



MONASH University

Three Experiments on Corruption

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Abstract

This thesis comprises three papers investigating the mechanisms surrounding the exchange of petty bribes prevalent in many parts of the developing world. The first two papers utilise laboratory experiments to investigate the efficacy of a self-reporting mechanism in deterring the exchange of a petty bribe. In the final paper I conduct a natural field experiment in New Delhi, India where we directly observe bribes being requested.

In the first paper my co-author and I investigate whether offering a monetary reward to whistle-blowers who report their own involvement in petty bribery is able to destabilise trust and deter agents from offering or accepting a bribe. The mechanism is not dissimilar to laws instituted in the United States and EU that extend full or partial leniency to whistle-blowers who report on their organisation's involvement in forming a cartel. We conduct a laboratory study to test this mechanism and find the mechanism approximately halves the number of bribes being exchanged. This outcome arises despite the participants engaging with the same partners over several periods and potential payouts being significantly higher for agents to exchange bribes and favours over several periods without self-reporting.

In the second paper I investigate whether the monetary reward for whistle-blowing is as effective in scenarios where agents do not anticipate interacting with one another repeatedly. This is more reflective of many interactions where individuals pay bribes to public officials but even if bribery is routine they seldom interact with the same public official repeatedly. As trust is more difficult to establish in such scenarios the base level of bribery exchange was anticipated to be lower which allowed the possibility that a reward for whistle-blowing would not further erode trust. The results reveal the whistle-blowing mechanism again approximately halves the level of bribes being exchanged despite a lower baseline incidence of bribes.

In the final paper my co-authors and I directly approach notaries public in New Delhi and request they attest a copy of a document as being genuine. In a control treatment we check whether prices above the legal rate are demanded for legitimate requests. In further treatments we request the attestation be backdated (mildly illegitimate request) and certified when the copy is shown to be augmented from the original (highly illegitimate request). We observe only a low degree of overcharging in the control treatment but substantial bribes being demanded in the backdating treatment. About half of the notaries refuse to attest the

augmented document but those who consent demand significantly higher bribes. We also study the effect of competition by comparing notaries at court (high competition) and in isolated home offices (low competition). Surprisingly, notaries with high competition demand higher bribes. We attribute this effect to the crowding out of altruism by competition.

Author Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

General Declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes 3 unpublished publications. The core theme of the thesis is behavioural development economics. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the candidate, working within the Department of Economics under the supervision of Professor Klaus Abbink and Professor Lata Gangadharan.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

In the case of chapters 2, 3 and 4 my contribution to the work involved the following:

(If this is a laboratory-based discipline, a paragraph outlining the assistance given during the experiments, the nature of the experiments and an attribution to the contributors could follow.)

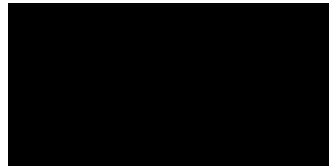
Thesis chapter	Publication title	Publication status*	Nature and extent (%) of students contribution
2	Reward Self-Reporting to Deter Corruption: An Experiment on Mitigating Collusive Bribery	Under Review	Formulation of research question, design of experiment, data analysis and write up. (70% of total contribution)
3	Reward Self-Reporting to Deter Corruption: Combating Collusive Bribery in a Stranger Matched Game	Unpublished	Formulation of research question, design of experiment, data analysis and write up. (100% of total contribution)

4	Corruption in the Field: Evidence from Notaries A Field Experiment on Corruption Among Notaries Public	Unpublished	Formulation of research question, design of experiment, data analysis and write up. (30% of total contribution)
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Assistance regarding the conducting of laboratory experiments for Chapters 2 and 3 was provided by Alex Ming Zhi Peng of Xiamen University. Data gathering for the natural field experiment of Chapter 4 was predominantly obtained by Puneet Arora.

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student signature:



Date: 29 September 2015

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student and co-authors' contributions to this work.

Main Supervisor signature:

Date: 29 September 2015

Acknowledgements

I am deeply indebted to my supervisors Klaus Abbink and Lata Gangadharan for their invaluable research guidance, encouragement and advice throughout my candidature.

I would like to thank my co-authors Klaus Abbink, Lata Gangadharan and Puneet Arora for their contributions. I am grateful to Alex Ming Zhi Peng for his assistance with my laboratory studies. Thanks also go to Jason Shachat for making Xiamen University's Finance and Economics Experimental Laboratory available for my experiments. I am also grateful to my fellow PhD candidates for their support throughout the journey, especially Joseph Vecchi, Ananta Neelim and Vilas Gobin.

I would like to acknowledge the generous funding provided by Monash University and the Australian Research Council, without which this research would not have been possible.

I dedicate this thesis to my family. To my wife Andrea, for her love, support and patience especially during my absences while on conference, thank you. I am also grateful to my daughters Selene and Helen for providing the much needed laughter and respite from research.

Chapter 1: Introduction

My thesis comprises three papers utilising experimental methods to examine petty corruption. Corrupt interactions are by their nature secretive which makes traditional data gathering particularly challenging. They also demand a degree of trust between parties which introduces behavioural phenomenon that are well analysed using experimental methods. The experiments were conducted in Xiamen, China and Delhi, India, two developing nations severely impacted by the burdens of corruption (Escaleras, Anbarci, & Register, 2007; Pei, 1999; Smyth, 2000). Societal attitudes and experiences of corruption, in particular petty corruption, are markedly different from developed nations that such experiments could not have been conducted in low corruption developed nations without serious questions on external validity being introduced. Examining behaviour patterns among subjects in these environments will provide critical insights for policies designed to address corruption.

In the first paper we examined whether offering or receiving a bribe could be deterred if agents were less able to trust their partners. Trust is an integral requirement for bribes to be exchanged as both parties have sufficient knowledge of their illicit activities that should either of them report their activities to the authorities both would face potentially very severe penalties. A central tenant that supports mutual trust, even between two individuals who have no prior interaction, is that in most societies both the agent receiving the bribe and the individual paying the bribe is breaking the law and thus cannot report their partner without facing legal sanctions themselves. Thus petty bribery interactions share many characteristics with cartel formation in that members of a cartel have a disincentive to report their partners as it would expose themselves to prosecution. To erode the trust within cartels several jurisdictions (including the EU and USA) have implemented a variety of leniency policies that enable whistle-blowers to escape sanctions or receive greatly reduced sanctions.

This paper extends the notions introduced by cartel leniency policies to examine whether they would also be effect in combating bribery. Investigations into the effectiveness of such policies in the setting of cartels reveal that a “bonus leniency” program where agents are offered monetary rewards could be even more effective than simply granting clemency as this would incentivise self-reporting even in cases where agents have abided by the terms of their collusive arrangement (Aubert, Rey, & Kovacic, 2006; Jacquemet & Rulliere, 2006). Thus in this study we design a mechanism that provides a monetary reward for whistle-blowers who report their bribery activities.

We conducted a laboratory experiment to test the hypothesis that a monetary reward for whistle-blowers would destabilise trust and significantly reduce the incidence of bribes being exchanged. Participants were matched with the same partner throughout the experiment. They were first provided an opportunity to establish a degree of trust with their partner by interacting for several periods in a regime where whistle-blowing was impossible and corruption could yield significant private benefits. In the second stage of the experiment the Control group repeated the interaction of the earlier phase of the experiment for several more periods while the Symmetric reporting group were provided an incentive to report their partner. Should both parties report however they were both confronted with a mild penalty. Two asymmetric regimes were also established to examine whether trust would be better eroded if only the receiver of the bribe or only the payer of the bribe could report their activities to the authority. The sessions were conducted in Xiamen, China with a total of 99 pairs of participants across the four treatments.

We observe a significant decline in bribery exchange in the Symmetric treatment where the proportion of groups exchanging bribes approximately halves. The asymmetric treatments were less effective but did also demonstrate significant declines in the later phases of the experiment where agents were anticipating the experiment would soon be concluding which reduced the long term benefits of cooperation relative to the short term benefits of receiving a reward for whistle-blowing. These results suggest policies currently in place to incentivise whistle-blowing as a measure to combat cartels may also be effective were they modified to combat bribery.

While the first paper did provide a strong result, the participants being matched with the same partner each period obscured the precise reason the whistle-blowing incentive worked. This is because it was clear the mechanism was more effective after several periods of interactions. This is problematic as coupled with the partner matching design it prevents us from being able to disentangle whether the decline in bribes being exchanged was a result of decreasing costs of betraying one's partner (with fewer periods remaining to cooperate there is lower opportunity cost of reporting one's partner in later rounds) or simply as a response to earlier periods of betrayal. The second paper is a direct extension of the first with the aim of disentangling these phenomena by repeating the experiment of the first paper but with participants stranger matched.

As participants have no expectation of interacting with the same partner in future periods the concern of the costs of betraying one's partner declining with each period is eliminated. There is essentially no cost to betrayal in any period. Thus if we observe the rate of bribes being exchanged is substantially lower than the baseline immediately following the implementation of the mechanism, we can surmise that the mechanism functions without the need of individuals first being themselves betrayed.

Indeed the results do bear this out with a decline in incidence of bribes exchange comparable to the first paper and the effect is immediate (although starting from a lower starting point as the stranger matching mechanism is itself a deterrent). Thus we are left with the encouraging result that a whistle-blowing mechanism can deter individuals before they are reported by their partner provided agents do not expect to interact with one another regularly.

Finally the third paper deviates from the motivations of the first two papers and seeks instead to directly observe the underlying dynamics of bribes being exchanged in the field. The objective is simply to establish whether an organised market exists for the corrupt services of Notaries Public in Delhi, India. The novelty of this study is that it seeks to shed light on an otherwise extremely opaque interaction (we are not able to state a priori whether it would be appropriate to label it a market) that has mostly been studied through surveys which might suffer from significant biases given respondents are discussing their experience of an illicit activity.

An experimenter approached notaries individually and requested they certify that a photocopy of a document we created to appear official is a genuine copy of its original. In the baseline we made no further requests, in the Backdating treatment we requested the notary backdate the certification several days (low risk, less severe violation) while in the Augmented treatment we distorted the photocopy and having pointed it out to the notary requested the augmented document nevertheless be certified (high risk, very severe violation). In each case the same experimenter interacted with all notaries and followed as closely as possible a set script. The chief dependent variables are the proportion of notaries who refused the request and the price demanded by those that were prepared to accept our request. We also took note of the environment the notary operated in to establish whether the prices were related to whether competing notaries were situated within an easy walk.

We find that a high proportion of notaries refuse the request to certify the augmented copy while a very small proportion of notaries refused the backdating request. The prices charged increased with the severity and risk associated with nature of the violation although prices were highly variable, implying they were determined largely on an ad hoc basis. Our most surprising result is that competition appears to increase the prices quoted.

Our findings reveal the corrupt services of notaries in Delhi do not resemble that of an organised market or if it is to be classed as a market markedly deviates from ordinary market characteristics (mainly that prices rise with competition). In addition to these observations a primary contribution of this paper is the methodology that can be replicated by others of conducting a natural field experiment to directly investigate the highly opaque world of corruption.

Throughout the three papers we demonstrate the potential for experiments to overcome the challenges of investigating the clandestine and hidden market of petty corruption. We show the versatility of experiments, offering both the capacity to probe the problem as well as to test potential solutions. Our findings offer reasons to be optimistic, showing that agents engaging in corruption can be dissuaded provided appropriate disincentives are applied.

Declaration for Thesis Chapter 2

Declaration by candidate

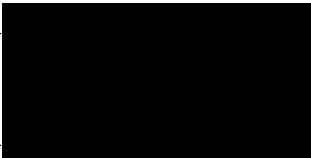
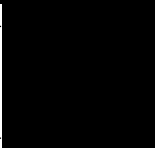
In the case of Chapter 2, the nature and extent of my contribution to the work was the following:

Nature of contribution	Extent of contribution (%)
Formulation of research question, design of experiment, data analysis and write up.	70

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

Name	Nature of contribution	Extent of contribution (%) for student co-authors only
Klaus Abbink	Experiment design and write up	

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

Candidate's Signature		Date 8 Aug 2015
Main Supervisor's Signature		Date 8 Aug 2015

Chapter 2 - Reward Self-Reporting to Deter Corruption: An Experiment on Mitigating Collusive Bribery¹

2.1. Introduction

Corruption has been shown to impose an enormous toll upon wider society including reduced GDP growth, higher inequality and lower investment (J. G. Lambsdorff, 2005; Méon & Sekkat, 2005). However since the early 2000's researchers have begun investigating whether betrayal or the fear of betrayal is effective in preventing or disrupting bribery (Abbink, Dasgupta, Gangadharan, & Jain, 2014; Abbink, Irlenbusch, & Renner, 2002; Engel, Goerg, & Yu, 2012; J. Lambsdorff & Nell, 2007)². As bribery inherently involves multiple parties engaging in an illicit activity the parties must be able to trust one another to enter into the arrangement. The threat of being betrayed by one's partner alerting the authorities can undermine this trust and thus act as a powerful deterrent to engaging in corruption. This paper asks whether offering a reward for self-reporting is capable of preventing or disrupting collusive bribery³ through undermining this trust.

We investigate this policy by conducting a laboratory experiment of a stylised bribery game. Our experiment closely follows the theoretical framework presented in Dufwenberg and Spagnolo (2014). We include a symmetric and two asymmetric reporting regimes to examine whether any one regime noticeably outperforms the others in deterring and undermining bribery. A laboratory study is particularly well suited to answering such questions due to complications that would arise in the field due to the illicit nature of bribery. Furthermore, Armantier and Boly (2011) show the potential for laboratory based corruption studies to closely mirror outcomes in the field. Due to the mild consequences of being betrayed the results of the experiment are likely to overestimate the willingness of agents in the field to trust one another. This suggests that a similar mechanism implemented in legislation could have greater effectiveness than the rewards mechanism of this study.

Offering rewards to combat bribery is not entirely without precedent in legislation, with Singapore rewarding officials who refuse bribes and expose their client (Svensson, 2005). However no empirical evidence has been uncovered examining the efficacy of such a

¹ We gratefully acknowledge financial support from Monash University. We thank Prof. Jason Shachat for allowing us to conduct our experiment in Xiamen University's WISE laboratory. Alex Ming Zhi Peng provided excellent research assistance.

² Indeed there has already been prominent support for such measures from a policy advisor to combat India's endemic corruption (Basu, 2011).

³ Collusive bribery occurs when agents offer bribes to receive some benefit, such as to secure a government contract or for faster delivery of services from public officials. This should be distinguished from harassment bribes where public officials abuse their authority to extort money or gifts.

policy⁴. The US False Claims Act also incentivises whistle-blowers to bring charges on behalf of the State against organisations defrauding the government but the whistle-blowers in this context have not themselves committed a crime⁵.

Before we investigate the effectiveness of rewards in combating corruption it is worthwhile to consider what we have learned from studies examining the efficacy of offering full or partial leniency to whistle blowers within cartels⁶. A number of jurisdictions have already implemented such programs such as the 1993 DOJ Corporate Leniency Policy in the US and the 1996 EU Leniency Program however there are mixed reports of whether the leniency policies deterred collusion or instead deterred organisations from violating collusive agreements⁷. As cartel formation shares many similarities with collusive bribery, the notion of employing leniency programs to combat cartel formation has naturally been extended to the mitigation of bribery.

Several studies in anti-cartel formation have suggested that offering rewards (sometimes referred to as 'bonus' leniency, see Aubert et al. (2006); Jacquemet and Rulliere (2006)) may have several benefits over partial or full leniency. Apestegui, Dufwenberg, and Selten (2007); Bigoni et al. (2012) and Hamaguchi et al. (2009) demonstrate experimentally that offering rewards can reliably deter cartel formation by providing an incentive to self-report even when one's collaborator adheres to the agreement or if the chance of being caught is perceived to be low. The former property is especially advantageous with partial or full leniency having been shown to entrench cartel behaviour in some instances as it allowed self-reporting to act as a means of punishing deviations from the agreed behaviour (Buccirossi & Spagnolo, 2006). These studies suggest that leniency may be effective in combating some instances of corruption but is unlikely to be able to combat collusive bribery. This is because leniency would not incentivise agents engaging in collusive bribery to self-report if they perceive there to be negligible risk of being exposed otherwise. However the promising

⁴ For Singapore this policy is a minor initiative amongst a raft of anti-corruption measures launched over decades. Hence it is impossible to isolate the marginal effect of this one policy. Singapore providing a precedent in law is encouraging however that other jurisdictions may contemplate similar measures should evidence emerge of its efficacy in combating bribery

⁵ See <http://www.justice.gov/opa/pr/justice-department-recovers-nearly-6-billion-false-claims-act-cases-fiscal-year-2014> for a summary of False Claims Act cases brought in 2014.

⁶ While cartels function in oligopoly settings corruption nevertheless resembles collusion to the extent that it involves playing a trust and reciprocity game like that of (Berg, Dickhaut, & McCabe, 1995).

⁷ For articles concerning leniency programs and cartel formation see (Abbink and Hennig-Schmidt (2006); Aubert et al., 2006; Bigoni, Fridolfsson, Le Coq, & Spagnolo, 2012; Brenner, 2009; Brisset & Thomas, 2004; Buccirossi & Spagnolo, 2006; Hamaguchi, Kawagoe, & Shibata, 2009; Jacquemet & Rulliere, 2006; Leslie, 2008; Spagnolo, 2008) .

findings relating to reward mechanisms deterring cartel formation warrants investigation of whether such mechanism can be effectively applied to combating collusive bribery.

The novelty of the paper lies in its being the first, to the best of our knowledge, to conduct an experiment on the efficacy of a reward mechanism in combating bribery⁸. The construct of our asymmetric regimes is also novel in that they restrict which party is permitted to self-report. This differs from studies we have thus far encountered that focus on altering the relative size of penalties between parties such as Engel et al. (2012)⁹. Also our experiment has a set number of periods but participants are only informed of some minimum number of repetitions. This results in a range of periods where there is certainty of repeating the interaction and a range of periods with uncertainty regarding whether another period will be played. This allows us to distinguish behaviour observed when participants are guaranteed of interacting with their partner again and when it is ambiguous (and hence trust and reputation may not be as great a concern). This provides a depth to our observations that cannot be captured by a one-shot game or a game with a fixed probability of ending each period.

We find the reward mechanism is only mildly effective in periods where participants are assured of interacting in future periods but very potent in periods where future interaction is not guaranteed. This implies a rewards mechanism would function best to prevent or uncover bribes between agents who do not expect to encounter one another again. This would be the case for the vast majority of petty bribes (one does not typically expect to be stopped by the same traffic officer or encounter the same clerk at a government office on multiple occasions) but is not applicable where, for example, a particular politician is responsible for choosing between tenders for a government contract that renews each year. Also the experiment does not incorporate the possibility of the justice system failing to convict a guilty party even after a self-report has been submitted by their partner or the possibility of retribution by the public servant, both of which have been shown by Abbink et al. (2014) to reduce the effectiveness of a leniency program.

⁸ Also our reward mechanism differs from the cartel literature as we fix the size of the reward independent of the fine. Should such a policy be implemented into law we feel disconnecting the reward from the fine eliminates any ambiguity for the reporting party as to the size of the reward they will actually receive. The mechanism would be weakened if agents believed there was a high likelihood of their partner being unable to pay the fine or if they believed the fine may be reduced on appeal.

⁹ Engel et al. (2012) only permitted self-reporting if the corrupt favour was not granted resulting in their leniency mechanism effectively becoming a deterrent to cheating. If it is considered undesirable for agents to grant the corrupt favour this could lead to the perverse outcome observed in many anti-trust studies of leniency discouraging cheating and resulting in higher rates of undesirable behaviour.

Should these concerns be overcome our results support the implementation of either a symmetric reward mechanism or one where only public servants can report being offered a bribe. The success of allowing only public servants to make reports is likely due to clients initiating bribery in this experiment. The fear of being reported strongly decreased the rate of offering bribes. Should the scenario be reversed and the public servants initiate bribery (such as with harassment bribes) it is likely a policy of only accepting reports from clients would be more effective. Indeed it is likely a mechanism rewarding public servants for reporting a bribe would only exacerbate bribery in such circumstances.

Quah (2002) argues that a lesson of Singapore's success in eliminating endemic corruption is that a comprehensive approach is necessary to tackle corruption. Despite the limitations our findings suggest a rewards program if applied appropriately could complement other anticorruption measures such as staff rotation Abbink (2004) and increasing public servants' wages Van Rijckeghem and Weder (2001). With the scale of bribery in many developing nations imposing a tremendous burden upon the nation (for example Gorodnichenko and Sabirianova Peter (2007) provide a lower bound estimate of the scale of bribery in Ukraine to be on the order of 0.9% - 1.2% of GDP or US\$460-580 million) rewarding self-reports of bribery is a sorely needed additional tool for policy makers intent on eliminating corruption.

2.2. The Experiment

The most tenacious instances of bribery are likely to occur where both clients and officials receive some benefit, there is repeated interaction between pairs of clients and officials such that trust can be established and there is little or no perceived risk of being caught. To rigorously test the efficacy of a reward mechanism we simulate a game in the laboratory that possess such qualities.

The experiment is in two parts and has 4 treatments: a Control, a Symmetric Treatment (ST), an Only Importer Reports treatment (OIR), an Only Officer Reports treatment (OOR). The first part is the collusive bribery game that is common to all treatments. The second part repeats this game but adds a reward mechanism to all but the Control. Participants are informed the experiment is in two parts at the beginning of the experiment but are not provided any information regarding the second part until the conclusion of the first.

Part 1: The Collusive Bribery Game

Consider a repeated interaction, sequential decision game where participants are matched with the same partner throughout the experiment. We present a scenario of an 'Importer' attempting to bring some goods through customs that are valued at 400 credits. The 'Customs Officer' inspects the goods and if she performs her duties honestly will record the goods and apply an import duty of 200 credits. The Customs Officer earns a wage of 200 credits per period and the revenue the government collects is donated to charity¹⁰. The role of a charity is to provide a negative externality for bribery that does not impact on other participants in the laboratory.

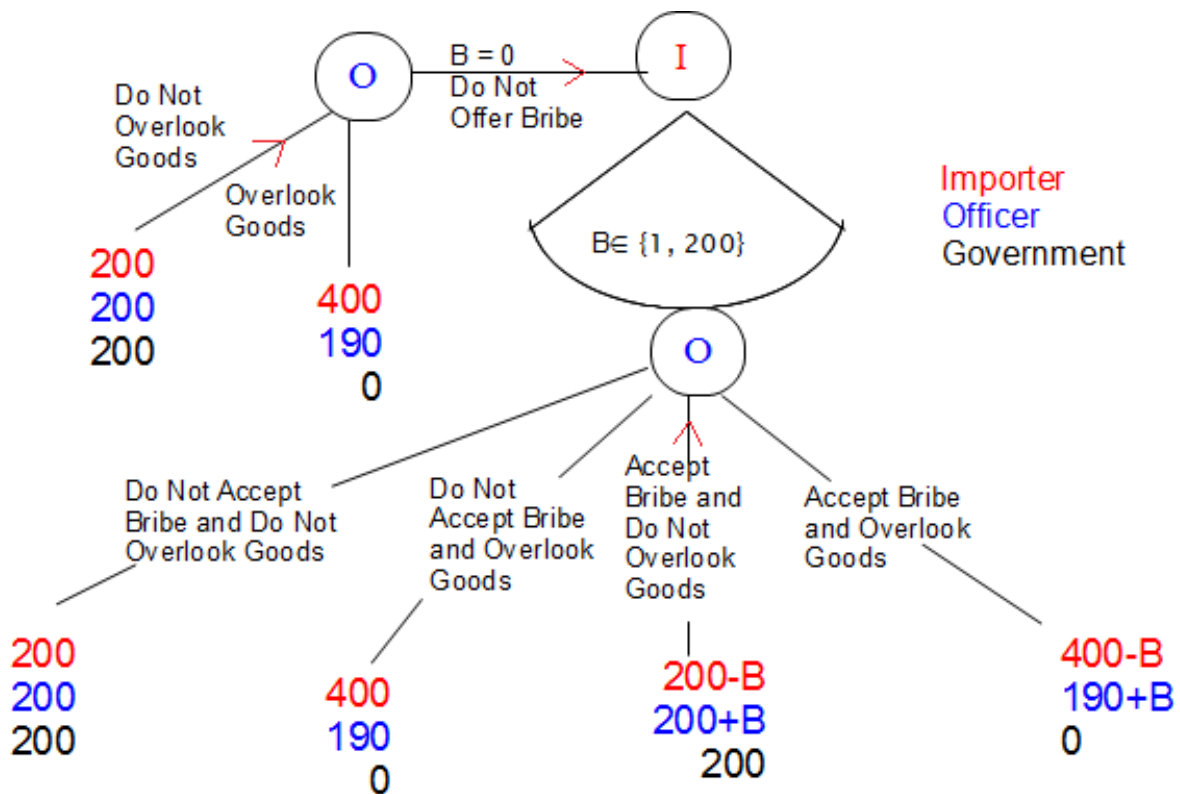


Figure 1: The Collusive Bribery Game Tree

Figure 1 describes the Collusive Bribery game. First the Importer is given the option of offering the Customs Officer a bribe B from 1 to 200 credits. It is clearly communicated to both parties that this is a bribe (as opposed to gift) to persuade the Officer to overlook the goods and allow the Importer to escape paying the import duty. The Officer is then informed whether or not a bribe was offered and if so, the size of the bribe. If a bribe was offered the

¹⁰ The Chinese Red Cross was nominated to be the charity although participants were not made aware of which specific charity would be the recipient. This was to prevent personal attitudes towards a particular charity to influence decisions.

Officer may choose to accept it or refuse it. Irrespective of whether a bribe was accepted or even offered the Officer then has the option of overlooking the goods. Should the Officer overlook the goods she will incur a cost of 10 credits to reflect the effort necessary to doctor or destroy paperwork¹¹. Arrows indicate the one-shot sub-game perfect equilibrium (SPE).

