participants, which are themselves involved in corruption decision-making. Contrary to other bribery games, while corruption generates a negative externality, lack of corruption generates a positive externality on the other individuals.

Schikora compares bribery behavior in the baseline version of the game and in two whistle-blowing treatments. In the *symmetric* whistle-blowing treatment (SWT), both briber and bribee can blow the whistle against each other at any point of the game, following an attempt to demand or pay a bribe, and/or following the official's decision to reciprocate or not. The consequences of whistle-blowing are the same for the briber and the bribee (i.e. a given monetary loss), no matter who blew the whistle. In the *asymmetric* whistle-blowing, or whistle-blowing *with leniency* treatment (LT), the bribee is granted leniency, i.e. he/she can retain the (tripled) bribe after blowing the whistle against the briber.

The game is repeated for 10 rounds, relies on a fixed-partner design, and uses neutrally framed instructions. The instructions of the experiment are neutrally framed.¹⁷

Schikora finds that while giving the briber the possibility to blow the whistle against an official that demanded a bribe is effective in reducing corruption, the possibility to whistle-blow after the official has made his or her reciprocity decision increases the chances that corruption will take place. In other words, the briber (or client) can use whistle-blowing as a threat to force public officials to reciprocate. This result replicates the finding in the anti-trust literature (see Buccirosi and Spagnolo, 2006; and Bigoni et al. 2009) that whistle-blowing can actually increase the likelihood of cartel agreements between firms. On the other hand, Schikora shows that whistle-blowing under asymmetric leniency reduces the occurrence of corruption (i.e. the "reciprocation" choice) by giving the public official the opportunity to avoid reciprocation without incurring the risk of being penalized by the client through whistle-blowing.

¹⁶ Lambsdorff and Frank (2010, 2011) employ a one-shot bribery game that allows for whistle-blowing on the part of the briber and the bribee. As these papers do not aim to investigate the deterrence effect of whistle-blowing, we do not discuss them here.

¹⁷ The briber and the bribee are referred to as Type A and Type B, and there is no mention of bribery; the money that the briber could pay to the official is called "a transfer". Even the actions of offering or demanding a bribe, and the actions of paying the bribe are presented using neutral language, i.e., using words like "Add", "Out", "OK", "Prefer", and "Nothing". The whistle-blowing decision is referred to as "whistle".

The “combined” treatment employed by Serra (2011) – discussed in Section 5.3 – could also be interpreted as a whistle-blowing mechanism that grants leniency to the citizen, i.e. a setting with asymmetric leniency, using Lambsdorff and Frank (2011)’s and Schikora’s terminology. This treatment proved highly effective in reducing bribe-demands of public officials in Serra’s experimental setting. However, there are a number of important characteristics of the “combined” mechanism that distinguish it from a typical whistle-blowing mechanism. Whistle-blowing typically involves a whistle-blower – the citizen in the experiment – who is willing to formally report a corrupt individual, i.e., the public official. The whistle-blower provides proof of the corrupt exchanges, and the conviction of the official depends on his or her testimony in court. The testimony of the whistle-blower leads to the punishment of the corrupt individuals accused of corruption, and possibly also of the whistle-blower, if he or she had an active role in the corrupt transactions – although leniency policies could lower the penalties imposed on the whistle-blower. Thus, the main distinctive factor of a typical whistle-blowing system is that the investigation of the act of corruption committed by the official relies on the precise accusations brought forward by the whistle-blower. Note that these accusations may be false, and opportunistic motives of the whistle-blower could constitute a serious concern. On the other hand, in the “combined” system simulated in Serra’s game, if a citizen reports the official, the official is informed about the anonymous report (i.e., he/she is informed that the citizen reported him/her as “corrupt”) and knows that he could be subject to a formal investigation as a result. However, the investigation in this case is purely top-down in nature, i.e., it does not rely on the whistle-blower’s testimony. Therefore, if the official is innocent, he/she should not suffer the intrinsic cost from being reported - knowing that the citizens’ accusations are false - and should not fear the possibility of a formal investigation. On the other hand, if the official is guilty of corruption, he/she would suffer both the cost generated by social disapproval and the risk of being fined if formally audited from the top. As for the citizen, knowing that his or her report could not be used to incriminate the official, but only to initiate a formal top-down investigation (over the general performance of the official), opportunistic motives should not apply – or at least should not be as strong as in a typical whistle-blowing system.

