Engel, Christoph; Goerg, Sebastian J.; Yu, Gaoneng

Working Paper

Symmetric vs. asymmetric punishment regimes for bribery

This Version is available at:
http://hdl.handle.net/10419/57476

Symmetric vs. Asymmetric Punishment Regimes for Bribery

Christoph Engel

Sebastian J. Goerg

Gaoneng Yu

MAX PLANCK SOCIETY

Symmetric vs. Asymmetric
Punishment Regimes for Bribery

Christoph Engel / Sebastian J. Goerg / Gaoneng Yu

January 2012

Symmetric vs. Asymmetric Punishment Regimes for Bribery

Christoph Engel, Sebastian J. Goerg, Gaoneng Yu[*]

Max-Planck Institute for Research on Collective Goods, Germany

January 3, 2012

Abstract

In major legal orders such as UK, the U.S., Germany, and France, bribers and recipients face equally severe criminal sanctions. In contrast, countries like China, Russia, and Japan treat the briber more mildly. Given these differences between symmetric and asymmetric punishment regimes for bribery, one may wonder which punishment strategy is more effective in curbing corruption. For this purpose, we designed and ran a lab experiment in Bonn (Germany) and Shanghai (China) with exactly the same design. The results show that, in both countries, with symmetric punishment recipients are less likely to grant the socially undesirable favor, while bribers are more likely to report to the authorities with asymmetric punishment. In addition, when punishment was asymmetric, corrupt offers were significantly more likely in Shanghai, but not in Bonn. Our results suggest a tradeoff between deterrence and law enforcement. In a forward-looking perspective, lawmakers must decide which aim carries more weight.

Keywords: Bribery, Punishment, Effectiveness, Asymmetry, Legislation
JEL: C91, D02, D03, D73, K14, K42

1

1 Introduction

Corruption is among the most vexing social evils.[1] Corruption is not only a blatant violation of good governance and procedural fairness; it also stifles economic growth (Mauro, 1995; Knack and Keefer, 1995). At least in the books, all legal orders of the world are therefore united in criminalizing corruption. Yet different legal orders adopt different regulatory strategies. One important difference has attracted little academic interest: while some countries target bribers and recipients symmetrically, others threaten recipients with much harsher punishment.

In major Western countries like the U.S.[2], the UK[3], France[4], and Germany (discharge-of-duty bribery)[5], bribers and recipients expect equally severe sanctions. In other legal orders punishment is asymmetric, in the sense that the prescribed punishment for the payer is mild relative to that for the receiver. This is evident in the criminal law of China[6], Japan[7], Russia[8], and Germany

---

[1]See the Corruption Perception Index of Transparency International for the empirics, available via `http://www.transparency.org/policy_research/surveys_indices/cpi`

[2]18 USC §201(b) provides that in case of violating the official duty, both the briber and the public official taking a bribe "shall be fined under this title or not more than three times the monetary equivalent of the thing of value, whichever is greater, or imprisoned for not more than fifteen years, or both, and may be disqualified from holding any office of honor, trust, or profit under the United States." §201(c) provides that for discharge of official duty, both the briber and the public official "shall be fined under this title or imprisoned for not more than two years, or both."

[3]The Public Bodies Corrupt Practices Act 1889 s2 and the Prevention of Corruption Act 1906 s1 provides that, both parties of bribery offence "shall be liable: on summary conviction, to imprisonment for a term not exceeding 6 months or to a fine not exceeding the statutory maximum, or to both; and on conviction on indictment, to imprisonment for a term not exceeding 7 years or to a fine, or to both." The 2010 Bribery Act s11 provides that any individual guilty of bribery is liable: on summary conviction, to imprisonment for a term not exceeding 12 months, or to a fine not exceeding the statutory maximum, or to both; on conviction on indictment, to imprisonment for a term not exceeding 10 years, or to a fine, or to both.

[4]French Penal Code, Articles 432-11, 433-1, 433-2, 434-9 provides that both the public official or judge and the briber are "punished by ten years' imprisonment and a fine of 150,000." Ordinance No.2005-759 of 4 July 2005, Official Journal of 7 July 2005, in force 1 July 2006, available via `http://195.83.177.9/upl/pdf/code_33.pdf`, accessed 24 December 2010.

[5]German Penal Code §331, §333, Bohlander (2008). A public official asking for a bribe for the discharge of an official duty shall be liable to imprisonment of not more than three years or a fine. A judge asking for a bribe having performed, or intending to perform in the future, a judicial act shall be liable to imprisonment of not more than five years or a fine. The person who offers the bribe shall be liable to the same punishment accordingly.

[6]The Criminal Law of the Peoples's Republic of China, Article 383, 386, 390, provide, several levels of punishments depending on the seriousness, with the highest punishment being death penalty for the public official and life imprisonment for the briber. Criminal Law of the People's Republic of China, China Legal System Publishing House, 2000, Beijing.

[7]Penal Code of Japan, Article 197 through 197-4, 198. For a public official in bribery, "imprisonment with work for not more than 7 years shall be imposed.", and the briber "shall be punished by imprisonment with work for not more than 3 years or a fine of not more than 2,500,000 yen." English translation by the Cabinet Secretariat of Japan, up to the revisions of Act No. 36 of 2006(Effective May 28, 2006), available via `http://www.cas.go.jp/jp/seisaku/hourei/data/PC.pdf`, accessed on 4 Jan 2011.

[8]The Criminal Code of the Russian Federation Article 290 provides "Bribe-taking by a functionary, ... if the functionary then takes actions (inaction) which are part and parcel of the functionary's official powers, ... shall be

(violation-of-duty bribery)[9].

In this paper, we bracket broader issues of justice and focus on a question that is preliminary to any normative discussion of the difference: which solution is more effective in curbing corruption? Specifically, we ask the following four questions: do symmetric and asymmetric punishment have different effects on potential offender decisions: (1) Whether to make an offer? (2) Whether to accept the offer? (3) Whether to do a favor after accepting an offer? (4) Whether to self-report after an offer is accepted but no favor returned?

Testing these questions in the field would have been hard, if not impossible. Payers and receivers have a strong incentive to keep corruption confidential. Even if policy makers were willing to experiment with the symmetry versus asymmetry of punishment, the resulting degree of corruption, i.e., the dependent variable, could not be measured reliably. An experiment in the lab offers a viable solution. In a set of bribery experiments, we manipulate punishment strategies to observe their effects on the bribery decision-making. Given that the different punishment regimes discussed above are effective in societies with different cultural backgrounds, one might argue that culture determines the most efficient regime. To ensure the robustness of our results across countries the experiments are conducted in Germany and China, two countries with different cultural backgrounds and legal orders.

Our results suggest that both strategies, asymmetric and symmetric punishment, have their advantages and disadvantages. With symmetric punishment, recipients are less likely to grant the

punishable by a fine in the amount of 100 thousand to 500 thousand roubles, or in the amount of the wage or salary, or any other income of the convicted person for a period of one to three years, or by deprivation of liberty for a term of up to five years, with deprivation to hold specified offices or to engage in specified activities for a term of up to three years. Bribe-taking by a functionary for illegal actions (inaction) shall be punishable by deprivation of liberty for a term of three to seven years, with disqualification to hold specified offices or to engage in specified activities for a term of up to three years." Article 291 provides "Bribe-giving to a functionary, in person or through a mediator, shall be punishable by a fine in the amount up to 200 thousand roubles, or in the amount of the wage or salary, or any other income of the convicted person for a period up to 18 months, or by corrective labor for a term of one to six months, or by arrest for a term of three up to six months, or by deprivation of liberty for a term of up to three years; bribe-giving to a functionary for the commission of known illegal actions (inactions) shall be punishable by a fine in the amount of 100 thousand to 500 thousand roubles, or in the amount of the wage or salary, or any other income of the convicted person for a period of one to three years, or by deprivation of liberty for a term of up to eight years." NO. 63-FZ OF JUNE 13, 1996 (with the last amendment on December 28, 2004). Adopted by the State Duma on May 24, 1996, adopted by the Federation Council on June 5, 1996, available via http://www.legislationline.org/documents/section/criminal-codes, accessed on 4 Jan 2011.

    [9]German Penal Code §332, §334. Bohlander (2008). Under §332 I StGB, a public official asking for a bribe and thereby having violated or intending to violate his official duties is punished by at least 6 months of imprisonment. Under §334 I StGB, a payer offering a bribe and causing the official to violate or intending to violate his official duties is punished by at least 3 months of imprisonment. By the same token, under §332 II StGB, a judge asking for a bribe thereby having violated or intending to violate his judicial duties is punished by at least 1 year of imprisonment. Under §334 II StGB, a payer offering a judge a bribe and causing the judge to violate or intending to violate his official duties is punished by at least 6 months of imprisonment.

favor. Yet with asymmetric punishment, bribers are more likely to report to the authorities. This suggests a tradeoff between deterrence and law enforcement. In this study, we observe only minor differences between the locations and the greater picture is stable across locations, suggesting that our results are stable to cultural influences.

The remainder of the paper is organized as follows: Section 2 reviews the related work. Section 3 presents the design of the experiment and makes theoretical predictions. Section 4 is the results section. Section 5 concludes with a discussion and policy implications.