The Officer has the option of being in a sense altruistic by not taking a bribe yet overlooking the goods (although this is likely to be a signal demonstrating a willingness to perform the corrupt favour in exchange for bribes in future), trustworthy by performing the corrupt favour upon receiving a bribe or treacherous by taking a bribe but failing to perform the corrupt favour (subsequently referred as 'Renegade'). Importers are aware of the potential for this type of betrayal. Both parties are informed there is no chance of any authority uncovering bribery or corrupt favours being performed and hence the only disincentives for an Importer to offer a bribe are inherent aversion of corruption and the fear of betrayal. Should a pair of participants cooperate over several periods exchanging bribes and overlooking the goods then the Importer should form some trust for the Officer. Without the option to renege participants would not be able to establish a similar degree of trust with their partners.

This game is played for 6 periods but participants are only told that this game will be played for at least 5 periods.¹² The number of periods is fixed rather than randomised to ensure the duration of the first part of the experiment is identical across treatments¹³. As the game is repeated, the one-shot SPE of not engaging in corruption is not the optimal strategy if one anticipates a reasonable probability of one's partner being willing to engage in corruption over multiple periods and will cease cooperating if betrayed. The purpose of designing the interaction to have a one-shot SPE of not engaging in corruption is so that Importers engaging in corruption in Part 1 of the experiment actively signal to their partner they are prepared to trust them and the officers who do not renege in turn demonstrate they are trustworthy. We wish to observe whether a rewards mechanism is able to dissolve

¹¹ We imply the Officer has already carried out the inspection and noticed the goods and hence there is negligible additional effort to recording the goods formally. Also note that this effort cost results in there being a small inefficiency in performing the corrupt favour.

¹² In a Pilot session Part 1 was played for 13 periods with participants told it would be played for at least 10 periods. The number of periods was greatly reduced when it became apparent some participants required substantially more time than expected to reach a decision.

¹³ We also considered setting a probability for the game to continue each period after period 5 but this would have enabled us to analyse data up to the minimum number of periods played. As we were interested to see whether the rewards mechanism was more effective were participants aware the game may not progress, it was imperative we be able to analyse data over several periods where the participants were uncertain whether another period will be played.

partnerships even when such signals of trust and trustworthiness have been exchanged for several periods.

Part 2: Introducing a Rewards Mechanism

The second part of the experiment is the only component that differs between treatments. In the Control treatment participants simply repeat the collusive bribery game from the first part of the experiment. In the OIR treatment the Importer can earn a monetary reward for engaging in corruption and reporting their partner. In the OOR only the Officer may report should the pair engage in corruption. In ST both have the opportunity to report their partner.

Across all treatments (except for the Control) a report is only accepted if both a bribe is exchanged *and* the corrupt favour granted. This allows the Officer the possibility of pocketing an offered bribe while not needing to fear being reported. The degree of trust that the Importer is required to place in his partner before offering a bribe is thus heightened compared to a mechanism that accepts reports if either a bribe is exchanged or a corrupt favour granted absent a bribe¹⁴. In all treatments participants were again told the game would be played for at least 5 periods while it was actually played for 8¹⁵.

Also note that the reward of 200 credits in each treatment is equal to the size of total earnings that can be captured by the Importer and Officer in each period. Should the Importer offer a bribe of 100 credits both parties can earn approximately the value of the reward in as little as two periods. As agents are informed Part 2 is repeated for at least 5 periods they should all be aware sustaining cooperation for two or more periods is at least as profitable as receiving a reward through self-reporting and undermining future opportunities to engage in corruption. The manner by which the mechanism is intended to function therefore is not to make reporting the most profitable strategy in the long run but to introduce mistrust and doubt to disincentivise bribery.

¹⁴ In many real world instances of petty bribery it may be impractical or impossible to renege on the promised favour. In such instances the Importer would have less to fear and would likely be more inclined to offer a bribe. If however there are instances where public officials can take a bribe but renege on the promised favour, legalising such behaviour would likely disincentivise bribes being offered in the first place.

¹⁵ In the Pilot session Part 2 was played for 19 periods when participants were informed it would be played for at least 10 periods. Again it was necessary to substantially reduce the number of periods due to time constraint.

Only Importer Reports Treatment

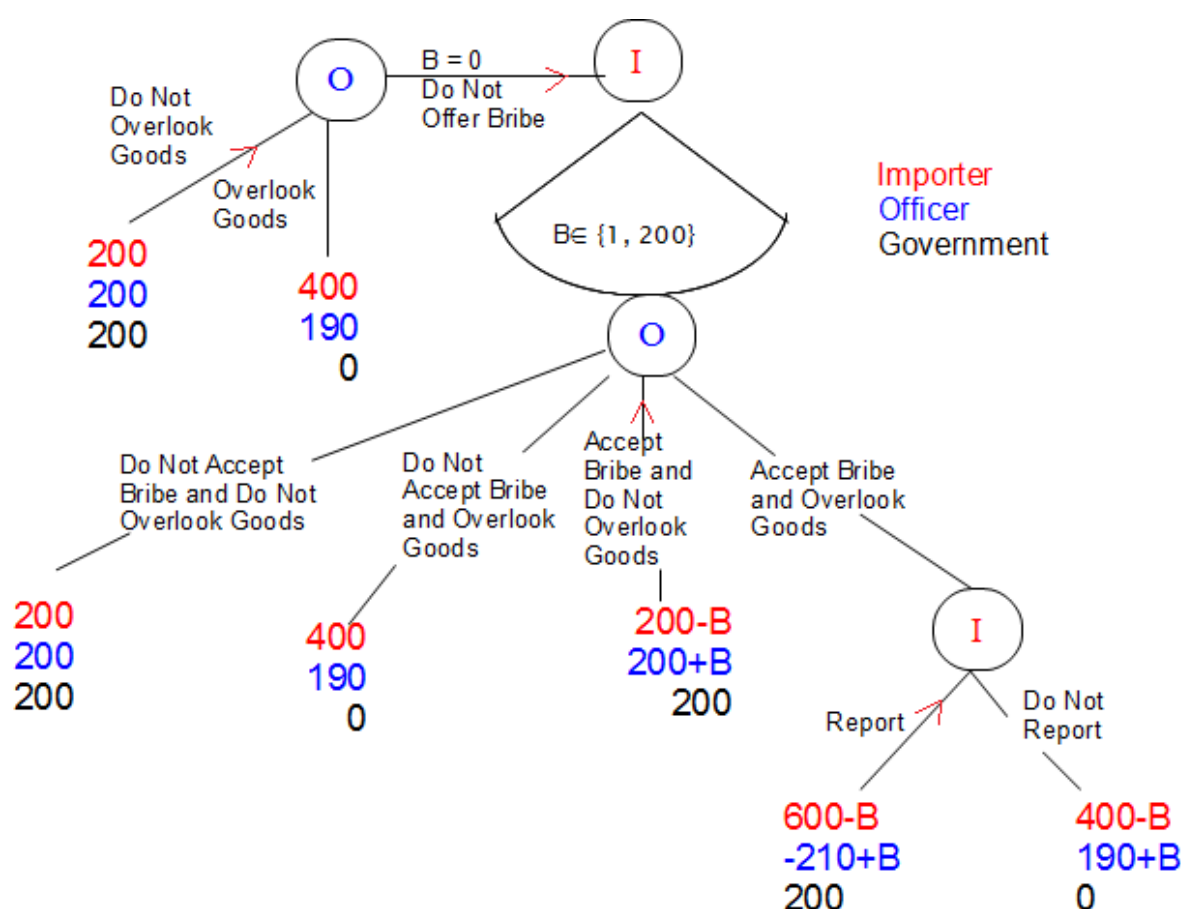


Figure 2: The OIR game tree

Figure 2 shows the OIR game. It is identical to the first part of the experiment unless participants choose to exchange bribes and carry out the corrupt favour. Importers who elect to offer a bribe are asked whether they will report their activities in the event the Officer accepts the bribe and grants the corrupt favour. The Officers are of course unaware of the Importer's reporting decision. If the Importer reports the corrupt act she receives an additional 200 credits while the Officer is penalised 400 credits. The government in this manner recovers the cost of the corrupt act. The bribe value is not affected to simplify decision making.

The one-shot SPE is for the Importer to not offer a bribe and the Officer to not overlook the goods but over several periods cooperation without betrayal is profit maximising. Notice that compared to the collusive bribery game in part 1 of the experiment the Importer now has an additional incentive to offer a bribe but the Officer now faces a risk of being betrayed.

Only Officer Reports Treatment

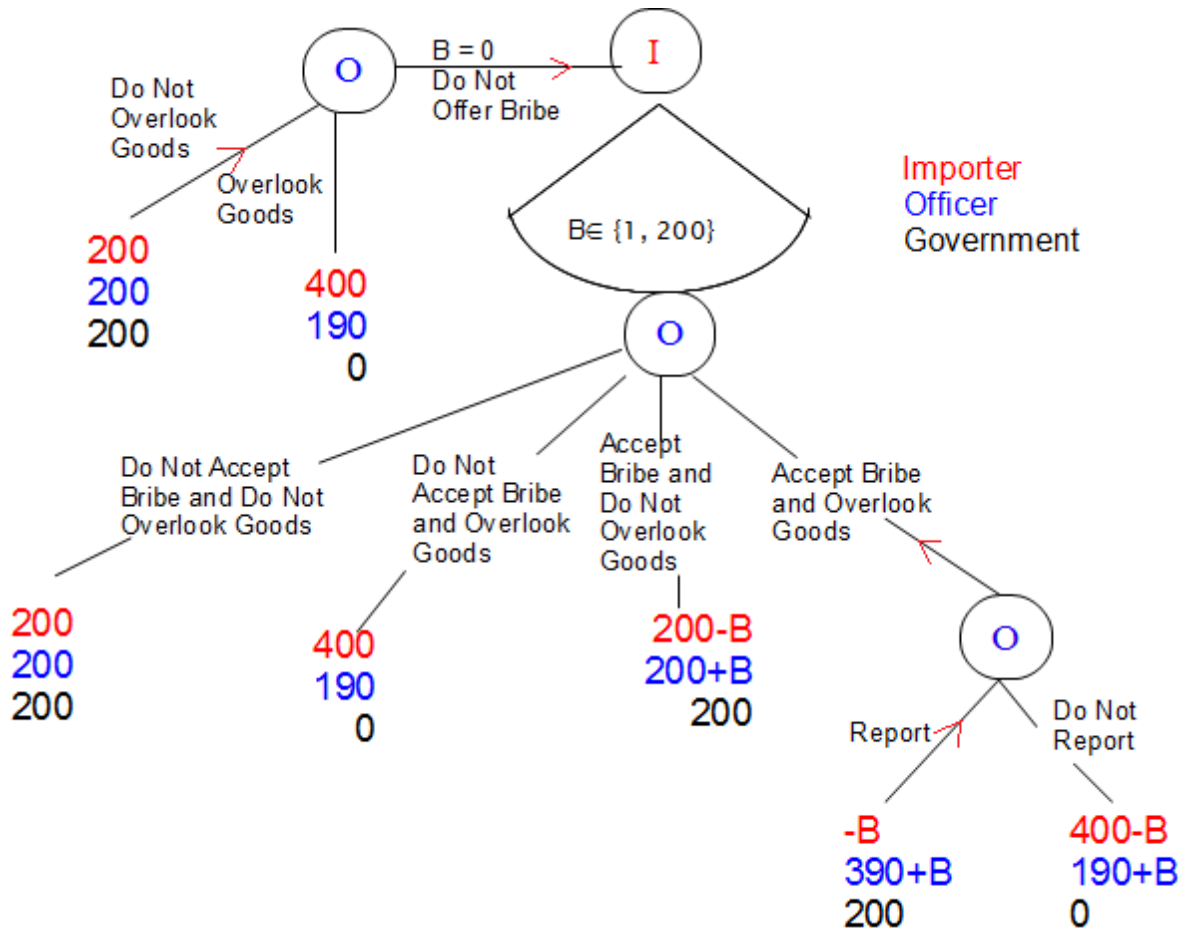


Figure 3: The OOR game tree

Figure 3 shows the OOR game. The Officers who accept a bribe and grant the corrupt favour then elect whether they will lodge a report. The Officers receive an additional 200 credits should they report their partner and are able to keep the bribe. The Importer is penalised 400 credits. The Importer and Officer not engaging in corruption is again the SPE in a one-shot game while in a repeated game cooperation is profit maximising. Here Importers face a greater threat of betrayal than previously, imposing greater disincentives from offering a bribe but should a bribe be offered the Officer has a stronger incentive to carry out the corrupt action.

Symmetric Treatment

Figure 4 shows the symmetric reward mechanism. Importers and Officers are both asked whether they would like to report should a bribe be accepted and the corrupt favour

granted. Neither agent is aware of their partner's reporting decision until the outcome of the interaction is revealed. If neither report the outcome is identical to the Control. If only one partner reports the outcome is identical to either OIR or OOR, depending on who reported. If both parties report both are penalised 150 credits although the bribe value is not recovered. In this way the symmetric rewards mechanism creates a Prisoner's Dilemma game which participants would likely wish to avoid.

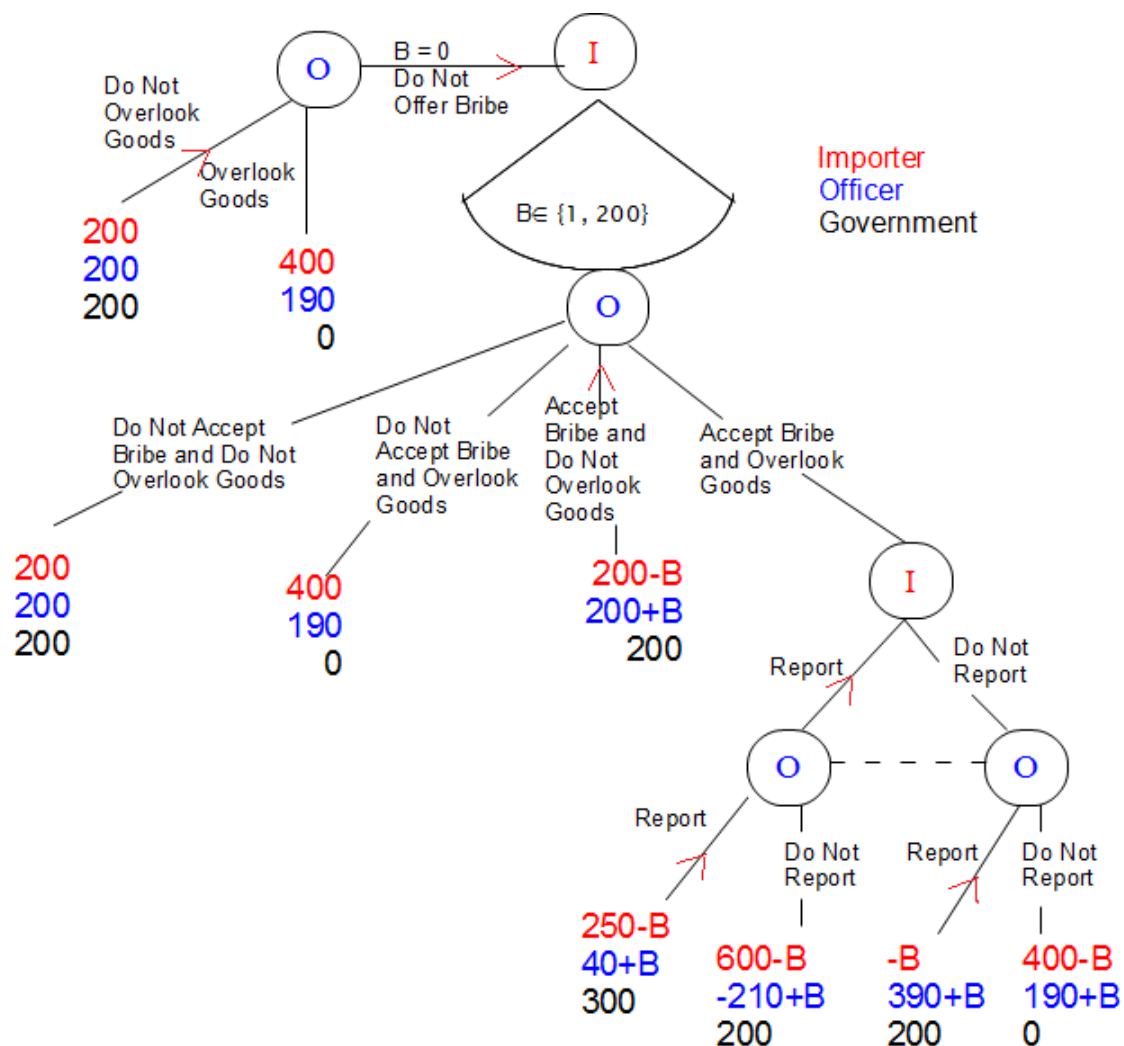


Figure 4: The Symmetric Treatment game tree

While it is profit maximising to resist betraying one another and engage in corruption, if participants consider it likely the game will soon end it becomes profit maximising to self-report even if this prevents future cooperation. Thus it is likely behaviour during the periods where the game is certain to continue will be different to those where the continuation of the game is uncertain.

Procedure

All experimental sessions were conducted at Xiamen University, Xiamen China with undergraduate students. We conducted the experiment in Xiamen as we felt subjects would more likely have experienced some form of corruption either themselves or through a close friend or relative. As the study examines whether a reward mechanism might help reduce bribery in highly corrupt societies, recruiting subjects who have actual experience of corruption or at least have been immersed in a culture where corruption is perceived to be a widespread concern lends additional credence to our results¹⁶.

One hundred and ninety eight subjects participated in the experiment. Subjects were recruited through the Wang Yanan Institute for Studies in Economics (WISE) experimental economics participant pool¹⁷ and the sessions were conducted in the WISE Experimental Economics Laboratory. The experiment was computer based and ran on zTree (Fischbacher, 2007).

Each subject participated in only one treatment. Two sessions were conducted for each treatment with the sessions stretching over six days. As WISE boasts a very large number of undergraduate students we felt the risk of participants informing subjects of later sessions details of the experiment were remote.

Subjects within each pair were randomly assigned as either an 'Importer' or 'Customs Officer' and matched to a subject of the opposite role. These pairs were maintained throughout the experiment and subjects were made aware they were to be interacting with the same partner. There were 27 pairs in the Control treatment, 26 in ST and 23 in each of OIR and OOR¹⁸.

The same instructor read aloud the instructions in each session¹⁹. The instructions used in-context language to evoke participants' pre-existing attitudes towards corruption²⁰. Instructions for the second part of the experiment were provided following the conclusion of the first part.

¹⁶ Barr and Serra (2010) find that country of origin does influence willingness to engage in corruption in an experiment while Cameron, Chaudhuri, Erkal, and Gangadharan (2009) revealed that attitudes towards corruption across cultures cannot always be predicted by the extent of corruption in those cultures. Nevertheless it is more revealing to conduct our experiment in a nation where novel anti-corruption measures might be of great benefit.

¹⁷ Students joined the pool by registering on their database which is run using ORSEE (Greiner, 2004). Any student within the university was eligible to join the participant pool but the majority were studying within WISE.

¹⁸ Although we did attempt to balance the number of pairs between each treatment lower participation in the later sessions prevented us from perfectly balancing the number of pairs between sessions.

¹⁹ The instructions were provided in Mandarin Chinese. An English translation and the Mandarin version of the instructions are included in the appendix.

²⁰ Barr and Serra (2009) find that framing of the experiment does influence bribery decisions however Abbink and Hennig-Schmidt (2006) do not find a significant difference.

Following the bribery games all participants were presented with a set of questions probing their attitudes towards several types of corruption. These questions were obtained from Truex (2011) and are shown in Table 6²¹. In addition to these the questionnaire asked about prior experience of bribery, nepotism and favour exchange.

A high proportion of subjects report that they have been exposed to corruption with 58% indicating they or someone close to them have been asked to pay a bribe in the past, 68% claim they or someone close to them have witnessed nepotism and 44% indicated they or someone close to them have been asked to perform a favour in exchange for a favour from someone in authority. Only 16.1% indicated 'no' to all three questions. As this whistle-blowing mechanism is intended to be applied in environments where petty corruption is common, we sought to conduct our experiment with participants who were likely to have had experience of it. These figures suggest Xiamen, China was an appropriate location to conduct this experiment.

Also an aggregate measure of the acceptability of corruption showed a mean response of 2.6 on a 1 to 5 scale with 1 being "Very Unacceptable" and 5 being "Very Acceptable". There are no significant differences of acceptability between treatments or between Importers and Exporters. Attitudes to corruption were also not observed to significantly influence willingness to engage in bribery or inclination to report/renege²².

Payout of each player was calculated based on their cumulative earnings over the experiment. On average participants earned 40.5 Chinese yuan (approximately US\$6.50) with the majority between 35 and 55 yuan (US\$5.60 - US\$8.80).

2.3. Results

Incidence of Bribe Exchange

The first three columns of Table 1 show the mean number of bribes being exchanged as a proportion of the total number of opportunities. It can be interpreted as the average proportion of pairs exchanging bribes across all periods including instances where the Officer reneged or either party reported. The last three columns show the mean value of all positive bribe offers. It suggests there is a drop in the mean incidence of bribery in all reward treatments relative to the Control. It suggests those who continue to offer bribes tend to offer similar values under the OIR and OOR regime but reduce their offers under ST.

²¹ The original set of questions presented in Truex (2011) contained 13 questions. Participants were presented with all 13 questions but responses were not collected for two of them due to an error in the experiment code.

²² Pairs reporting a modest acceptability of engaging in bribery were more likely to exchange bribes and to betray one another than either those who considered it most acceptable or least acceptable.

	<i>Proportion Exchanging Bribes</i>			<i>Size of Offered Bribe</i>		
	Mean	S. Dev	Freq	Mean	S. Dev	Freq
<i>Part1</i>						
Aggregated	0.527	0.500	594	70.7	33.1	387
<i>Part2</i>						
Control	0.611	0.489	216	87.2	27.7	142
OIR	0.457	0.499	184	80.7	35.4	105
OOR	0.370	0.484	184	63.7	38.6	76
ST	0.322	0.468	208	63.7	35.9	75
Part 2 Total	0.443	0.497	792	80.7	34.6	398

Note: Mean size of offers include those that were rejected.

Table 1: Summary of Incidence of Bribe Exchange and Size of Offers

Figure 5 shows the mean incidence of bribe exchange per period and Figure 6 shows the mean bribe values per period excluding when no bribe was offered. Table 2 shows non-parametric tests of the incidence of exchange of bribes and bribe values between treatments. Note that in these and all subsequent tests the independent pairs are the unit of observation. These clearly show that all reward mechanisms reduce the willingness to exchange a bribe while ST and OIR also reduce the intensive margin of bribery by reducing the value of bribes offered among those continuing to offer bribes.