Schikora (2011b)’s and Serra (2011)’s findings call for further research. In particular, the complexity of Schikora’s experimental design makes studying the effects of symmetric and asymmetric whistle-blowing in a much simpler setting – i.e. with only one initiator of corruption, and whistle-blowing possible to only one of the parties involved – and with corruption-framed instructions desirable.¹⁸ Serra (2011)’s findings leave a number of questions unanswered. For instance, would the reporting system be effective in preventing corruption by itself, i.e., if it were purely bottom-up in nature and, thus, if did not trigger probabilistic top-down detection and punishment? And, would the combined system be more effective than purely top-down auditing also in a better institutional environment,

¹⁸ See Section 6 for a discussion about framing effects in bribery experiments.

where the top-down probability of detection is significantly higher than 4%? Would the threat of the citizens' reports act as a corruption deterrent if the act of reporting were costly to the citizen?

6. Non-monetary incentives and intrinsic motivations as an anti-corruption tool

According to social psychologists, individuals choosing to obey or disobey formal rules or norms rationalize their actions with reference to the external incentives they face and their intrinsic motivations.¹⁹ Such motivations result from the internalization of social norms, i.e., behavioral rules enforced internally by guilt and externally by social disapproval and sanctions leading to feelings of shame.²⁰ If non-monetary incentives do matter for corruption, then anti-corruption interventions that rely uniquely in changes in the economic incentives associated with corruption might fail, especially in countries trapped in systemic corruption equilibria, where corrupt behavior is socially accepted. In these countries, solutions targeting anti-corruption values and social norms, besides formal norms, may also be needed in order for a country to escape the corruption trap.

In this section we focus on experimental studies aimed at investigating the role that intrinsic motivations play in corruption decision-making. In particular, we discuss experimental findings obtained in relation to: individuals' responses to: 1) awareness about the "corrupt nature" of their actions in the game, i.e. to instructions loaded with corruption references, as opposed to neutral language; 2) awareness about the negative externalities generated by their engagement in corruption; and 3) awareness about the possibility to receive social disapproval in addition to probabilistic top-down punishment.

6.1 Non-monetary cost from acting "corruptly": Evidence on framing effects

Abbink and Hennig-Schmidt (2006, AHS thereafter) hypothesized that, since corruption is illegal and generally viewed as immoral, if intrinsic motivations do matter in corrupt exchanges, presenting experimental participants with a game framed as a corrupt exchange between a firm and a public official, as opposed to a neutrally framed but otherwise equivalent game, would activate social and psychological factors that would significantly reduce individuals' propensity to act corruptly.²¹

AHS employed the bribery experiment introduced by AIR (2002), described in Section 5. In the framed treatment they referred to Player 1 (i.e. the briber) as a "firm applying for the permission to run a plant that pollutes the environment", and to Player 2 (i.e., the bribee) as a "public official" that

¹⁹ This perspective was introduced to economists by Kreps (1997).

²⁰ For details see Benedict (1934) and Grusec and Kuczynski (1997).

