An experiment on corruption and gender

M. Fernanda Rivas[*†]

December 2008

Abstract

There exists evidence in the social science literature that women may be more relationship-oriented, may have higher standards of ethical behavior and may be more concerned with the common good than men are. This would imply that women are more willing to sacrifice private profit for the public good, which would be especially important for political life. A number of papers with field data have found differences in the corrupt activities of males and females, nonetheless they have drawbacks that may be overcome in a lab experiment. The aim of this paper is to see experimentally if women and men, facing the same situation behave in a different way, as suggested in the field-data studies or, on the contrary, they behave in the same way. The results found in the experiment show that women are indeed less corrupt than men.

Keywords: corruption, gender, experiment

JEL classification: C91, D73, J16

[*]University of Granada. Email: mfrivas@ugr.es

[†]I thank Jordi Brandts for his supervision, and Selim Ergun for his help in running the experiments and for his helpful comments.

1 Introduction

A large stream of research papers has documented systematic gender differences in behavior. This evidence suggests that women may be more relationship-oriented, may have higher standards of ethical behavior and may be more concerned with the common good than men are. This would imply that women are more willing to sacrifice private profit for the public good, and this would be especially important for political life.

Criminology literature shows that men are more likely to commit offenses than females (Gottfredson and Hirschi, 1990). This gender difference does not vary over time and countries; it starts at low ages and is maintained through the years. Additionally, they show evidence that crimes committed by men are more serious than those committed by women.

In the economics literature, a number of field data papers have found that women are less tolerant toward dishonest behavior, and that there exists a negative relation between women's participation rate in politics and corruption level. However, it can be argued that the observed gender difference in behavior in the field may be due to other reasons than real gender differences in corrupt behavior; possible interferences that can be controlled in a laboratory experiment. One possible reason is the different degree of risk aversion of males and females as observed in many experiments. This could be an important determinant of gender difference given that corrupt behavior (almost) always implies a probability of being discovered and thus being punished. Therefore, a gender difference in behavior could be due to a difference in risk aversion — women who are more risk averse would avoid risky activities such as getting involved in corrupt activities more frequently than men. In this experiment I control for risk aversion, trying to isolate the results from the influence of this variable.

Another possible explanation for the observed gender difference is that women have entered the labor market and politics much more recently than men. The difference may therefore be due to differences in terms of accessing networks of corruption, or in terms of knowledge about how to get involved in corrupt activities. Thus, it may be just a matter of time until women get involved in corrupt activities. In my experiment, subjects do not have a previous history, they do not have experience in this kind of game. Therefore, this effect — the differences in experience — can be ruled out as an explanation of any difference observed in the lab.

A third feasible explanation is that low levels of corruption and high female political participation are both the result of a liberal democracy that simultaneously promotes gender equality

and good governance. This limitation of the field studies can be overcome in a laboratory experiment where we observe male and female decisions taken in the same environment.

This paper addresses the question of whether women and men facing the same situation behave in a different way (as suggested in the field data papers), or on the contrary, whether they behave similarly when women are in the same position as men. As explained in the Handbook on Fighting Corruption (Phyllis and Kpundeh, 1999), "*In broad terms, corruption is the abuse of public office for private gain*". In this paper, corrupt behavior refers to bribery. Bribery is a form of pecuniary corruption; it is an act usually involving the giving of money or gifts to influence the behavior of the recipient in ways that are inconsistent with that person's duties or in violation of the law. In the experiment, I observe bribery through the manipulation of public officials' decisions in exchange for bribes.[1] The experimental design tries to capture the characteristics of corrupt behavior: the reciprocity between the briber and the official, the negative externality over the public, and the probability of being discovered.

In the experiment there are two types of players: firms and public officials. The possibility of corruption is introduced by allowing the firm to send some amount of money as a bribe to the public official, who has to decide between two alternatives. One of the alternatives is slightly better for the official, while the other is much more favorable to the firm, but has negative externalities over all the other players. I conduct four sessions: two sessions where subjects of both genders participate (one gender in one role and the other gender in the other role) and two sessions with only one gender participating. The objective is to check whether or not men and women behave differently according to their partner's gender. If women are stereotyped as less corrupt, I should observe that firms offer a bribe to female public officials less frequently than to male officials. Therefore, I also ask firms about their expectations regarding the corruptibility of public officials.

The results show that if the firm is a woman, even when controlling for relevant variables, a lower bribe is offered. When asked about their beliefs regarding the probability that a public official will accept the bribe and choose the most favorable alternative for the firm — but with negative consequences for the other participants— both male and female firms expect female public officials to accept the bribe and choose the corrupt alternative less frequently than male officials. Nonetheless, the econometric analysis shows that the partner's gender is not statistically

[1] In what follows I call the manipulation of public officials' decisions in exchange for bribes either bribery or corruption.

significant. Concerning the behavior of public officials, I find that if the public official is a woman and the firm is also a woman, the probability of accepting the bribe is lower and the probability of choosing the corrupt alternative is also lower.

The difference in the assigned probabilities would suggest some stereotyping behavior in that both genders expect women to be less corrupt than men. On the other hand, when analyzing their actual behavior, they do not show overall significant differences according to the gender of their partners.

The main result of the experiment is that women are less corrupt than men. Therefore, the conclusion is in line with the field data papers. It can thus be expected that increasing female participation in the labor force and politics would help to fight corruption.

The paper is organized as follows: in the next subsection field data papers dealing with gender and corruption are reviewed. An overview of some papers on experiments on gender differences and corruption are given in Subsections 1.2 and 1.3, respectively. The experimental design is explained in Section 2, the results are presented in Section 3, and finally conclusions are drawn in Section 4.

1.1 Literature on corruption and gender with field data

Dollar et al. (2001), Swamy et al. (2001), and Torgler and Valev (2006) show empirically that men are more frequently involved in corrupt activities than women. These papers study the acceptability of corrupt behavior by men and women and the relationship between women's participation rate in politics and a corruption index.

Analyzing data for more than 100 countries, Dollar et al. (2001) find a strong negative and statistically significant relationship between the level of female participation in politics — measured by the percentage of seats occupied by women in the lower and upper chambers — and a corruption index — the International Country Risk Guide index. Their conclusion is that encouraging women to have a higher political participation may be beneficial to the whole society.

Using different data sources, Swamy et al. (2001) study the hypothesis that female participation in the government would reduce corruption. Using the World Value Surveys (WVS) they find that women are less tolerant towards dishonest or illegal activities than men. The second data set they use is an enterprise survey conducted in Georgia, where firm owners and managers

were asked the following question: "*How frequently do the officials providing the service require unofficial payments?*". The evidence they find suggests that men are more frequently involved in corruption than women. With the third data set using cross-country data [2], they find that corruption is less prevalent where women carry more weight in politics and in the labor force, in line with Dollar et al. (2001).

In a more recent paper, Torgler and Valev (2006) investigate empirically if women are more willing to be compliant than men. Analyzing the WVS and the European Values Survey, they find a strong gender effect: women are more willing to comply than men, and are less likely to agree that corruption and cheating on taxes can be justified. Moreover, they do not observe a decline over time in the gender difference, thus it contradicts the role theory which suggests that greater equality in status between men and women would decrease gender differences over time.[3]

Although these papers control for variables other than gender that may explain the corruption index or the acceptability of corruption (e.g. age, education, religion, earnings, etc.), they still have some drawbacks. The main criticism of these papers is that gender difference may be driven by the existence of a liberal democracy that simultaneously promotes a high level of gender equality —and therefore a high level of female participation in the labor market and politics— and low levels of corruption. If this were the case, then a relationship would exist between low corruption indexes and high levels of female participation in politics, but a higher female participation in politics would not *cause* lower levels of corruption. Instead, both things would be caused by the presence of a liberal democracy. This potential problem is ruled out in the experiment. The subjects in the experiment — both men and women — are exposed to the *same* situation where they can freely choose what to do. If we find a gender difference after controlling for the appropriate variable, it should be due to a real difference in behavior between men and women.

[2] They use the Transparency International Corruption Perception Index, which is based on different information sources such as investor surveys and assessments of country experts.

[3] Criminology literature also suggests that the role theory cannot explain differences in crime rates between men and women (Gottfredson and Hirschi, 1990).

1.2 Experiments on gender differences

Many papers study gender differences in behavior, although they yield contradictory results. Some papers find differences and others do not. In what follows, I review some papers that analyze issues related to corruption such as risk aversion, giving, reciprocity, and deception.

As regards risk aversion, Croson and Gneezy (2008) review evidence that shows that men are more risk taking than women. The observed differences in risk perception (men are more overconfident than women) may explain, in part, the differences in risk taking. A number of papers reviewed in Croson and Gneezy (2008) support the evolutionary argument rather than the socialization argument to explain the gender difference.[4] Nevertheless, some papers find different results. Schubert et al. (1999) find that in a strongly ambiguous context women are more risk averse when lottery choices are framed as gains, while men are more risk averse when lotteries are framed as losses. They find no gender differences when the context is abstract or weakly ambiguous. Johnson and Powell (1994) find that gender differences depend on the subject pool. In the subpopulation of managers, for example, they do not find differences in risk taking. The absence of a difference may be due to self selection, or adaptation to the demands of the job. Eckel and Grossman (2002) analyze whether there exist gender differences in financial risk and also measure gender differences in expectations about other's behavior. Both genders estimate correctly that women have a higher degree of risk aversion than men. However, they overestimate the degree of risk aversion — especially of women. Eckel and Grossman argue that if women are stereotyped as more risk averse, this could affect them negatively in many aspects ranging from lower wages to less aggressive health treatments.

As concerns offers and acceptance/rejection, Eckel and Grossman (2001) find no gender difference in an ultimatum game in the proposer behavior, but in the responder rate of rejections: women are more likely to accept lower offers. In a solidarity game — a variation of the dictator game — Selten and Ockenfels (1998) find that women are more generous (or show more solidarity) than men. In terms of reciprocity, a number of papers find no gender differences (Eckel and Wilson, 2004a; Eckel and Wilson, 2004b), while others find that women are more reciprocal

[4] Evolutionary theories hold that sex differences are dependent on reproduction: men are more risk taking in the period when they are trying to attract mates, while women are more risk averse in the child-bearing period (Wood and Eagly, 2002). The socialization theory is not wholly focused on biology, but on cultural and social practices. Because men and women tend to have different social roles, they become psychologically different to adjust to their social roles (Eagly and Wood, 1999).

than men (Chaudhuri and Gangadharan, 2003; Snijdes and Keren, 2004).

Croson and Gneezy (2008) explain all these differences by different reactions to the context. Most of the differences mentioned above are due to changes in female behavior according to the context and how the experiment is framed, rather than changes in male behavior.