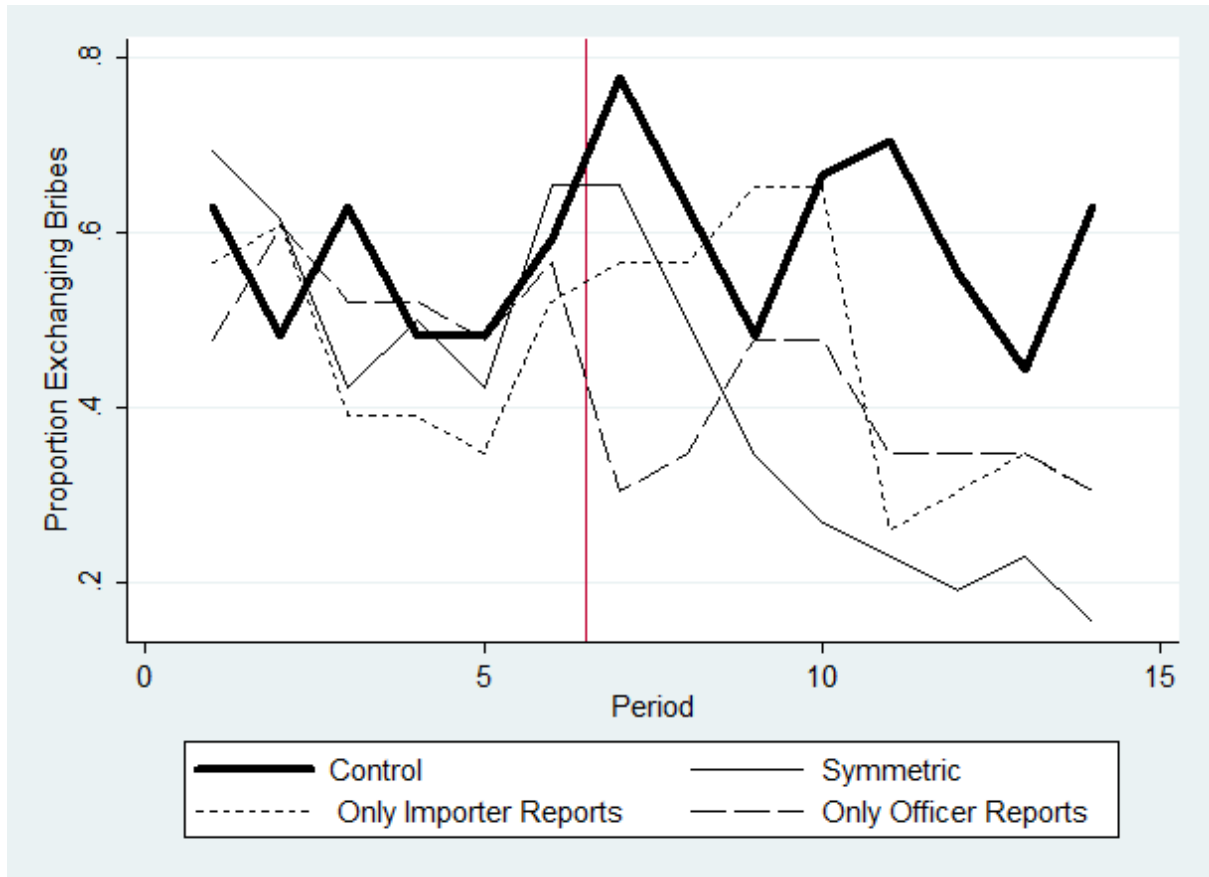
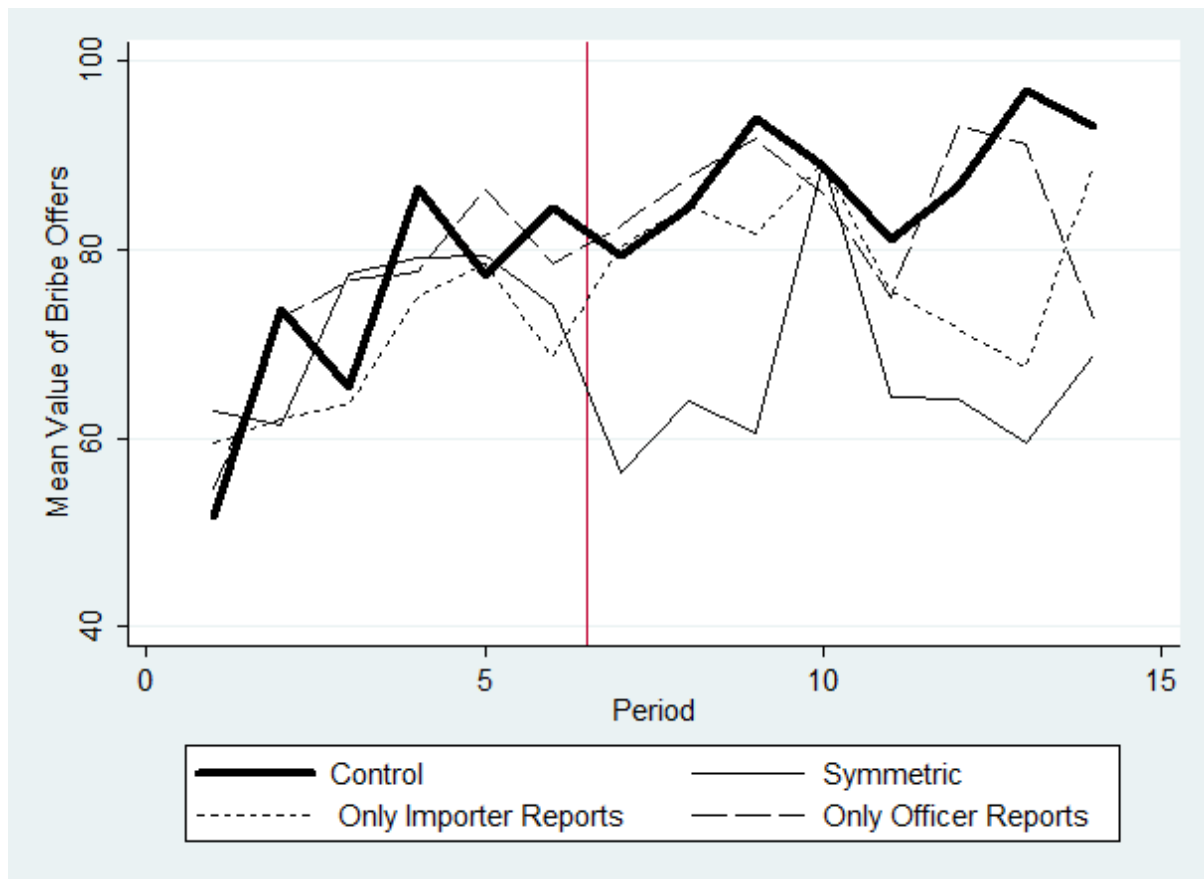


Figure 5: Mean Bribe Exchange Incidence by Period

Table 3 shows the mean bribery exchange incidence clustered into subgroups. These periods were selected to identify behaviour when participants were certain the game would continue (periods 1 to 4 and 7 to 10 inclusive) and compare it to periods where they were uncertain whether the next period would be played (periods 5 & 6 and 11 to 14). The rank sum test between periods 1 to 4 and 7 to 10 reveal a significant decline in bribes being exchanged for the ST and OOR treatments even while participants expect to interact with one another in the following period (although only significant to the 10% level for OOR). Comparing periods 11 to 14 against 7 to 10, we observe a stronger decline in the propensity to exchange bribes in the final periods of all reward treatments relative to the control. The final row interacts the reward mechanism with not being certain whether the game will continue next round. Given that the decline in bribery exchange between the certain and uncertain continuation periods were largely the same for Part 1 and Part 2 of the Control, we see a significant difference for both ST and OOR (albeit again only at the 10% level for OOR). Overall there is a significant decline in bribery rate while subjects expect the game to continue in each of ST and OOR and a further decline in periods where subjects are uncertain whether the game will be continued.

For robustness we conducted a repeated measures probit of bribe exchange incidence (see Table 7 in the Appendix). It also shows bribery exchange declining in the ST and OOR treatments.



Note: Excludes Values where no bribe was offered

Figure 6: Mean Bribe Values by Period

Wilcoxon Rank Sum

	Bribe Incidence		Bribe Value	
	Z	p value	Z	p value
Control = OIR	3.088	0.002	2.547	0.011
Control = OOR	4.809	0.000	0.787	0.431
Control = ST	5.954	0.000	4.779	0.000

Kruskal Wallis Test**(p value)**

Bribe Exchange Incidence

Null Hypothesis: All Treatments Equal

0.000

Bribe Value

Null Hypothesis: All Treatments Equal

0.000

Note: Only includes observations in Part 2, bribe value includes only positive bribe offers.

Table 2: Non Parametric tests of Bribe Exchange Incidence and Value

Similar analyses was conducted in relation to the incidence of bribes being offered and the incidence of corrupt favours being granted. As Officers had the opportunity to accept a bribe and renege should they mistrust their partner, the acceptance rates for offered bribes were very high across all treatments. Thus the results for bribes being offered did not noticeably differ from those of bribe exchange incidence and are summarised in Table 8 in the Appendix. The incidence of the corrupt favour being granted closely mirrored the incidence of bribes being exchanged and are summarised in Figure 8 and Table 9 in the Appendix.

Mean Bribe Exchange Incidence

	Average Across Periods			
	1-4 (I)	5-6 (II)	7-10 (III)	11-14 (IV)
Control	0.56	0.54	0.63	0.58
OIR	0.49	0.44	0.59	0.30
OOR	0.53	0.52	0.38	0.34
ST	0.56	0.54	0.50	0.20

Wilcoxon Rank Sum test (p-values shown)

Difference between Columns	Control = OIR	Control = OOR	Control = ST
I and III	0.595	0.069	0.027
III and IV	0.047	0.034	0.001
II-I and IV-III	0.122	0.060	0.002

Table 3: Mean Bribe Exchange Incidence Grouped by Periods

Reneging and Self Reporting

Treatment	No Betrayals	Response to Betrayal			Total
		Encouraged	Neutral	Discouraged	
<i>Part 1</i>					
Aggregated	0	13	41	45	99
<i>Part 2</i>					
Control	11	3	1	12	27
OIR	5	4	6	8	23
OOR	12	1	1	9	23
ST	5	5	4	12	26
Part 2 Total	33	13	12	41	99

Table 4: Bribe Offers After Betrayal

Table 4 shows how pairs in each treatment responded to a betrayal in the previous period. A betrayal includes incidences of reneging or self-reporting. We constructed the categories of encouraged and discouraged by counting the frequency with which each pair

ceased exchanging bribes after a betrayal, continued offering bribes and not reporting and continued offering bribes and self-reporting. If a pair was found to more frequently continue exchanging bribes without reporting than either discontinuing or reporting then they were considered to have been encouraged²³. If a pair was found to more frequently discontinue exchanging bribes or attempt to report the bribe than continuing to bribe without reporting then they were classified as having been discouraged. Otherwise they were classified as having been neither encouraged nor discouraged.

Wilcoxon Rank Sum Test

	Z	p - value
Control = OIR	1.446	0.148
Control = OOR	-0.476	0.634
Control = ST	0.961	0.337

Kruskal Wallis Test

Null Hypothesis: All Treatments Equal

p - value

0.228

Wilcoxon Sign Rank Test

	Z	p - value
Null Hypothesis:		
Median Betrayal Response is Neutral	3.810	0.000

Note: Only includes observations in Part 2 where betrayal occurred at least once.

Table 5: Non-parametric Tests of Betrayal Response

Table 5 shows the non-parametric tests of the response to betrayal in Part 2. It reveals that responses to being betrayed was not significantly affected by the whistleblowing mechanism. The Wilcoxon Sign Rank test reveals that across all treatments partners are significantly more likely to be discouraged from betrayal than either to be neutral or encouraged. Note: Reference lines separate Parts 1 and 2

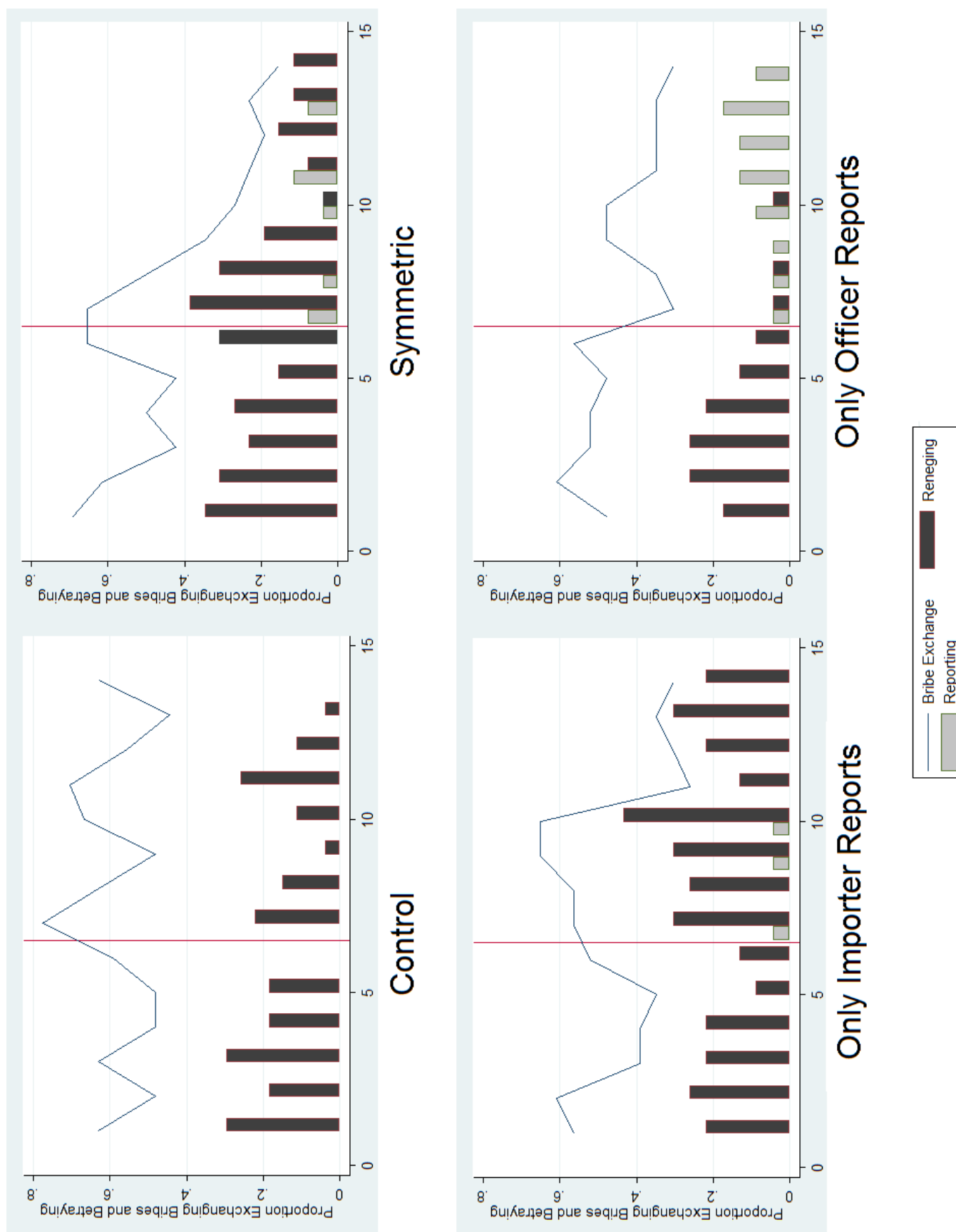
Figure 7 shows the incidence of bribe exchange compared against the rate of renegeing and self-reporting in each period. The bars indicating the proportion renegeing or reporting is a

²³ This is not particularly implausible as it was not uncommon to have Officer accept a small bribe but not confer the corrupt favour. In many instances this spurred the Importer to offer a larger bribe in hopes of stimulating reciprocity.

proportion of all pairs, including those who did not exchange a bribe. Reporting in the ST treatment was reasonably balanced when it did occur between the Importer and Officer with two incidences each of only Importers or only Officers reporting and five incidences of both members reporting. Both incidences of only the Importer reporting occurred with the same pair as did both incidences of only the Officer reporting. However all five incidences of both parties reporting occurred in different pairs as such a result immediately brought to a halt any cooperation between the members²⁴. This figure is consistent with the prior finding that in all treatments agents who are betrayed are more likely to be discouraged from bribing.

Also many pairs ceased exchanging bribes once one partner betrayed the other. The median number of times partners betray one another in Part 2 of the experiment is 1 for Control, 2 for ST and OIR and 0 for OOR.

²⁴ These results are not shown in detail in the diagram for simplicity.



Note: Reference lines separate Parts 1 and 2

Figure 7: Bribery Exchange and Betrayal

2.4. Conclusion

We evaluated the effectiveness of offering a reward for agents to self-report corrupt actions in combating collusive bribery. We tested three variations of the reward mechanism with a symmetric reporting mechanism (both client and official may self-report), one where only the client may self-report and one where only the official may self-report.

We find that symmetric reporting and permitting only the official to self-report are mildly effective in reducing bribery between agents who expect to interact with one another again. Permitting only the client to self-report in a scenario where the client initiates the corrupt activity (as opposed to harassment bribery where the official demands a bribe) does not have a significant effect on behaviour.

All reward mechanisms however are extremely effective in reducing the incidence of bribery in instances where agents expect they will not be interacting with their partner for many more periods or at all. Similarly the corrupt favour (which could be performed or not independently of whether a bribe was accepted) was granted at a significantly lower rate in ST and OIR but only in the periods where agents were uncertain whether the game would continue.

We do not find either of the asymmetric regimes to outperform the symmetric regime with the OIR being less effective in preventing bribes being exchanged while agents anticipate future interactions and the OOR being less effective in deterring bribery as well as the granting of the corrupt favour.

Our results support the implementation of a reward mechanism to deter collusive bribery especially to combat petty corruption where clients typically expect not to encounter the same official in future. They are unable to provide an indication of whether a reward mechanism would be effective in combating larger scale bribery (a multi-million dollar bribe to secure a very large government contract for example) or instances where the client interacts with the same official on a repeated basis. Also offering monetary rewards for self-reporting may not be sufficient to overcome problems associated with retribution as identified in Abbink et al. (2014). If for example one is repeatedly harassed for bribes by a corrupt police officer it is possible reporting this harassment would induce the officer's corrupt colleagues to exact severe retribution. Monetary rewards would likely be insufficient to entice reporting in these circumstances.

2.5. Appendices

	“Please indicate how acceptable each of the following scenarios is, with 1 being Very Unacceptable and 5 being Very Acceptable.”	Mean (SD in brackets)
1	A police officer does not give a taxi-driver a traffic ticket because he is a friend	3.1 (1.3)
2	A shopkeeper offers a tax collector a small amount of money in order to avoid paying taxes	2.6 (1.13)
3	A shopkeeper offers a tax collector a small gift in order to avoid paying taxes	2.55 (1.27)
4	A politician gives a job to a family member even though other applicants are more qualified	1.98 (1.1)
5	A businessman gives a job to a family member even though other applicants are more qualified	2.7 (1.33)
6	A government employee gives a job to a family member even though other applicants are more qualified	1.97 (1.11)
7	A construction contractor gives a government employee a large gift in hopes of receiving a government construction contract	2.42 (1.27)
8	A government employee awards a government construction contract to a friend’s business because he is a friend	2.49 (1.21)
9	Because of a delay, a schoolteacher gives a government employee a small gift in order to make sure that his passport gets processed	3.78 (1.2)
10	A schoolteacher gives a government employee a small gift in order to obtain a passport without proper documentation	2.94 (1.34)
11	A government employee asks a schoolteacher for a small gift in exchange for giving him a passport without proper documentation	2.18 (1.27)
12	A businessman offers a senior customs official a large amount of money in order to import goods without paying taxes	
13	A construction contractor gives a businessman a large gift in hopes of receiving a private construction contract.	
14	Have you or someone close to you ever been asked to pay a bribe?	58% “Yes”
15	Have you or someone close to you ever witnessed nepotism?	68% “Yes”
16	Have you or someone close to you ever been asked by someone in authority for a favour in exchange for a favour?	44% “Yes”

Table 6: Questionnaire

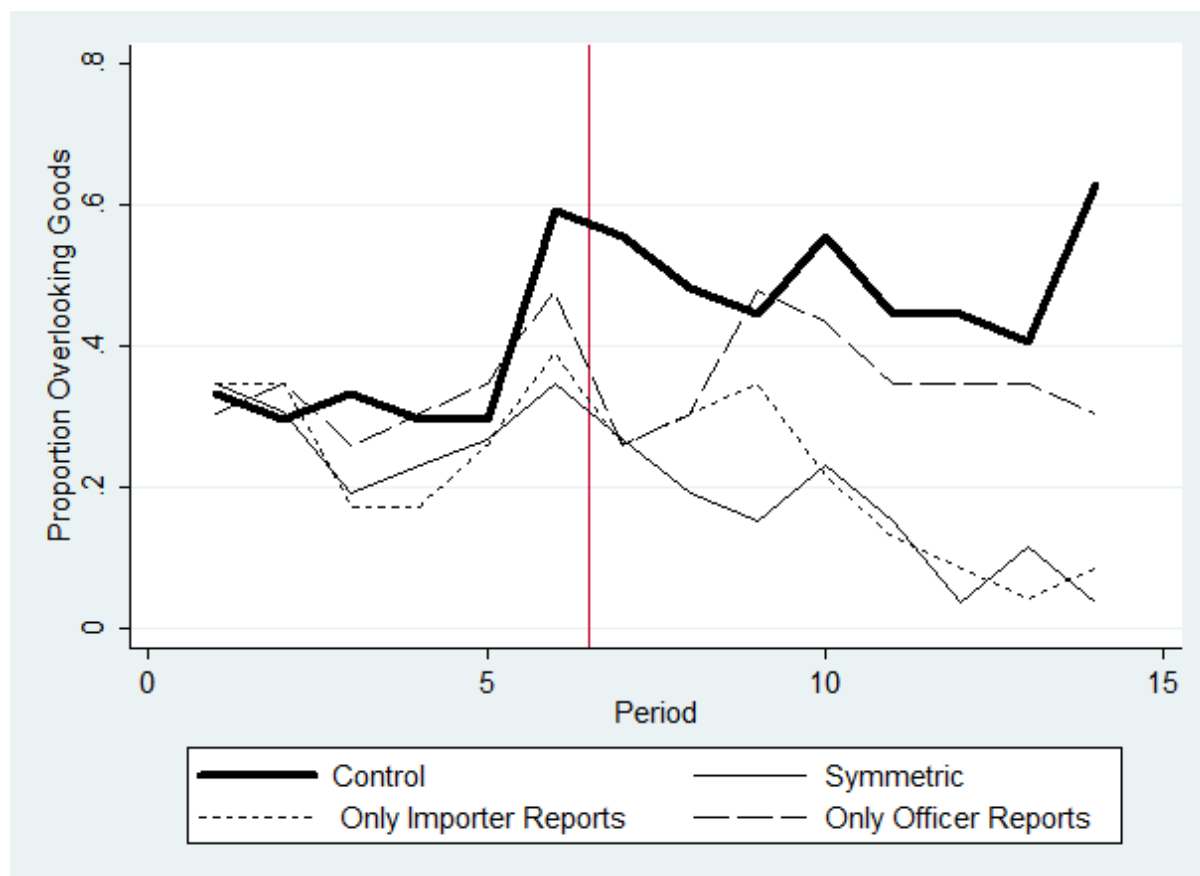
		Repeated Measured Probit	
		Incidence of Bribe Exchange	
		Semi robust	
		Coeff	Std. Err
<i>Certain Continuation</i>			
	OIR	-0.081	0.229
	OOR	-0.093	0.255
	ST	-0.043	0.219
	Part 2	0.042	0.202
	OIR Part 2	0.079	0.253
	OOR Part2	-0.599**	0.291
	ST Part2	-0.539**	0.271
<i>Uncertain Continuation</i>			
	Part 1	-0.171	0.228
	OIR	-0.087	0.288
	OOR	0.029	0.314
	ST	0.07	0.293
	Part 2	(omitted)	
	OIR Part 2	-0.555	0.416
	OOR Part 2	-0.046	0.373
	ST Part 2	-0.540	0.366
Number of Obs		1386	
Number of Pairs		99	
Wald Chi-squared (p-value)		0.000	

* p<0.10, ** p<0.05, *** p <0.01

Certain Continuation Periods in Control is the omitted category from the independent variables. Specification includes Period dummies, Importers' and Officers' questionnaire and experience of bribery results but are not reported here for ease of exposition. As the table displays interaction terms the marginal effect of being in an uncertain continuation period is not significantly different from the certain continuation period for the respective

treatment but the signs indicate bribery incidence for OIR and ST continues to decline in the uncertain continuation periods. Value for Part 2 Uncertain continuation omitted due to collinearity.

Table 7: Repeated Measures Probit of Incidence of Bribe Exchange



Note: Reference line separate Parts 1 and 2

Figure 8: Mean Incidence of Overlooking Goods by Period

	<i>Proportion Offering Bribes</i>		
	Mean	S. Dev	Freq
<i>Part1</i>			
Aggregated	0.652	0.477	594
<i>Part2</i>			
Control	0.657	0.476	216
OIR	0.571	0.496	184
OOR	0.413	0.494	184
ST	0.322	0.468	208
Part 2 Total	0.443	0.497	792

Table 8: Summary of Incidence of Bribe Offers

	<i>Proportion Overlooking Goods</i>		
	Mean	S. Dev	Freq
<i>Part1</i>			
Aggregated	0.348	0.477	792
<i>Part2</i>			
Control	0.519	0.501	216
OIR	0.250	0.434	184
OOR	0.429	0.496	184
ST	0.178	0.383	208
Part 2 Total	0.346	0.476	792

Table 9: Summary of Incidence of Officers Overlooking Goods

2.6. Instructions

Part 1 – Common to All Treatments

An Experiment of Economic Interactions

Instructions

Part 1

Thank you for participating in this experiment. We ask you not to communicate with any other participant during the course of this experiment. Failure to comply with this instruction will result in your being asked to leave the experiment. You will not receive payment should this occur. Please read the following instructions carefully. If you have any questions, please raise your hand and the experimenter will come to you.

This experiment will be conducted in two parts. You will receive the total payment from these two parts at the end of the experiment. The exchange rate throughout the experiment will be **150 credits = 1RMB**.

The first part of the experiment will place you in an interaction with another participant. The computer will randomly choose half the participants to perform the role of an Importer and the other half to perform the role of a Customs Officer. The computer will then randomly match each Importer with one Customs Officer. You will be told at the start of the interaction the role you are assigned. The interaction will be **repeated for at least 5 periods** and each time you will be paired with the same participant and you will both be performing the same role.

Your payment for the first part will be the sum of your earnings in each period.

Background

The importer is bringing some goods through customs for sale on the local market. However the goods incur a customs duty.

The customs officer inspecting the shipment may choose to overlook the items and thus allow the importer to avoid paying the customs duty. The importer is aware of this and has the option of offering the officer a bribe.

The customs officer can choose whether to overlook the goods irrespective of whether he/she accepts a bribe. Thus even if the customs officer accepts a bribe, he/she does not have to allow the importer to escape taxes. Similarly the officer may choose to overlook the goods even without receiving a bribe.

Regardless of whether the officer receives a bribe, if he/she chooses to overlook the goods the officer must go to some effort to alter the records.

There is no chance of any authority discovering any bribes being offered or exchanged nor of any goods that are overlooked.

The Interaction

1. You will first be told the role you are assigned.
2. The importer will then have the opportunity to offer a bribe.

3. Then the officer will be told whether a bribe was offered. If a bribe was offered the officer will also be told the value of the bribe.
4. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.