²¹ Framing effects have been found in prisoners' dilemma games (Ross and Ward, 1996; Liberman, Samuels and Ross, 2004), public goods games (Andreoni, 1995; Cookson, 2000, Rege and Telle, 2004, among the others), and dictator games (Eckel and Grossman, 1996; Branas-Garza, 2007).

can grant or deny such permission. Moreover, in the framed treatment the bribe that the firm could offer to the civil servant and that in AIR was called a “transfer,” was explicitly referred to as a “private payment”. As in AIR, the experiment was repeated for 30 rounds with fixed matching of firms and civil servants, and therefore simulates repeated corrupt exchanges relying on trust and reciprocity between briber and bribee. Moreover, the public official’s decision to grant the permit generates negative externalities on all the other participants in the session, in the form of a monetary loss of 3 tokens. Further, as in AIR’s sudden death treatment, there is 0.3% probability that corruption is detected and both firm and public official are disqualified from the experiment.

AHS found no significant difference between individuals’ decision to engage in corruption in the neutrally framed and the corruption framed versions of the experiment, suggesting that either intrinsic motivations do not really play a role in corruption decision-making, or that, as suggested by the authors, “the experimental design transmits the essential features of a bribery situation already with the neutral framing, such that the presentation does not add substantially to subjects’ interpretation of the task” (p.104). Possibly as a result of AHS’s null finding, a number of subsequent bribery experiments – including Schikora (2011a,b), discussed in Section 5 – have been neutrally framed with no attempts to investigate framing effects.

Barr and Serra (2009) do find framing effects in their experimental setting simulating a petty corruption scenario. The bribery experiment introduced by Barr and Serra differs from AIR’s design in many respects. First, while AIR focus on repeated corrupt transactions, Barr and Serra study petty corrupt exchanges in which both sides of the exchange tend to be executed more or less simultaneously, rendering trust, reciprocity and repetition unimportant and excludable from the design;²² consequently Barr and Serra’s bribery game is one-shot, and the act of accepting the bribe implies the delivery of the corrupt service. In other words, the public official has only one decision to make: whether or not to accept a bribe, while aware that accepting the bribe implies commitment to providing the corrupt service. Second, given the petty corruption scenarios that Barr and Serra aim to simulate, their corruption framed version of the experiment refers to ‘private citizens’ and ‘public officials’ interacting with regard to the provision of a public service, rather than ‘firms’ and ‘public officials’ interacting with regard to the granting of the permit to pollute the environment. Third, while in AIR engaging in corruption generates negative externalities on all experimental participants – which implies that each briber and each bribee suffer the negative externalities generated by other briber-bribee pairs – in Barr and Serra, those who suffer the negative externalities are unable to

²² Consider, for example, the case where a citizen applies for a driver’s license, or for a visa; or the case where a hospital patient requires a change of linen and offers a bribe to a nurse in exchange for having it done immediately.

engage in bribery themselves.²³ More in detail, each session is played by 5 participants in the role of ‘private citizens’, 5 in the role of ‘public officials’ and 5 in the role of ‘other members of society’. While citizens and officials are randomly matched at the beginning of the session and have the chance to engage in bribery, the other members of society are passive players, i.e. they do nothing during the experiment but they suffer a monetary loss for any citizen-official pair that engages in corruption.²⁴

By employing a simpler experimental design, aimed at investigating petty corruption transactions, Barr and Serra found evidence of framing effects for the participants in the role of private citizens; when the game was framed as a petty corruption scenario and the negative externalities suffered by innocent victims due to corruption were high,²⁵ subjects in the ‘private citizen’ role were less likely to offer bribes. The same does not apply to the participants in the role of public officials. The authors explain the differential results obtained for the ‘private citizens’ and the ‘public officials’ in the game by referring to Bardsley (2005)’s artificiality hypothesis, i.e. they argue that if the frame applied appears ‘artificial’ to experimental participants, it may induce role play rather than triggering intrinsic desires to abstain from an immoral, corrupt-like act. As students are citizens, the frame employed in the experiment did not invite them to role play; rather, the petty corruption frame possibly invited them to think about whether they themselves would engage in bribery were they to find themselves in a situation where it would be self serving to do so. On the other hand, the authors argue that the corruption-frame employed did not solve the artificiality problem applying to the students in the ‘public servant’ role, which might explain the null findings obtained for these students.