2 Related Work

There are quite a few papers on bribery experiments. They cover issues like trust and reciprocity (Abbink et al., 2000, 2002; Lambsdorff and Frank, 2007), moral cost of corruption (Abbink, 2002), deterrence versus intrinsic motivation (Schulze and Frank, 2003), staff rotation (Abbink, 2004), neutral versus loaded instructions (Abbink and Hennig-Schmidt, 2006), externality and framing effects (Barr and Serra, 2007), bribery and public procurement (Büchner et al., 2008), impact of parametric change (Krajčová, 2008), subject pool effects (Alatas et al., 2009), propensity to engage in and punish corruption (Cameron et al., 2009), bribery, punishment, norms and reciprocity (Banuri and Eckel, 2009), culture and corruption (Barr and Serra, 2010), gender and corruption (Frank et al., 2011), and sensitivity to corruption (Geng and Hennig-Schmidt, 2011). Especially, Abbink et al. (2000) shows that trust and reciprocation are sharply contrasted to equilibrium behavior. Lambsdorff and Frank (2007) find that payers do punish those who do not return a favor through costly self-reporting. However, none of these papers compares the effects of symmetric and asymmetric punishment.

By contrast, a number of theory papers touch upon the issue. Lambsdorff and Nell (2007) believe that double-dealing, whistle-blowing and extortion cause significant uncertainties for participants in corrupt transactions and legislators may use an asymmetric design of criminal sanctions[10] and leniency programs to amplify these inherent risks and increase the transaction cost in corrupt deals, destabilize corrupt arrangements and disband the "pact of silence", thereby making participation less likely in one-shot games. Similarly, Kingston (2007) introduces government as a strategic player that attempts to structure the game such that the level of corruption is reduced and shows that governments wishing to deter parochial corruption[11] will usually prefer to punish

---

[10]Lambsdorff and Nell (2007) show that the recipient of a bribe should be punished less for taking the money and more for reciprocating the bribe. Thus, by "asymmetric" the authors actually mean asymmetric definition of the elements of bribery offense, not asymmetric prescribed punishment, which is the topic of this paper.

[11]Parochial corruption refers to "a situation where only ties of kinship, affection, caste, and so forth determine

only the official receiving the bribe, not the bribe-payer. This result is derived from the following reasoning:

> Government can reduce the potential gains to the bribe-transacting parties by increasing the expected punishment of either party. However, increasing the official's punishment has an important additional benefit: it makes it harder for the parties to enforce the bribe transaction. The same is not true for punishment of the bribe-payer.

Quite differently, in a model studying the effect of leniency policy on illegal exchanges, Buccirossi and Spagnolo (2006) point out that moderate forms[12] of leniency may have a counterproductive side effect: "it could be exploited by sophisticated wrongdoers to implement occasional illegal transactions that would not be feasible otherwise."

Another part of the literature relevant to this topic are papers on leniency for self-reporting in the context of anti-trust. The U.S. Department of Justice believes that "the early identification of antitrust offences through compliance programs, together with the opportunity to pay zero dollars in fines under the Division's Corporate Amnesty program, has resulted in a 'race to the courthouse,'..." (Spratling, 1999). In a market game experiment, Apesteguia et al. (2007) concluded that leniency policy yields significantly lower market prices and that there is some tendency towards fewer cartels and more cartel reports.

However, two distinctions should be made here. Firstly, asymmetric punishment and leniency are not the same. Asymmetric punishment is prescribed, definite, and unconditional; leniency is ex post, at judicial discretion, and conditional on self-reporting. Secondly, bribery and cartels differ in several respects. Members of a cartel basically are in the same position and incur equal cost; in bribery cases the receiver usually has nearly no cost, whereas the payer bears the cost of the bribe at least. Cartels usually have more than two participants who act simultaneously, while bribery usually only involves two parties acting sequentially. Bribery can be one-shot, which is seldom the case for a cartel. All these differences may lead to different behavioral responses.

3 The Experiment

Bribery has rich features and occurs in various types. It is impractical to catch all of them in one simple experimental setup and in addition not desirable. The key advantage of a laboratory experiment is to control the setting and to exclude all influences which are not at the core/nucleus

---

access to the favors of power-holders" (Scott, 1972, p. 88).

[12]By "moderate form", the author means no reward.

of the research question. Therefore, our experiment is solely designed to test the effectiveness of symmetric and asymmetric punishment in preventing bribery.

3.1 A Simple Bribery Game

Assume the following situation: an individual has to decide whether to attempt a bribe or not. If he decides not to bribe, he faces no consequences, neither negative nor positive. But if he decides to approach a potential receiver, his fate depends on the decision by the receiver. The receiver can either reject the offer, accept it and provide a favor, or just accept the money without providing a favor. If the receiver rejects the offer, no additional consequences occur.

   If the receiver accepts the bribe, a money transfer between the individual and the receiver takes place. The receiver has now two possibilities: he can either grant a favor which would result in a monetary benefit for the bribing individual or grant no favor. Granting a favor would implicate the risk of being detected by the authorities; granting no favor might encourage the bribing individual to report the accepted transfer to the authorities.
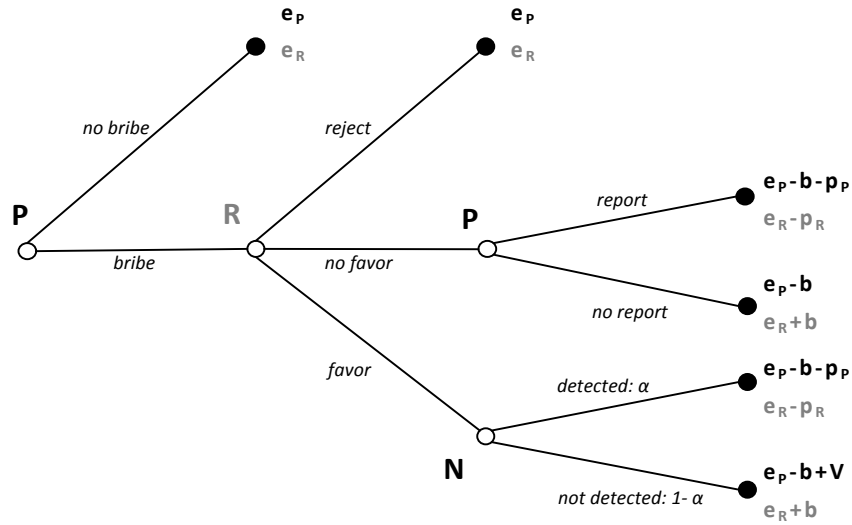
Figure 1: Bribery model

   Figure 1 captures this situation. The two players, Payer (P) and Receiver (R), receive an initial endowment of e_P or e_R, respectively. Both players keep their initial endowments if either P decides not to bribe R or if R decides to decline P's offer. If the receiver decides to accept the bribe, the payoffs of the two players depend on the decision to grant a favor or not.

   If R grants a favor, Nature (N) determines with a random draw whether the bribery is detected or not. With probability α the bribery is detected and with the probability $1 - \alpha$ the bribery is not

detected. If the bribery is detected, *P* and *R* receive a punishment of p_P and p_R, respectively, and the bribe is confiscated. If the bribery is not detected, *R* receives from player *P* the transfer *b*, and for player *P* the favor results in a monetary benefit of *v*.

If *R* grants no favor, payer *P* loses the transferred bribe *b* without receiving a benefit. Thus, *P* can either accept this situation or report the bribe to the authorities. Reporting to the authorities would result in punishment for both players, *R* would receive a punishment of p_R and *P* one of p_P. In addition, the bribe *b* is confiscated. If *P* does not report to the authorities, *R* keeps *P*'s transferred bribe *b* and *P* would have to bear the costs without receiving a benefit.

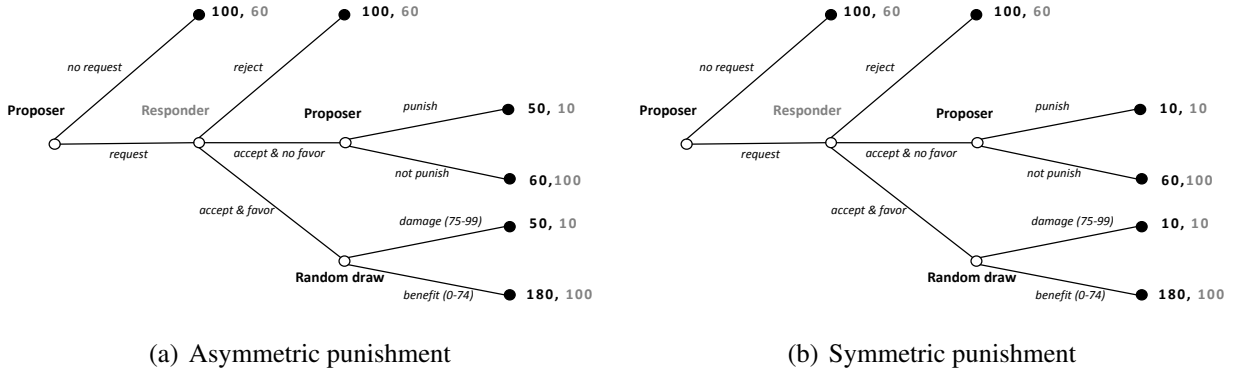(a) Asymmetric punishment   (b) Symmetric punishment

Figure 2: Game tree by punishment regime (notations and payoffs as used in the experiments).

This game allows us to vary the punishment regimes (i.e., the parameters of p_R and p_P), while keeping everything else constant. Figure 2 gives the game with the actual payoffs in the experimental currency talers and the actual wording used in the experiments. The parameters for the experiments were set as follows: the endowment for the proposer e_P and the receiver e_R is 100 taler and 60 taler, respectively; the amount of bribe *b* is 40 taler; the gain for the proposer *v* is 120 taler, which is three times the bribe; and the probability α of being detected is set to 0.25. If an asymmetric punishment regime is applied punishment for the proposer p_P is set to 10 taler, and for the receiver p_R to 50 taler. In case of symmetric punishment, both player receive a punishment of 50 taler ($p_P = p_R$). Figure 2 gives the game trees of both punishment regimes.[13]

Before we turn to the experimental procedure and the behavioral predictions, we briefly discuss the underlying assumptions and simplifications of the game as described above:

- The game describes a situation in which bribery occurs at the sole initiative of the briber. The receiver is paid for the violation of his official duty, but we exclude situations in which the

---

[13]We chose the parameters to capture the key features of legal doctrine and bribery. Thus our parameters hold the following conditions:

receiver asks for a bribe or even extorts it. The amount of the bribe is fixed and bargaining between payers and receivers is excluded. Once the bribe has been paid and accepted, the parties cannot voluntarily end their illegal relationship.