Another paper in this line is that of Dreber and Johannesson (2008). They study gender differences in deception in a sender-receiver game, finding that male senders are more prone than female senders to lie in order to secure a higher payoff to the detriment of their partners' payoff . Although the topics — deception and corruption — are not the same, they are related in that both imply negative externalities to other subjects.

This paper contributes to this literature by experimentally examining whether there exist differences in the corrupt behavior of women and men.

1.3 Experiments on corruption

Given the difficulty of collecting reliable field data on corrupt activities due to the secrecy in which they take place, in recent years the topic has been studied using laboratory experiments. In this subsection I review three research papers on corruption using experiments, Abbink et al. (2002), Abbink and Hennig-Schmidt (2002), and Alatas et al. (forthcoming). The first two papers deal with bribery games — whose design I follow in this paper — while the last paper studies gender differences in the acceptability of corruption.

Abbink et al. (2002) present the first interactive experimental corruption game.[5] They model bribery as a situation with "negative" reciprocity, implementing a two-player sequential game where the first player — the potential briber — is interpreted as a businessman or a firm and the second player as a public official. The first player can send some amount of money to the second player in the hope of persuading him/her to make a decision favorable to the firm. This experiment has three different treatments to separate three characteristics of corruption: reciprocity (between the subjects involved in the activity), negative externalities over others, and the risk of being caught.[6] In the baseline — a pure reciprocity game — they find that the

[5] Several papers look for factors that influence people's corruptibility in non-interactive games, e.g. Frank and Schulze (2000), Schulze and Frank (2003).

[6] The corrupt relation should be based on trust and reciprocity between the subjects involved given that no binding contract is possible. As shown in many different studies, corruption implies a negative effect over the public and implies a probability —generally small— of being discovered.

(non-desirable) relationship can be established through trust and reciprocity. They add negative externalities in their second treatment, finding no evidence of any effect on decision making. In the third treatment, which includes an external risk, they find less reciprocal cooperation. The results suggest that harsh, low-probability punishment of corruption may be very preventive. In their experiment, the instructions were written in neutral terms. In a follow-up paper, Abbink and Hennig-Schmidt (2002) analyze if there exist differences in behavior when the instructions are loaded.[7] They do not find significant differences between the neutral-instruction and the loaded-instruction treatments, concluding that the game is rather insensitive to the way it is presented to subjects.

Alatas et al. (forthcoming) conduct an experiment to investigate whether there exist gender differences in the acceptability of corruption and whether they differ between countries. They conduct the experiment in Australia, India, Indonesia, and Singapore. The experiment is a one-shot game where subjects play in groups of three: one firm that can offer a bribe, one public official that can accept/reject the bribe, and one citizen that can punish the other two players. They only find gender differences in Australia, concluding that gender differences are culture specific. Although Alatas et al. (forthcoming) investigate a subject similar to that examined in this paper, there are important differences. First of all, they focus on the acceptability of corruption and not on corrupt behavior in itself, given that the public official does not have more discretionary power other than accepting or rejecting the bribe. Secondly, they conduct a one-shot experiment, whereas I conduct a 20-round experiment. I am interested in studying corrupt behavior in a long-run relationship between the briber and the official, while they are interested in investigating the willingness to punish corruption where the subject who might punish does not obtain any economic benefit from doing so.

2 Experimental design

Using a typical bribery experiment, I consider two participants: a firm (F hereafter) and a public official (PO hereafter). The design of the experiment tries to capture the characteristics of corrupt behavior —the reciprocity between the briber and the bribee, the negative externality over the public, and the probability of being discovered. Focus is placed on *the manipulation of a public official's decisions through the use of a bribe.* F is allowed to send some amount of money

[7] The difference between neutral and loaded instructions in this experiment is explained in the following section.

to PO, who has to decide between one alternative that is slightly better for himself/herself and another alternative that is much more favorable to F, but has negative externalities over all the other participants of the experiment.[8][9]

The experiment was designed in completely neutral terms following the design used by Abbink et al. (2002). As explained above, Abbink and Hennig-Schmidt (2002) replicated the experiment by Abbink et al. (2002) using loaded instead of neutral instructions, finding no significant difference in subjects' behavior between the two cases. In the loaded case, subjects were told that a firm wanted to run an industrial plant which would have negative consequences for the public and the public official had to decide whether to give permission or not. Prior to the public official's decision, the firm could make a private payment to the official. In the case that the public official accepted the transfer, there was a certain probability of being discovered and penalized. In this situation, it was clear that the private payment was an attempt to manipulate the public official's decision in order to convince him/her to choose the alternative that was most favorable to the firm, thereby causing negative externalities over the public. Given that they did not find significant differences in behavior between the neutral and loaded treatments, it can be deduced that subjects view the situation as being corrupt even when using neutral instructions. Given this result, and the tradition of using neutral instructions in experimental economics, I follow the neutral design of Abbink et al. (2002).

The experiment was conducted at the Universitat Autònoma de Barcelona with undergraduate students enrolled in different majors, who were recruited by public advertisements posted throughout the campus. The experiment was programmed and conducted with z-Tree software (Fischbacher, 2007).

The experiment consisted of 20 rounds[10], each of which has 4 stages. In the first two stages F has to decide how many tokens to transfer to PO. PO then has to decide whether to accept the transfer or not (stage 3), and choose between two alternatives (stage 4). The subjects are endowed with 40 tokens.[11] The experiment has four treatments: ff, mm, fm, and mf,

[8] As explained below, every time the most favorable alternative to F is chosen, both members of all the other pairs in the lab are penalized.

[9] See instructions in Appendix 1.

[10] As mentioned above, I am interested in studying corrupt behavior in a long-run relationship between the briber and the official. Repeated interaction is important for the creation of relationships and bonding in bribery and corruption settings. Due to time constraints, I use 20 rounds instead of the 30 rounds used in Abbink et al. (2002) .

[11] The reason for the equality of initial endowments is to allow equal payoffs if non-corrupt behavior is carried

where the first letter denotes the gender (f-female, m-male) of F and the second letter denotes the gender of PO. The pairs (F and PO) are anonymously matched and remain unchanged throughout the experiment.[12] In the mixed sessions before entering the lab, subjects are told that one gender will sit in one part of the lab and the other gender in the other part. When the instructions are read aloud, they are told that one gender will play one role and the other gender will play the other role. The objective is not only to check whether men and women behave differently or not, but also whether men and women behave differently depending on their partner's gender.[13]

Stage 1 F has to decide whether to offer a transfer (a bribe) to PO or not. If F decides to offer a bribe, the experiment moves to stage 2. If F decides not to offer a bribe, s/he is asked the following question: What do you think is the probability that your partner will choose alternative B?[14], and the experiment moves to stage 4.

Stage 2 F has to decide how many tokens t to offer as a bribe. If F offers any positive amount, s/he has to pay a fixed transfer cost of 2 tokens.[15] For the sake of simplicity, t is defined in integer numbers. They are small enough to ensure that F does not end up with a negative payoff. Therefore I take $t \in \{1, 2, ..., 10\}$. After F decides how many tokens to offer, s/he is asked: 1) What do you think is the probability that your partner will accept the tokens you have offered?; 2) If your partner accepts the offer, What do you think is the probability that s/he will choose alternative B?; and 3) If your partner does not accept the offer, What do you think is the probability that s/he will choose alternative C? [16][17] Then, the experiment moves to stage 3.

---

out. See Table 3.

[12] A long term relationship between the firm and the public official is represented.

[13] It would also have been possible to always conduct mixed sessions in which subjects were told the gender of their partner or even their partner's name. Telling them their partner's gender would have placed too much emphasis on gender, while choosing the second option would have placed the anonymity of the subjects at risk.

[14] Alternative B is the "corrupt" alternative. It is much more favorable to F, but has negative consequences for the members of all the other pairs in the lab.

[15] The transfer cost represents the cost F has to pay to approach PO. This cost is independent from the fact of whether PO accepts the transfer or not.

[16] Alternative C implies a costly punishment to F.

[17] The possible answers for the probabilities are: 0, 0.10 - 0.19, 0.20 - 0.29, 0.30 - 0.39, 0.40 - 0.49, 0.50 - 0.59, 0.60 - 0.69, 0.70 - 0.79, 0.80 - 0.89, 0.90 - 0.99, 1.

Stage 3 PO has to decide whether or not to accept the bribe offered by F. If PO accepts the bribe, s/he receives $3t$ [18], and an integer (n) between 0 and 999 is randomly chosen. If $n < 3$, the pair is disqualified from the experiment — and are only paid the show-up fee — and if $n \geqslant 3$, the experiment moves to stage 4.[19] If PO decides to reject the bribe, then the experiment moves to stage 4.[20]

Stage 4 PO has to decide between different alternatives.

i) *If PO has accepted the bribe*, s/he has to decide between alternative A and B. Alternative A is the "non-corrupt" alternative, which is slightly better for PO and has no consequences for the other participants. Alternative B is the "corrupt" alternative, which is much more favorable to F but has negative externalities. When alternative B is chosen, 3 tokens are discounted from the earnings of all the other subjects in the lab. This represents the negative externality that corruption has over the public.[21] The minimum possible deduction is 0 if no pair (apart from his own) chooses alternative B, and $3 * (g - 1)$ if all other pairs choose alternative B, where g is the number of pairs in the lab.[22] The payoffs are defined in Table 1.[23]

Amount transferred	1		2		3		4		5		6		7		8		9		10	
Alternative chosen	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Firm	47	67	46	66	45	65	44	64	43	63	42	62	41	61	40	60	39	59	38	58
Public official	53	48	56	51	59	54	62	57	65	60	68	63	71	66	74	69	77	72	80	75

Table 1: Payoffs if the public official accepts the bribe

PO's payoffs are higher if s/he chooses alternative A rather than B. This is so to reflect the

[18] The number of tokens is tripled to show the difference in marginal utility between the firm (the briber) and the public official. It is assumed that the income of a public official is lower than the income obtained in a private business such as a firm.

[19] In the real world, the probability of being discovered is small but the punishment is generally severe. The design tries to captures this fact.

[20] Abbink et al. (2002) also choose a random number to determine whether or not to disqualify the pair. They find that the inclusion of a small probability of being disqualified (0.3%) significantly decreases the level of corruption in comparison to the case with no probability of being disqualified. Therefore, although using a random number generator is a concern since subjects may not believe that this is a possible outcome, their result shows that subjects really perceive the disqualification as a possible result.

[21] As reported in many papers, corruption is positively related to crime and negatively related to economic development, among other negative consequences.