The ‘artificiality hypothesis’ could also explain the null findings of AHS; the business-license frame might have seemed as artificial to the student subjects as the neutrally loaded frame adopted in AIR. An additional possible explanation of AHS’s null results lies in the repeated nature of the experiment. It is possible that the dynamic of learning suppressed any possible framing effect. In a one-shot experiment, subject can form their decisions only on the basis of the instructions and the description of the game therein. In a repeated game, however, independent of the matching protocol, participants respond to experience they make during play, the feedback that they get through the decisions of the other players and the feeling that they get for the decision situation. The way the situation is presented in the instructions then plays a much smaller role than when it is the only source of information to base a decision on. Of course, this explanation is speculative unless properly tested.

²³ Building on the example in footnote 14, one or more poor clients who cannot afford to bribe may be left without a license or a visa, or clean linen, longer as a result of the bribery.

²⁴ An additional difference in the design is the fact that the bribe is not tripled before being passed on to the public official. AIR’ and AHS’s rationale for this multiplication was that the marginal utility of any given bribe was likely to be greater for a public official than for a business person, due to the latter being richer. Given that Barr and Serra’s game is more analogous to acts of petty corruption, this rationale does not apply as there is little evidence to suggest that public service providers are significantly poorer than service recipients in developing countries.

²⁵ As discussed in Section 6.2, Barr and Serra (2009) manipulated both the frame of the experiment (neutral or corruption-loaded) and the extent of negative externalities generated on innocent others (either low or high).

In summary, the evidence on framing effects is mixed. Taking the null effects of AHS as conclusive evidence that the awareness of the illegality or immorality of a corrupt action has no deterrence effect on individuals' corruption decision-making would be a mistake, as it would be to conclude that researchers could safely apply a neutral frame to all corruption experiments. The findings of Barr and Serra suggest that the existence of framing effects depend on the specific design employed and the degree of artificiality of the corruption frame adopted. In particular, rendering the game explicitly about corruption seems to act on individuals' intrinsic motivations, as long as the specific corruption frame applied is salient to the experiences of the experimental participants. More research testing the robustness and broader applicability of both AHS's and Barr and Serra's findings is certainly needed.

6.2 Non-monetary cost from harming others: Evidence on externality effects

One distinctive feature of corruption is the generation of negative externalities on people other than those involved in the corrupt transaction. Do individuals involved in corruption care about such negative externalities? Do they suffer non-monetary costs if/when aware of the harms their actions cause to society? Put it differently, could intrinsic motivations in the form of feelings of guilt and shame associated with harming others prevent corruption from taking place?

The bribery experiment introduced by AIR and described in the previous sections was the first to address these questions. Under one of the three treatments employed, whenever a bribe was offered and a corrupt service provided by a briber-bribee pair, all the other briber-bribee pairs in the same experimental session incurred a loss. If less bribery was observed under this treatment as compared to a treatment where corruption did not generate negative externalities on others, it could be taken as evidence that individuals take account of the harm that corrupt exchanges cause to others when deciding how to act. AIR found no evidence of externality effects on individuals' decision to engage in bribery, and concluded that their results “cast doubts on the effectiveness of campaigns appealing to the consciousness of the officials of the negative welfare effects of bribery” (p. 448).

Büchner, Freytag, González, and Güth (2008) also found no evidence of externality effects in a repeated procurement experiment in which pairs of sellers bid to obtain a public contract. The bid of each seller could include a bribe to be paid to the buyer, i.e., the public official. One treatment tests for externality effects by allowing pairs of sellers to bid against each other in groups made of three pairs of sellers. In this treatment, while each seller is still competing against the seller in his pair and therefore still individually responsible for the bid made (and the possible bribe offered), each group of sellers is matched with a *reference matching group*. Negative externalities come into play by comparing the total amount of bribes offered by each group and the matching group; the group that end up having offered the larger amount of bribes receives a lower exchange rate from experimental into real currency in the next ten rounds of the experiments. The authors find that “being aware that corruption is detrimental for society does not help much: It mainly increases heterogeneity in behavior

due to idiosyncratic reactions to such social effects” (p. 116).