- In this experiment, we ignore negative externalities on outsiders in case of successful bribery. We refrained from imposing negative externalities for the following reasons: first, experimental evidence suggests that adding negative externalities has no significant effect on bribery decisions (Abbink et al., 2002). Second, bribery is an intentional crime and offenders might not care about induced externalities.[14] Third, bribery is often erroneously believed to be a victimless crime and offenders might be unaware of externalities.

- The payer will not be sanctioned if the offer is rejected. This captures a situation where the payer has been cautious enough to approach the potential receiver in a way that cannot be proven in court.

- The main goal of this paper is to investigate the effect of different punishment regimes on fostering or deterring bribery. Therefore, we ignore the case of self-reporting to the authorities by the payer if a favor was granted (which might, for instance, result from moral compunctions). Furthermore, most countries employ voluntary disclosure programs only for active bribery (Nell, 2007). This motivates why we ignore self-reporting by the receiver.

$$e_P \geq b > 0 \tag{1}$$
$$v > b \tag{2}$$
$$p_P + b > v - b \tag{3}$$
$$p_R > b \tag{4}$$
$$(1 - \alpha)(v - b) > \alpha(p_P + b) \tag{5}$$
$$(1 - \alpha)b > \alpha p_R \tag{6}$$

Inequality (1) is the briber's budget constraint. This condition also ensures that there are situations in which bribery pays for the client. Inequality (2) makes sure that the gain from bribery is larger than the bribe paid; otherwise there would be no incentive to bribe. Inequalities (3) and (4) are Bentham's Rule for the payer and the receiver respectively. Betham's Rule commands that *the evil of the punishment must be made to exceed the advantage of the offence* (Bentham, 1802). Inequalities (5) and (6) are the participation constraints for the payer and the receiver respectively. According to (Becker, 1968) a crime is only committed if the expected utility from committing the crime is higher than the expected utility of not committing the crime. Thus, the inequalities explain why there is still an incentive to bribe even if the evil of the punishment exceeds the advantage of the offence.

[14]The 2008 milk scandal in China is a typical example. A spokesman said that the scale of the problem proved that it was "clearly not an isolated accident, [but] a large-scale intentional activity to deceive consumers for simple, basic, short-term profits." In the BAE case, former Prime Minister Tony Blair stated that the investigation was dropped to prevent the 'wreckage of a vital strategic relationship' with Saudi Arabia and the loss of British jobs. See BBC Money Programme 5 October 2004, BBC News 15, 19 December 2006. See also Williams (2008).

- There is no external detection if the offer has been accepted but no favor granted. We do so in the interest of isolating effects. With our design, if the recipient takes the bribe, but does not grant the favour, the only risk is revenge.

Despite these assumptions and simplifications our game captures the essence of bribery: successful bribery results in a reciprocal relationship between payer and receiver, which is advantageous for both parties. This relationship is threatened with detection, resulting in severe criminal sanctions. And this situation is described by the game above.

3.2 Experimental Procedure

For this study, experiments in Germany and in the PR China were conducted. Choosing two different locations is meant as a robustness check. We want to see whether the results reflect a generalizable effect, rather than differences in national cultures, or in the legal environment.[15] In Germany, the experiments were run at the BonnEconLab of the University of Bonn and in China at the Vernon-Smith Experimental Economics Research Center of the Shanghai Jiao Tong University.[16]

In the experiment, two different punishment regimes were tested: asymmetric punishment and symmetric punishment. In each city, two sessions per punishment regime were conducted, with 24 subjects per session. Subjects were randomly assigned either to the role of a proposer or to the role of a responder and groups of two (one proposer and one responder) were randomly matched. In total we have 192 participants, who were mainly undergraduate students from various disciplines, including law, economics, political science, and mathematics (Germany: 50% female, age $M = 23$; China: 41% female, age $M = 21$). Table 1 summarizes the treatments and the number of independent observations.

At the beginning of each session, subjects were seated in cabins, instructions were distributed and read out. All subjects received the same instructions which included the terms favor and punishment, but, to focus solely on the effect of alternative punishment regimes, no references to bribing or criminal activities were given.[17] Thereafter, subjects were informed about their randomly determined role (proposer (payer of the bribe) or responder (receiver of the bribe)) and had

---

[15]Those readers who have a specific interest in the influence of culture on corruption may want to refer to the paper by Barr and Serra (2010) and those interested in the sensitivity to bribery in China to Geng and Hennig-Schmidt (2011).

[16]The experimental software was programmed in z-Tree (Fischbacher, 2007). Refer to the appendix for screenshoots in English. In Bonn subjects were invited via ORSEE (Greiner, 2004).

[17]To avoid translation errors regarding the task and notions, instructions and computer screens were translated from English into the corresponding language and afterwards back-translated into English by a different person (Brislin, 1970). For an English version of the instructions, refer to the appendix.

Table 1: Treatments

	Location	Punishment	Subjects	Ind. Groups
1	China	Asymmetric	48	24
2	China	Symmetric	48	24
3	Germany	Asymmetric	48	24
4	Germany	Symmetric	48	24
Total			192	96

to decide in the corresponding role. Only after the first period, subjects were informed that they would play the same game in the same role with the same anonymous partner for additional 10 rounds. To gather a sufficient amount of data, the strategy method (Selten, 1967) was adopted for the second and third stages. That is, each responder had to decide, conditional on receiving an offer, and each proposer had to decide whether to report conditional on a favor being refused. However, proposers' reporting decisions were only elicited if the proposer submitted an offer. At the end of each round, subjects were informed about the actual decisions and their payoffs. At the end of each session, risk attitudes were elicited (Holt and Laury, 2002).[18]

Each session lasted less than two hours including the time for payments. The final payoff consists of the payoff from period 1 and a random period selected from periods 2-11. The exchange rates from taler into the corresponding currency were adjusted to the hourly wage of a student helper (Bonn: 0.06 Euro per taler; Shanghai 0.14 Yuan)[19] and each participant received a show-up fee of 4 Euros in Bonn and 9 Yuan in Shanghai. Earnings were paid out in cash directly after the experiment and average payoffs were 20 Euros in Bonn and 45 Yuan in Shanghai.

3.3 Behavioral Predictions

The two treatments of our experiment allow us to investigate the effects of asymmetric and symmetric punishment by comparing the frequencies of bribe attempts, of accepted bribes, of granted favors, and of reports to the authorities between the two treatments. However, standard theory under the assumption that players' behavior is purely money-maximizing and that this is common

---

[18]This test was motivated by the fact that the design exposes participants to stochastic risk (if the favor is granted) and to strategic risk (will the recipient accept? will the favor be granted?).

[19]Alternatively, one might have kept the exchange rate fixed, but given differences in purchasing power this would have resulted in running a high stake experiment in China.

knowledge predicts no bribery at all and thus no differences between the two punishment regimes.

This game-theoretical solution is driven by the assumption that subjects are solely motivated by their own payoffs, thus a payer would never engage in costly reporting to the authorities if the bribe was accepted but no favor granted. For this reason, it does not matter whether the punishment for the payer is high (symmetric punishment) or relatively low (asymmetric punishment). A money-maximizing briber never uses reporting to take revenge. From this point, the unique subgame-perfect equilibrium can be derived by backward induction. A rational receiver would anticipate the payer's behavior and therefore accept the money without granting a favor. Thereby, he earns more in comparison to rejecting the offer. Furthermore, he does not risk external detection and punishment which he would face if he granted the favor. A rational payer would foresee this rationale and decide not to offer a bribe to the receiver. Thus, in both treatments, no bribery at all should occur.[20]

Nevertheless, bribery occurs in lab experiments applying games with similar equilibria (e.g., Abbink et al. (2002)) and of course outside the lab. In addition, behavioral experiments repeatedly demonstrate the willingness to engage in costly punishment (e.g., Güth et al. (1982)[21], Fehr and Gächter (2000), and Henrich et al. (2006)). These results are very stable and even hold in related bribery experiments (Lambsdorff and Frank, 2007). The tendency to punish unkind behavior has been linked to distributional preferences as well as fairness intentions (Fehr and Schmidt (1999), Bolton and Ockenfels (2000), Falk and Fischbacher (2006)). Given this evidence, we formulate our first hypothesis about subjects' behavior:

Hypothesis 1: *Bribe attempts, positive reciprocity (granting favors), as well as negative reciprocity (reporting to the authorities) are observed under both punishment regimes.*

In our setup, self-reporting can be stimulated by inequality aversion (Fehr and Schmidt, 1999) and negative reciprocity (Falk and Fischbacher, 2006). Both concepts explain the willingness to engage in costly punishment. In the case of asymmetric punishment, the cost of self-reporting is reduced for the payer. Thus, retaliating upon the receiver for taking the bribe but granting no favor becomes much cheaper for the payer. In terms of Fehr and Schmidt (1999), this means that the cost for reducing payoff inequalities between payer and receiver decreases. Depending on the degree of inequality aversion, this should lead to more reporting in the case of asymmetric punishment.[22]

---

[20]This results holds for risk-neutral and risk-averse subjects.

[21]Early evidence can be found in the the results of ultimatum games. There responders typically reject offers of less than twenty percent of the total amount available. Responders are thus willing to punish unfair behavior, even at a financial cost to themselves. And this response seems to be expected and anticipated by proposers; they typically offer a substantial portion of the sum to be divided - ordinarily forty to fifty percent. See Güth et al. (1982, 367, 371-72, 375 tbls.4 & 5); Kahneman et al. (1986, S285, S291 tbl.2), summarized in Jolls et al. (1998).