[22] There were 13 pairs in the room for 3 sessions , while there were 12 pairs in the remaining session. This difference is due to technical problems in the laboratory.

[23] The deductions are not included in the following tables.

fact that when choosing a corrupt alternative, PO will have to pay some costs, for example, hiding some information from his/her superiors.

ii) *If PO rejects the bribe*, s/he has to decide between alternative A and C. Alternative C implies a costly punishment to F. When PO rejects the bribe, the probability of being disqualified is zero. For this reason, I introduced the possibility that PO may punish F to induce F to evaluate the corruptibility of PO before offering a bribe. In this situation, even if PO rejects the bribe and thus the probability of being disqualified and penalized is zero, F can be punished by PO. The payoffs are shown in Table 2.

Alternative chosen	A	C
Firm	48	36
Public official	50	48

Table 2: Payoffs if the public official rejects the bribe

iii) *If F does not offer a bribe*, then PO has to decide between alternative A and B. The payoffs are defined in Table 3. Again, when the corrupt alternative (B) is chosen, 3 tokens are discounted from the earnings of all the other subjects in the lab.

Alternative chosen	A	B
Firm	50	70
Public official	50	45

Table 3: Payoffs if the firm does not offer a bribe

When they are caught, both subjects are excluded from the experiment and only paid the show-up fee. In this case the subjects are asked to complete a questionnaire. To persuade the subjects to remain in the lab, they are offered an extra payment of 2 euros when they learn that they are disqualified.

The game tree is shown in Figure 1.[24]

[24] The letters inside the circles show who is taking the decision, F, PO or N (nature). −3... shows the amount deducted from all the other participants each time alternative B is chosen.

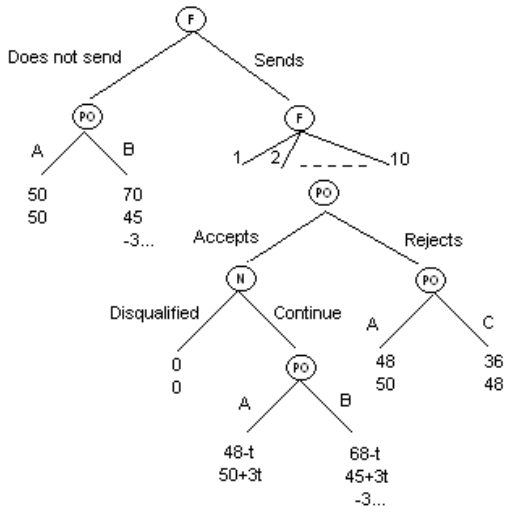

Figure 1: Game tree

At the end of each round, subjects are informed *only* about the payoff they obtain as a result of the decisions made by their own group, i.e. they are not informed about the deductions due to other pairs choosing alternative B *until* the end of the experiment. In this way, independence between pairs is maintained.

The final payoffs are calculated as the sum of all the period payoffs converted into euros — the rate of conversion is 1.5 euros for 100 tokens plus the show-up fee (3 euros).

After the 20 rounds are over, the subjects are given a questionnaire to rate the likelihood of their engaging in 16 risky activities on a 1 (very unlikely) to 5 (very likely) scale.[25] The sum of the answers gives the degree of risk loving of the subjects — the higher the sum, the higher the degree of risk loving. Following Datta Gupta et al. (2005), I decided not to use lottery choices to measure risk aversion because the experimental task could have influenced the choices of risky lotteries. On the other hand, the influence could have gone from risk elicitation to the experimental task if I had conducted the risk elicitation procedure using lotteries before the experiment. Moreover, psychometric tests have greater test-retest reliability compared to lottery choices (Eckel, 2005).

[25] The questionnaire is the same one used by Datta Gupta et al. (2005), which is a modified version of the psychometric test in Weber et al. (2002).

3 Results

The level of corruption is observed in the frequency and amount of bribes offered and the frequency of B (corrupt) choices induced by bribes. Table 4 shows the number of subjects and some preliminary results. No pair was disqualified in any session.

Session	Number of subjects	Average earnings	Frequency of bribes offered	Average bribe offered	Frequency of acceptance	Frequency of B choices
Female F - Male PO	26	17.03	0.17	3.61	0.80	0.49
Male F - Female PO	24	16.76	0.35	4.43	0.93	0.41
Male F - Male PO	26	16.12	0.26	5.96	0.88	0.78
Female F - Female PO	26	17.72	0.14	3.11	0.49	0.28
Total	102	16.91	0.23	4.50	0.82	0.53

The average earnings include the show-up fee (3 euros).
The average bribe offered is conditional on being positive.
The frequency of B choices is conditional on having accepted the bribe.

Table 4: Average values of the main results

The first preliminary conclusion that can be drawn from Table 4 is that the frequency of bribes and the average bribe offered are higher when F is a man. Bribes are more frequently accepted when they come from a male F, while the lowest rate of acceptance is observed when a female PO is paired with a female F. The highest frequency of B choices is observed when only men are playing, while the lowest frequency is observed when only women are playing.

There are six possible scenarios that could take place in each stage game: a bribe is not offered and alternative A or B is chosen, a bribe is offered and accepted by PO and alternative A or B is chosen, or a bribe is offered and rejected and alternative A or C is chosen. Given that the last case (bribe is rejected and alternative C is chosen) is only observed 7 times, the last two alternatives are considered jointly. Table A5 in Appendix 2 shows how frequently each of these possible scenarios is observed for each group in each of the sessions. 4 groups (17 times in total) in the fm session, 6 groups in the mf (42 times) and in the mm session (46 times), and 2 groups (5 times) in the ff sessions follow the path: F offers a bribe, PO accepts it and chooses alternative B, i.e. the scenario that is defined as corrupt.

The rest of the section is organized as follows. In subsection 3.1, the decisions taken by F are analyzed. In subsection 3.2, I present the predictions made by F about PO's behavior, while in the following two subsections I analyze the decisions taken by PO and the subjects' earnings, respectively.

3.1 Decisions taken by the firm

The first decision F has to take is whether to offer a transfer (bribe) to PO. If F decides to offer a transfer, then s/he has to decide how many tokens to offer.

The percentage of men that decide to offer a bribe at least once is 80%, while the percentage of women is 65% (p-value=0.247).[26] Moreover, the average number of times women offer a bribe (3.2) is smaller (p-value=0.000) than the average number of times men offer one (6). On average, men offer a bribe to a male PO 5.2 times, while the number of times they offer a bribe to a female PO is 7 (p-value = 0.025). On the contrary, the number of times women offer a bribe does not depend on their partner's gender. It is 3.4 when playing with a male PO and 2.8 when their partner was another woman (p-value = 0.398).

RESULT 1: On average, women offer a bribe less frequently than men.

Analyzing the second decision — the amount offered once the subject has decided to offer a bribe — I find that the average bribe offered by men is 5.11 tokens, and by women, 3.38 tokens (p-value=0.000). As reported in Table 4, men offer 5.96 tokens on average to male POs and 4.43 tokens to female POs (p-value = 0.001), while women offer 3.61 and 3.11 tokens, respectively (p-value = 0.209) As before, men are influenced by their partner's gender, while women are not. The average bribe offered in Abbink et al. (2002) is 5.68 tokens, which is higher than 4.50, the average in the present experiment.[27] Figure 2 shows the histogram of bribes offered, conditional on being positive. For low amounts, the frequency of women offering a bribe is clearly higher than the frequency of men. The peak in 6 tokens may be explained by the fact that by transferring this amount and PO choosing alternative B, both players would get almost the same payoff (62 and 63 tokens).[28]

[26] The p-values shown always correspond to the Mann-Whitney U-test.

[27] The average bribe in Abbink et al. (2002) is even higher than the average bribe offered by male firms in my experiment. Part of the difference may be due to the different gender composition of the sample.

[28] This could be the reason why an inequity averse F would decide to offer 6 tokens as a bribe. Abbink et al. (2002) find the same peak.

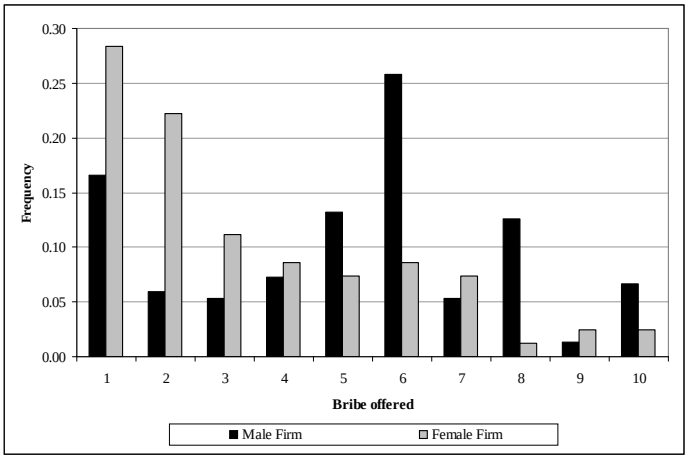

Figure 2: Histogram of bribes offered

RESULT 2: The average transfer offered by women is lower than the average transfer offered by men.

The figures below show the frequency of bribes offered and the average bribe — conditional on being positive — by period. Figure 3 shows that men offer a bribe more frequently than women. Figure 4 shows that — with the exception of periods 2 and 11— the bribe offered by men is higher than the bribe offered by women, as observed with the aggregated values.[29]

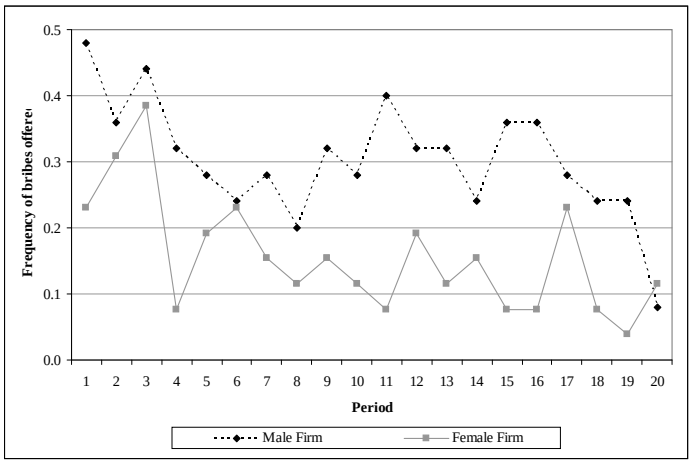

Figure 3: Frequency of bribes offered by period

[29] The econometric analysis below justifies the aggregation of the data from sessions fm and ff on the one hand, and mm and mf on the other.