One feature of the experimental design that AIR and Büchner et al. (2008) have in common is that individuals who are in the position to choose whether or not to engage in corruption are at the same time responsible for the negative externalities imposed on others (if they choose corruption over honesty), and subject to the negative externalities imposed by others’ corrupt actions. While this is certainly the case in corruption scenarios involving competition among potential bribers and bribes, such experimental settings do not allow isolating the effect that non-monetary costs from harming others play in corruption decision-making from the effect of negative reciprocity and/or conditional cooperation. In other words, given that the negative externalities are potentially reciprocal, in the AIR’s and in the Büchner et al.’s settings conditional cooperators would not, respectively, abstain from corruption and offer a low bribe (or no bribe) unless they believed that others were doing likewise.

The petty corruption experimental design of Barr and Serra (2009), described in section 6.1 eliminates the possible confounds generated by negative reciprocity and/or conditional cooperation by introducing passive victims of corruption, i.e. 5 participants (called ‘other members of society’) who do not have the possibility to engage in bribery themselves but suffer a monetary loss for any corrupt agreement reached by any of the 5 citizen-official pairs interacting (only once) in the experiment. Barr and Serra test for externality effects by manipulating the magnitude of the negative externalities generated on the other members of society; they find that private citizens’ (public officials’) propensity to offer a bribe (accept a bribe) is significantly lower when the externalities generated on other members of society are higher, suggesting that non-monetary costs generated by awareness of the large social costs generated by petty corruption might have a significant deterrence effect on petty corruption behavior.

Besides the absence of negative reciprocity from the motivations behind corrupt behavior in the design of Barr and Serra, there are two additional possible explanations of the different results obtained by AIR and Barr and Serra. First, while in Barr and Serra, in the high externality treatment corruption generated relatively large negative externalities on each of 5 individuals, in AIR corruption generated small negative externalities on each of 16 individuals. Although the total effect of the damages was severe in AIR, the effect on each individual sufferer was modest. It is possible that harming many people a little concerns participants less than harming a few people a lot. Second, it is possible that the apparent importance of trust and reciprocity between bribers and bribees in the AIR’s design dominated the decision making and suppressed any tendency for guilt associated with reducing the welfare of others to come to the fore.

Abbink (2005) conducted a modified version of the original AIR’s design where the corrupt action, i.e. the public official’s choice of Y, generated negative externalities not on all the other firm-official

pairs, but on 12 other subjects assigned the role of ‘workers’ and not involved in the interaction between firms and officials. While this version of the game is closer to Barr and Serra’s design in terms of the negative externalities design, and could be used to investigate whether negative reciprocity and/or conditional cooperation annul the intrinsic motivations that individuals might suffer from harming others while engaging in corruption – as speculated above – Abbink (2005)’s objective is not to compare the effect of negative externalities imposed on “passive” subjects as opposed to the externalities imposed on other firms and officials also actively potentially engaged in corruption. The objective of Abbink (2005)’s paper is instead to compare corrupt behavior when workers earn substantially more than the firms and officials, and when they earn significantly less.²⁶ Notably, there is also no significant difference between behavior in the treatments of AIR and Abbink (2005).

In summary, the experimental evidence about the existence of intrinsic motivations generated by individuals’ awareness about the negative externalities that corruption generates on others is still at its infancy. Different studies, employing different designs, have produced contrasting results. In particular, in the context of bribery, AIR (2002) found no negative externality effect and, so, accepted the null hypothesis that individuals take no account of the harm that corrupt exchanges causes to others; on the other hand, Barr and Serra (2009) found evidence of externality effects in their petty bribery game, and argued that campaigns designed to raise awareness about the harm petty corruption causes others could reduce citizen engagement in petty corruption and, possibly, cause them to seek other ways to improve the public services they receive. While we speculated that there could be at least three reasons why AIR and Barr and Serra reached different conclusions, a comprehensive, scientific investigation of the causes of their contrasting results would be useful and interesting.