Earnings

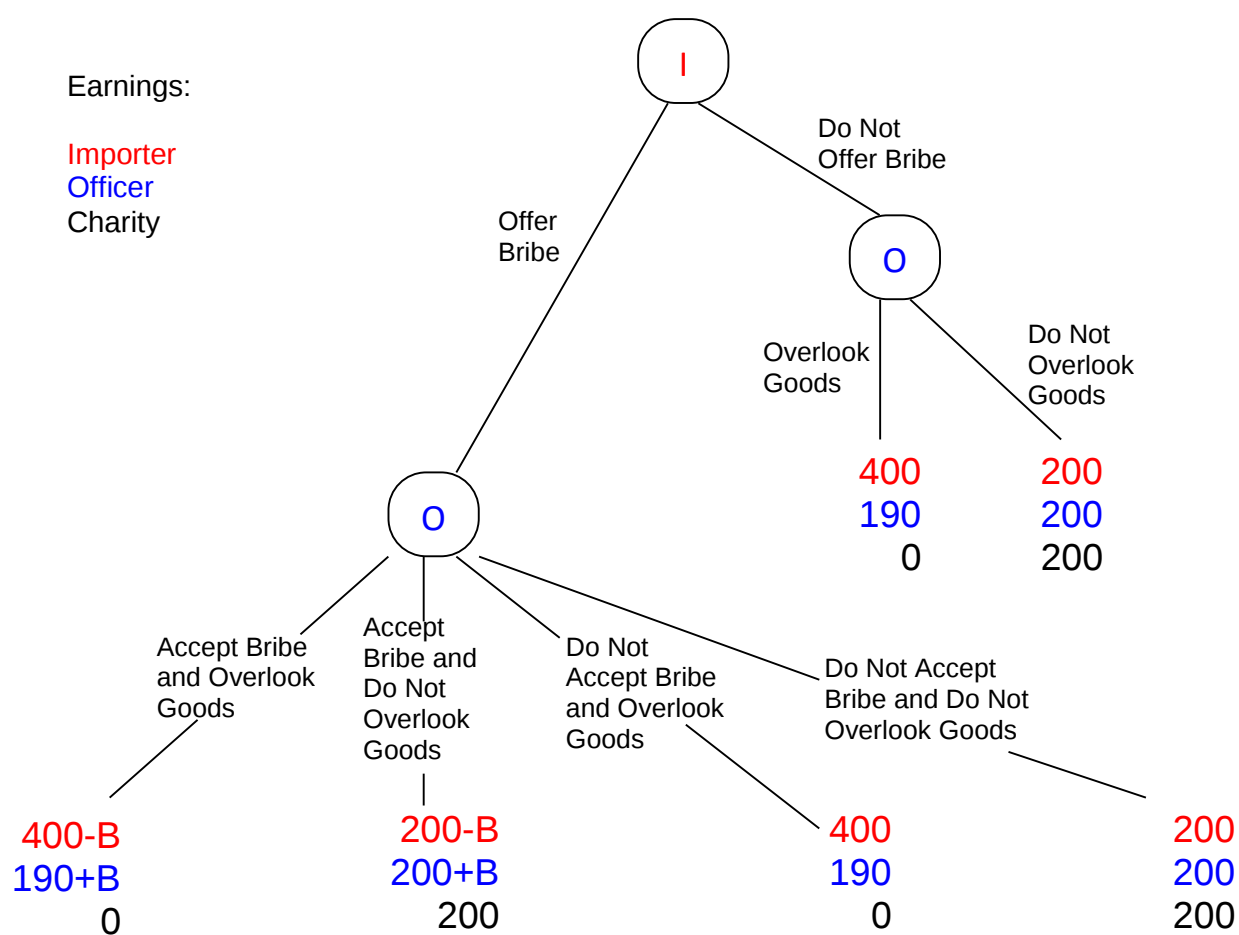
- The goods are worth **400 credits** to the importer.
- The officer earns **200 credits** in wages.
- The customs duty levied on the goods is **200 credits**. If the officer overlooks the goods, the importer will not have to pay this duty.
- If the officer overlooks the goods, the effort that he/she must spend altering the records is represented as a **10 credit** cost to the officer.
- As the maximum amount the importer can save should the officer overlooks the goods is **200 credits**, the importer can offer a bribe no greater than **200 credits**.
- The system will count and donate any proceeds that are collected as customs duty to charity. Hence any goods that are overlooked reduces the donations to charity

Thus there are four possible outcomes in each period with payoffs as follows (B represents the size of the bribe paid to the customs officer):

	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	$200-B$	$200 + B$	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0
If the importer pays a bribe B credits and the officer overlooks the goods	$400-B$	$190+B$	0

A summary of the interaction and earnings are displayed in figure 1. B represents the size of the bribe paid to the customs officer, the red areas represent the earnings of the importer with each set of decisions while the blue area represents the earnings of the customs officer in each set of outcomes.

Figure 1: Interaction and Earnings Summary



Part 2 – Control

An Experiment of Economic Interactions

Instructions

Part 2

This part of the experiment is identical to the first part of the experiment. You will be interacting with the same participant as in part one and you will each be performing the same roles as before.

This interaction will be **repeated at least 5 times**. It will not necessarily have the same number of periods as part one of the experiment.

Part 2 – OIR Treatment

An Experiment of Economic Interactions

Instructions

Part 2

In this part of the experiment you will be interacting with the same participant as in part one and you will each be performing the same roles as before except the importer will have one extra decision to make. This interaction will be **repeated for at least 5 periods**. It will not necessarily have the same number of periods as part one of the experiment.

There is now a new role, that of the government, that will be played by the computer. The government implements a new program where it will reward those who admit to offering bribes and fine officials who accept them. The government will only act on a claim if a bribe is paid *and* goods are overlooked. Thus even if a bribe is paid the authorities will ignore a report if the official does not overlook the goods.

If bribes are paid and goods overlooked then the government will reward an importer making a report **200 credits** but **fine** the official **400 credits**.

The government is unable to accurately verify the value of any bribe and thus the official will keep any bribe paid regardless of whether one or both of the parties report themselves.

Also as the officer destroyed paperwork relating to the goods in overlooking them the government is unable to recover any duties that were overlooked. Thus if the official overlooked the goods, the importer does not need to pay the duty regardless of whether the importer made a report.

The Interaction

1. The importer will have the opportunity to offer a bribe.
2. If the importer offers a bribe he/she will be asked whether he/she would like to make a report in the event the officer accepts the bribe and overlooks the goods.
3. The officer will be told whether a bribe was offered. If a bribe was offered the officer will also be told the value of the bribe. The officer is not told whether the importer would make a report should the bribe be accepted and goods overlooked.
4. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.

If the importer does not make a report there is again no chance of being caught and the earnings will be determined in exactly the same way as in the first part of the experiment. If however the importer does make a report he/she will earn a reward of **200 credits** and the officer will be penalised **400 credits** on top of their earnings from wages or sale of the goods.

The net proceeds of fines minus rewards received by the government are also donated to the charity.

Thus the payout for this part of the experiment in each period is the same as part 1 of

the experiment if either no bribe is paid or if the officer does not overlook the goods:

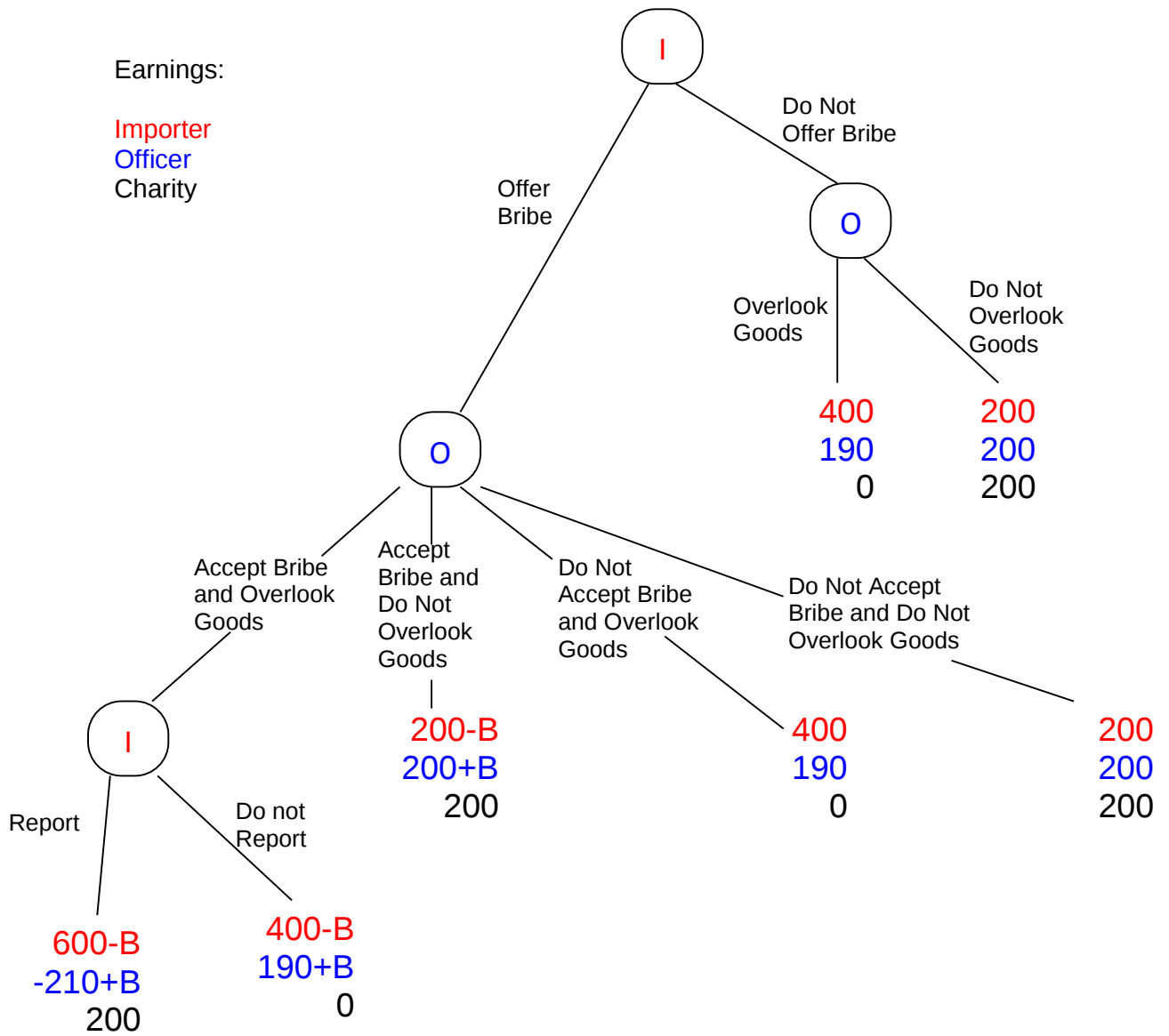
	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	$200 - B$	$200 + B$	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0

If however a **bribe is paid** and goods are **overlooked** the earnings depend on whether the importer made a report. The final payouts under each reporting decision are as follows:

	Importer Receives	Officer Receives	Charity Receives
If the importer does not make a report	$400 - B$	$190 + B$	0
If the importer makes a report	$600 - B$	$-210 + B$	200

The summary of final payouts in each period are displayed in figure 3:

Figure 3: *Summary of Interaction and Earnings in Part 2*



Part 2 – OOR Treatment

An Experiment of Economic Interactions

Instructions

Part 2

In this part of the experiment you will be interacting with the same participant as in part one and you will each be performing the same roles as before except the officer will have one extra decision to make. This interaction will be **repeated for at least 5 periods**. It will not necessarily have the same number of periods as part one of the experiment.

There is now a new role, that of the government, that will be played by the computer. The government implements a new program where it will reward those who admit to receiving bribes and fine individuals who offer them. The government will only act on a claim if a bribe is paid *and* goods are overlooked. Thus even if a bribe is paid the authorities will ignore a report if the official does not overlook the goods.

If bribes are paid and goods overlooked then the government will reward an officer making a report **200 credits** but **fine** the importer **400 credits**.

The government is unable to accurately verify the value of any bribe and thus the official will keep any bribe paid regardless of whether one or both of the parties report themselves.

Also as the officer destroyed paperwork relating to the goods in overlooking them the government is unable to recover any duties that were overlooked. Thus if the official overlooked the goods, the importer does not need to pay the duty regardless of whether the importer made a report.

The Interaction

1. The importer will have the opportunity to offer a bribe.
2. The officer will be told whether a bribe was offered. If a bribe was offered the officer will also be told the value of the bribe.
3. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.
4. If a bribe is offered and accepted and the officer overlooked the goods, the officer will then decide whether or not to make a report.

If the officer does not make a report there is again no chance of being caught and the earnings will be determined in exactly the same way as in the first part of the experiment. If however the officer does make a report he/she will earn a reward of **200 credits** on top of his/her wages and the importer will be penalised **400 credits** on top of their earnings from sale of the goods.

The net proceeds of fines minus rewards received by the government are also donated to charity.

Thus the payout for this part of the experiment in each period is the same as part 1 of

the experiment if either no bribe is paid or if the officer does not overlook the goods:

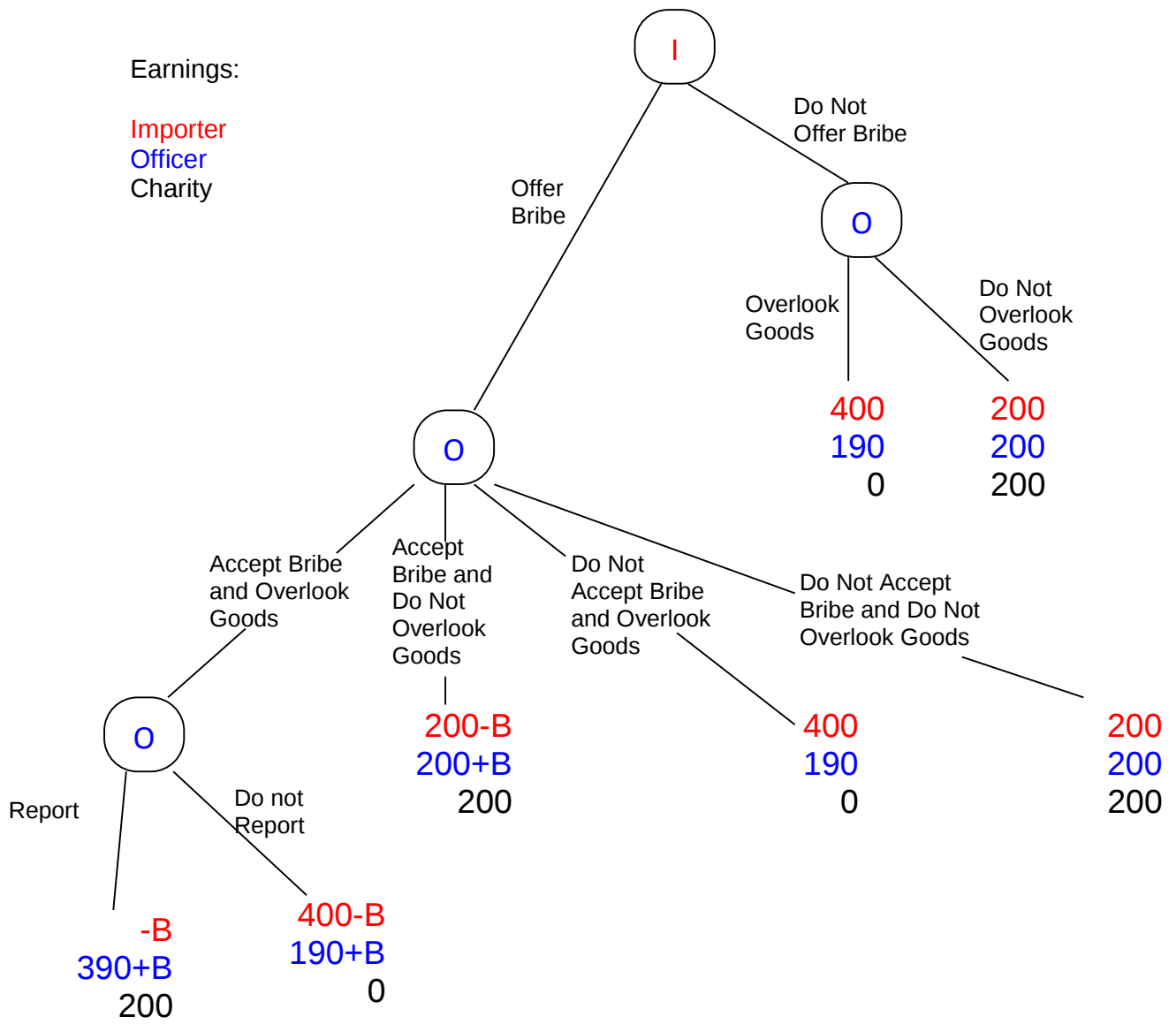
	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	$200 - B$	$200 + B$	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0

If however a **bribe is paid** and goods are **overlooked** the earnings depend on whether the officer made a report. The final payouts under each reporting decision are as follows:

	Importer Receives	Officer Receives	Charity Receives
If the officer does not make a report	$400 - B$	$190 + B$	0
If the officer makes a report	$-B$	$390 + B$	200

The summary of final payouts in each period are displayed in figure 3:

Figure 3: *Summary of Interaction and Earnings in Part 2*



Part 2 – ST Treatment

An Experiment of Economic Interactions

Instructions

Part 2

In this part of the experiment you will be interacting with the same participant as in part one and you will each be performing the same roles as before except you will have one extra decision to make. This interaction will be **repeated for at least 5 periods**. It will not necessarily have the same number of periods as part one of the experiment.

There is now a new role, that of the government, that will be played by the computer. The government implements a new program where it will reward those who admit to engaging in corruption and fine the other party. The government will only act on a claim if a bribe is paid *and* goods are overlooked. Thus even if a bribe is paid the authorities will ignore a report if the official does not overlook the goods.

If bribes are paid and goods overlooked and only one of the parties makes a report the government will **pay** that party **200 credits** but **fine** the other party **400 credits**. If both of the parties report themselves the government will **fine both parties 150 credits**. This is summarised in figure 2:

Figure 2: Additional Rewards and Fines from Self Reporting

		Importer	
		No Report	Report
Customs Officer	No Report	0 0	+200 -400
	Report	-400 +200	-150 -150

The government is unable to accurately verify the value of any bribe and thus the official will keep any bribe paid regardless of whether one or both of the parties report themselves.

Also as the officer destroyed paperwork relating to the goods in overlooking them the government is unable to recover any duties that were overlooked. Thus if the official overlooked the goods, the importer does not need to pay the duty regardless of whether anyone has made a report.

The Interaction

5. The importer will have the opportunity to offer a bribe.
6. If the importer offers a bribe he/she will be asked whether he/she would like to make a report in the event the officer accepts the bribe and overlooks the goods.
7. The officer will be told whether a bribe was offered. If a bribe was offered the officer will also be told the value of the bribe. The officer is not told whether the importer would make a report if a bribe is accepted and goods overlooked.
8. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.
9. If a bribe was offered and the officer both chooses to accept the bribe and overlook the goods, the officer will then decide whether or not to make a report. Note that the officer is not told whether the importer will make a report.

If no one makes a report there is again no chance of being caught and the earnings will be determined in exactly the same way as in the first part of the experiment. If however one or both of you report yourselves you will earn a reward or be penalised on top of your earnings from wages or sale of the goods.

The net proceeds of fines minus rewards received by the government are also donated to a charity.

Thus the payout for this part of the experiment in each period is the same as part 1 of the experiment if either no bribe is paid or if the officer does not overlook the goods:

	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	200-B	200 + B	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0

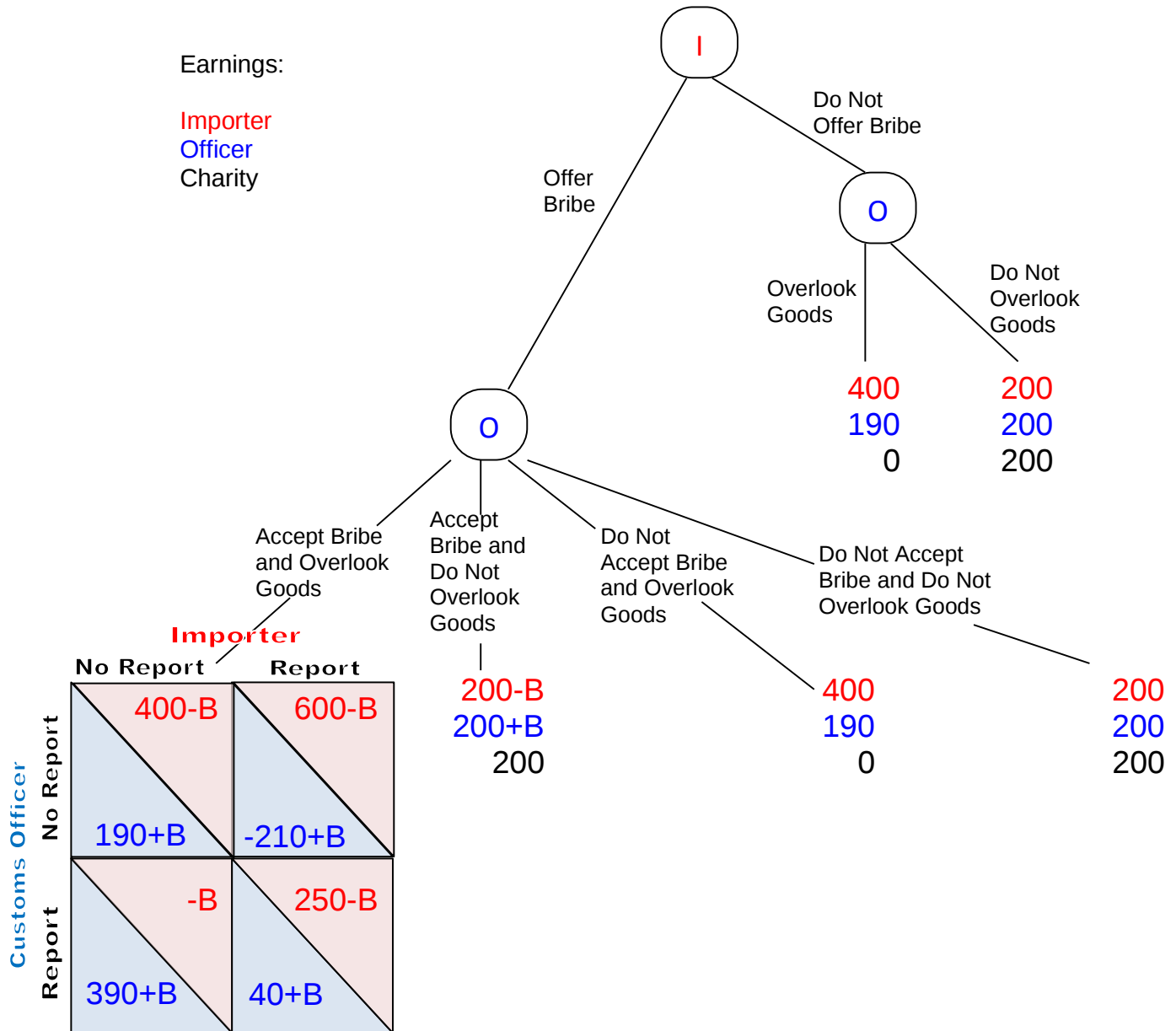
If however a **bribe is paid** and goods are **overlooked** both the officer and importer have an option of reporting their activity. The final payouts under each reporting decision are as follows:

	Importer Receives	Officer Receives	Charity Receives
If neither the importer nor the officer reports their activities	400-B	190+B	0
If the importer makes a report but the officer does not	600-B	-210+B	200
If the officer makes a report but the importer does not	-B	390+B	200

If the importer and officer both make a report	$250-B$	$40+B$	300
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The summary of final payouts in each period are displayed in figure 3:

Figure 3: *Summary of Interaction and Earnings in Part 2*



Declaration for Thesis Chapter 3

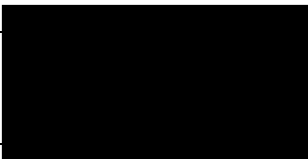
Declaration by candidate

In the case of Chapter 3, the nature and extent of my contribution to the work was the following:

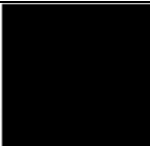
Nature of contribution	Extent of contribution (%)
Formulation of research question, design of experiment, data analysis and write up.	100

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

**Candidate's
Signature**

	Date 8 Aug 2015
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**Main
Supervisor's
Signature**

	Date 8 Aug 2015
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Chapter 3 - Reward Self-Reporting to Deter Corruption: Combating Collusive Bribery in a Stranger Matched Game²⁵

3.1. Introduction

Corruption is often identified as an obstacle to a nation achieving its potential with there being evidence revealing it reduces GDP growth, causes higher inequality and deters investment (J. G. Lambsdorff, 2005; Méon & Sekkat, 2005). This paper contributes to a growing body of work examining various policies aimed at deterring corruption. These include periodically rotating public servants between roles (Abbink, 2004) increasing public servants' wages (Van Rijckeghem & Weder, 2001) and offering reduced penalties to whistle-blowers (Engel et al., 2012)²⁶. In particular this paper is an extension to Abbink and Wu (2015) which conducted an experiment investigating whether paying monetary rewards to whistle-blowers is effective in deterring collusive bribery in a partner matched game.

Abbink and Wu (2015) simulated an interaction between an importer and a customs officer where the importer was able to offer the customs officer a bribe to waive an import tax. The customs officer could choose to waive the tax or not independent of whether they accepted a bribe. A variety of self-reporting designs were tested with the most effective design allowing either or both parties to self-report a bribe being passed and the tax being waived²⁷. With this design the self-reporting party was paid a sizeable reward while their partner was penalised double the value of the reward unless both parties self-reported. Should both self-report both incurred a modest fine²⁸. The interaction was repeated for 6 periods without any chance of detection and another 8 where self-reporting was possible (except in the Control). All groups were partner matched throughout the experiment.

The partner matching design was intended to examine whether the whistleblowing mechanism could induce mistrust even in groups that had established a history of cooperation. While cooperation gradually declined to less than half its initial level with the self-reporting

²⁵ I thank Prof. Jason Shachat for allowing me to conduct my experiment at Xiamen University's FEEL laboratory. Alex Ming Zhi Peng provided excellent research assistance.

²⁶ Engel et al. (2012) } only permitted self-reporting if the corrupt favour was not granted resulting in their leniency mechanism effectively becoming a weapon against Responders cheating. This resulted in the perverse outcome observed in many anti-trust studies of leniency discouraging cheating and resulting in higher rates of undesirable behaviour.

²⁷ The frequency of bribes being exchanged and tax being waived approximately halved, both results significant at 1% level of significance.

²⁸ Asymmetric reporting treatments where only the Importer could self-report or only the Officer could self-report were also tested. These were less successful in reducing corruption than the Symmetric Treatment and are not replicated in this study.

mechanism while largely remaining unchanged in the Control, the experiment could not distinguish whether this was a result of decreasing costs of betraying one's partner (with fewer periods remaining to cooperate there is lower opportunity cost of reporting one's partner in later rounds) or simply as a response to earlier periods of betrayal. This study seeks to disentangle these elements by conducting the same experiment but with participants matched with a random partner each period. This removes the opportunity cost of betrayal component to decision making and also more closely simulates the majority of petty bribe interactions.

It is hypothesised the removal of the opportunity cost of reduced future cooperation from betraying one's partner significantly reduces bribery exchange even without a self-reporting mechanism. Nevertheless it is also hypothesised that incentivising whistleblowing should further diminish the incidence of bribes being exchanged and taxes waived.