[22]In fact, already a subject having the joint combination of the smallest degree of envy and guilt ($\alpha = 0.5, \beta = $

Therefore, we formulate our second hypotheses as follows:

Hypothesis 2: *The reduced cost of self-reporting leads to more reports under asymmetric punishment.*

It has been shown that in voluntary contribution mechanisms cooperation increases in the effectiveness of punishment, i.e., lower costs per punishment point (c.f. Nikiforakis and Normann (2008), Egas and Riedl (2008)). A similar effect is present in our experimental study: retaliation and therefore the enforcement of cooperation if the bribe was accepted is cheaper under asymmetric punishment. In this case, even a rational self-centered receiver will grant the favor if he believes that the probability of being matched with a retaliating subject is high enough. As formulated in our second hypotheses, we expect more self-reports under asymmetric punishment, and therefore accepting the bribe without granting the favor becomes less attractive for receivers under asymmetric punishment.[23]

Hypothesis 3: *The threat of more self-reports under asymmetric punishment leads to more favors granted if the bribe is accepted.*

If asymmetric punishment leads to more favors granted, more payers benefit from offering bribes. As a result, we expect payers to make more offers under asymmetric punishment than under symmetric punishment.[24]

Hypothesis 4: *More bribe attempts are made by payers under asymmetric punishment*

Given the above hypotheses we expect more implemented bribes under asymmetric punishment than under symmetric punishment, resulting in our fifth hypotheses:

Hypothesis 5: *We expect more concluded bribes under asymmetric punishment*

4 Results

We now turn to the results of the experiment. We will start with the investigation of self-reporting behavior. Afterwards we will turn to the differences in rejections and favors between the two treat-

---

0.25; taken from Fehr and Schmidt (1999)) should report under asymmetric punishment, but not under symmetric punishment. Fehr and Schmidt (1999) assume that 30% of subjects have such a combination of α and β.

[23]Under both punishment regimes, a rational receiver would grant the favor if the reporting probability were higher than the external detection rate. Note that a population with a degree of envy and guilt as small as reported in footnote 22 (30%) already results in a higher frequencies of self-reports than the detection probability under asymmetric punishment, but not under symmetric punishment.

[24]We refrain from modeling the bribery game as a signaling game with two different types of payers (reporting and not reporting). In a signaling game, one could investigate whether subjects who are not reporting mimic reporting subjects by making an offer to the receiver. Yet the equilibria of the ensuing signaling game could be derived if the exact proportion of self-reporting payers was determined outside the experiment, which would make one of our main dependent variables pointless. Therefore, we do not deem this modeling strategy appropriate.

ments. For our analysis, we split this choice into the two logical steps: 1.) Shall I accept the bribe and 2.) If so, shall I grant the favor? Thereafter the frequencies of offers are compared between the two punishment regimes. Finally, this chapter concludes with an analysis of successfully and unsuccessfully conducted bribes.

4.1 Self-Reporting

(a) Mean frequency of reporting
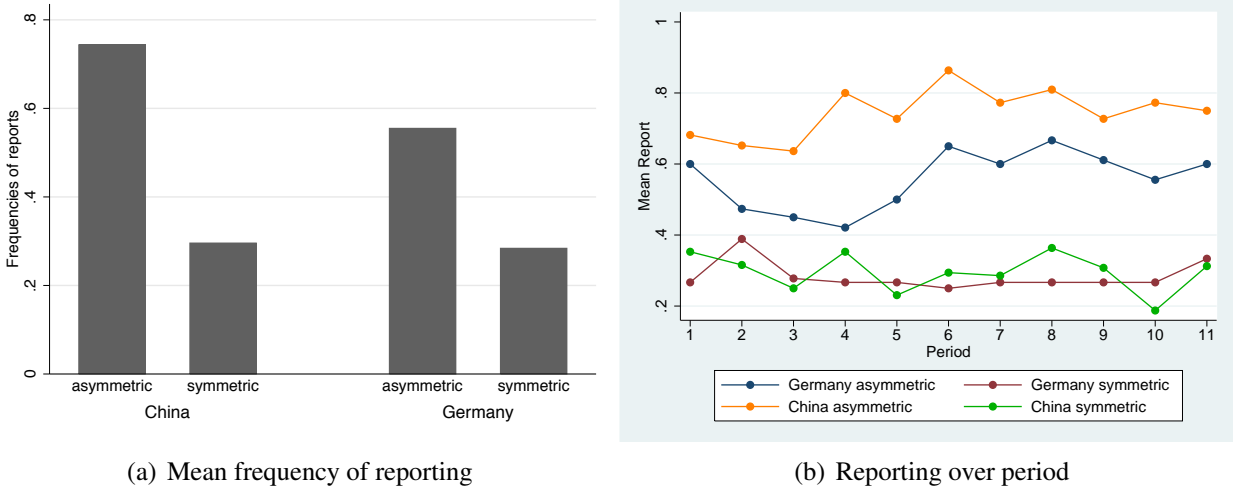
(b) Reporting over period

Figure 3: Reporting by treatment and country

Figure 3 gives the frequencies of reporting over all decisions and over time for the two punishment regimes in Bonn and Shanghai. Obviously, in Bonn and Shanghai self-reporting happened more frequently under asymmetric punishment than under symmetric punishment. This finding is in line with our second hypothesis. Over all rounds and both locations, significantly more self-reports occur under asymmetric punishment than under symmetric punishment ($p < 0.01$, two-sided Man-Whitney u-test) and this significant difference is already present in the first round ($p < 0.01$, two-sided Fisher's exact). These results hold for both locations separately: in Bonn, in 55% of all cases, a payer decided to report if an asymmetric punishment regime was present, while in a significantly lower 29% of all cases, payers reported if a symmetric punishment regime was present (overall: $p < 0.05$, two-sided Mann-Whitney u-test; first round: $p < 0.1$, two-sided Fisher's exact). A similar picture is present in Shanghai; there, in 69% of all cases payers decided to report under asymmetric punishment, while only 27% did so under symmetric punishment (overall: $p < 0.01$, two-sided Mann-Whitney u-test; first round: $p < 0.05$, two-sided Fisher's exact).

Model 1 of Table 2 basically repeats this nonparametric test. The proposer is much more likely

13

to punish the recipient, by reporting to the authorities, if the recipient has broken the deal and not granted the favor after having cashed in the bribe. Of course, a money-maximizing proposer would not do so. She is still better off if the authorities never learn about corruption. Yet since the sanction they expect is low, a considerable number of proposers would rather accept this small loss than allow the recipient to let them down. Apparently, the willingness of proposers to punish unfair recipients is pronounced, and it is sensitive to the price of punishment.

Table 2: Reporting to the Authorities

	Model 1 Reporting	Model 2 Reporting
Symmetric punishment	-9.152***	-9.927***
Germany	-1.453	-1.755
#Favor granted		0.221
Symmetric*#Favor granted		-0.725**
Period	0.082	0.080
Constant	3.945**	4.900***
Observations	776	713
P model	<0.001	<0.001

Random effects logit regressions, Hausman test insignificant. No data if there was no offer.
$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Actually, the difference between both treatments is huge. Model 1 predicts that proposers next to never report to the authorities if let down when punishment is symmetric (the predicted probability is below 1%), while they almost always punish an unfaithful recipient if the asymmetry of criminal law makes this cheap (the predicted probability is 97.07%). Further note that proposers do not have to learn this through experience; the time trend is insignificant. By contrast, model 2 shows an effect of experience that is confined to the symmetric treatment. The more often other recipients have granted the favor in the past, the smaller the probability of reporting is now. This suggests that proposers learn a certain degree of forgivingness.

4.2 Rejections

Figure 4(a) gives the mean rejection rates per punishment regime and location. In Bonn and Shanghai, more rejections occur under asymmetric punishment. However, this difference is not large and only weakly significant ($p < 0.1$, two-sided Mann-Whitney u-test). Figure 4(b) reveals that the difference between the rejection rates under symmetric and asymmetric punishment evolves only
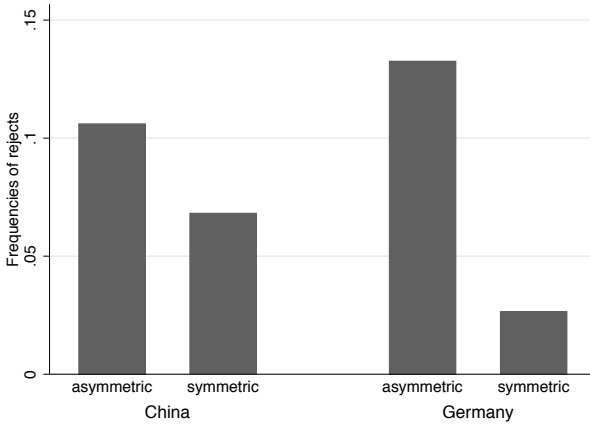
(a) Mean frequency of rejection
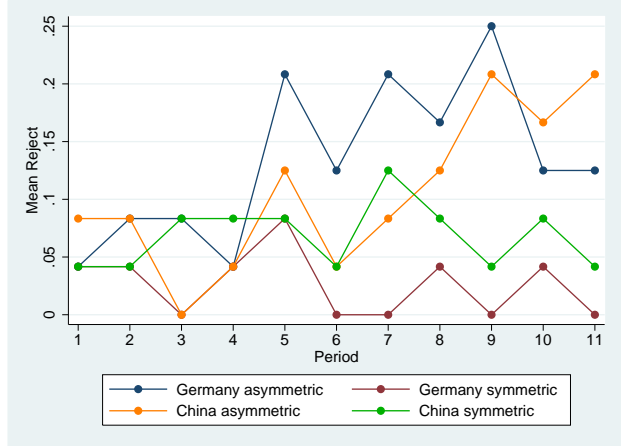
(b) Rejection over period

Figure 4: Rejection by treatment and country

over time. While the difference is not significant in the early rounds of the experiment, it becomes significant for period 9 ($p < 0.01$, two-sided Fisher's exact) and period 11 ($p < 0.05$, two-sided Fisher's exact).