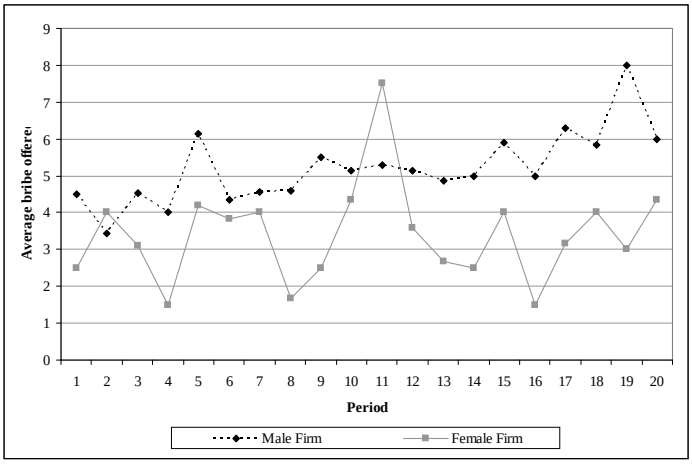

Figure 4: Average bribe offered by period

In this experiment, subjects play together for 20 periods. Therefore, not only PO can reciprocate F by choosing alternative B, but reciprocate PO's previous behavior by offering more tokens after s/he has chosen alternative B. This is indeed observed in the experiment. The average transfer after PO has chosen alternative A is 3.52[30], but is 5.64 tokens after s/he has chosen alternative B.[31]

In what follows, I *econometrically* analyze the decisions F has to take, i.e. whether to offer a bribe to PO, and if so, how many tokens to offer. Regarding the decision to send a transfer, I estimate a probit model with a clustered standard error, whose results are shown in Table 5. The second decision for those who decided to offer a bribe is to determine how many tokens to offer. An OLS model is estimated and the results are shown in Table 6. I review the results by analyzing the effects of the (significant) explanatory variables in both decisions at the same time.

The independent variables are the gender of the players (the dummy variables take a value of 1 if the player is a woman), the actions PO has taken in the two previous periods, the degree of risk loving (only in the first decision), and the period. I also include *interaction terms* between

[30] The average bribe offered when PO has chosen alternative A in the previous period when no bribe was offered is 3.63, while the average bribe is 3.08 if PO has chosen alternative A in the previous period after accepting a bribe.

[31] The average bribe offered when PO has chosen alternative B in the previous period when no bribe was offered by F is 5.86, while the average bribe offered is 5.55 if PO has chosen alternative B in the previous period after accepting a bribe.

the gender of F and the following variables: PO´s gender, PO's actions and F's risk loving degree; the last of which is only in the first estimation.[32] Degree of risk loving is included as an explanatory variable in the first decision because deciding to offer a transfer to PO implies a risk, since there is a 0.003 probability that the two subjects will be disqualified from the experiment[33] and only earn the show-up fee.[34] As explained above, the degree of risk loving is measured in the post experimental questionnaire using the Datta Gupta el al. (2005) version of the psychometric test in Weber et al. (2002). The variables reflecting PO's decisions in previous periods are included because subjects play a repeated game where they can be influenced by their partner's previous actions.[35] As explained at the beginning of Section 3, there are six possible scenarios that could take place at each stage of the game, but I consider only 5 possible cases (as shown in Table A5). Therefore, there are 5 dummies that reflect PO´s previous actions. The dummy that takes a value of 1 if no bribe is offered and alternative B is chosen is the excluded scenario (in the previous period and two periods ago).

[32] Although the coefficients of these interacted variables are not reported in Tables 5 and 6, they are taken into account when calculating the marginal effects shown.

[33] If PO accepts the bribe.

[34] It is not included in the second estimation because the amount offered as a bribe does not influence the probability of being disqualified. Nonetheless, I tested a model including this variable and it does not change any of the results reported.

[35] Including more than 2 lags affects the significance of lag 1 and lag 2 due to high levels of correlation and does not increase the explanatory power of the model.

Dependent variable: 1 if F sends a transfer 0 otherwise	Coefficient *p-value*				
	(I)	(II)	(III)	(IV)	(V)
Female player 1	**-0.1457**	-0.0124	0.0066	0.0011	0.0018
	0.06	*0.78*	*0.86*	*0.98*	*0.96*
Female player 2	0.0215	0.0234	0.0243	0.0269	0.0309
	0.78	*0.62*	*0.46*	*0.42*	*0.37*
No bribe & Alternative A _ Previous period		**-0.4372**	**-0.3199**	**-0.3101**	**-0.3126**
		0.00	*0.00*	*0.00*	*0.00*
Bribe rejected_Previous period		0.1896	0.0665	0.0696	0.0613
		0.11	*0.49*	*0.46*	*0.51*
Bribe accepted & Alternative A_Previous period		**0.1509**	0.0243	0.0178	0.0073
		0.09	*0.69*	*0.77*	*0.90*
Bribe accepted & Alternative B_Previous period		**0.5511**	**0.5051**	**0.4957**	**0.4917**
		0.00	*0.00*	*0.00*	*0.00*
No bribe & Alternative A _ 2 periods before			-0.0534	-0.0496	-0.0453
			0.39	*0.42*	*0.45*
Bribe rejected_2 periods before			**0.1598**	**0.1627**	**0.1523**
			0.08	*0.07*	*0.07*
Bribe accepted & Alternative A_2 periods before			**0.2870**	**0.2691**	**0.2457**
			0.00	*0.00*	*0.00*
Bribe accepted & Alternative B_2 periods before			**0.3171**	**0.3040**	**0.3053**
			0.00	*0.00*	*0.00*
Risk loving				0.0036	0.0038
				0.26	*0.25*
Period					**-0.0073**
					0.00
Number of observations	1020	969	918	918	918
Prob > chi2	0.2510	0.0000	0.0000	0.0000	0.0000

The table shows the marginal effects evaluated at the average of the independent variables.
A constant and interaction terms between the two genders, between Female player 1 and the options, and between Female player 1 and Risk loving are included in the estimations.

Table 5: Probit regression of the decision to offer a bribe

	Coefficient *p-value*			
	(I)	(II)	(III)	(IV)
Female player 1	**-1.8090**	**-1.5771**	**-1.5046**	**-1.4778**
	0.02	*0.02*	*0.01*	*0.01*
Female player 2	-1.1701	-1.0013	-0.4251	-0.3821
	0.14	*0.13*	*0.49*	*0.52*
No bribe & Alternative A _ Previous period		**-1.9667**	**-1.7458**	**-1.6553**
		0.04	*0.01*	*0.02*
Bribe rejected_Previous period		-0.1296	-1.0124	-1.0319
		0.89	*0.26*	*0.22*
Bribe accepted & Alternative A_Previous period		**-2.3819**	**-2.9402**	**-2.8892**
		0.03	*0.00*	*0.00*
Bribe accepted & Alternative B_Previous period		-0.4743	**-1.2868**	**-1.2770**
		0.56	*0.05*	*0.06*
No bribe & Alternative A _ 2 periods before			-0.7439	-0.7510
			0.23	*0.21*
Bribe rejected_2 periods before			0.6616	0.6690
			0.44	*0.43*
Bribe accepted & Alternative A_2 periods before			-0.9105	-0.9172
			0.14	*0.13*
Bribe accepted & Alternative B_2 periods before			**1.1391**	**1.1013**
			0.02	*0.03*
Period				0.0326
				0.39
Number of observations	232	214	197	197
Prob > F	0.0021	0.0000	0.0000	0.0000

A constant and interaction terms between the two genders and between Female player 1 and the options are included in the estimations

Table 6: OLS regression of the bribe offered

The first conclusion that can be derived from Table 5 is that the *gender* of the players does not have a significant effect on the decision to offer a bribe. The probability of offering a bribe is not influenced by either F's gender nor by PO's gender.[36] Although result 1 states that male F offers a transfer more frequently than female F, gender is not a significant explanatory variable when control variables are included. On the other hand, gender has an effect on the bribe offered. In line with result 2, the bribe offered is lower if F is a woman. These results show that despite the fact that the probability of offering a bribe is not influenced by F's gender, the amount offered is influenced: female F offers lower bribes than male F. If it holds that the lower the amount offered as a bribe, the lower the probability that PO will choose alternative B, then we should observe a lower level of corruption when F is a woman.

The *actions PO has taken in previous periods* affect the probability of offering a bribe and the amount offered, which decrease if PO has *chosen alternative A after no bribe was offered by F* in the previous period. A possible interpretation is that choosing alternative A in this situation is seen by F as a sign that no cooperation can be expected from PO. On the other hand, the probability of offering a bribe increases if PO *has accepted a bribe and has chosen alternative B* one or two periods ago. In this case, a corrupt relationship between F and PO is observed. On the other hand, this dummy variable has a negative sign in the OLS estimation when it refers to an action taken one period ago, but has a positive sign if the action was taken two periods ago. This means that the bribe offered is higher if PO has accepted a bribe and has chosen alternative B two periods ago, but the bribe is lower if this happened one period ago. A feasible explanation for the negative sign is that F is trying to establish a "cheaper" corrupt relation. F knows that PO is willing to cooperate and so now tries to achieve cooperation with a lower bribe. The positive sign of the variable lagged 2 periods shows a persistence of the corrupt relationship in accordance with the sign observed in Table 4.

Although they do not affect the amount offered, other variables that positively affect the probability of offering a bribe are those which reflect the following actions taken by PO two periods ago: 1) s/he *has rejected the bribe*, and 2) s/he *has accepted the bribe and has chosen alternative A*. In these cases, it could be interpreted that F thinks that PO's action is due to a low bribe and not to the fact that PO is unwilling to engage in a corrupt relation (in case of rejection) or unwilling to choose an alternative that has negative externalities (in case of accepting the bribe but choosing alternative A). S/he therefore offers a bribe again.

[36] The fact that PO's gender is not a significant variable justifies the aggregation of data in Figures 3 and 4.

The variable *period* has a significant negative effect on the probability of offering a bribe — the probability decreases across periods — but it is not significant in the OLS estimation.

One variable that is significant in the OLS, but not in the probit estimation, is the dummy that shows that PO *has accepted a bribe and has chosen alternative A* in the previous period. To some extent, its negative sign contradicts the positive effect the variable has in the OLS estimation when it refers to this action taken two periods ago. If this variable has a positive sign, it would mean that F thought that PO chose alternative A because the bribe was not high enough. However, its negative sign means that F is replying to PO's "nasty" action (he has not chosen the alternative most favorable to F) with another "nasty" action — lowering the bribe offered.

Finally, contrary to what could be expected, the risk loving degree does not have a significant effect on the decision to offer a bribe.