The idea of offering rewards to unravel trust has precedence in anti-cartel legislation where leniency from prosecution is offered to whistle-blowers to incentivise them to produce evidence against their partners. Legislation enacting this mechanism includes the 1993 Department of Justice Corporate Leniency Policy in the US and the 1996 EU Leniency Program²⁹. However leniency alone is unlikely to destabilise collusive bribery interactions where partners view one another favourably (as opposed to harassment bribery where the public official extracts rents from the client) and the chance of being detected is otherwise very low. In such circumstances Aubert et al. (2006) Jacquemet and Rulliere (2006) suggest offering rewards or 'bonus leniency' to provide an incentive to report even when the partner has fulfilled their promise and you have no reason to wish them punished.

Compared with Abbink and Wu (2015) the results reveal that the stranger matching dramatically reduces the willingness of participants to exchange bribes (Control treatment has a mean of 35.4% compared to 58.5% with partner matching) but similar to the partner matching scenario offering a reward for whistleblowing reduces the rate of bribery exchange by approximately one half. The self-reporting mechanism causes a greater collapse in officers waiving the tax as the self-reporting mechanism only acknowledges a self-report if both a

²⁹ For articles concerning leniency programs and cartel formation see Abbink and Hennig-Schmidt (2006) Aubert et al. (2006) Bigoni et al. (2012) Brenner (2009) Brisset and Thomas (2004) Buccirossi and Spagnolo (2006) Hamaguchi et al. (2009) Jacquemet and Rulliere (2006) Leslie (2008) .

bribe is exchanged and the corrupt favour is granted. The justification of this is to encourage an additional level of mistrust and betrayal, rendering ongoing corruption still less tenable³⁰.

The results suggest that even in environments with reduced level of corruption due to pre-existing heightened risks a self-reporting mechanism can still further diminish incidence of corruption. Also they confirm declines in corruption where agents encounter the same partner as observed in Abbink and Wu (2015) were not driven simply by an end of game effect where the opportunity cost of whistleblowing diminished as the game progressed.

This paper further affirms the potential for self-reporting incentives to combat corruption in a novel way and allows one to more confidently advocate their adoption alongside existing anti-corruption measures such as those that enhance transparency or oversight of public servants.

3.2. The Experiment

This study conducts a laboratory experiment in two parts and with two treatments: a Control and a Self-Report Treatment (SRT). The first part of the experiment, a collusive bribery game, is identical in both treatments. In the second part the Control simply repeats the collusive bribery game while the SRT allows individuals to self-report engaging in corrupt activities. Participants are informed the experiment is in two parts but are not provided information regarding the second part of the experiment until the conclusion of the first.

Part 1: The Collusive Bribery Game

Consider a repeated interaction, sequential decision game where participants are matched with a random partner each period. We present a scenario of an 'Importer' attempting to bring some goods through customs that are valued at 400 credits. The 'Customs Officer' inspects the goods and if she performs her duties honestly will record the goods and apply an import duty of 200 credits. The Customs Officer earns a wage of 200 credits per period and the revenue the government collects is donated to charity³¹. The role of a charity is to provide a negative externality for bribery that does not impact on other participants in the laboratory. All participants play the same role throughout the experiment.

³⁰ In this study paying a bribe is considered less undesirable than the corrupt favour itself (such as police tearing up speeding tickets or building inspectors overlooking non-compliance). Thus the mechanism is tailored to prevent the corrupt act from being performed more than it is to deter a bribe being exchanged. A regime that is more concerned with the paying of a bribe itself should augment the mechanism to allow reporting as long as a bribe is exchanged.

³¹ The Chinese Red Cross was nominated to be the charity although participants were not made aware of which specific charity would be the recipient. This was to prevent personal attitudes towards a particular charity to influence decisions.

Figure 9 describes the Collusive Bribery game. First the Importer is given the option of offering the Customs Officer a bribe B from 1 to 200 credits. It is clearly communicated to both parties that this is a bribe (as opposed to gift) to persuade the Officer to overlook the goods and allow the Importer to escape paying the import duty. The Officer is then informed whether or not a bribe was offered and if so, the size of the bribe. If a bribe was offered the Officer may choose to accept it or refuse it. Irrespective of whether a bribe was accepted or even offered the Officer then has the option of overlooking the goods. Should the Officer overlook the goods she will incur a cost of 10 credits to reflect the effort necessary to doctor or destroy paperwork³². Red arrows indicate the one-shot sub-game perfect equilibrium (SPE).

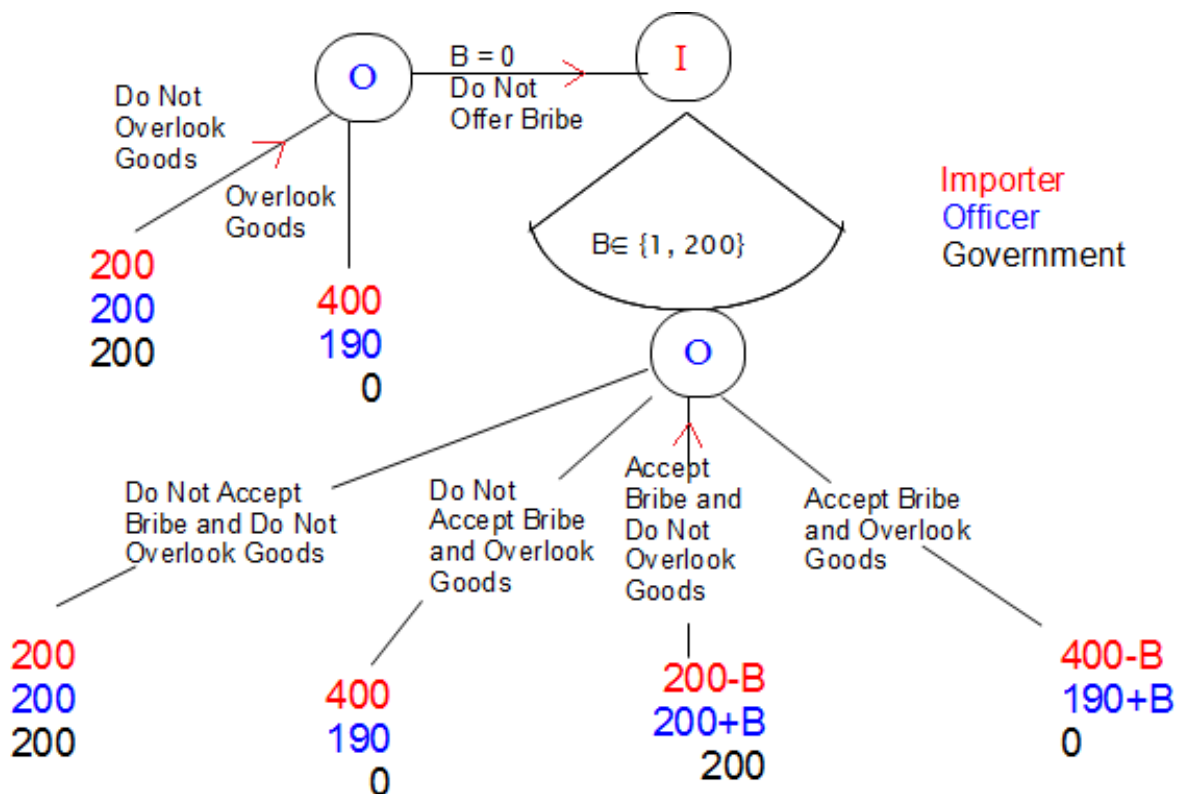


Figure 9: The Collusive Bribery Game Tree

The Officer has the option of taking a bribe but failing to perform the corrupt favour (subsequently referred as 'renege'). Importers are aware of the potential for this type of betrayal. Both parties are informed there is no chance of any authority uncovering bribery or corrupt favours being performed and hence the only disincentives for an Importer to offer a bribe are inherent aversion of corruption and the fear of renegeing. Unlike Abbink and Wu

³² We imply the Officer has already carried out the inspection and noticed the goods and hence there is negligible additional effort to recording the goods formally. Also note that this effort cost results in there being a small inefficiency in performing the corrupt favour.

(2015), participants are unable to build-up trust or reputation with one partner. Instead they gather information on the proportion of other participants in the lab that tend to reciprocate or renege.

The first part of the experiment is repeated for 6 periods although participants are only told that it will be played for at least 5 periods (this reduces backwards induction while maintaining the same number of periods for each part across treatments). As the participants are 'stranger' matched the one-shot SPE of not engaging in corruption is the dominant strategy. The potentially large reward of having one's goods overlooked was expected to tempt a significant proportion of Importers to offer a reasonably large bribe nevertheless but these would be the less risk averse, more altruistic or more trusting participants. Encountering several periods of Officers reneging would likely be sufficient to dissuade the majority of such Importers from offering bribes but it would be revealing if a self-reporting mechanism was able to amplify the distrust still further.

Part 2: Introducing a Rewards Mechanism

In the Control participants simply repeat part one of the experiment. In the SRT participants are introduced to a mechanism where they may potentially earn monetary rewards for engaging in corruption and reporting their partner.

In the SRT any self-report is only accepted if both a bribe is exchanged *and* the corrupt favour granted. This incentivises an Officer to accept any offered bribe but then renege without fear of being reported. Also as the participants are stranger matched such behaviour does not directly reduce the likelihood of receiving future bribe offers except in that the pool of Importers updates its expectations of trustworthiness of Officers unfavourably.

Part 2 is repeated for 8 periods across treatments but again participants are only informed it would continue for at least 5.

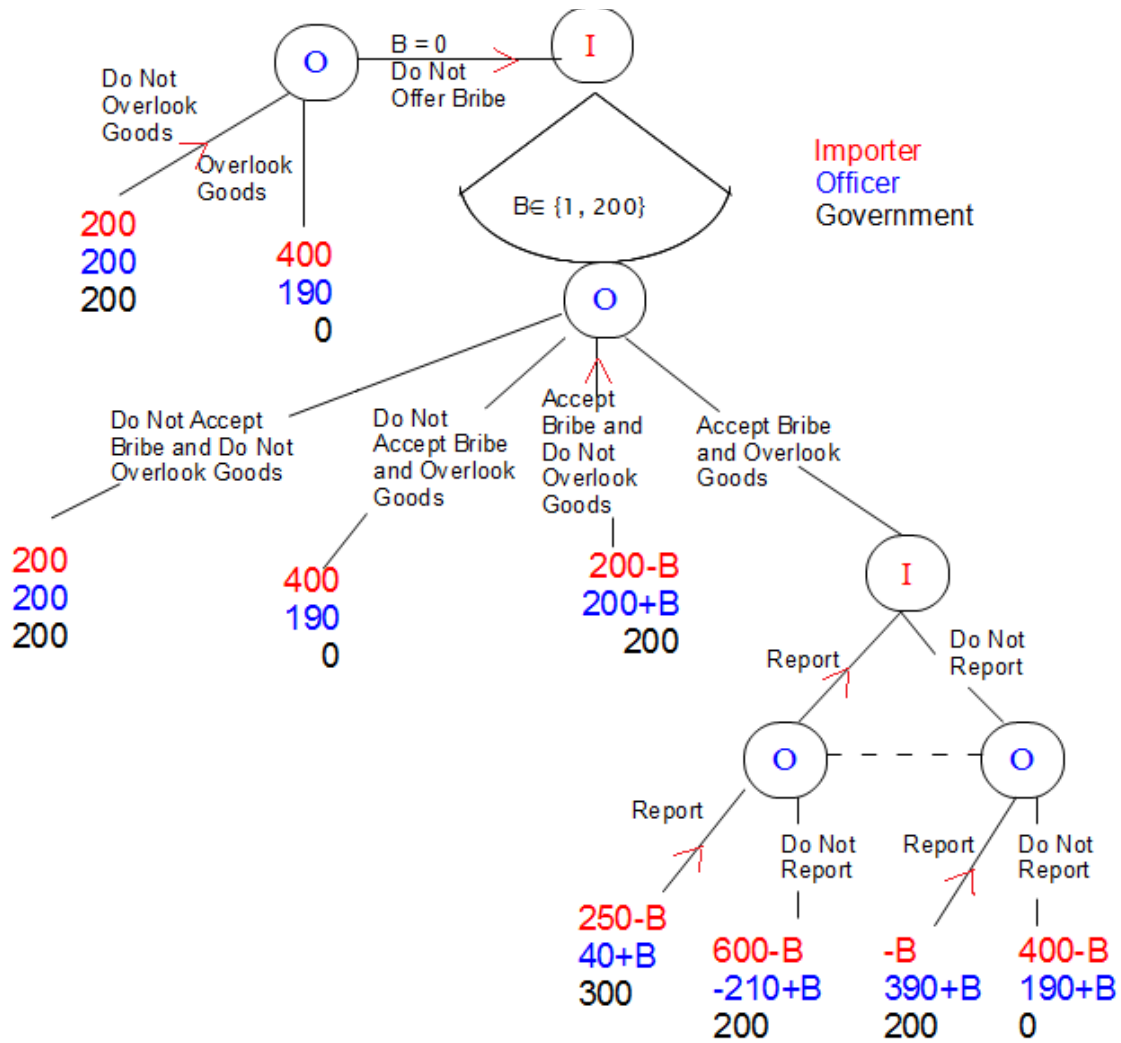


Figure 10: The Self Report Treatment Game

Figure 10 shows the symmetric reward mechanism. It is identical to the first part of the experiment unless participants choose to exchange bribes and carry out the corrupt favour. Importers who elect to offer a bribe are asked whether they will report their activities in the event the Officer accepts the bribe and grants the corrupt favour. The Officers who accept the bribe and grant the corrupt favour then elect whether they will lodge a report. Neither agent is aware of their partner's reporting decision until the outcome of the interaction is revealed.

Procedure

All experimental sessions were conducted at the Finance and Economics Experimental Laboratory (FEEL) in Xiamen University, Xiamen China. This allowed as

many conditions to be kept as identical as possible with Abbink and Wu (2015)³³. No one who had participated in Abbink and Wu (2015) was recruited for this experiment. An added advantage of conducting such an experiment in China is the greater likelihood of participants having confronted corruption³⁴.

Ninety six subjects participated in the experiment. Subjects were recruited through the FEEL participant pool³⁵. The experiment was computer based and ran on zTree (Fischbacher, 2007). Each subject participated in only one treatment. Two sessions were conducted for each treatment with the sessions stretching over two days. Each subject was assigned to either an Importer or Officer role for the duration of the experiment. Each session had 24 participants.

The same instructor read aloud the instructions in each session³⁶. The instructions used in-context language to evoke participants' pre-existing attitudes towards corruption. Instructions for the second part of the experiment were provided following the conclusion of the first part.

Following the bribery games all participants were presented with a set of questions probing their attitudes towards several types of corruption. These questions were obtained from Truex (2011) and are shown in Table 12. In addition to these the questionnaire asked about prior experience of bribery, nepotism and favour exchange. A high proportion of subjects have been exposed to corruption with only 15% indicating neither they nor anyone close to them has had to pay a bribe in the past, witnessed nepotism or exchange favours from someone in authority.

Payout of each participant was calculated based on cumulative earnings over the experiment. Participants earned on average 39.3 Chinese Yuan including a 10 Yuan show-up fee (at an exchange rate of US\$0.164 per Yuan this is approximately US\$6.50) with the majority between 35 and 55 Yuan (US\$5.60 – US\$8.80).

³³ Sessions for Abbink and Wu (2015) were conducted in FEEL in November 2012 while the sessions for this study was conducted in July 2013. While the participant pool will have experienced some natural turnover there is no reason to believe there has been any significant change to its overall make-up.

³⁴ Barr and Serra (2010) find that country of origin does influence willingness to engage in corruption in an experiment while Cameron et al. (2009) revealed that attitudes towards corruption across cultures cannot always be predicted by the extent of corruption in those cultures. Nevertheless it is more revealing to conduct an anti-corruption experiment with those who have greater exposure.

³⁵ Students joined the pool by registering on their database which is run using ORSEE (Greiner, 2004). Any student within the university was eligible to join the participant pool but the majority were studying within the economics department.

³⁶ The instructions were provided in Mandarin Chinese. An English translation is included in the appendix.

3.3. Results

Bribe Exchange

Summary statistics of the incidence of bribe exchange and the average size of bribes being offered are shown in Table 10. The portion displaying size of bribe offers excludes observations where no bribe was offered. Figure 11 shows the mean proportion of bribe exchange by period and Figure 12 shows the mean bribe values being offered per period. A Wilcoxon rank-sum test of the incidence of bribe offers between treatments (for part 2 observations only) confirmed that the SRT reduces the incidence of bribes being offered ($Z = 2.83, p = 0.01$). A Wilcoxon rank-sum test of the size of bribe offers (excluding zeros) for part 2 observations confirms SRT reduces the size of positive bribe offers ($Z = 4.51, p = 0.00$).

	Proportion Exchanging Bribes			Size of Offered Bribe		
	Mean	S. Dev	Freq	Mean	S. Dev	Freq
Part1						
<i>Aggregated</i>	0.441	0.497	288	62.0	34.4	127
Part 2						
<i>Control</i>	0.349	0.478	192	56.2	32.5	67
<i>ST</i>	0.219	0.414	192	28.6	30.9	42
<i>Total</i>	0.284	0.451	384	45.6	34.5	109

Note: Only positive bribe offers included in calculation of size of bribe offers.

Table 10: Summary Incidence of BribeExchange and Size of Offers

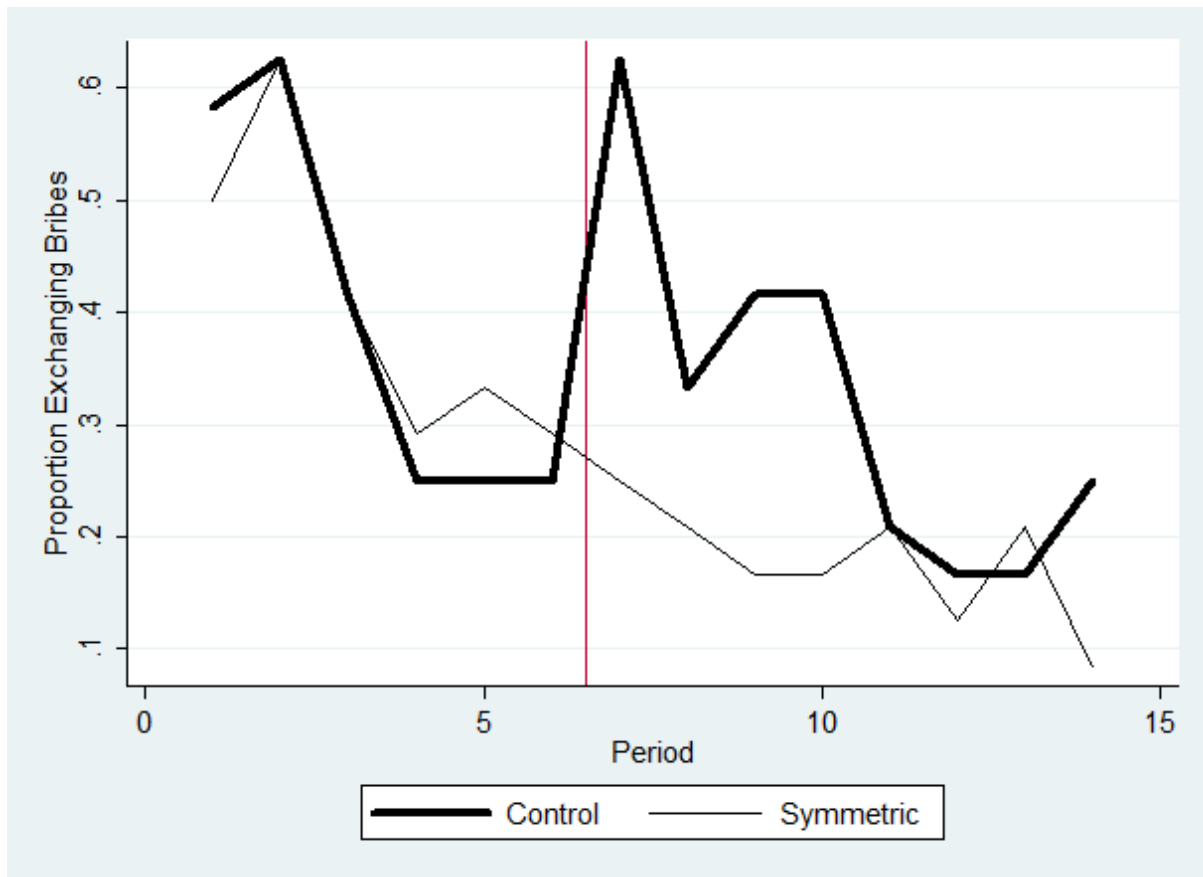
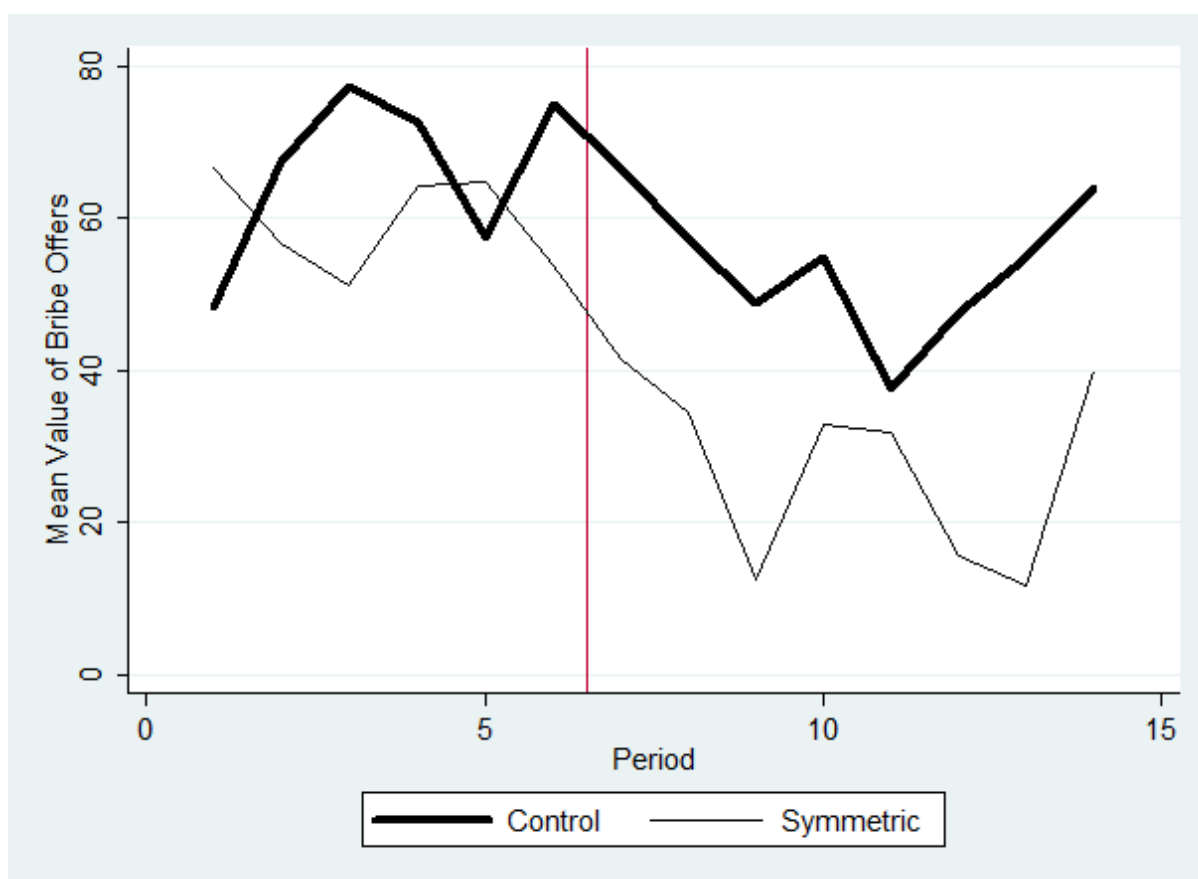


Figure 11: Mean Bribe Exchange Incidence by Period

Table 11 shows the mean bribery exchange incidence clustered into subgroups. These periods were selected to identify behaviour when participants were certain the game would continue (periods 1 to 4 and 7 to 10 inclusive) and compare it to periods where they were uncertain whether the next period would be played (periods 5 & 6 and 11 to 14). The rank sum test between periods 1 to 4 and 7 to 10 reveal a significant decline in bribes being exchanged in the SRT even when participants expect the game to continue. Comparing periods 11 to 14 against 7 to 10, we observe a stronger decline in the propensity to exchange bribes in the final periods of Control relative to the SRT. This is attributed to the bribe exchange incidence continuing to decline at the start of the second part of the experiment for the SRT but increasing in the Control. Overall there is a significant decline in bribery rate while subjects expect the game to continue under SRT but even without the reward mechanism reneging is effective in bringing bribe exchange rates down to comparable levels eventually.



Excludes observations where no bribe was offered.

Figure 12: Mean Bribe Values by Period

Mean Bribe Exchange Incidence

	Average Across Periods			
	1-4 (I)	5-6 (II)	7-10 (III)	11-14 (IV)
Control	0.47	0.25	0.45	0.20
SRT	0.46	0.31	0.20	0.16

Wilcoxon Ranksum Tests (p – values shown)

Difference between columns	Control = ST
I and III	0.004
III and IV	0.001
II – I and IV - III	0.350

Table 11: Mean Bribe Exchange Incidence Grouped by Periods

Reneging and Self Reporting

Figure 11 and Figure 12 show the rate of bribery compared against the rate of reneging and self-reporting in each treatment. The figures show attempted reporting as there were no incidences of actual reporting. This is due to virtually every bribe that was accepted resulting in the officer reneging in the SRT.

Reneging reduces the likelihood of Importers offering a bribe in the following period in Part 2 of the Control, (Wilcoxon rank-sum $Z = 4.47$, $p = 0.00$) but not in the SRT, (Wilcoxon rank-sum $Z = 0.92$, $p = 0.36$). This is likely caused by a subset of Importers in the SRT consistently offering small bribes and self-reporting while anticipating a high probability of being reneged.