Table 3: Rejecting the Offer

	Model 1 Rejection	Model 2 Rejection	Model 3 Rejection
Symmetric punishment	-1.468*	-1.529*	-2.061*
Germany	-0.804	-0.653	-1.295
#Offers		-0.226+	-0.265
#Reported to authorities		1.027*	1.152*
#Detection		0.379	0.359
Period	0.135**	0.248**	0.353*
Risk aversion			0.365
Constant	-4.104***	-4.437***	-6.671***
Observations	1056	960	810
P model	0.0042	0.0066	0.0036

Random effects logit regressions, Hausman test significant, but problem can be remedied by Hausman Taylor, treating # of past offers, past reports to the authorities and past detection as endogenous, subsequent second Hausman test insignificant. Risk aversion: switching point in Holt/Laury test, if participant was consistent. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Model 1 of Table 3 confirms the nonparametric test: if punishment is asymmetric, offers are

15

more likely to be rejected.[25] The significant time trend shows that corrupt deals are slightly less likely among experienced players. Model 2 shows that it has a significant effect on the future instance of corruption if a proposer has taken revenge on a recipient. Such proposers are more likely to resist corrupt offers that other proposers make in the future. Yet one should once more not be misled by the apparent size of the coefficient. If punishment is asymmetric, so that reporting to the authorities is not heroic, the predicted probability of an offer being rejected is as low as 2.2%. After the recipient has once been reported to the authorities, the rejection probability goes up to 8.3%. Even after two such experiences, it is only 13%. Interestingly, the frequency of detection in case the proposer has granted the favour has no significant influence on her later willingness to strike new corrupt deals. There is a small, and only weakly significant, effect of the number of offers this recipient has received in the past. Risk aversion does also not determine the decision to reject bribery offers (model 3).[26]
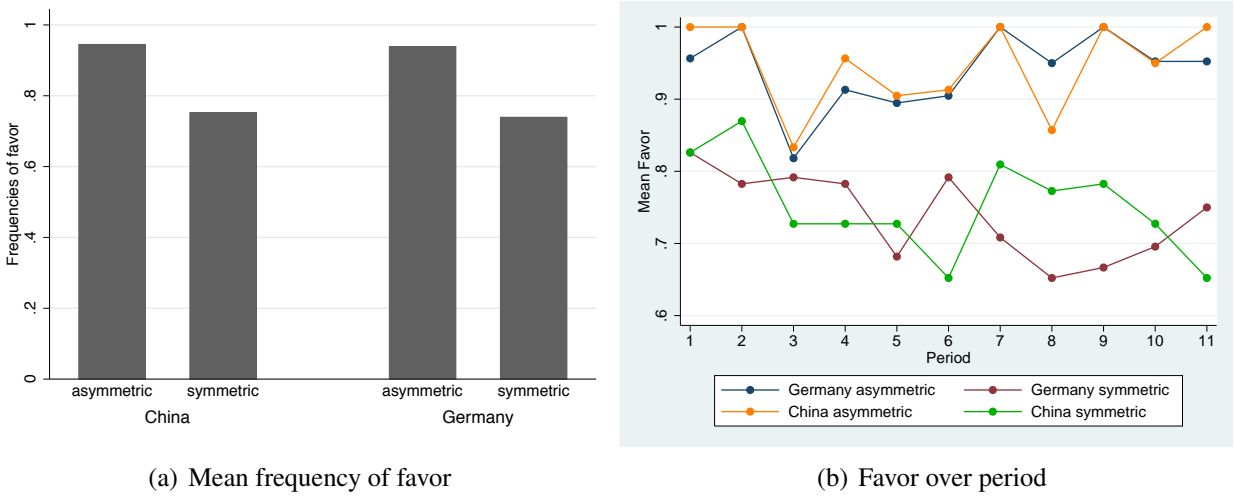
4.3 Favors

(a) Mean frequency of favor

(b) Favor over period

Figure 5: Favor by treatment and country

Figure 5 shows that more favors are granted under asymmetric punishment. This difference is

---

[25]In the experiment, receivers simultaneously chose between three options: rejecting the offer, accepting the offer and granting the favour, accepting the offer and refusing the favour. In our regressions, we split this choice into the two logical steps: shall I accept the bribe? If so, shall I grant the favour? If we rerun the regressions with a multinomial logit model, results look similar.

[26]Recall that risk aversion is measured by the Holt/Laury test (Holt and Laury, 2002). A larger measure indicates a higher degree of risk aversion. For our regressions, we only use data from participants who at most switched once from the safer to the riskier lottery. In total 31 subjects were inconsistent in the Holt/Laury task, 16 Proposer and 15 Responder.

not only significant for the overall means ($p < 0.01$, two-sided Mann-Whitney u-test), but already in the first round ($p < 0.01$, two-sided Fisher's exact). This finding confirms our third hypothesis. In Bonn, 79.17% always chose to return a favor under asymmetric punishment, and not a single subject granted no favor over all periods. In the symmetric treatment, 45.83% always chose to return a favor, and 4.17% always chose no favor (Figure 5(a)). Results in Shanghai are very similar, and the overall difference is significant at both locations (both: $p < 0.05$, two-sided Mann-Whitney u-test).

Besides treatment effects, another finding worth mentioning is the extremely strong tendency of receivers to return the favor. In both treatments at both locations, favors are granted on more than 70% of all occasions. This observation is in accordance with the previous experimental finding that trust and reciprocation is a prominent feature of bribery and leads to violation of equilibrium behavior (Abbink et al., 2002).

Our parametric analyses confirm the above results. Model 1 in Table 4 shows two separate effects: recipients anticipate that proposers are much more likely with asymmetric punishment to report to the authorities. This leads to the significant treatment effect. If they have experienced in the past that proposers do indeed rely on this cheap punishment technology, this makes refusing the favor upon accepting the bribe even less likely. Note, however, that we estimate a logistic regression. While the coefficient of a single experience with reporting to the authorities looks large, actually even without any such experience the predicted probability of granting the favor is already 99.09%. If punishment is asymmetric, corrupt deals are almost perfectly enforced.

Model 2 shows that recipients are all the more likely to grant the favor the more they are risk-averse. Note that recipients actually face two competing risks. If they refuse the favor, they risk that the proposer reports to the authorities. If they grant the favor, corruption may be detected by the authorities on their own initiative, in which case the recipients also face the sanction. From the fact that the regressor is significantly positive we learn that recipients are more afraid of the punishing sentiments of proposers than of surveillance by the authorities.

4.4   Offers

Figures 6(a) and (b) show that at both locations more offers were made under asymmetric than under symmetric punishment. Overall, the differences between offers under symmetric and asymmetric punishment are significant (overall: $p < 0.01$, two-sided Mann-Whitney u-test), which confirms our fourth hypothesis. However, first-round behavior differs significantly between the two punishment regimes only in Shanghai ($p < 0.01$, two-sided Fisher's exact).

Model 1 of Table 5 confirms that bribery is less likely if punishment is symmetric. The regres-

Table 4: Granting the Favor

|	Model 1 Favor	Model 2 Favor
Symmetric punishment	-2.453**	-2.940**
Germany	0.404	-0.018
#Reported to authorities	1.646**	1.648**
Period	-0.166**	-0.200**
Risk aversion		0.615*
Constant	5.397***	3.437*
Observations	881	742
P model	0.0002	0.0009

Random effects logit regressions, Hausman test significant, but problem can be remedied by Hausman Taylor, treating # of past reports to the authorities as endogenous, subsequent second Hausman test insignificant. No data if the offer was rejected. Risk aversion: switching point in Holt/Laury test, if participant was consistent. [+] $p < 0.1$, [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$.
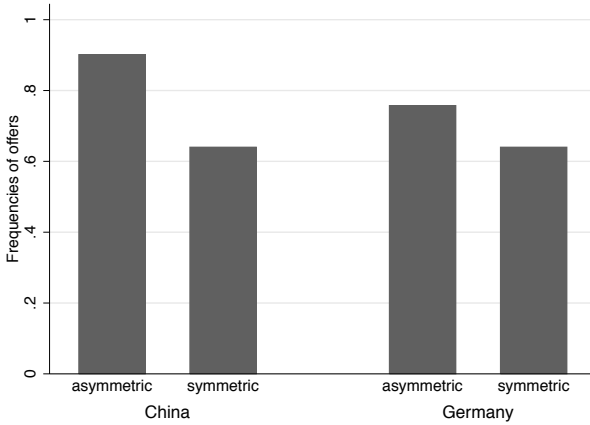
(a) Mean frequency of offer
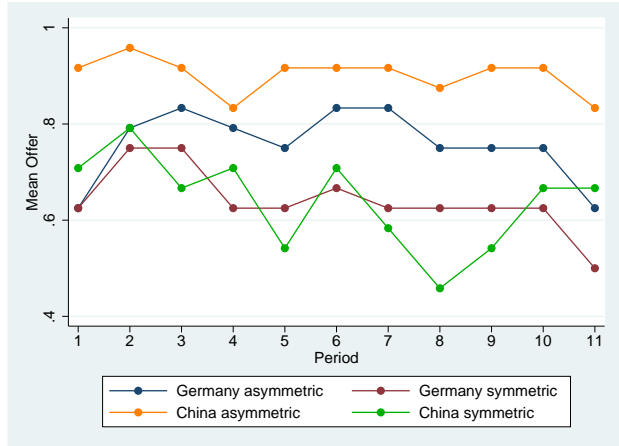
(b) Offer over period

Figure 6: Offer by treatment and country

sion also shows that experienced participants are slightly less likely to offer a bribe. From models 2 and 3 we learn that proposers are highly sensitive to the experiences they are making. If bribery has worked out in that the expected favor has been granted, proposers become more likely to offer a bribe again in the future. By contrast, the more often they have been detected, the less they are likely to engage in corruption in the future. Finally, from model 4 one sees that the more a proposer is risk-averse, the more she refrains from bribing an official.