The main conclusion from the previous econometric analysis is the same as result 2.

3.2 Beliefs regarding the public official's actions

After F has made his/her decisions, F is asked about his/her beliefs regarding the actions PO would take. In case F has not offered a bribe to PO, s/he is asked: What do you think is the probability that your partner will choose alternative B?[37] If F has offered a bribe, s/he is asked about the probability of PO accepting the transfer and the probability of PO choosing alternative B if PO accepts the transfer, or alternative C if PO rejects the transfer.

When F does not offer a bribe, men assign on average a 0.18 probability of PO choosing alternative B, while women assign on average a probability of 0.10 (p-value=0.000). Women are not influenced by their partner's gender, while men are. Men assign a higher probability to a male PO (0.23) than to a female PO (0.13) (p-value=0.017).

When F offers a bribe, men assign a higher probability to PO accepting the bribe (0.81) and PO choosing alternative B (0.60) than women (0.68 and 0.36, respectively).[38]

RESULT 3: Men assign a higher probability to PO accepting the bribe and choosing the corrupt alternative than women.

[37] Recall that alternative B is the "corrupt" alternative.

[38] Both comparisons between female and male probabilities yield p-values = 0.000.

The average probability assigned to a male PO accepting the bribe is higher than the probability assigned to a female PO — 0.80 vs. 0.74 (p-value=0.084). The same is observed with respect to the probability of PO choosing alternative B — 0.59 vs. 0.45 (p-value=0.001). Male Fs do not assign different probabilities to PO accepting the transfer according to their partner's gender — 0.81 vs. 0.82 (p-value = 0.812) — while women do differentiate — 0.78 vs. 0.56 (p-value = 0.000). Regarding the probability of choosing the alternative that is most favorable to F, men and women assign different probabilities to male and female POs. The probability men assign to PO choosing alternative B is 0.70 when they are playing with men, and 0.53 when they are playing with women (p-value = 0.000). The probabilities assigned by women are 0.42 and 0.29, respectively (p-value = 0.082). When F is asked about the probability of PO choosing alternative C in case PO rejects the offer, women assign a higher probability than men — 0.40 vs. 0.25 (p-value = 0.000). None of them assigns different probabilities according to PO's gender.

The difference in expectations about the behavior of male and female public officials shows that Fs expect women to be less corrupt than men.

RESULT 4: Male and female firms expect female public officials to choose the corrupt alternative less frequently than male officials.

Figures 5 and 6 show the average difference between the assigned probabilities and the real frequencies. Figure 5 shows that women tend to overestimate the frequency, while men tend to underestimate it. On the other hand, Figure 6 shows no significant differences between women and men in terms of the accuracy of assigning probabilities.[39]

[39] The lack of significance of player 2's gender in the econometrical analysis below justifies the aggregation of sessions fm with ff, and mm with mf.

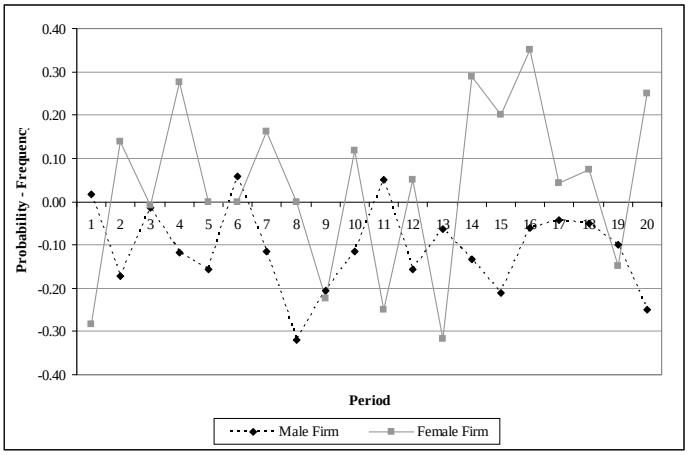

Figure 5: Probability of accepting the bribe minus frequency of acceptance

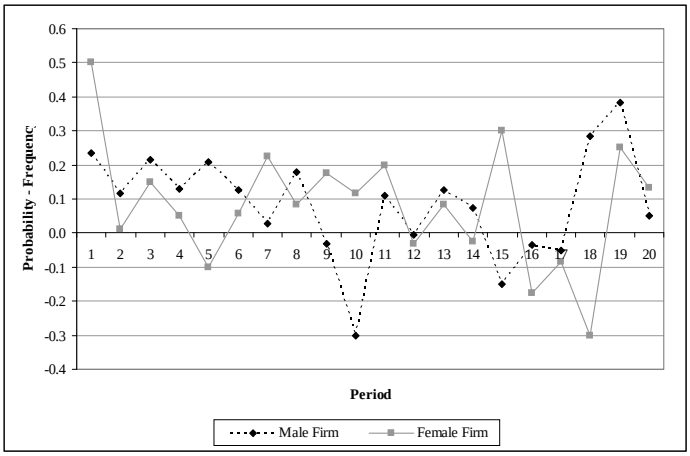

Figure 6: Probability of choosing alternative B minus frequency of B choices

Table 7 shows two *tobit estimations* for the probabilities of accepting the bribe and choosing alternative B when F decides to offer a bribe.[40] The estimations show that once control variables are considered, the gender of the players is no longer significant. The *amount offered* as a bribe has a positive and significant effect on both probabilities. The other variable that affects both probabilities is the dummy that shows that two periods ago *PO has accepted the bribe and has chosen alternative B*. As expected, it has a positive effect as it does in the models estimating the probability of offering a bribe and the amount offered. The first probability also increases

[40] I estimate these two models and not the probability of choosing alternative B when F is not offering a bribe because I want to focus on PO's decisions when F has offered a bribe.

if two periods ago *PO has chosen alternative A after no bribe or after a bribe was offered by F.* The last variable also has a positive and significant effect in the model explaining the decision to offer a bribe. Nonetheless, one could expect the previous variable to have a negative sign instead of a positive one. The *degree of risk loving* has a positive and significant effect — the higher the risk loving degree of F, the higher the probability s/he assigns to PO accepting the bribe.

The probability assigned to PO choosing alternative B decreases if PO *has accepted the bribe and has chosen alternative A* in the previous period. This variable also has a significant and negative effect on the amount offered as a bribe.

Random effects Tobit estimations		
Dependent variable:	Accept	Alternative B
Female player 1	-0.0700	-0.1193
	0.46	*0.11*
Female player 2	0.0476	-0.0334
	0.62	*0.63*
Amount offered as a bribe	**0.0222**	**0.0375**
	0.01	*0.00*
No bribe & Alternative A _ Previous period	-0.0245	-0.0501
	0.67	*0.44*
Bribe rejected_Previous period	-0.0895	-0.0693
	0.28	*0.46*
Bribe accepted & Alternative A_Previous period	0.0197	**-0.1300**
	0.78	*0.10*
Bribe accepted & Alternative B_Previous period	0.0304	0.0698
	0.60	*0.26*
No bribe & Alternative A _ 2 periods before	**0.1618**	-0.0926
	0.02	*0.23*
Bribe rejected_2 periods before	0.0567	-0.0165
	0.51	*0.86*
Bribe accepted & Alternative A_2 periods before	**0.1322**	-0.0368
	0.08	*0.66*
Bribe accepted & Alternative B_2 periods before	**0.1665**	**0.1549**
	0.01	*0.04*
Risk loving	**0.0166**	-0.0017
	0.04	*0.78*
Period	-0.0017	-0.0022
	0.55	*0.51*
Number of observations	197	197
Prob > chi2	0.0125	0.0000

The table shows the marginal effects evaluated at the average of the independent variables.
A constant and interaction terms between the two genders, between Female player 1 and the options, and between Female player 1 and Risk loving are included in the estimations.

Table 7: Tobit estimations of the probabilities assigned by the firm when offering a bribe to the public official

3.3 Decisions taken by the public official

The decisions PO has to take depend on whether F has decided to offer a bribe to PO or not. As the focus of the paper is on the manipulation of a public official's decisions through the use of a bribe, I analyze the decisions PO takes when F has offered the *public official* a bribe. In this situation, PO's first decision is whether to accept the bribe or not. Then, as explained in section 2, PO has to decide between two alternatives.

The percentage of male POs that are offered a bribe at least once in the 20 periods is 73%, while the percentage of women is 72%. When receiving an offer, the average frequency of acceptance is 85% for men and 79% for women (p-value = 0.292).

RESULT 5: The frequencies with which men and women accept a bribe are not statistically different.

As Table 4 shows, the frequency with which women accept the bribe is 93% when playing with a male F and 49% when playing with a female F (p-value = 0.000). The frequency with which men accept the offer when they are playing with a male F is 88%. When F is a woman it is 80% (p-value = 0.225). In this case, women behave differently if playing with a man or with another woman, while men do not. Moreover, the difference between men and women's frequency of acceptance when they are playing with a male F is not statistically significant (p-value=0.314). When a male F offers a bribe, it is accepted in 88% of the cases if he is playing with another man, and in 93% of the cases when the PO is a woman. When F is a woman, the frequency of acceptance of the bribe offered by her differs (p-value=0.004) if PO is a man (80%) or a woman (49%).

The next step is to analyze the alternative PO chooses once s/he has accepted the bribe offered by F. In this situation, men choose alternative B in 67% of the cases, while women do so in 39% of the cases (p-value = 0.000).

RESULT 6: Women choose alternative B less frequently than men.

Figures 7 and 8 show the frequency of B choices by period and by bribe amount, respectively. With some exceptions, both figures show that the frequency is higher for men than for women. Figure 7 also shows that no male PO takes the action that favors F in period 1, but they do so in the following periods. This is probably a form of strategic behavior to push F to increase

the bribe offered. In period 2 the bribe offered — and accepted — is not higher (it was 3.67, while in period 1 it was 4.07), but 80% of male POs choose alternative B. The evolution of the frequency of B choices is rather similar to the evolution of the bribe amount.