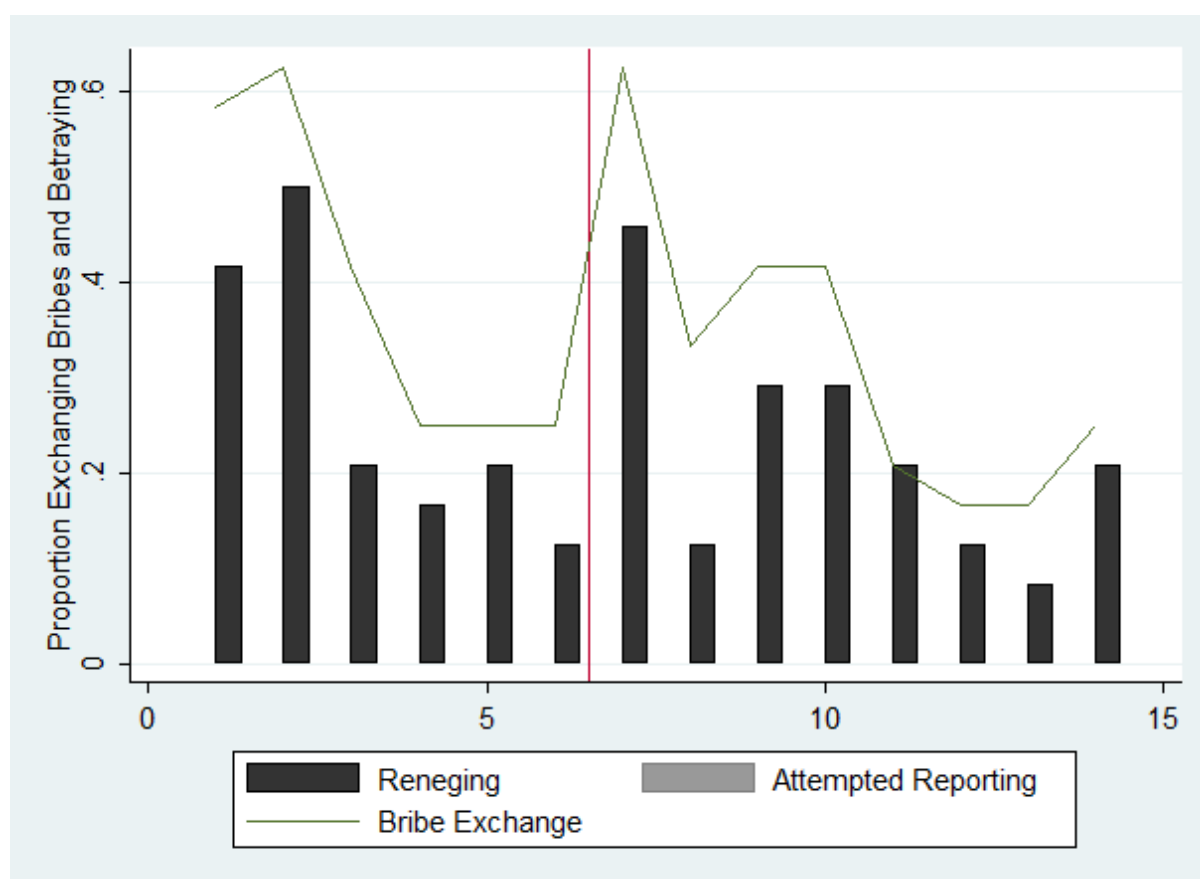


Figure 13: Bribery and Betrayal – Control

Given the high proportion of those offering bribes in SRT attempting to self-report (close to 100% in most periods) the incidence of bribes still being offered understates the

success of the self-reporting mechanism. A stronger indicator is the rate of goods being overlooked in Part 2 sharply declining between treatments (10.4% Control, 2.1% SRT).

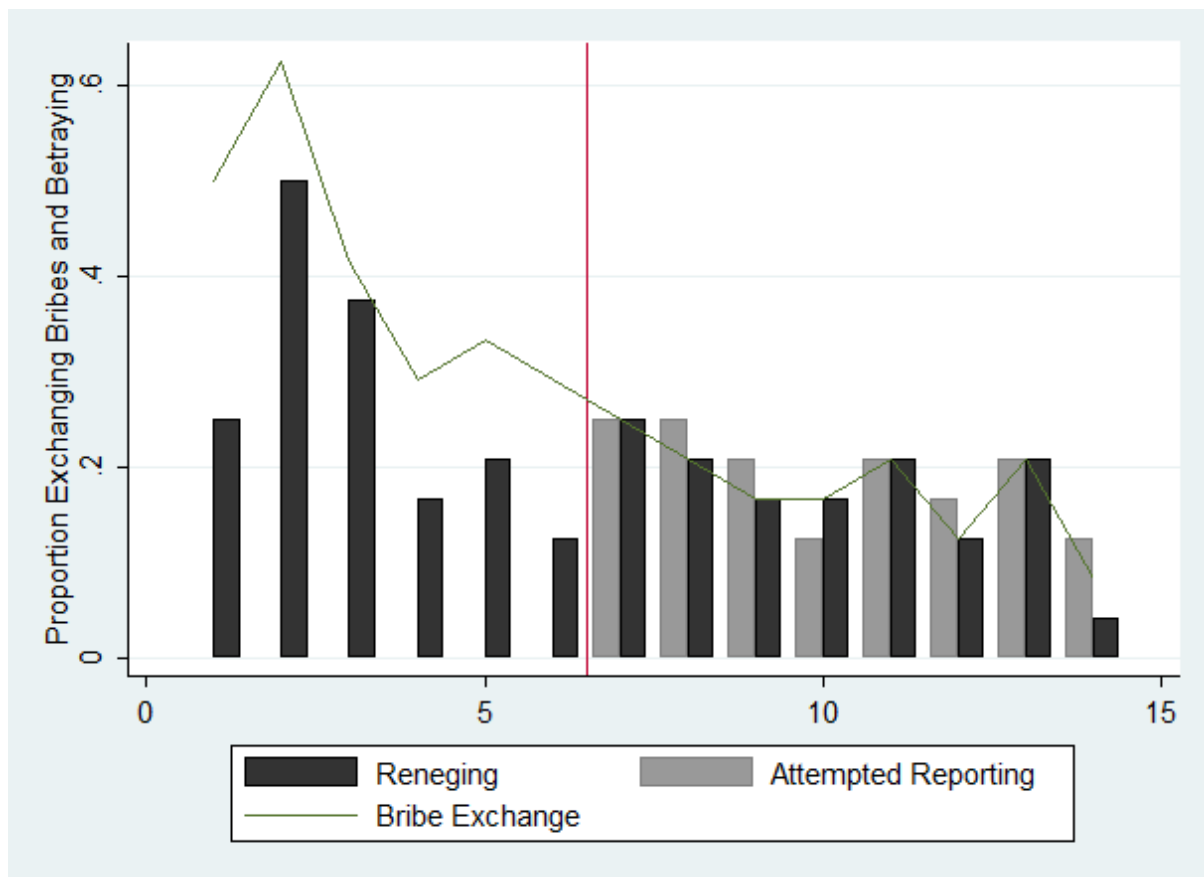


Figure 14: Bribery and betrayal - SRT

3.4. Conclusion

This paper examined the effectiveness of offering a reward for agents to self-report corrupt interactions as a means of combating collusive bribery. The results demonstrate that the self-reporting mechanism is able to dramatically reduce the incidence of bribes being offered and even more significantly reduce corrupt favours being granted³⁷.

The mechanism functioned by undermining trust and expectations of reciprocity for most but also encouraged a small subset of agents to doggedly offer small bribes in an attempt to ensnare their partner. Such strategies persisted over several periods of being

³⁷ The scale of decline is comparable with Abbink and Wu (2015) although the starting level of bribery is lower as the stranger matching regime itself erodes the ability for agents to establish trust.

reneged upon in addition to the always present risk of incurring a fine rather than reward should their partner also report their activities³⁸.

The incidence of bribes being exchanged in SRT remaining low at the beginning of Part 2 demonstrates the mechanism functions at least in part on the expectation of the cost of betrayal being low. This is because participants without any additional experience of being betrayed nevertheless anticipated their partners would have no self-interested reason to refrain from self-reporting. Thus a whistle-blowing incentive can successfully deter bribery even among individuals who have no prior history of being reported and penalised.

These results further support the application of a mechanism incentivising self-reporting as a means of combating corruption by demonstrating their efficacy in an environment where agents do not establish any familiarity with their partners. Nevertheless some practical limitations discussed in Abbink et al. (2014) remain. These include deterrents to reporting should there be low conviction rates even with one party testifying and also potential harassment or retribution from the public official.

Another constraint of this study is that the deterrent to corruption stems mostly from the dramatically higher likelihood of reneging. Many petty corruption interactions involve payment and the granting of the corrupt favour occurring concurrently. Reneging would not be possible in such circumstances. While it is likely a reward for self-reporting would still have a deterrence effect such a scenario is beyond the scope of this paper. Hence an opportunity for further study would be to construct a reward mechanism for a scenario where a bribe is exchanged only when a corrupt favour is granted and vice versa.

Another drawback of the current mechanism is that an agent who is coerced into paying a bribe by a public servant and then self-reports still incurs a fine should the public servant also lodge a report. To avoid punishing the client twice it would be advisable to allow both the client and the public servant to self-report but penalise the public servant as if only the client self-reported in the event of both submitting a report. Thus the mechanism heavily disincentivises the public servant from demanding or accepting a bribe. Should a situation arise where a client is in a position to threaten a public servant unless a corrupt favour is

³⁸ Such tenacity was not observed with the partner matching regime of Abbink and Wu (2015) as once one has been reneged upon by a partner it would be illogical to expect that offering another small bribe next period would induce a different outcome with the same partner.

granted the public servant should be able to report such demands via existing law enforcement channels.

3.5. Appendices

	“Please indicate how acceptable each of the following scenarios is, with 1 being Very Unacceptable and 5 being Very Acceptable.”	Mean (SD in brackets)
1	A police officer does not give a taxi-driver a traffic ticket because he is a friend	2.9 (1.4)
2	A shopkeeper offers a tax collector a small amount of money in order to avoid paying taxes	2.6 (1.17)
3	A shopkeeper offers a tax collector a small gift in order to avoid paying taxes	2.4 (1.22)
4	A politician gives a job to a family member even though other applicants are more qualified	1.90 (1.14)
5	A businessman gives a job to a family member even though other applicants are more qualified	2.7 (1.39)
6	A government employee gives a job to a family member even though other applicants are more qualified	2.00 (1.20)
7	A construction contractor gives a government employee a large gift in hopes of receiving a government construction contract	2.5 (1.37)
8	A government employee awards a government construction contract to a friend’s business because he is a friend	2.58 (1.33)
9	Because of a delay, a schoolteacher gives a government employee a small gift in order to make sure that his passport gets processed	3.70 (1.19)
10	A schoolteacher gives a government employee a small gift in order to obtain a passport without proper documentation	2.8 (1.21)
11	A government employee asks a schoolteacher for a small gift in exchange for giving him a passport without proper documentation	2.30 (1.37)
14	Have you or someone close to you ever been asked to pay a bribe?	52% “Yes”
15	Have you or someone close to you ever witnessed nepotism?	68% “Yes”
16	Have you or someone close to you ever been asked by someone in authority for a favour in exchange for a favour?	38% “Yes”

Table 12: Questionnaire

3.6. Instructions

Part 1 – Common to All Treatments

An Experiment of Economic Interactions

Instructions

Part 1

Thank you for participating in this experiment. We ask you not to communicate with any other participant during the course of this experiment. Failure to comply with this instruction will result in your being asked to leave the experiment. You will not receive payment should this occur. Please read the following instructions carefully. If you have any questions, please raise your hand and the experimenter will come to you.

This experiment will be conducted in two parts. You will receive the total payment from these two parts at the end of the experiment. The exchange rate throughout the experiment will be **100 credits = 1RMB**.

The first part of the experiment will place you in an interaction with another participant. The computer will randomly choose half the participants to perform the role of an Importer and the other half to perform the role of a Customs Officer. The computer will then randomly match each Importer with a Customs Officer. You will be told at the start of the interaction the role you are assigned. The interaction will be **repeated for at least 5 periods** and each time you will be paired with another participant randomly. In each period however you will perform the same role throughout Part 1 of the experiment.

Your payment for the first part will be the sum of your earnings in each period.

Background

The importer is bringing some goods through customs for sale on the local market. However the goods incur a customs duty.

The customs officer inspecting the shipment may choose to overlook the items and thus allow the importer to avoid paying the customs duty. The importer is aware of this and has the option of offering the officer a bribe.

The customs officer can choose whether to overlook the goods irrespective of whether he/she accepts a bribe. Thus even if the customs officer accepts a bribe, he/she does not have to allow the importer to escape taxes. Similarly the officer may choose to overlook the goods even without receiving a bribe.

Regardless of whether the officer receives a bribe, if he/she chooses to overlook the goods the officer must go to some effort to alter the records.

There is no chance of any authority discovering any bribes being offered or exchanged nor of any goods that are overlooked.

The Interaction

5. You will first be told the role you are assigned.
6. The importer will then have the opportunity to offer a bribe.
7. Then the officer will be told whether a bribe was offered. If a bribe was offered the officer

will also be told the value of the bribe.

8. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.

Earnings

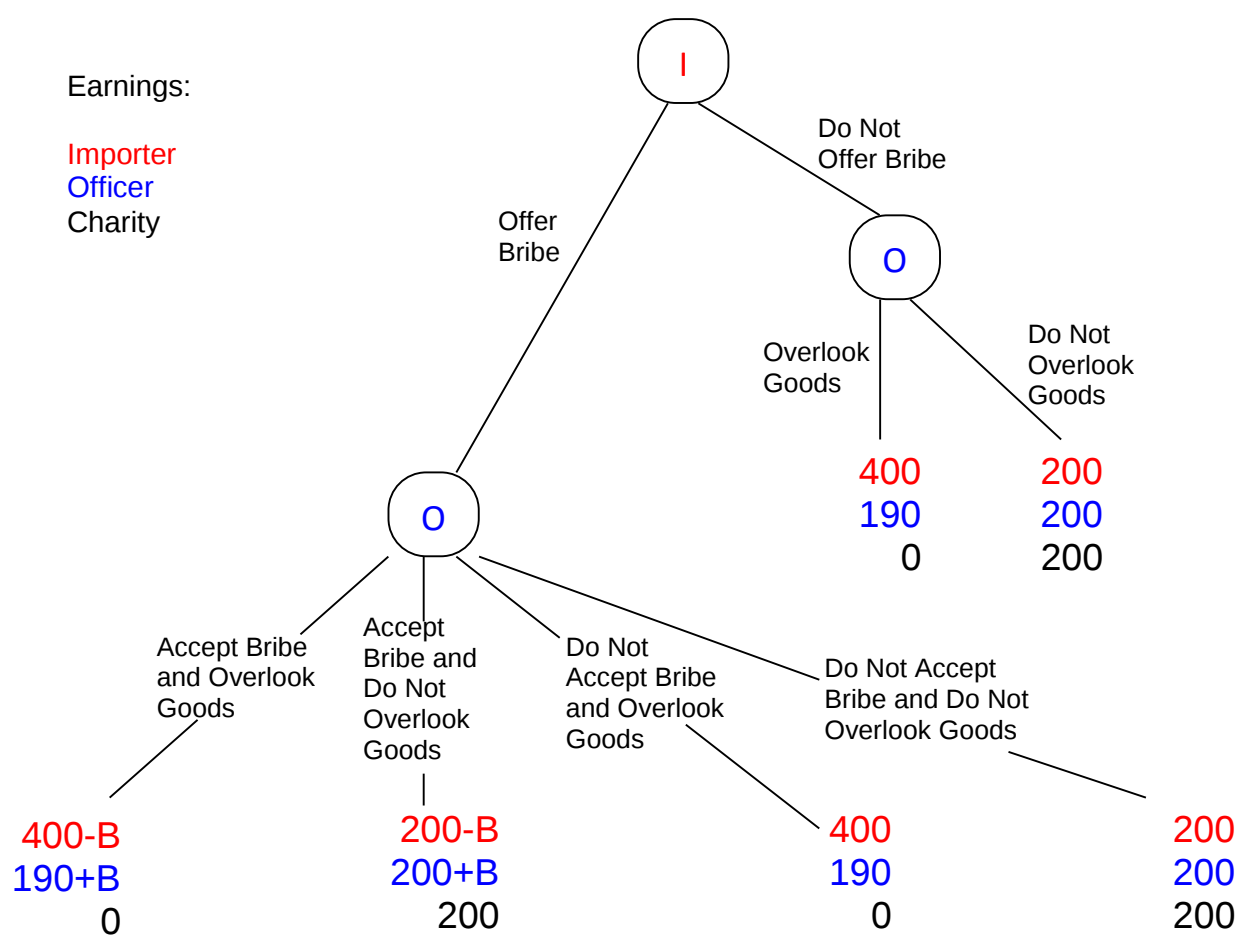
- The goods are worth **400 credits** to the importer.
- The officer earns **200 credits** in wages.
- The customs duty levied on the goods is **200 credits**. If the officer overlooks the goods, the importer will not have to pay this duty.
- If the officer overlooks the goods, the effort that he/she must spend altering the records is represented as a **10 credit** cost to the officer.
- As the maximum amount the importer can save should the officer overlooks the goods is **200 credits**, the importer can offer a bribe no greater than **200 credits**.
- The system will count and donate any proceeds that are collected as customs duty to charity. Hence any goods that are overlooked reduces the donations to charity

Thus there are four possible outcomes in each period with payoffs as follows (B represents the size of the bribe paid to the customs officer):

	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	200-B	200 + B	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0
If the importer pays a bribe B credits and the officer overlooks the goods	400-B	190+B	0

A summary of the interaction and earnings are displayed in figure 1. **B** represents the size of the bribe paid to the customs officer, the red areas represent the earnings of the importer with each set of decisions while the blue area represents the earnings of the customs officer in each set of outcomes.

Figure 1: Interaction and Earnings Summary



Part 2 – Control

An Experiment of Economic Interactions

Instructions

Part 2

This part of the experiment is identical to the first part of the experiment. You will again be randomly paired with another participant each period as in Part 1. You will be performing the same role in each period as in Part 1 of the experiment.

This interaction will be **repeated for at least 5 periods**. It will not necessarily have the same number of periods as part one of the experiment.

Part 2 – SRT Treatment

An Experiment of Economic Interactions

Instructions

Part 2

In this part of the experiment you will be interacting in the same way as before except that you will have one extra decision to make. This interaction will be **repeated for at least 5 periods**. It will not necessarily have the same number of periods as part one of the experiment. You will again be matched with a partner randomly each period. In each period you will again be performing the same role as in Part 1 of the experiment.

There is now a new role, that of the government, that will be played by the computer. The government implements a new program where it will reward those who admit to engaging in corruption and fine the other party. The government will only act on a claim if a bribe is paid *and* goods are overlooked. Thus even if a bribe is paid the authorities will ignore a report if the official does not overlook the goods.

If bribes are paid and goods overlooked and only one of the parties makes a report the government will **pay** that party **200 credits** but **fine** the other party **400 credits**. If both of the parties report themselves the government will **fine both parties 150 credits**. This is summarised in figure 2:

Figure 2: *Additional Rewards and Fines from Self Reporting*

		Importer	
		No Report	Report
Customs Officer	No Report	0 0	+200 -400
	Report	-400 +200	-150 -150

The government is unable to accurately verify the value of any bribe and thus the official will keep any bribe paid regardless of whether one or both of the parties report themselves.

Also as the officer destroyed paperwork relating to the goods in overlooking them the government is unable to recover any duties that were overlooked. Thus if the official overlooked the goods, the importer does not need to pay the duty regardless of whether

anyone has made a report.

The Interaction

10. The importer will have the opportunity to offer a bribe.
11. If the importer offers a bribe he/she will be asked whether he/she would like to make a report in the event the officer accepts the bribe and overlooks the goods.
12. The officer will be told whether a bribe was offered. If a bribe was offered the officer will also be told the value of the bribe. The officer is not told whether the importer would make a report if a bribe is accepted and goods overlooked.
13. If a bribe is offered, the officer will then decide whether or not to accept the bribe and also whether or not to overlook the goods. If a bribe is not offered the officer will simply decide whether or not to overlook the goods.
14. If a bribe was offered and the officer both chooses to accept the bribe and overlook the goods, the officer will then decide whether or not to make a report. Note that the officer is not told whether the importer will make a report.

If no one makes a report there is again no chance of being caught and the earnings will be determined in exactly the same way as in the first part of the experiment. If however one or both of you report yourselves you will earn a reward or be penalised on top of your earnings from wages or sale of the goods.

The net proceeds of fines minus rewards received by the government are also donated to a charity.

Thus the payout for this part of the experiment in each period is the same as part 1 of the experiment if either no bribe is paid or if the officer does not overlook the goods:

	Importer Receives	Officer Receives	Charity Receives
If the importer does not offer a bribe and the officer does not overlook the goods	200	200	200
If the importer pays a bribe B credits and the officer does not overlook the goods	200-B	200 + B	200
If the importer does not pay a bribe and the officer overlooks the goods	400	190	0

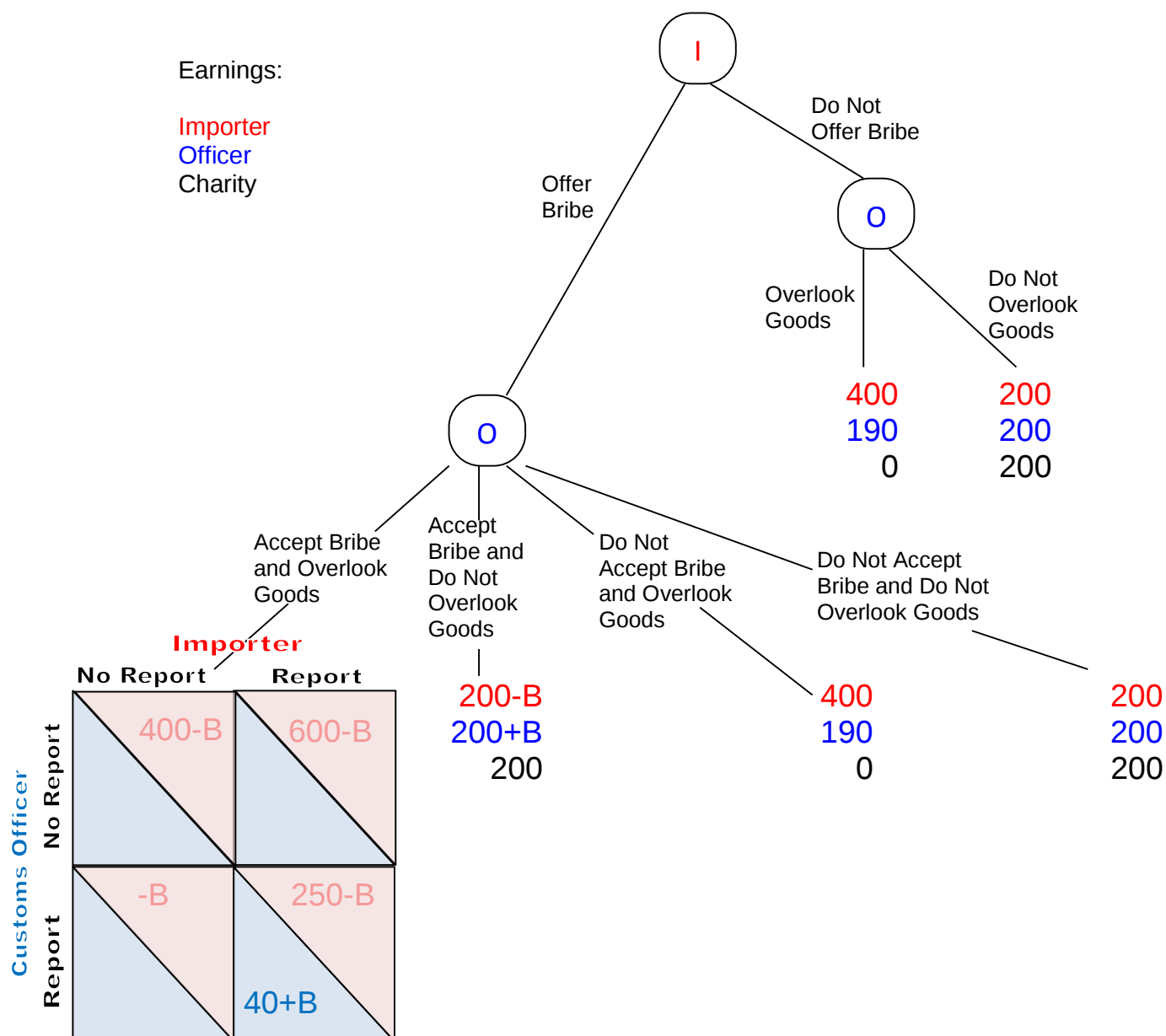
If however a **bribe is paid** and goods are **overlooked** both the officer and importer have an option of reporting their activity. The final payouts under each reporting decision are as follows:

	Importer Receives	Officer Receives	Charity Receives
If neither the importer nor the officer reports their activities	400-B	190+B	0
If the importer makes a report but the officer does not	600-B	-210+B	200

If the officer makes a report but the importer does not	$-B$	$390+B$	200
If the importer and officer both make a report	$250-B$	$40+B$	300

The summary of final payouts in each period are displayed in figure 3:

Figure 3: *Summary of Interaction and Earnings in Part 2*



Declaration for Thesis Chapter 2

Declaration by candidate

In the case of Chapter 2, the nature and extent of my contribution to the work was the following:

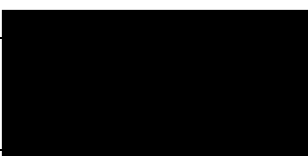
Nature of contribution	Extent of contribution (%)
Formulation of research question, design of experiment, data analysis and write up.	30

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

Name	Nature of contribution	Extent of contribution (%) for student co-authors only
Klaus Abbink	Experiment design and write up	
Lata Gangadharan	Experiment design and write up	
Puneet Arora	Experiment design and data collection	

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

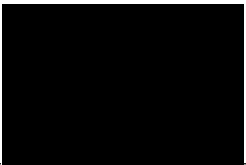
**Candidate's
Signature**

	Date 8 Aug 2015
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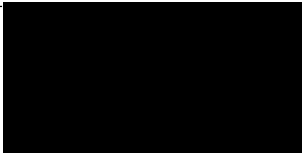
**Main
Supervisor's
Signature**

	Date 8 Aug 2015
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**Coauthor's
Signature**

	Date 8 Aug 2015
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**Coauthor's
Signature**

	Date 29 Sept 2015
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Chapter 4 - Corruption in the Field: Evidence from Notaries: A Field Experiment on Corruption among Notaries Public³⁹

4.1. Introduction

Corruption deservedly receives significant research attention given its potential to undermine social welfare initiatives and diminish growth (see Méon and Sekkat (2005) and Olken (2006)) but due to its clandestine nature has proven difficult to directly observe. This results in our being poorly informed regarding fundamental aspects of corruption. Are pricing schemes standardised or determined spontaneously? Are prices sensitive to competition? In what way do risk of detection, penalties and immorality influence decision making in a corrupt environment? Even in environments where corruption is rampant are there many officials who would refuse a bribe? This study aims to answer these questions by expanding the hitherto very limited body of work observing petty corruption in the field. Providing a basic understanding of the mechanisms that enable corruption to thrive is the necessary first step towards policy makers devising effective tools to combat it.