	Model 1 Offer	Model 2 Offer	Model 3 Offer	Model 4 Offer
Symmetric punishment	-2.053**	-1.242**	-1.217**	-1.576**
Germany	-0.910	-0.391	-0.481	0.244
#Favor		0.621***	0.768***	0.834***
#Detection			-0.627**	-0.632*
Period	-0.101**	-0.360***	-0.332***	-0.352***
Risk aversion				-0.464**
Constant	4.297***	2.931***	2.934***	5.315***
Observations	1056	960	960	800
P model	0.0002	<0.001	<0.001	<0.001

Table 5: Offering a Bribe

Random effects logit regressions, Hausman test insignificant on model 1, but significant on the remaining models. Problem can be remedied by Hausman Taylor, treating # of past favors and past detection as endogenous, subsequent second Hausman test insignificant. Risk aversion: switching point in Holt/Laury test, if participant was consistent.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.5 Effect on Deals
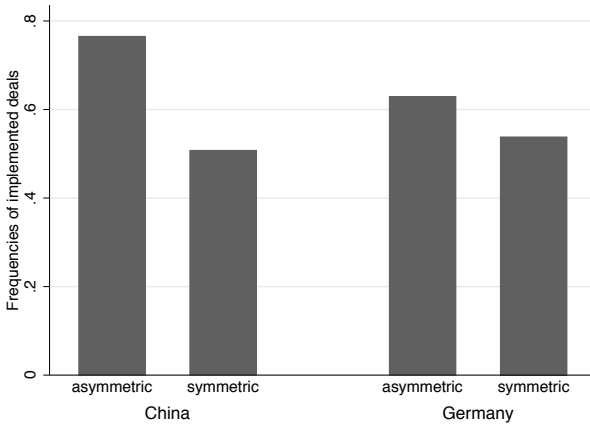
(a) Mean frequency of deal
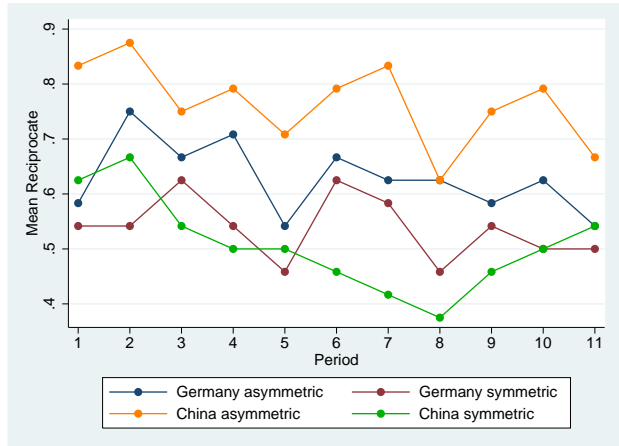
(b) Deal over period

Figure 7: Deal by treatment and country

Ultimately, from a normative perspective, neither offers nor rejections per se matter. Rather, the law wants to deter corrupt deals. This can mean two things: deals should not be struck, or they should not be implemented. In the former perspective, the number of offers that are not rejected is

critical. In the latter perspective, it matters whether a deal is struck and the favor is granted.

From Figure 7, it is easy to see that in China deals were implemented more frequently with asymmetric punishment. This is supported by a Wilcoxon ranksum test ($p < 0.01$, two-sided Mann-Whitney u-test). In Germany, this effect is weaker and not significant. Overall, the treatment effect on deals implemented is significant ($p < 0.05$, two-sided Mann-Whitney u-test) and in line with our fifth hypothesis.

As the regressions in Table 6 show, it takes time for treatment effects to unfold. Participants do not immediately adopt a definite strategy. Actually, the more experience they have, the more they become cautious. This follows from the fact that the time trend is negative in both regressions, and highly significant. If we control for the time trend, we find that there is significantly less corruption if punishment is symmetric. Significantly less deals are implemented (model 2). There is also a weakly significant effect of the punishment scheme on the number of deals concluded (model 1).

Table 6: Deals Concluded and Deals Implemented

	Model 1 Deals concluded	Model 2 Deals implemented
Symmetric punishment	-0.952$^+$	-1.411*
Germany	-0.432	-0.475
Period	-0.113***	-0.092***
Constant	2.734***	2.318***
Observations	1056	1056
P model	0.0006	0.0011

Random effects logit regressions, Hausman test insignificant. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The game-theoretic logic suggests that participants react to the experiences they are making in the spirit of backward reasoning. If proposers frequently punish receivers for breaking the deal by reporting to the authorities, deals should be kept more faithfully. If deals are frequently rejected or broken, proposers should become more hesitant to offer a bribe. This is indeed what we find.

5 Conclusion

In this paper, two different punishment regimes (i.e., asymmetric and symmetric punishment) for bribery were experimentally investigated. Under both punishment regimes, bribery was observed, but less implemented deals were observed under a symmetric punishment regime. Interestingly,

these results hold for our experiments in China and Germany, suggesting that we have found a general effect that is not conditional upon a specific social, political, economic, or legal culture.

If the situation we have tested in our experiment captures the essence of the interaction between a briber and an official, we have a clear message for policymakers. If bribers are punished more leniently, there is more corruption. Interested parties have less hesitance to approach a public official and offer a side payment in exchange for an expected violation of their professional duties. Most importantly, if punishment is asymmetric, bribers have no longer reason to fear that they will be a let down by the official. In principle, this risk is pronounced. Since corrupt deals are illegal, the briber cannot take the official to court if the official cashes in the bribe but does not grant the expected favor. Yet the asymmetry of punishment provides bribers with a fairly cheap technology for punishing dishonest officials. If she breaks the implicit deal, at a relatively small cost for herself the briber may impose severe harm on the official. Our experiment shows that bribers indeed use this technology, and that this is rightly anticipated by most officials. Fairness preferences, in the form of punishing sentiments, therefore lead to the almost perfect enforcement of the corrupt deal.

It is true that a few more officials reject the bribe if punishment is asymmetric. Seemingly, the argument brought forward by Susan Rose-Ackerman applies: "Because it takes two to enter into a corrupt deal, the crime will not occur if the law can deter at least one of the parties" (Rose-Ackerman, 1999). Yet the size of the effect is rather modest. More importantly, rejections become somewhat more frequent if the official has experienced that a proposer has indeed been willing to endure the small sanction for herself, for the sake of punishing this official when she has broken the corrupt deal. This indicates that asymmetric punishment chiefly deters such corrupt deals that would not have been implemented in the first place. What might look desirable at first glance turns out to be a screening device. Only those corrupt deals are struck that both sides are willing to implement.

It thus seems that, from a policy perspective, punishing the briber more leniently is a very bad idea. This message not only matters for a legislator contemplating to introduce the asymmetry openly. It also speaks to the temptation silently to introduce such an asymmetry in jurisprudence. In most countries, this is feasible since the legislator only determines a lower and an upper bound, without precisely determining the severity of the criminal sanction. The courts might exploit the partial indeterminacy of the sanction to sneak in asymmetry, in reaction to retributive sentiments.

Yet our experiment has fixed one parameter in a way that need not hold in the field. In the experiment, the probability of detection is 25%, and it is not influenced by how many instances of corruption have been reported to the authorities in the past. Depending on context, policymakers may believe that the base rate of detecting corruption is much lower. In the extreme, granting the

briber a privilege may be the only realistic means of ever learning about certain types of corruption. Moreover, due to reporting the authorities have a chance to make it very visible to officials that society cares, that there is a positive risk of detection, and that they face severe sanctions. As long as the detection probability remains small, this will not deter hard-nosed money-maximizing officials. But it may help keep up the morale of officials who might be more tempted to give in to bribing as long as they have the impression that anti-corruption legislation is essentially law in the books.

While we can imagine contexts where the detection probability is indeed extremely low, we have no reason to believe this to be true in general. Unsurprisingly, given the dark field is the issue, we cannot report direct evidence on detection probabilities in the field. Yet we have a not too remote proxy. In its last Global Corruption Barometer, Transparency International has asked its respondents: "How would you assess your current government's actions in the fight against corruption?" Overall, 29% answered effective (while 50% said that efforts were ineffective, and 21% agreed with neither statement). In some countries, many more respondents believed government to fight corruption effectively: 56% in Denmark, 57% in the Netherlands, and 68% in Luxembourg. In the two countries of our experiment, 36% said efforts were effective in China, and 21% did so in Germany (Transparency International 2011, Appendix C Table 4). For sure, this perception cannot directly be translated into a detection probability. Yet to the extent that corruption goes unnoticed, a government cannot possibly fight it.

In criminological parlance, detection probability is an issue of certainty. Other readers might wonder whether our experiments appropriately capture the mirror dimension of punishment, its severity. For sure, in the lab we cannot implement drakonian sanctions, like losing one's job, being expelled from one's community, or even being executed. All of those are available in the field, at least in some jurisdictions. Yet note that, to the extent implementable in the lab, our sanctions are very severe. Bribers lose 9/10 of their endowment when detected (or when they self-report and punishment is symmetric), and officials lose 5/6. If severity is critical, we have given it a good shot. Actually, even if a reader felt our choice of the detection probability was too generous, given we sure understate severity, the sanction threat, resulting from both certainty and severity, is certainly not too high in the experiment.