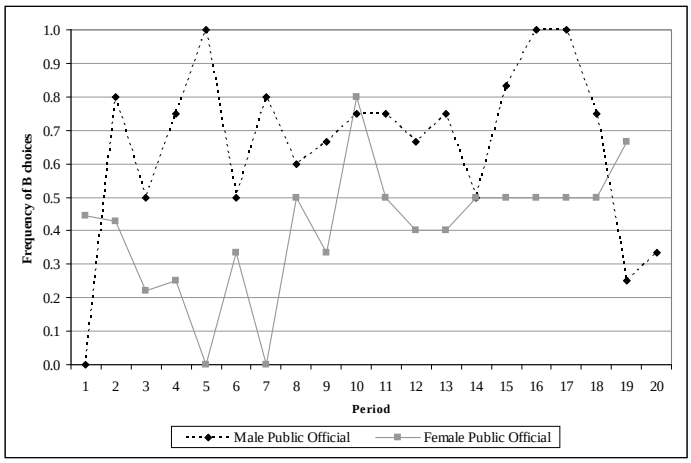

Figure 7: Frequency of B choices by period

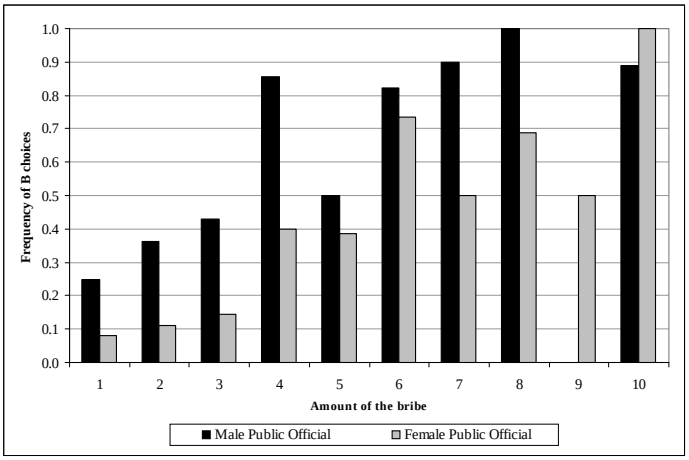

Figure 8: Frequency of B choices by amount of the bribe

The frequency of B choices by the male PO when playing with another man is 78%, but when playing with a woman the percentage is 49% (p-value = 0.004). The percentages for the female PO are 41% and 28%, respectively (p-value = 0.300). In this case, it is men and not women who differentiate according to their partner's gender, although the opposite was observed with respect to the frequency of acceptance. These values are shown in Table 4.

It is interesting to note that the highest frequency of B choices is observed when only men are playing (78%), while the lowest frequency is observed when only women are playing (28%).

Figures A1 and A2 in Appendix 2 show the frequency of B choices for the four different sessions. Figure A1 shows that the frequency of B choices by male POs differ according to their partner's gender. On the other hand, in line with previous results, the frequency of female POs does not differ depending on F's gender. Figure A2 shows that the frequency of females' B choices is lower than the frequency of males', independently of F's gender.

As explained above, F is asked to assign a probability to the event that PO will accept the bribe and that PO will choose alternative B. It turns out that the average assigned probability to PO accepting the bribe is very close to the real frequency when only women are playing —the difference is 0.01— but is not so accurate in the other cases. When only men are playing, they underestimate both frequencies by 0.07 points on average in the first probability and by 0.08 points in the second one. When a female F is playing with a male PO, they underestimate the frequency of acceptance and B choices by 0.02 and 0.07 points, respectively. The highest differences are observed when a male F is paired with a female PO. They underestimate the probability of acceptance by 0.11 points, and the probability of PO choosing alternative B by 0.12 points.

In the remainder of this subsection I will show the results of the *econometric analysis* of the two POs' decisions. The results are shown in Tables 8 and 9. The estimated models are probits with clustered standard errors. In the first model, the dependent variable takes a value of 1 if PO accepts the bribe and 0 otherwise. In the second model, the dependent variable takes value 1 if PO chooses the alternative that is most favorable to F (alternative B), and takes value 0 if PO chooses alternative A. The independent variables are the gender of both players (the dummy variables take a value of 1 if the player is a woman); the amount of the bribe offered (and accepted by PO) in the current period, one period ago, and two periods ago; the degree of risk loving (only in the first decision), and the period. I also include *interaction terms* between the gender of the two players, between the gender of PO and the amount of the (current and lagged) bribes, and between PO's gender and the risk loving degree. Risk loving degree is included in the decision of whether to accept the bribe or not because the decision implies a risk. That is, if PO accepts the bribe, then a number is randomly chosen to decide if the pair will be disqualified or not. If the pair is not disqualified, then PO has to choose one alternative. In this decision the risk loving degree plays no role, given that there is no risk of being disqualified at this point.

	Coefficient *p-value*					
	(I)	(II)	(III)	(IV)	(V)	(VI)
Female player 2	-0.0274	0.0005	0.0152	0.0204	0.0145	0.0160
	0.70	*1.00*	*0.80*	*0.70*	*0.78*	*0.75*
Female player 1	**-0.2609**	**-0.2173**	**-0.2614**	**-0.2587**	**-0.2381**	**-0.2350**
	0.01	*0.07*	*0.01*	*0.01*	*0.02*	*0.02*
Amount of bribe		**0.0216**	0.0380	0.0479	0.0490	0.0489
		0.08	*0.00*	*0.00*	*0.00*	*0.00*
Amount bribe_Previous period			-0.0165	**-0.0221**	**-0.0216**	-0.0210
			0.17	*0.10*	*0.10*	*0.12*
Amount bribe_2 periods ago				-0.0051	-0.0054	-0.0050
				0.69	*0.67*	*0.68*
Risk loving					-0.0016	-0.0019
					0.75	*0.72*
Period						-0.0015
						0.79
Number of observations	232	232	214	197	197	197
Prob > chi2	0.0007	0.0171	0.0000	0.0000	0.0000	0.0000

The table shows the marginal effects evaluated at the average of the independent variables.
A constant and interaction terms between the two genders, between Female player 2 and the amount of the bribe, and between Female player 2 and Risk loving are included in the estimations.

Table 8: Probit regression of the decision to accept the bribe

	Coefficient *p-value*				
	(I)	(II)	(III)	(IV)	(V)
Female player 2	**-0.3390**	**-0.3513**	**-0.3462**	**-0.3579**	**-0.3451**
	0.01	*0.00*	*0.00*	*0.00*	*0.00*
Female player 1	-0.0518	-0.1293	-0.0803	-0.1038	-0.0999
	0.42	*0.26*	*0.42*	*0.34*	*0.36*
Amount of bribe		**0.0962**	**0.1020**	**0.1151**	**0.1141**
		0.00	*0.00*	*0.00*	*0.00*
Amount bribe_Previous period			0.0178	0.0293	0.0260
			0.24	*0.12*	*0.14*
Amount bribe_2 periods ago				-0.0321	-0.0322
				0.25	*0.25*
Period					0.0789
					0.47
Number of observations	190	190	176	164	164
Prob > chi2	0.0150	0.0000	0.0000	0.0000	0.0000

The table shows the marginal effects evaluated at the average of the independent variables.
A constant and interaction terms between the two genders and between Female player 2 and the amount of the bribe are included in the estimations.

Table 9: Probit regression of the decision to choose alternative B

Although PO's *gender* does not have a significant effect on the decision to accept the bribe when we calculate the marginal effect on the average of the variable reflecting F's gender, it is significant when we calculate the effect when F is 1, i.e. F is a woman. In this case, the marginal effect is -0.3563 and its p-value is 0.02. This means that if F is a woman, the probability that a female PO will accept the bribe is 0.3563 points lower than the probability that a male PO will accept the same bribe. The gender of PO has a significant and negative effect on the decision to choose the corrupt alternative. If PO is a woman, the probability of choosing the alternative most favorable to F is 0.3451 points lower —ceteris paribus— than the probability that a male PO will choose this alternative. This result is similar in some ways to the result in Dreber and

Johannesson (2008). They find that men are more prone to lie in order to secure a higher payoff to the detriment of their partner's payoff than women, while I find that men are more prone to choose an alternative that negatively affects the other players.

When F is a woman, the probability that PO will accept the bribe decreases by 0.2350 points. Nonetheless, this variable is not significant in Table 9. But if we calculate the marginal effect of *Female firm* when PO is a man — instead of doing it on the average of the variable — this variable has a significant and negative effect. The marginal effect is -0.2131 and the p-value is 0.03. This result is in line with the previous result that shows that F's gender is important to male POs when deciding whether to choose alternative B or not. The probability that a male PO will choose alternative B is 0.2131 points lower when F is a woman rather than a man.

As expected, the *bribe amount offered* in the current period has a positive and significant effect in both decisions. The higher the amount, the higher the probability of accepting the bribe and choosing alternative B. One more token offered as a bribe increases the probability of acceptance by 0.0489 points and the probability of choosing alternative B by 0.1141 points. Contrary to Eckel and Grossman (2001), I do not find that females are more likely to accept lower offers. Nonetheless, what I do find is that bribes offered to women are lower than bribes offered to men (as shown in subsection 3.1). Therefore, firms might expect women to accept lower bribes.

The other variables included in the estimations are not significant. The most important conclusion of this analysis is summarized in the following results.

RESULT 7: If the public official is a woman, the probability of accepting the bribe is lower when the firm is also a woman.

RESULT 8: If the public official is a woman, the probability of choosing the corrupt alternative is lower.

3.4 Earnings

The average initial earnings[41] are 15.76 euros for male F and 15.24 euros for female F (p-value = 0.015). When playing with a male PO, male F earns 15.94 euros on average, while when playing

[41] The initial earnings are the earnings before subtracting the corresponding tokens due to the number of times alternative B has been chosen.

with a female PO they earn 15.56 euros on average (p-value = 0.650). The corresponding values for female F are 15.48 and 15.00 euros (p-value = 0.081). The initial earnings of PO are 15.94 and 15.21 for men and women, respectively (p-value = 0.140). The male PO earns 15.87 euros when playing with a man and 15.25 when playing with a woman (p-value = 0.418). The values for the female PO are 15.25 and 15.18 euros, respectively (p-value = 0.186). Therefore, before deductions, male firms earn more than female F on average, and female F earns more when playing with males than when playing with females. There is no difference in PO's initial earnings.

Given the different number of POs that choose alternative B, we have different deductions in each session. The average deduction in the mm session is 2.78 euros, in the mf session it is 2.02 euros and in the fm and ff sessions they are 1.33 and 0.37 euros, respectively.[42]

Therefore, the final earnings after subtracting the above deductions are 13.34 euros for male F and 14.39 euros for female F (p-values=0,000). Note that the difference in the final earnings has the opposite sign as does the difference in the initial earnings.

Male F earns 13.16 and 13.54 euros when playing with men and women, respectively (p-value = 0.186). The average earnings of female F are 14.15 and 14.63 euros, respectively (p-values = 0.057). The average final earnings of male PO are 13.52 euros, while the earnings of female PO are 14.36 (p-values = 0.002). The average earnings of male PO are 13.09 and 13.92 (p-value = 0.012), while those of female PO are 13.98 and 14.81 (p-values = 0.004) when playing with a male F and a female F, respectively. In both cases public officials earn more when playing with a female F due to the difference in the deductions. The main results are summarized as follows.