Finally, while in the experiments discussed above subjects knew exactly how much harm they were causing to others, in real life it is often unclear whether and how much harm corruption causes to others; therefore, individuals might be more likely to ignore the negative consequences that their engagement in corruption may cause on others. Once again, we encourage further research into the externality effects associated with different kinds of corruption, including how such effects are perceived and “processed” by individuals deciding whether or not to act corruptly.

7. Concluding remarks

Theoretical investigations of corruption have proposed to a number of anti-corruption policies; however, testing the effectiveness of such policies in the field is highly problematic given the hidden nature of corrupt transactions. The assessments and policy recommendations (if any) provided by empirical investigations based on cross-country comparisons are fraught with measurement,

²⁶ This paper and the results obtained are discussed in Section 5.

endogeneity and omitted variables biases. In this article, we surveyed the empirical evidence generated by experimental studies of corruption relying on the simulation of corrupt transactions in controlled settings. In particular, we reviewed experimental investigations of the effectiveness of anti-corruption policies acting on individuals' monetary incentives, and experimental studies exploring the impact that policies acting on individuals' intrinsic motivations could play in the fight against corruption.

Corruption comes in many different forms, which means that experimental designs employed for the study of corruption also come in many different forms. Although this limits the possibility to compare findings by different authors employing different experimental settings, we can still make some tentative conclusions about the effectiveness of specific anti-corruption policies tested in the lab. First, imposing extremely severe penalties is an effective way to curb corruption, even if the associated probability of detection is (or is perceived to be) very small. Second, when the penalty is not as severe, attempts could/should be made to positively affect individuals' perceptions of the probability of detection. Third, increasing transparency in the handling of public funds and making sure that the officials in charge of such funds are monitored by individuals that are accountable to (i.e. elected by) public service recipients, is likely to significantly reduce embezzlement. Fourth, paying fair salaries to public officials seem to reduce their corruptibility, although what constitutes a fair salary is context-specific and needs to be assessed on a case by case basis. Fifth, whistle-blowing seems to reduce corruption, conditional on asymmetric leniency provisions.

As for institutional arrangements to fight corruption, the evidence is still scarce. We reviewed one experimental study showing that staff-rotation reduces corruption, and one providing evidence against the four-eyed-principle, i.e. suggesting that having more than one official in charge of sensitive areas of public service might increase rather than decrease corruption. More research would be beneficial. Studies of the industrial organization of corruption are also missing. One study showed that the presence of intermediaries increase corruption by eliminating uncertainty and reducing the moral costs of the parties involved, and suggested that the use of intermediaries for the provision of public services should be banned. Further research conducting a thorough examination of the advantages and disadvantages of prohibiting or regulating the use of intermediation for the provision of public services is needed.

The experimental evidence concerning the effectiveness of anti-corruption policies aimed at changing value systems rather than incentive systems is more mixed and seems to depend on the characteristics of the corruption exchanges simulated in the experimental settings employed by different authors. While intrinsic motivations seem to matter in experiments simulating one-shot every-day-life corrupt transactions between private citizens and public officials, the opposite is true in experiments simulating repeated transactions between firms and officials, involving trust, reciprocity and

competition between bribers. Taking the appropriateness of the experimental designs aside, we could tentatively conclude that, while a preference for not doing harm to others and might reduce a citizen's tendency to engage in petty corruption the same preference might not come into play when it is a business person contemplating bribery and when the others in question are his or her competitors. While more research is needed, the surveyed evidence seems to suggest that public awareness and educational programs aimed at raising consciousness of both the illegality/immorality of corruption and the harm that one's corrupt acts inflict on others, should not be excluded from the policymakers' toolbox, especially if the target is every-day-life petty corruption.

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