We engage notaries who administer legal documents to certify that a document we present to them is a genuine copy of its original. For some notaries we also make an illicit request. These notaries are common around the world and provide services that carry legal authority. By observing whether they accept our illicit requests we examine whether their legal authority can be compromised for a bribe.

We vary the nature of the interaction with the notaries such that in the Control treatment no illicit request is made. We conduct two more treatments in which we introduce an illicit request to the interaction. In the Backdating treatment we request the notary to backdate the certification by a few days. This is a violation of the notary's duties but would appear only mildly immoral and carries little risk as there is no evidence demonstrating that the document was not certified on the date shown. In the Augmented treatment we modify an important detail of the copy and make the notary aware of the discrepancy. Certifying this copy constitutes a severe breach of professional ethics and the law. It also carries greater risk of detection as the certified copy can be shown to be different to the original. These

³⁹ We are grateful for funding from the Australian Research Council (DP140101900). This research project has been approved by the Human Research Ethics Committee at Monash University. We retain responsibility for any errors.

treatments enable us to examine whether there is a difference in the size of bribes requested or the rate of refusal between a request for a low risk, minor violation (Backdating) and a high risk, major violation (Augmented).

Also we are interested in the impact of competition on the size of bribes requested and the likelihood of engaging in corruption. Approximately half of notaries in our sample operate from within large district court complexes which exhibit significantly higher densities of notaries relative to other locales. Thus we determine the impact of competitors being nearby by creating another treatment dimension of whether the notaries operated In-Court (IC) or Out-of-Court (OC). Conventional economic theory would suggest that competition creates a downward pressure on prices, hence lower bribe demands from the OC notaries. Also competition may increase the proportion of corrupt agents should agents engaging in corruption be able to reduce operating costs. This pressures competitors to also engage in corruption or be priced out of the market (Basu, McGavock, & Zhang, 2013). While notaries do not incur higher costs by refusing corrupt offers it would reduce the number of clients they service and thus increase their average cost per client⁴⁰.

A potential shortcoming of comparing IC and OC notaries to distinguish between high and low competition is that there may be other differences between them that might account for any observed differences in fees. For example OC notaries may rely less on document certification as their primary source of income, they may have different professional training or serve a different type of clientele. Also, as we could not randomise notaries into treatments, notaries have self-selected whether they operate in a high competition or low competition environment. Fortunately OC notaries exhibit some variation in competition which enables us to conduct a robustness test.

Our findings offer several important insights into the market for corruption. We find that most notaries are prepared to fulfil a low risk illicit request for a modest bribe but half refuse the riskier request. This reveals that even in environments where corruption is commonplace the threat of prosecution can deter some from more serious or riskier violations. Those who do consent to the riskier violation demand substantially higher bribes but only if competitors are nearby. Surprisingly competition not only fails to reduce the size of bribes demanded but rather increases the size of bribes demanded for both the high risk and low risk request. We do not find support that competition increases the proportion of corruption agents

⁴⁰ Assuming a positive fixed cost for obtaining notary registration and the opportunity cost of time

however. The size of bribes requested also tends to be determined ad hoc with significantly larger variances in fees for the Backdating and Augmented treatments than the Control.

There are numerous advantages to a natural field experiment design where the researchers directly interact with the officials over other forms of data gathering⁴¹. The majority of data available on corruption are from surveys which often report a significant difference between perceptions of corruption and experiences of corruption⁴². However Olken (2009) demonstrated that there are significant individual-level biases in reported perceptions of corruption and stresses the importance of gathering objective measures.

Given the illegality of exchanging a bribe, survey data and other indirect data gathering methods, such as recruiting members of the public to interact with officials, may also underreport the extent of illicit behaviour. Finally it is often impossible to capture the full nuance of an interaction reported to researchers second hand. Such accounting may lead to miscommunication or intriguing secondary findings being missed.

To our knowledge this paper is amongst the first to report on first-hand corrupt interactions between researchers and public officials in a natural field experiment. This is due to the numerous challenges that must be overcome. First a suitable body of officials must be identified that are widely known (or at least rumoured) to be corrupt but also would enable researchers to interact repeatedly with different agents without arousing suspicion. As our research question varied whether we made a lawful or illicit request we needed an interaction where we could easily vary the nature of the request without substantially changing any other aspects. Second, there is some inherent risk to the researcher when making an illicit request. While we painstakingly sought to reduce this risk throughout the design process we could not entirely eliminate the possibility of an official alerting the authorities to our making an illicit request. Finally, many bureaucratic hurdles could present themselves when designing such a study. Field experiments are notorious for typically requiring significant resources and cooperation with a third party such as an NGO, government body or company. A key advantage of our design is that it requires a relatively modest budget and no cooperation from governmental bodies, who may also be corrupt or otherwise incentivised to downplay the severity of corruption. This enables our findings to be more easily verified with a repetition study and prevents our having to accommodate the needs and wishes of a third party.

⁴¹ See List (2011) for a discussion of the characteristics of the various types of experiments along with their benefits and drawbacks.

⁴² See the India Corruption Studies (2011) prepared by the Centre for Media Studies and the EU Anti-Corruption Report (European Commission, 2014).

Notaries Public circumvent all of these challenges as they are numerous, widely rumoured to be corruptible and unlikely to make a complaint to the authorities.

4.2. Literature Review

Our paper is closely related to several prior field experiments in the area of corruption. Bertrand, Djankov, Hanna, and Mullainathan (2007), for example, demonstrated that bribery was commonplace in obtaining a driver's license in New Delhi. While this paper revealed some startling insights data was collected through members of the public recruited to interact with middlemen and officials. We obtain observations directly with notaries rather than relying on middlemen or members of the public, enhancing the degree of control and enabling us to document aspects of interactions that might be missed from a post-experiment questionnaire⁴³.

Fried, Lagunes, and Venkataramani (2010) obtained direct observations of corruption with traffic police by making illegal left turns in Mexico City and varying whether the driver appeared affluent or working class. Our study varies the characteristics of the violation rather than the personal attributes of the bribe giver.

Olken and Barron (2007) conducted an observational study by accompanying truck drivers in Aceh Indonesia. They discovered that bribery interactions obeyed similar market principles to legal commercial entities including some weigh stations engaging in sophisticated third degree and second degree price discrimination. Naturally Olken and Barron (2007) did not vary the nature of the cargo which was assumed not to include contraband.

Beekman, Bulte, and Nillesen (2011) and (2013) observed a relationship between embezzlement of aid by villages leaders and the reduction of willingness of villagers to engage in economically productive activities. We do not make observations of the effects of corruption on the community but focus instead on the act of engaging in corruption.

There have also been a number of field studies investigating the effectiveness of anti-corruption mechanisms such as monitoring to combat embezzlement (Olken, 2005, 2006) or enhanced transparency regulations to combat bribery (Peisakhin, 2012; Peisakhin & Pinto, 2010). While this paper does not test potential anti-bribery policies we do seek to contribute

⁴³ For example we found on occasion notaries refusing an illicit request indicated a concern for our wellbeing as the reason while other notaries consented and did not request a bribe. It might be reasonable to interpret both behaviours as examples of altruism. As it is impossible to anticipate all potential responses some behaviours would not be documented were we to rely on post experiment surveys with members of the public.

to future policies by providing a greater depth of understanding of how bribery interactions are conducted.

Finally this paper was also significantly informed by Armantier and Boly (2011) which investigated various factors that might influence bribe acceptance by recruiting members of the public to grade exams. While we also directly observe agents unaware they were participating in a study, our participants demand bribes while performing their full time occupations.

Given the challenges of field experiments investigating anti-corruption policies the majority of experimental studies relating to combating corruption are laboratory studies (see Abbink and Serra (2012) for a review). By offering the experimenter total control over the interaction, lab experiments are well suited to testing particular aspects of corruption and anti-corruption policies. However they are by design unable to holistically observe a corrupt interaction as it would occur in the field. Field experiments offer a more nuanced and more reliable view of the challenges corruption presents than either surveys or laboratory experiments can achieve. Given the obstacles that must be overcome to conduct a field experiment on illicit activity it is unsurprising there are very few such studies. Thus by shedding light on a secret market operating in parallel with legitimate markets and doing so in a novel manner, our study constitutes a significant contribution to the literature.

4.3. Experimental Design

We approached Notaries Public in Delhi and requested they certify that a copy of a document is a genuine copy of the original⁴⁴. Notaries Public in India have a reputation for a willingness to engage in corruption and would be unlikely to uncover that we were conducting an investigation. Also given the nature of the request we considered it unlikely a scrupulous notary would inform the police⁴⁵. Interacting with notaries also allowed us to make either legal or illicit requests. Furthermore as the fees charged by notaries for certifying a document as being a genuine copy of the original is very low (regulated price is Rs. 10 or approximately US\$0.17) and notaries were unaware we were conducting a study, this

⁴⁴ While Notaries Public are not in the direct employ of the State they are a tightly regulated service in India. Regulations pertaining to notaries are detailed in The Notaries Rules, 1956 and are available at <http://lawmin.nic.in/la/subord/notaryrules.htm>

⁴⁵ The consequences of encountering a scrupulous official was a key deciding factor in selecting notaries. An alternate design where we interact with ticket inspectors on trains and offer a bribe for fare evasion was dismissed partly for this reason.

experiment could be conducted with relatively modest expense and few bureaucratic hurdles needing to be cleared.

We implemented a two by three design varying whether we did not make an illicit request accompanying the document certification (Control), whether we requested the certification be backdated four days (Backdating), or whether a copy that had been augmented from the original could be certified (Augmented). Observations from notaries within large district court complexes (In-Court or IC) and out of these complexes (Out-of-Court or OC) were classified as separate treatments. This is because IC notaries typically operated in much closer proximity to competitors (sometimes sharing a large open-plan office) and in a busier environment. This allows us to study the effect of competition on bribe demands in the natural environment. We conduct a robustness test using only OC observations, which exhibit some variation in competition, to check whether differences between IC and OC fees can be largely attributed to differences in competition.

Document to be Certified

All treatments provided the notary with an original document that is purportedly an academic transcript from a fictional German University (see appendix for a copy of the transcript). The university is fabricated and the name listed on the transcript does not belong to anyone known to us. These steps were taken to avoid augmenting an actual university transcript which we felt would clearly be unacceptable ethically or legally. The original document was printed on 300 gsm paper so that it would look and feel more authentic but aside from an attempt at replicating a watermark did not include other means of demonstrating authenticity. We relied on notaries' likely inexperience with genuine German academic transcripts to avoid arousing suspicion.

In the Control and Backdating treatments notaries were presented with a black and white photocopy of the original and asked to certify this was a true and accurate copy. In the Augmented treatment we modified the “Magisterarbeit / *Master thesis*” mark from 3.0 to 1.0 and the “Gesamtnote / *Final grade*” from “gut / *good* (1.7)” to “sehr gut / *very good* (1.5)” (see appendix). As these changes were not visually striking we considered it likely notaries only taking a cursory examination of the documents would probably overlook the difference. For this reason we always informed the notary of the discrepancy to ensure they did not certify our copy due to negligence.

While we could have approached notaries asking them to certify a copy of any arbitrary document as being true copies of an original we decided to use a university transcript as it would offer both a convincing backstory and confer sufficiently severe consequences of certifying a document falsely.

Interaction with Notary

All interactions with notaries were carried out by one researcher who is also one of the co-authors of this study⁴⁶. This was to ensure there were no researcher fixed effects such as gender or variations in appearance of trustworthiness that may influence our results. Also as the interactions and negotiations could become quite complicated and unpredictable we could not adequately plan a set response for every contingency. For this reason we felt it would be inappropriate to have multiple researchers interacting with notaries.

In the Control interactions we approached notaries who were otherwise unoccupied and as closely as possible reported the following:

Hello, my name is ... I would like to have a copy of my brother's academic transcript certified as being a true copy of the original.

[Presents original and photocopy]

My brother has received a research assistant position with an Australian University but the copy he sent with his application wasn't certified so they've said they need to see a certified copy before they can formally offer him the job.

If the notary did not make any further enquiries we did not volunteer any further information. If the notary enquired about the institution we explained as succinctly as possible that his brother completed his Masters studies at a German university. If the notary enquired as to why the applicant was not present to have the document certified himself we explained that he was currently at work.

For the Backdating treatments we reported the same statements as the Control but with the following added once the notary indicated a willingness to certify the copy:

⁴⁶ This researcher is a local of Delhi. He is of average height and build and does not have any particularly distinguishing visual features such as tattoos or piercings. At the time of the experiment he was in his mid-20's. We have no reason to believe he has any personal attributes that would be particularly remarkable to notaries relative to other clients they would encounter throughout the day.

Also would I be able to get it backdated about four days? My brother was actually supposed to get this to them two days ago but it slipped his mind. They phoned him yesterday and he lied and said he must have faxed it to the wrong number. So now he needs a copy backdated a few days so they don't catch him in a lie.

Can you help me?

We chose the phrase “can you help me?” to signal an understanding that we were making an illicit request and that we would be prepared to pay a bribe if necessary but did not want to initiate the bribe negotiation ourselves. By not initiating the bribe request we were also able to observe whether notaries were prepared to certify the copy without a bribe. In the event a notary refused our request we would not pressure him or attempt to negotiate further but rather thank him for his time and depart.

For the Augmented document treatments we reported the following in place of the Backdating statement:

Also there's one more thing I should mention. I don't know how he managed it but I noticed my brother's changed the copy somehow.

[Points out the discrepancies]

I think he's sent an uncertified version of this copy to the Australian university so he'll have to have this copy certified.

Can you help me?

We considered it crucial to reveal to the notary the discrepancy between the original and the copy as a careless notary could easily have failed to notice the difference. Also if a notary did notice the discrepancy without being informed beforehand it is likely he would believe we were attempting to deceive him at some risk to himself. We could not anticipate how notaries might then respond and thus did not want to expose ourselves to unnecessary risks.

Just as with the Backdating treatments we did not pressure notaries that refused the request.

The Backdating and the Augmented treatments allow us to capture elements of collusive corruption where the bribe is in payment for a benefit the client is not entitled to. The other class of bribes, “harassment” bribes, are extracted by public officials to provide clients with something they are already entitled to and is akin to our Control treatment.

The key dependent variables we recorded are whether the notary consented to certifying the document and if so, the fee charged. The official fee that a notary is permitted to charge for certifying one or two pages is Rs. 10 (USD 0.17). We do not classify fee requests exceeding this amount as harassment bribery as it is unlikely that this amount is sufficient to compensate the notary for the opportunity cost of his time.

Immediately following the interactions the researcher recorded the size of the fee requested, some personal characteristics of the notary such as gender and approximate age and any other remarks worth mentioning. All interactions were conducted in Hindi which is the local language in Delhi.

Selection of Notary and Treatment

For each interaction we randomly selected a notary whom we had not interacted with previously and who was unoccupied at the time. As we randomly chose the notary for each observation the notaries whom we interacted with still faced a random assignment to each treatment. We aimed to collect a balanced set of observations across the Control, Backdating and Augmented treatments in both the In-Court and Out-of-Court setting. While we felt it necessary to conduct all interactions with the same individual, this placed significant constraints on the number of observations that could be obtained. Notaries and solicitors qualified to certify documents as being genuine copies in New Delhi number in the thousands but many perform only higher value duties and could not be approached for this study. Of those that could be approached many operated in busy court complexes, in large document services companies or in road-side stalls near busy markets. While a small number do operate as sole traders in private offices the majority of notaries are clustered near others.

Ensuring Notaries Remain Unaware of our Conducting an Experiment

As the notaries remaining unaware of their being involved in a study is pivotal to obtaining valid observations, multiple precautions were implemented to ensure the interactions remained as natural as possible. Already discussed is the decision to use a fictional German transcript to ensure notaries dismissed any seemingly unusual qualities of

the transcript as being a result of its foreign origin. The script for how the interactions were to be initiated was also carefully tailored to be as simple and unremarkable as possible.

Also in all treatments the researcher haggled with the notary should the notary nominate a price above a predetermined amount (Rs. 30 for Control, Rs. 50 for Backdating and Rs. 100 for Augmented). This is because haggling over prices is extremely common in Delhi⁴⁷. As the thresholds above which we attempted to haggle were determined somewhat arbitrarily, the analysis conducted on prices will be in relation to the initial fee quoted⁴⁸.

Furthermore we paid any fee below Rs. 40 and had the copy certified. For the Backdating and Augmented treatments where a fee exceeding this may be considered justifiable the researcher attempted to discontinue the interaction if he felt it could be done without raising suspicion. For example if a notary in one of the Augmented treatments requested Rs. 300 the researcher may have been able to excuse himself by indicating he hadn't anticipated it would be so costly and would need to consult with his brother. If however the notary requested a fee that the researcher considered modest, it was accepted. Once we had interacted with a notary we did not return to the area for at least two months. This is to ensure that the notaries could forget having seen our researcher on a previous occasion. Also as he could not be seen to be visiting numerous notaries in the same area we could typically only gather one or two observations for each visit to a court or marketplace. Thus after obtaining 97 observations we face significant limitations in our ability to obtain further observations without running the risk of a notary recalling the researcher from a previous occasion and exposing us.

We conducted three pilot interactions with IC notaries, one for each of Control, Backdating and Augmented, to test the appropriateness of the script and garner likely responses from notaries. These interactions did not present any concerns regarding the viability of the script in seeming genuine and clearly communicating the nature of our request. As the interactions reassured us we did not need to make modifications to the document, script or design of the experiment otherwise, these pilot interactions are included in the results for analysis.

⁴⁷ Of 35 attempts at haggling the notary was willing to reduce prices on 18 occasions. The mean price reduction on successful haggling attempts was 34.8%. We do not discuss the outcomes of haggling in greater detail as there was no difference between treatments and this was not a primary question of our study. It may be of interest to note however that like with legal requests, haggling is a common practice even for bribes

⁴⁸ All analyses were repeated using the final price and the same results are obtained except where indicated in the results.

With very few exceptions we believe the notaries we interacted with considered our interaction indistinguishable from any other interaction with a client⁴⁹.

4.4. Ethical Concerns

A field study of an illegal activity demands that special consideration be shown to questions relating to the ethical conduct of the researchers and the participants. These questions extend far beyond the typical questions raised by a laboratory study where the primary concern is to ensure participants are not detrimentally impacted and provide informed consent for their involvement. Against this baseline our study does not raise any particularly difficult issues as the participants, being unaware of their involvement in a study and carrying out routine duties, cannot be adversely impacted from our interacting with them. Clearly this requires that we anonymise all data and refrain from reporting individuals to the authorities.

A more complex matter is the consideration of whether it is ethical for researchers to approach unwary participants and invite them to perform an illegal activity. The design of the study minimises these ethical concerns where possible. To such ends the design involved our avoiding payment for any fee exceeding Rs. 40 and providing the notary an opportunity to request a bribe while not being insistent on their performing an illicit activity. A consultation process with members of the public who had recently interacted with notaries provided us with the insight that a Backdating and Augmented treatment would likely be consistent with common illicit requests made of notaries. This reduces the likelihood of our inciting notaries to violate professional and legal standards that they have not already violated. It is our aim to simply observe their professional conduct in their day to day affairs rather than to alter it.

4.5. Research Questions

We wish to observe whether a significant number of notaries refuse an illicit request. High refusal rates would suggest corrupt notaries should not be considered as operating within an organised, underground market but rather as deviants within an otherwise law-abiding cohort. If the refusal rate is higher in the Augmented treatment than Backdating it would imply that higher fees are not sufficient to overcome some notaries' risk aversion or threshold for ethical violations.

Do a significant proportion of notaries refuse illicit requests? Is the refusal rate higher for riskier/more serious violations?

We also wish to uncover the prices notaries charge for the illicit services we request. If the mean fee request in the Backdating and Augmented treatments is higher than the Control then we can conclude a collusive bribe is being requested for the majority of illicit requests. Should there be a mark-up between the Backdating and Augmented treatments then we would be able to conclude the risk and/or scale of the violation influences the price.

Do notaries charge bribes for illicit requests? If so, what is the size of the bribes? Is the size of the bribe dependent on the riskiness/seriousness of the requested violation?

The variance of fees is also of interest as a low variance (or at least no significant difference between Control and the other treatments) would imply the market for corrupt services charges relatively uniform fees for a homogenous service rather than each notary determining a price ad hoc.

Is there a uniform bribe for a given service or are they determined ad hoc?

Finally we wish to observe whether competition reduces the bribes demanded or increases the likelihood of consenting to an illicit request. Competition reducing prices is assumed to be a feature of almost all legal markets, thus it is worth enquiring whether the market for corruption shares at least this quality with better understood markets. Meanwhile if scrupulous notaries lose too many potential clients to less scrupulous rivals competition may drive up corruptibility.

Does competition reduce the size of bribes? Does it increase the proportion of corrupt notaries?

4.6. Results

We conducted one on one interactions with 100 Notaries. A total of 97 observations are used in the analysis⁵⁰.

Refusal Rates

Table 13 shows the number of observations in each of the six treatments and the proportion of notaries refusing to certify the copy. The number of observations does not differ significantly between treatments ($p=0.29$, Fisher's Exact Test). The frequency of

⁵⁰ 3 observations were discarded when it was revealed the agent was not in fact a licensed notary. Two were pretending to be notaries but instead were middle-men for nearby notaries who would interact with clients and then bring them to the genuine notary to complete their request. The third was operating as a notary while using a copy of her husband's notary seal. This is discussed further in section 0 and in the Appendix.

refusal differs between treatments ($p=0.00$, Fisher's Exact Test), with significantly more refusals in the Backdating and Augmented treatments.

	Total	Consent	Refuse
Control IC	19	19	0
Control OC	17	17	0
Backdating IC	11	10	1
Backdating OC	20	16	4
Augmented IC	16	8	8
Augmented OC	14	7	7
Total	97	77	20

Table 13: Frequency of Refusal to Certify

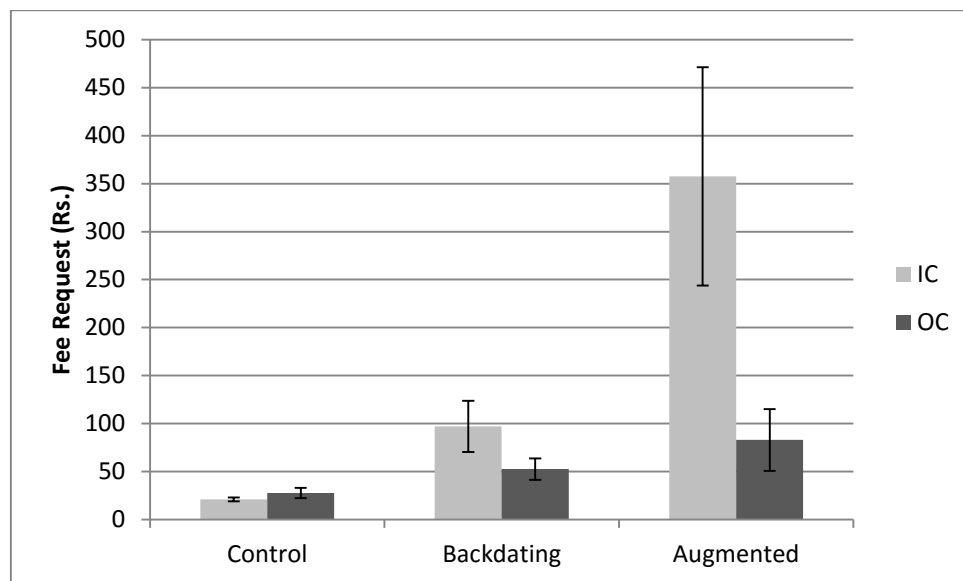
As we are interested in whether a riskier and more immoral request is more likely to be refused we compare the pooled Backdating observations with the pooled Augmented observations. The refusal rate between pooled Backdating and Augmented treatments also differs ($p=0.01$, Fisher's Exact Test). Overall no Control requests were refused, 16% of Backdating requests were refused and 50% of Augmented requests were refused.

Size and Uniformity of Bribes

	Untransformed Fees		Natural Log of Fees	
	In-Court	Out-of-Court	In-Court	Out-of-Court
Control	21.1 (2.04)	27.6 (5.32)	2.97 (0.089)	3.12 (0.15)
Backdating	97.0 (26.6)	52.5 (11.0)	4.28 (0.25)	3.79 (0.18)
Augmented	357.5 (113.8)	82.9 (32.2)	5.16 (0.55)	3.88 (0.43)

(Standard error in parentheses)

Table 14: Mean Fee by Treatment



(Standard errors shown by error bars)

Figure 15: Mean Fee Requested by Treatment

Table 14 and Figure 15 show the mean fee requested for observations where notaries consented to certify the document. These only report the initial fees stated by the notaries. A Kruskal Wallis equality of populations rank test shows the mean fee requested differs between treatments, $\chi^2(5, N=77) = 26.3, p=0.00$. A Levene's Robustness test rejects the null

hypothesis that the variances are equal between treatments ($F_{5,71} = 82.3$, $p < 0.001$). As the variance is proportional to the mean fee request we transform the fees to the logarithmic scale and repeat the Levene's Robustness test (right columns of Table 14). Taking the natural log causes us to lose one observation in the Backdating treatment where the notary consented to our request but did not charge any fee. The null of variances being equal between treatment is still rejected ($F_{5,70} = 9.19$, $p < 0.001$). These results are consistent with notaries demanding different fees depending on the nature of the request. The greatly increased variance in fee requests for Backdating and Augmented treatment observations also suggests there is no uniform price for corruption but rather that the prices are determined ad hoc.