RESULT 9: Before deductions, male firms earn on average more than female firms. Considering the deductions, female firms earn more than male firms. Also, female public officials earn more than male public officials. The difference is due to higher deductions when men are playing.

[42] Recall that mm means Male player 1 - Male player 2, mf means Male player 1 - Female player 2, fm Female player 1 - Male player 2, and ff Female player 1 - Female player 2.

4 Conclusions

The aim of this paper was to study in a controlled environment whether women and men behave in different ways with respect to corruption —as suggested in the papers using field data— or, on the contrary, they behave in a similar way. In the experiment, participants took one of two roles, that of a firm or that of a public official. The possibility of corruption was introduced by allowing the first player (the firm) to send some amount of money as a bribe to the second player (the public official) in the hope of persuading the official to take a decision favorable to the firm, although this decision had negative externalities over all the other participants in the experiment.

The percentage of male firms that decided to offer a bribe to the public officer at least once was 80%, while the percentage of female firms that did so was 65%. Moreover, the average number of transfers was 6 for men and 3.1 for women; statistically different quantities. The average amounts offered — conditional on being positive — were also statistically different. They were 5.11 and 3.38 for male and female firms, respectively.

The estimations show that even when controlling for the previous actions of the public officer, the public officer's gender and the firm's risk aversion, a lower amount was transferred if the firm is a woman. This result implies that if the manipulation of the public officer's decisions positively depends on the amount offered as a bribe — as I found— then the probability of observing a corrupt relationship will be lower if the firm is a woman. When estimating the probabilities of the public officer's actions, men assigned a higher probability than women to the public officer accepting the bribe and choosing the corrupt alternative. Moreover, both male and female firms expected female public officials to choose the corrupt alternative less frequently than male officials.

The average frequencies of bribe acceptance were not statistically different for male and female public officials. When the bribe was accepted, men chose alternative B in 67% of the cases, while women did so in 39% of the cases; statistically different percentages. The highest average percentage of B choices was observed when only men were playing (78%), while the lowest was observed when only women were playing (28%). The probit models estimated show that if the public official is a woman, the probability of accepting the bribe is lower (if the firm is also a woman), as well as the probability of choosing the corrupt alternative.

Given the results mentioned above, the conclusion is in line with the field data papers. That

is, women are less corrupt than men. Thus, increasing participation by women in the labor force and politics would be expected to help in fighting corruption.

One question that arises at this point is whether the observed differences are due to stereotyping behavior or are simply inherent differences between males and females. If women are stereotyped as being less corrupt, they would receive less bribe offers and would therefore be less frequently involved in corrupt activities. This would not necessarily be due to inherent gender differences, but to the stereotyped behavior of the bribers.

With the raw numbers, I found that men offered bribes more frequently to females than to male public officials, although they offered them lower bribes. With respect to the assigned probabilities, I found that both genders assigned a lower probability to their partner choosing alternative B when playing with a female public officer instead of a male public officer. This result might show some stereotyping behavior or a learning process by the firms, given that female officers indeed chose alternative B less frequently than males. Despite these results, the partner's gender is generally not significant in the econometric analysis of the decisions and assigned probabilities. Partner's gender is only significant in the estimation of the probability of accepting the bribe, and when the public official is a man in the estimation of the probability of choosing the corrupt alternative. Both probabilities are lower if the firm is a woman. Therefore, I observe only weak evidence of stereotyping behavior.

According to Gottfredson and Hirschi (1990), one explanation of gender difference in crime is a difference in self-control. Self-control is "the extent to which they are vulnerable to the temptations of the moment" or "the extent to which they are restrained from criminal acts". This behavior can also be extended to differences in corruption. This would mean that women exercise greater self-control and therefore refrain from engaging in corrupt behavior. Moreover, as Gottfredson and Hirschi (1990) point out, people with low self-control tend to be more egocentric and disinterested in others' needs. In relation with corruption, one possible explanation for the difference observed in the experiment is that women are more sensitive to others' losses and that is why they choose the corrupt alternative with negative externalities over all the other participants less frequently.

To reach a definitive conclusion as to why gender difference is observed, more studies need to be conducted on this subject. This paper is an attempt to study gender differences in corruption through a lab experiment, albeit further research should shed more light on this topic.

References

[1] Abbink, Klaus and Heike Hennig-Schmidt (2002), "Neutral versus loaded instructions in a bribery experiment". Working paper, University of Nottingham and University of Bonn.

[2] Abbink, Klaus, Bernd Irlenbusch, and Elke Renner (2002), "An experimental bribery game". *The Journal of Law, Economics and Organization*, 18 (2), pp. 428-454.

[3] Alatas, Vivi, Lisa Cameron, Ananish Chaudhuri, Nisvan Erkal, and Lata Gangadharan (forthcoming), "Gender and Corruption: Insights from an experimental analysis". *Southern Economic Journal*.

[4] Chaudhuri, Ananish and Lata Gangadharan (2003), "Gender differences in trust and reciprocity". Working Paper, Economics, The University of Auckland.

[5] Croson, Rachel and Uri Gneezy (2008), "Gender differences in preferences". *Journal of Economic Literature*, forthcoming.

[6] Datta Gupta, Nabanita, Anders Poulsen, and Marie-Claire Villeval (2005), "Male and Female Competitive Behavior. Experimental Evidence". GATE Working Paper 05/12.

[7] Dreber, Anna and Magnus Johannesson (2008), "Gender differences in deception". *Economics Letters*, 99, pp. 197-199.

[8] Dollar, David, Raymond Fisman, and Roberta Gattia (2001), "Are women really the "Fairer" sex? Corruption and women in government". Policy research report on gender and development. *Journal of Economic Behavior and Organization*, 46(4), pp. 423-429.

[9] Eagly, Alice and Wendy Wood (1999), "The origins of sex differences in human behavior: Evolved dispositions versus social roles". *American Psychologist*, 54, pp. 408-423.

[10] Eckel, Catherine and Philip Grossman (2000), "Differences in the economic decision of men and women: experimental evidence". In *Handbook of Experimental Economics Results*. Ed by C Plott and V.L. Smith.

[11] Eckel, Catherine and Philip Grossman (2001), "Chivalry and Solidarity in Ultimatum Games". *Economic Inquiry,* 39, pp. 171-188.

[12] Eckel, Catherine and Philip Grossman (2002), “Sex Differences and Statistical Stereotyping in Attitudes Toward Financial Risk”. *Evolution and Human Behavior*, 23 (4), pp. 281-295.

[13] Eckel, Catherine and Rick Wilson (2004a), “Whom to Trust? Choice of Partner in a Trust Game”. Working Paper, Virginia Polytechnic.

[14] Eckel, Catherine and Rick Wilson (2004b), “Conditional Trust: Sex, Race and Facial Expressions in a Trust Game”. Working Paper, Virginia Polytechnic.

[15] Fischbacher, Urs (2007), "Z-tree. Zurich toolbox for readymade economic experiments". *Experimental Economics,* 10(2), pp.171-178.

[16] Frank, Björn and Günther Schulze (2000), "Does economics make citizens corrupt?". *Journal of Economic Behavior and Organization,* 43 (1), pp. 101-113.

[17] Gottfredson, Michael and Travis Hirschi (1990), "A general theory of crime". Stanford: Stanford University Press.

[18] Phyllis, Dininio and Sahr John Kpundeh (1999), "A handbook on fighting corruption". Technical Publication Series. Center for Democracy and Governance, U.S. Agency for International Development.

[19] Johnson, Johnnie and Philip Powell (1994), “Decision making, risk and gender: Are managers different?”. *British Journal of Management,* 5, pp. 123-138.

[20] Schulze, Günther and Björn Frank (2003), "Deterrence versus intrinsic motivation: experimental evidence on the determinants of corruptibility". *Economics of Governance,* 4 (2), pp. 143-160.

[21] Schubert, Renate, Matthias Gysler, Martin Brown, and Hans-Wolfgang Brachinger (1999), "Financial decision-making: Are women really more risk averse?". *American Economics Review Paper and Proceedings*, 89, pp. 381-385.

[22] Selten, Reinhard and Axel Ockenfels (1998), "An experimental solidariy game". *Journal of Economic Behavior and Organization*, 34, pp. 517-539.

[23] Snijders, Chris and Gideon Keren (2004), “Do you trust? Whom do you trust? When do you trust?” In S.R. Thye, E.J. Lawler, M.W.Macy, H.A. Walker (Eds.), *Advances in group processes,* pp. 129-160. Amsterdam: JAI, Elservier Science.

[24] Swamy, Anand, Stephen Knack, Young Lee, and Omar Azfar (2001), "Gender and corruption". *Journal of Development Economics,* 64 (1), pp. 25-55.

[25] Torgler, Benno and Neven T. Valev (2006), "Women and illegal activities: gender differences and women's willingness to comply over time". Working Paper Nr. 2006-15. Center for Research in Economics, Management and the Arts (CREMA).

[26] Weber, Elke, Ann-Renée Blais and Nancy Betz (2002), "A domain-specific risk attitude scale: measuring risk perceptions and risk behaviors". *Journal of Behavioral Decision Making*, 15 (4), pp. 263-290.

[27] Wood, Wendy and Alice Eagly (2002), "A cross-cultural analysis of the behavior of women and men: Implications for the origins of sex differences". *Psychological Bulletin*, 128, pp. 699-727.

5 Appendix 1: Instructions

(Original text in Spanish)

Thank you for participating in this experiment on decision making. You will be paid 3 euros for showing up plus the money you earn during the experiment, which will depend on your and other participants' decisions. At the end of the session you will be paid in private.

From now on, you will not be allowed to speak with the other participants. If you have any questions or doubts at any time during the experiment, please raise your hand and we will attend to you personally.

There are two types of participants in the experiment: player type 1 (hereafter Player 1) and player type 2 (hereafter Player 2). Players 1 are those that have an odd number and Players 2 those that have an even number. At the beginning of the experiment, each Player 1 will be matched with one Player 2 in an anonymous way. This match will be maintained throughout experiment.

The experiment consists of 20 identical and independent rounds. Each round consists of 4 stages which will be explained in short. At the beginning of each round, each participant will be assigned 40 tokens, meaning that each participant will have 40 tokens to be used in this round.

Stage 1

Player 1 has to decide whether to send a transfer to Player 2 or not.

- If he does, his credit is reduced by 2 tokens (which is a fixed cost for transferring tokens) and the experiment moves to stage 2.
- If Player 1 decides not to send a transfer to Player 2, his credit remains unchanged and the experiment moves to stage 4.