Provided policy makers consider increasing reporting incentives: why be mild to the payer? Why not to the receiver? There are two possible explanations. The first argument is based on considerations of justice and morality. Bribery is not merely an economic crime; it is also a crime against honesty and integrity. Public officials have voluntarily joined government, and thereby accepted the special duties that go with the office. This reason for the asymmetry was already

given a century back, when the relevant provisions of the Criminal Code of Qing were drafted (Shen, 1911). The second argument is utilitarian. The payer is usually the weak link of the bribery transaction. In bribery, the payer is in a disadvantageous position, for the receiver may cheat, which may trigger the desire to take revenge. In contrast, the receiver is always in the leading position and bears no direct cost, thus has no incentive to self-report.

Yet from a policy perspective, one may wonder why it would not even be better to only reduce the payer's punishment in case she actually blows the whistle. Actually, the Chinese Criminal Code does provide such a mechanism. There is a special provision granting conditional reduction which is only applicable to the payer of bribery offences.[27] Besides, a general clause providing reduced punishment for criminals who turn themselves in is available to any kind of crimes.[28] However, the application of both provisions is at judiciary discretion. Not formally making the privilege for the payer conditional on whistle-blowing might be a way of inducing more whistle-blowing. The would-be whistle-blower may be sure to get the privilege, and is thus not deterred from whistle-blowing by the risk of being severely punished herself.

Our message to policymakers thus is the usual lawyer's advice: it depends. If policymakers expect corruption to be detected relatively easily, granting the briber a privilege is not helpful. More people will approach officials with corrupt offers. If officials accept, bribers may safely expect to receive the illegal favor. Yet if the detection of corruption is very difficult, and if policymakers lack opportunities for making the determination of society to fight corruption very salient, asymmetric punishment may help. Yet policymakers should compare this solution with a true leniency program, which makes the privilege conditional on the fact that, without reporting, a government stood no chance to spot this instance of corruption.

---

[27] Article 390 Para 2 of the Criminal Code of the Peoples's Republic of China reads: "Before prosecution, offenders in offering bribes who take the initiative to admit their crime may receive a lighter punishment or be exempted from punishment."

[28] Article 67 of the Criminal Code of the Peoples's Republic of China reads: "The act of voluntarily giving oneself up to the police and giving a true account of one's crime after committing it is an act of voluntary surrender. Criminals who voluntarily surrender may be given a lesser punishment or a mitigated punishment. Those among them whose crimes are relatively minor may be exempted from punishment."

References

Abbink, K., 2002. *Fair salaries and the moral costs of corruption*, Working Paper 2002-5, Centre for Decision Research and Experimental Economics, Nottingham University.

Abbink, K., 2004. *Staff rotation as an anti-corruption policy: an experimental study*, European Journal of Political Economy 20, 887-906.

Abbink, K., and Hennig-Schmidt, H. 2006. *Neutral versus Loaded Instructions in a Bribery Experiment*, Experimental Economics 9, 103-121.

Abbink, K., Irlenbusch, B. and Renner, E. 2000. *The Moonlighting Game*, Journal of Economic Behavior and Organization 42, 265-277.

Abbink, K., Irlenbusch, B. and Renner, E. 2002. *An Experimental Bribery Game*, Journal of Law, Economics and Organization 18, 428 - 454.

Ai, C. and Norton C. E., 2003. *Interaction Terms in Logit and Probit Models*, Economics Letters 80, 123-129.

Alatas, V., Cameron, L., Chaudhuri, A., Erkal, N. and Gangadharan, L. 2009. *Subject Pool Effects in a Corruption Experiment: A Comparison of Indonesian Public Servants and Indonesian Students*, Experimental Economics 12, 113-132.

Apesteguia, J., Dufwenberg, M., and Selten, R., 2007. *Blowing the whistle*, Economic Theory 31.

Banuri, S., and Eckel, C. 2009. *Bribery, Punishment, Norms and Reciprocal Relationships: Evidence from US and Pakistan*.

Barr, A., and Serra, D., 2007. *Externality and framing effects in a bribery experiment*, Working paper 2007-16, Centre for the Study of African Economies, University of Oxford.

Barr, A., and Serra, D., 2010. *Culture and Corruption: An experimental analysis*, The Journal of Public Economics, 94(11-12), 862-869.

Becker, G., 1968. *Crime and Punishment: An Economic Approach*, Journal of Political Economy 76, 169-217.

Bentham, J., 1802. *Theory of Legislation*, Trubner & Co., London, 1864.

Bohlander, M., 2008. *The German Criminal Code: A Modern English Translation*, Hart Publishing, Oxford.

Bolton, G. and Ockenfels, A, 2008. *ERC: A Theory of Equity, Reciprocity, and Competition*, The American Economic Review 90, pp. 166-193.

Brislin, R. W. 1970. *Back-translation for cross-cultural research*, Journal of Cross-cultural Psychology, 1(3), 185-216.

Buccirossi, P., and Spagnolo, G. 2006. *Leniency policies and illegal transactions*, Journal of Public Economics 90, 1281-1297.

Büchner, S., Freytag, A., Gonzalez, L. and Güth, W. 2008. *Bribery and public procurement: an experimental study*, Public Choice 137, 103-117.

Cameron, L., Chaudhuri, A., Erkal, N. and Gangadharan, L. 2009. *Propensities to Engage in and Punish Corrupt Behavior: Experimental Evidence from Australia, India, Indonesia and Singapore*, Journal of Public Economics 93, 843-851.

Cooper, D., J., Van Huyck, J. B., 2003. *Evidence on the Equivalence of the Strategic and Extensive Form Representation of Games*, Journal of Economic Theory 110, 290-308.

Ellsberg, D., 1961. *Risk, ambiguity, and the Savage axioms*, Quarterly Journal of Economics 75, 643-669.

Egas, M. and Riedl, A., 2008. *The economics of altruistic punishment and the maintenance of cooperation*. Proceedings of the Royal Society B 275, 871-878.

Falk, A. and Fischbacher, U., 2006. *A theory of reciprocity*. Games and Economic Behavior 54, 293?315.

Fehr, E. and Gächter, S., 2000. *Fairness and retaliation: The economics of reciprocity*. Journal of Economic Perspective 14, 159-181.

Fehr, E. and Schmidt, K. M., 1999. *A theory of fairness, competition, and cooperation*. The Quarterly Journal of Economics 114, 817-868.

Fischbacher, U., 2007. *z-Tree. Zurich Toolbox for Ready-made Economic Experiments*, Experimental Economics 10, 171-178.

Frank, B., Graf Lambsdorff, J. and Boehm, F., 2011. *Gender and Corruption: Lessons from Laboratory Corruption Experiments*, European Journal of Development Research 23, 59?C71.

Geng, H. and Hennig-Schmidt, H., 2011. *Sensitivity to Corruption: An Experimental Investigation in China*, mimeo.

Greene, W. 2009. *Testing Hypotheses About Interaction Terms in Nonlinear Models*, Working paper.

Greiner, B. 2004. An online recruitment system for economic experiments, In: Krämer, H. and V. Macho (Ed.), GWDG Bericht 63. Forschung und wissenschaftliches Rechnen 2003. Ges. fuer Wiss. Datenverarbeitung Goettingen, pp. 79-93.

Güth, W., Schmittberger, R. and Schwarze, B., 1982. *An Experimental Analysis of Ultimatum Bargaining*, Journal of Economic Behavior and Organization 3.

Henrich J., et al., 2006. *Costly Punishment Across Human Societies*, Science Vol 312(23).

Holt, A. C. and Laury, K. S., 2002. *Risk Aversion and Incentive Effects*, The American Economic Review. 92(5), 1644-1655.

Jolls, C., Sunstein, R. C., and Thaler, R., 1998. *A Behavioral Approach to Law and Economics*, Stanford Law Review 50, 1471-1550.

Kahneman, D., Knetsch, L. J., Thaler, H. R. 1986. *Fairness and the Assumptions of Economics*, 59 J. BUS.

Kingston, C., 2007. *Parochial corruption*, Journal of Economic Behavior and Organization 63(1), 73-87.

Knack, S., and Keefer, P., 1995. *Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures*, Economics and Politics 7, 207-227.

Krajčová, J., 2008. *Testing Leniency Programs Experimentally: The Impact of Change in Parameterization*, CERGE-EI working paper 370.

Lambsdorff, J. G., and Frank, B. 2007. *Corrupt Reciprocity - an Experiment*, Passau discussion paper.

Lambsdorff, J. G., and Nell, M. 2007. *Fighting Corruption with Asymmetric Penalties and Leniency*, CeGE-Discussion Paper 59.

Liebrand, G. B. W., 1984. *The effect of social motives, communication and group size on behaviour in an N-person multi-stage mixed-motive game*, European Journal of Social Psychology 14, 239-264.

Liebrand, G. B. W., and McClintock, G. C., 1988. *The ring measure of social values: a computerized procedure for assessing individual differences in information processing and social value orientation*, European Journal of Personality, 2, 217-230.

Mauro, P., 1995. *Corruption and Growth*, Quaterly Journal of Economics 110, 681-721.

Nell, M., 2007. *Strategic Aspects of Voluntary Disclosure Programs for Corruption Offenses*, Discussion paper, University of Passau No. V-52-07.

Nikiforakis, N. and Normann, H. T. 2008. *A comparative statics analysis of punishment in public-good experiments*, Experimental Economics 11, pp. 358-369.

Rammstedt, B. and John, O. P., 2007. *Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German*, Journal of Research in Personality 41, 203-212.

Rose-Ackerman, S., 1999. *Corruption and Government: Causes, Consequences and Reform*, Cambridge University Press, New York.