Effect of Competition

We examine whether there are differences in the fee requests between the Control, Backdating and Augmented treatments in court and out of court. We also wish to identify whether there were significant differences in fee requests between the IC and OC environments.

Table 15 shows the one-tailed Monte-Carlo Permutation tests of differences in fees between treatments⁵¹. They reveal that the increase in fees for a Backdating request relative to the control is significant, as is the increase for an Augmented request. The price increase between Augmented and Backdating however is only significant for IC observations. Also IC notaries charge significantly more than OC notaries for illicit requests but oddly less for Control requests.

	IC	OC		IC – OC
Backdating - Control	75.9 (0.000)	24.9 (0.026)	Control	-6.59 (0.138)
Augmented – Control	336.4 (0.000)	55.3 (0.012)	Backdating	44.5 (0.048)
Augmented - Backdating	260.5 (0.013)	30.4 (0.137)	Augmented	274.6 (0.029)

(One tailed p-values shown in parentheses)

⁵¹ 100000 replications in all tests, only includes observations where notaries consented to the request.

Table 15: Pairwise Tests of Differences in Fees

While a primary difference between IC and OC notaries was that the IC notaries always had a large number of competitors in close proximity there were a number of other characteristics that differed between the environments. As a robustness test we consider only the OC observations and distinguish between observations that had or did not have any competitors close by. These OC Notaries were considered to have competitors close by if it was clear another notary was accessible within a two minute walk⁵².

Figure 16 shows the mean fee requested where OC notaries consented to certify the document and separating observations where notaries had competitors relatively close by. A Kruskal Wallis equality of populations rank test shows the mean fee requested differs between treatments and competition, $\chi^2(5, N=40) = 13.66, p=0.02$.

Table 16 shows the two-tailed Monte-Carlo Permutation tests of differences in fees between observations with and without competition⁵³. Note that only OC observations are included as all IC observations have competitors close by. Unfortunately this results in very few observations in the “with competition” cells (7 for Control, 4 for Backdating and 3 for Augmented).

⁵² OC environments that were classified as having competitors close by included busy street markets where a group of notaries have set up stalls beside one another or notaries who have established their offices near a rival.

⁵³ 100000 replications run in all tests, only includes observations where notaries consented to the request.

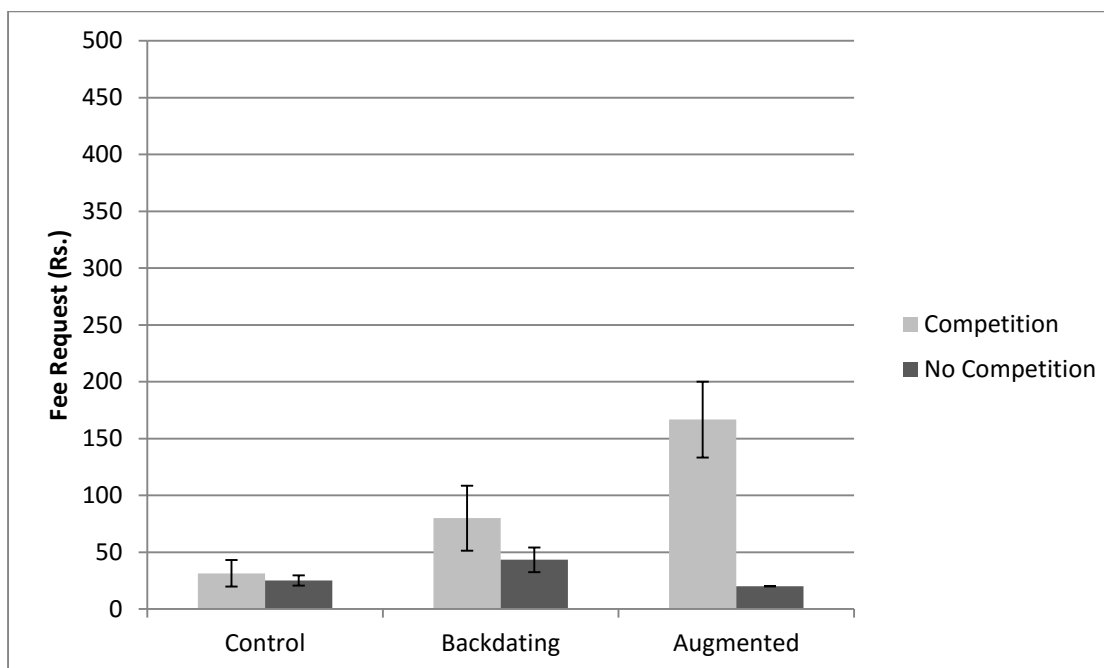


Figure 16: Mean Fee Requested for OC by Competition

	With Competition	Without Competition		With - Without Competition
Backdating – Control	48.6 (0.045)	18.3⁵⁴ (0.089)	Control	6.43 (0.334)
Augmented – Control	135.2 (0.008)	-5.0 (0.376)	Backdating	36.7⁵⁵ (0.085)
Augmented-Backdating	86.7 (0.071)	-23.3 (0.139)	Augmented	146.7 (0.014)

(Two tailed p-values shown in parentheses)⁵⁶

Table 16: Pairwise Tests Differences in OC Fees

These show that while prices still rise with illicit requests when competitors are present notaries no longer condition their prices on the nature of the request when there are

⁵⁴ Significant at 5% level of confidence if test conducted with final prices following haggling

⁵⁵ Not significant at 10% level if test conducted with final prices following haggling.

⁵⁶ Two tailed p-values shown as effect of competition on prices in opposite direction to expectations.

no competitors. This results in competition seemingly increasing the price of corrupt services. Note however that this result may be a quirk of the small number of observations in each cell.

	Total	Consent	Refuse
Backdating Comp	4	4	0
Backdating No Comp	16	12	4
Augmented Comp	4	3	1
Augmented No Comp	10	4	6
Total	34	23	11

Table 17: Frequency of Refusal by Competition (OC only)

Table 17 shows the number of refusals by whether there were competitors nearby. The refusal rate does not significantly differ between notaries with and without competitors nearby ($p=0.12$, Fisher's Exact Test). We are unable to find support that competition increases corruptibility.

4.7. Post Experiment Survey

Following the data gathering we conducted a survey with notaries in Delhi to ascertain whether notaries do indeed consider performing Backdating and Augmented requests a violation of their duties. Also we wished to establish whether they believed there to be a standardised price for bribery⁵⁷. The notaries were not necessarily those who participated in the experiment but we did not exclude those that did participate. These surveys were conducted by new research assistants several months following the initial data gathering to reduce the likelihood of notaries recalling being part of the study. Some questions were incentivised, these being estimates of average fees requested for each of the Control, Backdating and Augmented interactions and estimates of the proportion of notaries who consented to perform the Backdating and Augmented requests respectively. Non-incentivised questions included evaluation of what a fair fee would be for each of the Control, Backdating and Augmented interactions, how appropriate it would be to grant the Backdating and Augmented request, and whether the notary being surveyed would consent to a Backdating or Augmented request. We also inquired about their gender, age and years of experience as a notary. The surveys were paper based with RAs handing over the surveys for the notaries to fill out themselves but RAs clarified questions when requested. The surveys were in Hindi, an English translation is included in the appendix.

⁵⁷ This simply serves as a robustness check for the fees we were charged in our interactions.

Approximately 150 notaries were approached but only 100 notaries completed the survey (see Table 18). Of these many were unable or declined to provide an answer for what they felt to be a fair fee for either the Backdating or Augmented treatments. Several also failed to provide a response as to the average fee requested despite this being an incentivised question. We also see significant underreporting of whether the notary would personally perform either a Backdating or Augmented request although this may be partly offset by the survey only being completed by two thirds of notaries who were approached.

Survey Responses

	IC	OC - Comp	OC - No Comp	Total
No. Observations	56	26	18	100
BD Reported Value for Fair Fee	17	5	7	29
BD Reported Value for Avg Fee	43	20	12	75
BD Would Perform Request	6	3	4	13
Aug Reported Value for Fair Fee	10	2	3	15
Aug Reported Value for Avg Fee	33	20	12	65
Aug Would Perform Request	0	0	0	0
Average Age	50.5	55.2	53.9	52.3
Average Years of Experience	8.4	9.5	8.7	8.76
Proportion Female	0.48	0.27	0.2	0.39

Table 18: Survey Completion

The size of fees deemed appropriate and estimates of the average charged are shown in Table 19 along with evaluations of appropriateness for each request. Two tailed Monte-Carlo Permutation tests of differences in responses between IC and OC notaries were conducted and significant differences indicated by asterisks⁵⁸. No significant difference was identified between OC notaries with competitors nearby and without (fourth and fifth columns of Table 19). The high proportion of notaries who refused or were unable to provide a response for what a fair fee for a Backdating or Augmented request as well as the high

⁵⁸ Gender, age and years of experience were included as control variables.

variance in average fees requested provides further support that there is no standardised price for corrupt services among notaries. This coupled with the high number of notaries who refused to complete the survey once they discovered the nature of the questions demonstrates that notaries widely understand accepting such requests constitutes corruption.

We also observe that IC notaries expect other notaries to cite higher prices than OC notaries. The survey did not ask notaries the main cause of this discrepancy in their opinion as it would have conflicted the incentivised question of the average fee for each of the services provided.

	IC	OC	OC <i>Competitors Nearby</i>	OC <i>No Nearby Competitors</i>
Control Fair Fee (Rs)***	45.4 (7.86)	18 (2.39)	17.9 (2.17)	18.1 (5.02)
Control Avg Fee (Rs)***	78.9 (12.3)	24.7 (3.5)	27.5 (5.46)	20.6 (3.23)
BD Appropriateness (4 point scale, 1=Highly Appropriate, 4=Highly Inappropriate)	3.71 (0.087)	3.66 (0.12)	3.77 (0.13)	3.5 (0.22)
BD Fair Fee (Rs)	128.5 (35.2)	92.9 (37.6)	56.0 (12.1)	119.0 (64.0)
BD Estimate Proportion Agree*	41 (4.84)	49.6 (4.87)	47.9 (6.30)	52.2 (7.89)
BD Avg Fee (Rs)*	192.9 (51.3)	86.7 (14.3)	74.5 (6.86)	107 (36.5)
Aug Appropriateness (4 point scale, 1=Highly Appropriate, 4=Highly Inappropriate)	3.96 (0.036)	4 (0)	5 (0)	4 (0)
Aug Fair Fee (Rs)	204.5 (66.6)	200 (79.1)	125 (75)	250 (126)
Aug Estimate Proportion Agree	15.9 (2.9)	20.3 (3.31)	22 (4.76)	17.9 (4.29)
Aug Avg Fee (Rs)	270 (65.1)	183 (30.6)	150 (14)	238 (77.6)

(Standard error in parentheses, asterisks indicate significant
Difference between IC and aggregated OC in two-tailed tests)

Table 19: Mean Survey Responses

4.8. Discussion

Prices for Corruption

We find the fees for illicit activities are higher than legitimate requests, consistent with notaries demanding a collusive bribe for backdating or certifying augmented copies. The size of the collusive bribe is dependent on the riskiness or scale of the violation although the difference was not statistically significant among Out-of-Court notaries.

The variance of prices for Backdating and Augmented observations was substantially larger than for the Control suggesting that there is no uniform price of corruption but rather is determined ad hoc. This is despite the service essentially being homogenous as one notary's seal is not preferred by the client over another. While we are unable to determine precisely how each notary decides upon a price, a mark-up for Augmented requests over Backdating suggests notaries are likely to be influenced by risk evaluations and judgements of the client's willingness to pay (it is likely notaries would consider the client to more desperately need the augmented document to be certified than to have a certification to be backdated). While some notaries who refused our illicit requests have stated ethical concerns as a chief reason, it is unclear whether those who consented allowed ethical considerations to factor in to the price they demanded. Also some notaries were motivated to demand very low fees for altruistic reasons but it is unclear whether altruism factored into most notary's considerations.

The mean price demanded in Backdating IC is modest compared to the Augmented IC treatments but neither is particularly unattainable for skilled workers (the minimum wage for semi-skilled worker is Rs. 344 per day⁵⁹). Should cost be a consideration for someone seeking to have an augmented copy certified they can find significant discounts by seeking notaries outside of courts. If we consider such practices to be undesirable this is particularly alarming as it not only suggests notaries are readily corruptible but also that few clients would be priced out of the market.

The Effect of Competition

Surprisingly we find a lack of competition dissuades notaries from demanding higher fees for performing illicit requests. Indeed the four notaries that did not face nearby competitors and did certify the copy in the Augmented OC treatment all requested only Rs. 20 which would be considered low even in the Control treatments. Contrary to the expected

⁵⁹ Current minimum wages available from:
http://www.delhi.gov.in/wps/wcm/connect/doi_t_labour/Labour/Home/Minimum+Wages/

effect of competition applying downward pressure to prices, we observe that notaries tend only to ask for collusive bribes in environments with competitors nearby.

Unfortunately we are only able to speculate as to the cause of competition increasing the size of bribes demanded. Possible explanations include higher operating costs in courts and marketplaces where notaries cluster, a price fixing agreement between notaries in a given locale⁶⁰ or a more competitive environment inducing notaries to be more self-interested and more motivated to maximise returns. As we have no evidence to suggest costs are consistently higher for notaries in courts compared to those in private offices the final explanation appears the most plausible at this time. A possible avenue for future investigation is to survey retired notaries who may be more willing to discuss matters relating to corruption in their former profession.

Also we do not find support for competition increasing the likelihood of a notary being corrupt but this may be a consequence of relatively few observations of OC notaries with competitors nearby.

Refusal to Perform Illicit Certification

While a small number of notaries were reluctant to backdate a copy we find the majority of notaries are prepared to perform the low risk, low violation request. This reluctance dramatically increases however when we request that they certify an augmented copy. While most of the notaries who refused to backdate a copy did not explicitly justify their refusal, the majority of notaries refusing to certify an augmented copy expressed they were not prepared to expose themselves to the risk of being detected and penalised. Some communicated prison sentences as potential penalties, indicating a severe penalty and monitoring (or at least the perception of such threats looming) can deter the worst of behaviours.

The high acceptance rate of notaries to backdate a certification is consistent with the low risk nature of the request. There is no evidence of their having backdated the certification apart from the accusation of the client. It is reasonable for the notaries to assume such testimony alone could not secure a conviction against them. In contrast certifying an augmented document does expose oneself to prosecution as there is physical evidence of wrongdoing or at the least gross negligence. No notaries ever suggested they believed our

⁶⁰ This could justify higher prices in the Control observations but it seems less likely notaries are able to fix prices on illegal activities.

researcher to be attempting to conduct a sting operation but it is likely even the slightest possibility would be sufficient to deter a significant proportion of notaries.

Further evidence that the threat of penalties acts as the chief deterrent is found from five of the fifteen notaries who refused our augmented document certification offering to act as an intermediary to have the copy certified with a second notary or recommending the other notary directly. They also instructed that we should not reveal to the second notary that the copy has been augmented⁶¹. Only one notary in each of the Augmented and Backdating treatments expressed concern for our wellbeing and suggested ethical objections when refusing our request.

That the notaries did not appear perturbed by ethical concerns of the backdating request was reinforced by one notary during a backdating interaction openly discussing with a competitor seated beside him the nature of our request. It appears altering the date of certification does not even violate a social norm.

Altruism, Malfeasance and Negligence

Several non-quantifiable results were also obtained that warrant mentioning. Two notaries consented to backdating a certification and two consented to certifying an augmented copy for altruistic reasons. They did not request a bribe (one stated he never charged students and asked for no fee at all) and expressed a desire to assist the researcher's fictional brother.

Another altruistic observation was not included in the results as the agent was not herself a notary. She presented herself as a notary and expressed a willingness to backdate a certification. Upon taking the copy however she proceeded to make another photocopy but onto paper that already bore her husband's signature. Her husband presumably is a notary and was working in a different location. What makes this interaction truly remarkable was that the agent expressed a desire to help the researcher's brother and charged a fee consistent with the Control observations. Thus this agent demonstrated one can simultaneously behave altruistically while violating the law along two dimensions.

In addition to demonstrating a willingness to violate the law other objectionable behaviours were also observed. Two notaries presented with an augmented document negotiated a fee but rather than certifying the document themselves took the copy to a nearby

⁶¹ We do not observe whether the notaries who were offering to act as intermediaries would have informed the second notary of the copy being augmented. Presumably they would have had to reveal such information to justify to the second notary why they do not simply certify the copy themselves.

notary and without revealing the discrepancy between the copy and its original obtained a certification from the second notary⁶². While we did encounter two intermediaries advertising themselves to be notaries but whose sole function was instead to bring clients to their employer, the two notaries who obtained certification of the copy from another notary possessed notary stamps.

Finally those who wish to have an augmented copy certified but are reluctant to part with a sizeable bribe may find themselves fortunate to encounter a negligent notary. As the typical fee for a legitimate certification approximates only US\$0.35 - \$0.40 it is unsurprising a significant proportion of notaries we encountered were so rushed they attempted to certify the copies before we had completed the backstory and request. We had to interrupt the notaries on several occasions to prevent them certifying the augmented copy without first revealing to them there was a discrepancy. An opportunity for future study could be to investigate the reliability of services performed by notaries excluding corruption concerns but instead focusing entirely on their conscientiousness. A false certification is no less detrimental to the intended recipient whether it was a product of corruption or negligence.

4.9. Conclusion

We conducted a natural field experiment where we interacted with notaries in Delhi to obtain first hand observations of the market for corrupt services. Key novel aspects of our study was that we were able to vary the nature of the corrupt request and we also were able to interact with the notaries directly rather than through intermediaries who in India are common vehicles for exchanging bribes. We wished to uncover whether there is a uniform bribe for a particular service or if the prices are determined ad hoc. We also sought to measure whether the price demanded increased with the risk or scale of the ethical violation of the request. Finally we wish to determine the effect of competition on the market for corrupt services.

We find the prices charged for corrupt services are determined ad hoc. This is despite each notary offering a homogenous service relative to other notaries. Prices are higher for requests that are riskier or embody a greater ethical violation. It is unclear whether this is due to a premium demanded to compensate the notary to accept heightened risk or a perception of a greater willingness to pay on the part of the client for more egregious requests.

⁶² It is unclear why the second notary consented to certifying a document without enquiring why the notary presenting the document did not simply certify it himself.

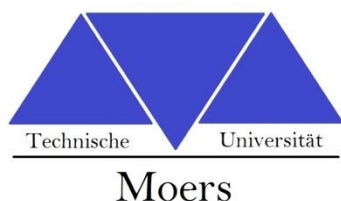
Contrary to expectations we find being in proximity to rivals increases bribes demanded. We speculate a likely explanation is that a more competitive environment induces notaries to be more motivated towards maximising revenue.

Notaries are observed to hold few reservations relating to fulfilling an illicit request that carries little to no risk to themselves and represents only a small violation. When there is a non-trivial risk to being prosecuted for a more serious offence however we find half of notaries refuse the request. We observe this is often not for moral objections but rather an aversion to the risks and penalties they would be exposed to. Indeed the backdating of a certification does not appear even to violate a social norm with some notaries prepared to discuss it openly with third parties.

Notaries exhibit both self-interest and altruism with a large variance in the range of fees charged for performing illicit tasks. Most notaries do charge a bribe however to perform an illicit task so appealing to one's altruism should not be relied upon.

4.10. Appendices

Original Transcript



Technische
Universität
Moers

Arjun Arora

Notenübersicht / *Official Academic Record*

Studienabschluss / *Awards*

Magister der Wissenschaften (M.Sc.) in Volkswirtschaftslehre / *Master of Science (MSc) in Economics*
Englischsprachiger Studiengang / *English language track*

Lehrveranstaltungen / *Course History*

Wintersemester 2011-12 / <i>Winter semester 2011-12</i>		ECTS / <i>ECTS</i>	Note / <i>Grade</i>
VWL511	Microeconomic Theory	10	2.0
VWL521	Macroeconomic Theory	10	1.7
VWL541	Introductory Mathematical Economics	10	1.7
Sommersemester 2012 / <i>Summer semester 2012</i>			
ÖKM511	Introductory Econometrics	10	1.0
VWL533	Markets, Institutions and Economic Growth	5	1.7
VWL542	Mathematical Economics	10	1.3
VWL551	Development Economics and Policy	5	1.3
Wintersemester 2012-13 / <i>Winter semester 2012-13</i>			
ÖKM 532	Econometric Methods	10	2.0
VWL512	Game Theory I	5	2.0
VWL517	Choice Theory	5	1.3
VWL572	Economics of Uncertainty	5	1.0
Sommersemester 2013 / <i>Summer semester 2013</i>			
JUR621	Law and Economics	5	2.0
JUR648	Economics of Regulations	5	1.7
VWL513	Game Theory II	5	1.3
VWL532	Topics in Economic Theory	5	2.3
Magisterarbeit / <i>Master thesis</i>		15	3.0

gut / *good* (1.7)

Dr. Karin Sattler

Volkswirtschaftlicher Prüfungsausschuss / *Economics Exam Board*

13.08.2013

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Arjun Arora

Notenübersicht / *Official Academic Record*

Studienabschluss / Awards

Magister der Wissenschaften (M.Sc.) in Volkswirtschaftslehre / *Master of Science (MSc) in Economics*
Engelssprachiger Studiengang / *English language track*

Lehrveranstaltungen / Course History

Wintersemester 2011-12 / <i>Winter semester 2011-12</i>		ECTS / <i>ECTS</i>	Note / <i>Grade</i>
VWL511	Microeconomic Theory	10	2.0
VWL521	Macroeconomic Theory	10	1.7
VWL541	Introductory Mathematical Economics	10	1.7
Sommersemester 2012 / <i>Summer semester 2012</i>			
ÖKM511	Introductory Econometrics	10	1.0
VWL533	Markets, Institutions and Economic Growth	5	1.7
VWL542	Mathematical Economics	10	1.3
VWL551	Development Economics and Policy	5	1.3
Wintersemester 2012-13 / <i>Winter semester 2012-13</i>			
ÖKM 532	Econometric Methods	10	2.0
VWL512	Game Theory I	5	2.0
VWL517	Choice Theory	5	1.3
VWL572	Economics of Uncertainty	5	1.0
Sommersemester 2013 / <i>Summer semester 2013</i>			
JUR621	Law and Economics	5	2.0
JUR648	Economics of Regulations	5	1.7
VWL513	Game Theory II	5	1.3
VWL532	Topics in Economic Theory	5	2.3
Magisterarbeit / <i>Master thesis</i>		15	1.0

sehr gut / *very good* (1.5)

Dr. Karin Sattler

Volkswirtschaftlicher Prüfungsausschuss / *Economics Exam Board*

13.08.201

Chapter 5 – Concluding Remarks and Direction for Future Research

In this chapter I summarise the main findings of the papers and discuss potential avenues for further research.

5.1 Chapters 2 and 3

In these papers we extended the leniency policies implemented in the EU and US to combat cartel formation and applied them in combating petty corruption. To ensure the whistle-blowing mechanism incentivised reporting even when both parties adhered to the agreement we offered a monetary reward for self-reporting. We show that whistle-blower mechanisms have the potential to be effective in combating petty bribery interactions with the symmetric reporting mechanism approximately halving the number of groups engaging in bribery irrespective of whether participants anticipated interacting with the same partner again. Asymmetric regimes also reduced bribery but to a lesser extent.

This line of investigation can be extended in several ways. Firstly a rewards mechanism could be applied to harassment bribery to examine whether it has similar outcomes and in particular, whether it offers any benefits over full or partial leniency programs. Secondly a bribery interaction where the official initiates by demanding a bribe could be simulated to examine whether this improves the performance of either asymmetric regime. Finally modifying the reward payout to be dependent on the size of the bribe or including all previous instances of bribes being paid may allow it to be more versatile. Such a mechanism may be able to combat bribery involving substantial sums or be applicable to instances where agents expect to interact with one another in future as the size of the potential reward increases with every bribe exchanged.

5.2 Chapter 4

In this paper we conducted first hand bribery interactions with notaries to deduce whether a market existed for notaries' corrupt services. We observed that notaries are largely unperturbed by ethical concerns of backdating or certifying an augmented copy but are sensitive to the risk of prosecution being greater with the augmented certification request. We also observe prices increase with the nature of the violation but counter-intuitively we observe competition increases prices. We also observe that while it is not difficult to have notaries perform illicit requests they do not universally agree to do so with some notaries

refusing even the backdating request. It was not clear whether this was a result of ethical concerns or perceived risks of prosecution.

A natural extension of this is to investigate the prices charged and the acceptance rate should we have utilised intermediaries who were present in large numbers especially in the court complexes. Should we find a high acceptance rate for the Augmented treatment this would signal even the penalties that deter notaries are insufficient to impede determined intermediaries. It would be especially intriguing to see whether the intermediaries charge more for the corrupt requests as if we observe no significant difference between the cost of an Augmented certification compared to a baseline, it would strongly imply the intermediaries do not inform the notaries of the discrepancy or the notaries do not consider there to be a risk of prosecution with a trusted intermediary involved.

Also there is an opportunity for future studies to investigate whether societies with less experience of corruption may in some instances be similarly willing to violate rules but with altruism rather than profit as a primary motivator.

Finally, eradicating corruption may fail to improve outcomes for services that involve the official conducting an inspection if low wages demotivate them. There is scope for future studies to examine the scale of negligence among public servants and whether corruption and poor incentives must be tackled together.

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