Stage 2

Player 1 decides how many tokens to transfer to Player 2 from among 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 tokens. The experiment moves to stage 3.

Stage 3

Player 2 decides whether to accept the transfer or not.

- If Player 2 decides to accept the transfer, then Player 1's credit is reduced by the amount transferred and Player 2's credit is increased by the triple of the amount transferred by Player 1. For example, if Player 1 sends 2 tokens, Player 2 receives 6 tokens. After this, an integer ranging from 0 to 999 is randomly drawn by the computer (every number has the same probability of being chosen).

  - If the randomly drawn number is 0, 1, or 2, then the pair is disqualified. This means that the experiment ends for these two players and their earnings in the experiment are 0. They will only receive 3 euros for showing up. These players have to remain in their seats in silence and fill in a questionnaire that will be distributed to them. For the other participants, the experiment will continue normally.
  - If the randomly drawn number is 3, 4, 5, ...or 999, then the experiment moves to stage 4.

- If Player 2 decides not to accept the transfer offered by Player 1, then the credit remains unchanged (the transfer cost from stage 1, however, is paid by Player 1). The experiment moves to stage 4.

Stage 4

Player 2 chooses one alternative depending on what has happened until that time, i.e. whether Player 1 has transferred tokens and in case he did, whether Player 2 has accepted the transfer or not.

1. If Player 1 decided not to offer a transfer, Player 2 has to choose between alternatives A and B.

2. If Player 1 offered a transfer that was accepted by Player 2, then Player 2 has to choose between alternatives A and B.

3. If Player 1 offered a transfer that was rejected by Player 2, then Player 2 has to choose between alternatives A and C.

This is shown in the following table.

Situation			Alternatives
Stage 1	**Stage 2**	**Stage 3**	**Stage 4**
Player 1	*Player 1*	*Player 2*	*Player 2*
Decides not to send tokens	-------	-------	A or B
Decides to send tokens	Decides the amount of tokens	Accepts the tokens	A or B
Decides to send tokens	Decides the amount of tokens	Does not accept the tokens	A or C

Table A1

Apart from the corresponding payoffs in each situation (see tables), for every pair that chooses Alternative B (i.e. for each Player 2 that does so) the payoff of all the other participants will be decreased by 3 tokens. These 3 tokens are not included in the tables.

CASE 1: Player 1 decided not to offer a transfer to Player 2.

The payoffs are as follows.

Alternative	A	B
Firm	50	70
Public official	50	45

Table A2

This means that if Player 2 chooses Alternative A, the payoffs are 50 tokens for both players. If, on the contrary, Alternative B is chosen, the payoffs are 70 tokens for Player 1 and 45 for Player 2. If Alternative B is chosen, 3 tokens will be deducted from the payoffs of both members of all the other pairs in the room. The amounts in the table are the total payoffs corresponding to this round, including the initial tokens (40 and the added tokens for each alternative chosen.

CASE 2 : Player 1 decided to offer a transfer of tokens, which was accepted by Player 2.

In this case the payoffs depend on the amount transferred. The amounts in the following table are the total payoffs corresponding to this round of the experiment, including the initial tokens (40), the added tokens for each alternative chosen, the transfer made, and the cost of making the transfer.

Transfer amount	1		2		3		4		5		6		7		8		9		10	
Alternative	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Firm	47	67	46	66	45	65	44	64	43	63	42	62	41	61	40	60	39	59	38	58
Public official	53	48	56	51	59	54	62	57	65	60	68	63	71	66	74	69	77	72	80	75

Table A3

For example,

- If 2 tokens are transferred and Alternative A is chosen, the payoffs are 46 tokens for Player 1 and 56 tokens for Player 2. If Alternative B is chosen, then the payoffs are 66 and 51 tokens, respectively. If Alternative B is chosen, 3 tokens will be deducted from the payoffs of each member of all the other pairs in the room.

- If 5 tokens are transferred and Alternative A is chosen, the payoffs are 43 tokens for Player 1 and 65 tokens for Player 2. If Alternative B is chosen, then the payoffs are 63 and 60 tokens, respectively. If Alternative B is chosen, 3 tokens will be deducted from the payoffs of each member of all the other pairs in the room.

- If 10 tokens are transferred and Alternative A is chosen, the payoffs are 38 tokens for Player 1 and 80 tokens for Player 2. If Alternative B is chosen, then the payoffs are 58 and 75 tokens, respectively. If Alternative B is chosen, 3 tokens will be deducted from the payoffs of each member of all the other pairs in the room.

CASE 3 : Player 1 offered a transfer and it was rejected by Player 2.
In this case the payoffs are as follows.

Alternative	A	C
Firm	48	36
Public official	50	48

Table A4

This means that if Player 2 chooses Alternative A, the payoffs are 48 tokens for Player 1 and 50 tokens for Player 2. If Alternative C is chosen, the payoffs are 36 tokens for Player 1 and 48 tokens for Player 2. The above amounts are the total payoffs corresponding to this round of the experiment, including the initial tokens (40), the tokens added or deducted for each alternative chosen, and the cost of making a transfer.

DEDUCTIONS

From the previous payoffs we should deduct an amount depending on how many type 2 players have chosen Alternative B. For each Player 2 of the other pairs that choose Alternative B, we have to deduct 3 tokens from the payoffs. For example, if there are 5 pairs (excluding yours) that have chosen Alternative B, then we have to deduct 15 tokens from your and your partner's payoffs (5 pairs * 3 tokens).

The minimum deduction is 0 (if none of the other pairs chooses Alternative B). The maximum deduction is 3 times the number of pairs that are now in the room (excluding yours). For example, if there are 13 pairs in the room, it means that there are 12 pairs apart from your own. Hence, the maximum possible deduction is 3 * 12 = 36 tokens.

After stage 4, the round ends. The total earnings of the experiment are the sum of the payoffs obtained in the 20 rounds converted into euros plus 3 euros for showing up. The exchange rate is 1.5 € for 100 tokens. This means that your total earnings will be the total amount of tokens you have multiplied by 0.015. You will be told how much you have earned at the end of the experiment.

NOTE

You will be told the amount to be deducted from your earnings as a result of the pairs choosing Alternative B at the end of the experiment, when the 20 rounds are over.

6 Appendix 2

Session	Group	NoBribe+A	NoBribe+B	PO Rejects	PO Accepts+A	PO Accepts+B	Total
Female F - Male PO	1	18	1	1	0	0	20
(fm)	2	10	2	1	3	**4**	20
	3	19	1	0	0	0	20
	4	14	0	5	1	0	20
	5	18	0	0	2	0	20
	6	19	0	0	1	0	20
	7	20	0	0	0	0	20
	8	10	8	1	0	**1**	20
	9	20	0	0	0	0	20
	10	7	2	1	5	**5**	20
	11	20	0	0	0	0	20
	12	7	0	0	6	**7**	20
	13	19	1	0	0	0	20
Male F - Female PO	1	15	2	0	2	**1**	20
(mf)	2	19	0	0	1	0	20
	3	20	0	0	0	0	20
	4	3	5	2	8	**2**	20
	5	1	0	3	5	**11**	20
	6	8	3	1	4	**4**	20
	7	3	2	0	4	**11**	20
	8	3	0	0	17	0	20
	9	17	1	0	2	0	20
	10	12	2	0	3	**3**	20
	11	18	2	0	0	0	20
	12	20	0	0	0	0	20
Male F - Male PO	1	2	7	0	1	**10**	20
(mm)	2	18	1	1	0	0	20
	3	18	0	2	0	0	20
	4	20	0	0	0	0	20
	5	18	2	0	0	0	20
	6	8	4	2	1	**5**	20
	7	15	0	0	1	**4**	20
	8	17	2	1	0	0	20
	9	16	3	1	0	0	20
	10	3	2	1	6	**8**	20
	11	3	0	0	1	**16**	20
	12	19	0	0	1	0	20
	13	15	0	0	2	**3**	20
Female F - Female PO	1	3	2	11	0	**4**	20
(ff)	2	10	0	4	5	**1**	20
	3	20	0	0	0	0	20
	4	20	0	0	0	0	20
	5	20	0	0	0	0	20
	6	19	0	1	0	0	20
	7	19	0	1	0	0	20
	8	19	0	0	1	0	20
	9	20	0	0	0	0	20
	10	17	0	0	3	0	20
	11	19	0	1	0	0	20
	12	15	2	0	3	0	20
	13	18	0	1	1	0	20

Table A5: Data by group and session

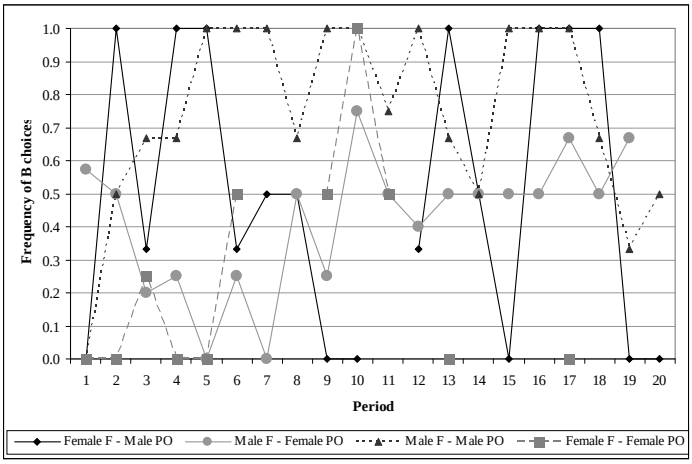

Figure A1: Frequency of B choices by period and session

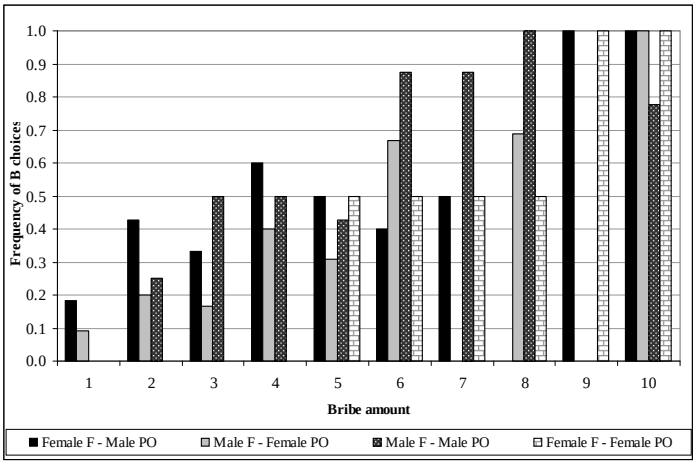

Figure A2: Frequency of B choices by amount of the bribe and session