Scott, J.C., 1972. *Comparative Political Corruption*. Prentice-Hall, Englewoods Cliffs.

Selten, R., 1967. Die Strategiemethode zur Erforschung des eingeschränkt rationalen Verhaltens im Rahmen eines Oligopolexperiments. In: Sauerman, H. (Ed.), Beiträge zur experimentellen Wirtschaftsforschung. J.C.B. Mohr (Paul Siebeck), Tübingen, pp. 136-168.

Shen J., 1911. *Comment on equal punishment for bribery parties(Yu Shou Tong Ke Yi)*, Ji Yi Wen Cun, Vol. 6.

Schulze, G. G., and Frank, B. 2003. *Deterrence versus Intrinsic Motivation: Experimental Evidence on the Determinants of Corruptibility*, Economics of governance 4, 143-160.

Spratling, G. R., 1999. *Making companies an offer they shouldn't refuse: the antitrust division's corporate leniency policy? - An update*, Antitrust Division, U.S. Department of Justice, available via http://www.usdoj.gov/atr/public/speeches/2247.htm, accessed on 2 Jan 2011.

Williams, S., 2008. *The Bae/Saudi AI-Yamamah Contracts: Implications in Law and Public Procurement*, International and Comparative Law Quarterly 57, 23-24.

Appendix

A   Instruction[29]

Welcome to the Experiment

Welcome to this decision experiment. Please read the following instructions carefully. The Experiment will be done anonymously, so that you will not be informed with which of the other participants you interacted. Please keep in mind that from now on and throughout the entire experiment you are not permitted to talk to other participants. If you have questions, please give a hand signal and we will come to you. During the experiment you can earn Taler. The amount depends on your decisions and on the decisions of the other participants in your group. At the end of the experiment, the Taler will be converted into EURO by an exchange rate of 1 Taler = 0.06 Euro. This amount in EURO will be paid to you. Additionally you will receive 4 EURO for showing up and participating in the experiment. You will be called by your cabin number in order to receive your payoff. Please return all the instructions when receiving your money.

Every participant will be randomly assigned to one of two roles: either proposer or responder. In this experiment always two persons (one proposer and one responder) interact.

Description of the game

At the beginning of the experiment, every proposer receives an initial endowment of 100 Taler. The responder will receive an initial endowment of 60 Taler.

The proposer can transfer an amount of 40 Taler to the responder and therefore ask for a favor. **If the proposer decides not to ask for a favor**, the game ends and each participant receives his initial endowment, which will be converted into EURO.

If the proposer decides to ask for a favor, the responder can choose one of three possible actions:

1. Rejection of the 40 Taler and not doing a favor

2. Acceptance of the 40 Taler and not doing a favor

3. Acceptance of the 40 Taler and doing a favor

---

[29]These are the instructions for the symmetric treatment, original text was in German and Chinese, respectively. The instruction for asymmetric treatment are the same, except the punishment for the payer was changed to 10 Taler.

If the responder rejects the 40 Taler and does not do a favor, the game ends and each participant receives his initial endowment (converted into EURO).
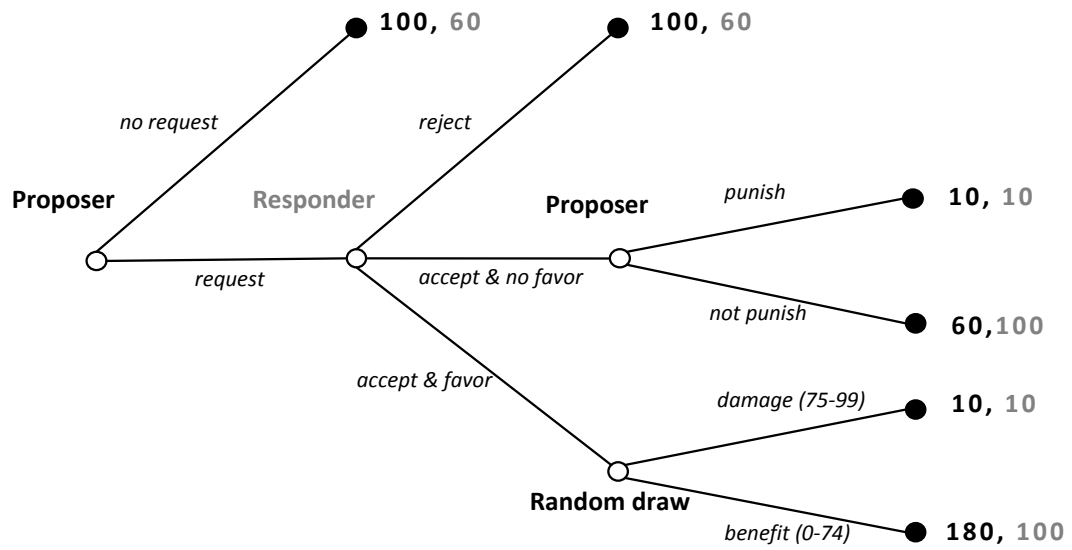
If the responder accepts the 40 Taler and does not do a favor, the final payoff depends on a decision of the proposer. He can decide if he wants to punish the responder for his refusal to do him a favor or not. If the proposer decides not to punish, the proposer receives his initial endowment minus the transferred 40 Taler (100-40=60 Taler). In this case, the responder will get his initial endowment plus the transferred 40 Taler (60+40=100). If the proposer decides to punish, the responder is fined with 50 Taler and the transferred 40 Taler will be destroyed. The responder receives his initial endowment minus the fine (60-50=10). The punishment will cost the proposer 50 Taler. Thus, he will receive his initial endowment minus the transferred 40 Taler and minus the costs for the punishment (100-40-50=10). Nobody will receive the transferred 40 Taler.

If the responder accepts the 40 Taler and does a favor, the decision about the final payoff depends on a lottery. Then a number between 0 and 99 is randomly drawn. In the unlikely case of the number being 75 or higher, the proposer will suffer a damage of 10 Taler, while the responder will suffer a damage of 50 Taler. The transferred 40 Taler will be destroyed. The proposer will receive his initial endowment minus the transferred 40 Euro and minus the damage (100-40-50=10 Taler). The responder will receive his initial endowment minus the damage (60-50=10 Taler). In case of the drawn number being lower than 75 every proposer will get an additional 120 Taler as the result of the favor of the responder. The proposer will receive his initial endowment minus the transferred 40 Taler, plus the additional Taler (100-40+120=180 Taler). The responder will receive his initial endowment plus the transferred 40 Taler (60+40=100).

The following graph summarizes the possibilities of decisions and payoffs:

How to make your decision

At the beginning of the experiment, you will be informed about the role to which you have been assigned (proposer or responder). After this you make your decisions according to your role. Therefore participants who have been assigned to the role of the proposer will decide if they want to transfer 40 Taler and if they want to punish the responder in case he accepts the 40 Taler, but does not do them a favor. The responder will be asked how he would react if the proposer transferred 40 Taler and asked for a favor. He decides if he would reject the offer or if he would accept it without doing the other one a favor or if he would accept it and would do the other one a favor. After all the decisions are made, they will be compared and the actual decisions will be calculated. The payoffs will be calculated as described above. At the end of the experiment, you will be asked to fill out some questionnaires.

100, 60   100, 60

no request   reject

Proposer   Responder   Proposer   punish   10, 10

request   accept & no favor

not punish   60,100

accept & favor   damage (75-99)   10, 10

Random draw

benefit (0-74)   180, 100

If you have any questions, please raise your hand!

B   Screenshots

Stage 1 Proposer decides:
Offer or not

Stage 2 Responder decides:
Reject, accept but no favor, or accept and favor

Stage 3 Proposer/Nature decides:
Punish/damage or not

You are the **Proposer!** Your endowment (in Taler) is: 100

You start the game by deciding whether to transfer 40 Taler to the **Responder** or not.

If you have any questions, please refer to the instruction!

Do you want to transfer 40 Taler to the **Responder?**   ○ Yes
                                                            ○ No

OK

Time remaining [sec]:   9

31

Stage 1 Proposer decides:
Offer or not

Stage 2 Responder decides:
Reject, accept but no favor, or accept and favor

Stage 3 Proposer/Nature decides:
Punish/damage or not

Your are the **Responder** ! Your endowment (in Taler) is: 60

Suppose that the **Proposer** has transferred 40 Taler to you, you have the following 3 options:

1. If you reject the 40 Taler, both you and the Proposer get the endowment as profit.

2.If you choose "accept but no favor", the proposer can decide whether to punish you or not (the punishment has a
cost for the proposer too).

3. If you choose "accept and favor", the profit for both of you depends on a draw from a lottery. A number (integer)
betwee 0 and 99 will be randomly drawn:
3a. If the number is smaller than 75, the profit for the proposer is 180 Taler, and your profit is 100 Taler.
3b. If the number is equal to or greater than 75, you and the proposer both receive a profit of 10 Taler.

If you have any questions, please refer to the instruction!

Please note:
**If the proposer actually decided to transfer 40 Taler to you, your present decision affects the real profits for
both.**

Please make your decision now: ○ accept and favor
                                                          ○ accept but no favor
                                                          ○ reject

OK

32

Stage 1 Proposer decides:
Offer or not

Stage 2 Responder decides:
Reject, accept but no favor, or accept and favor

Stage 3 Proposer/Nature decides:
Punish/damage or not

Suppose the Responder chose "accept but no favor", now you can decide whether to punish her or not.

If you choose "punish", both you and the Responder receive a profit of 10 Taler.

If you decide not to punish, your profit is 60 Taler and the Responder receive a profit of 100 Taler

If you have any questions, please refer to the instruction.

Please note: If the responder actually chose "accept but no favor", your present decision affects the real profit for both.

Do you want to punish the responder for the decision "accept but no favor"?   ○ Yes
                                                                                 ○ No

OK

33