2016

Gender Biases in Delegation

Eleonora Bottino

Teresa García-Muñoz

Praveen Kujal

Gender Biases in Delegation

Comments

Working Paper 16-22

Gender Biases in Delegation

Eleonora Bottino, Teresa García-Muñoz and Praveen Kujal

Abstract:

We explore gender biases towards delegation in a modified (delegation) dictator game. Under compulsory delegation and no (gender) revelation no significant gender differences are observed for choices made by principals. Male agents share little with the recipients, meanwhile, female (agents) are not responsive to the incentive scheme and return less to the dictator. However, a clear dichotomy in female behavior is observed under gender revelation. As principals, females behave similar to their male counterparts and appoint as agents those who return more to them. On the other hand, as agents' females show greater redistributive concerns relative to their male counterparts in the early periods even though it is detrimental to them over time. This results in both male and female principals delegating more to male agents over time.

1. Introduction

We study whether there are gender differences in delegation (Hamman, Loewenstein and Weber 2010) in the standard dictator game. In the gender treatment we reveal the gender of the agents. The principal then chooses between one of the two agents who then decide how to split the initial endowment between the dictator and the recipient.[1] We find that, under no gender revelation, there are no gender differences in allocation decisions. This is not the case under gender revelation there are no differences (in allocation decisions) between male and female *principals'*. Female *agents*, on the other hand, allocate less to their own principals relative to their male counterparts in the early periods. Consequently female agents are selected less frequently in subsequent periods.

Literature Review

Gender differences in competition, preferences, and cooperation in teams has been studied in the experimental literature (see Croson and Gneezy 2009 for a review). The results point towards multiple factors that contribute towards the so-called gender gap. For example, both sex discriminate and women tend to discriminate against their own sex. When selecting partners either sex has preference over the opposite sex. Further, men have a stronger response to competitive pressures (Niederle and Vesterlund 2007) while the context and group composition is an important determinant of the outcomes.

Examination of high paid occupation categories shows that women's salary is generally lower relative to men's within these occupations (Booth et al. 2003). Gneezy, Niederle and Rustichini (2003) show that, although men and women perform equally well solving mazes in a non-competitive environment, there are large gender differences in performance in a competitive one. The gender gap in performance is mainly driven by an increase in men's performance in competitive environments. Niederle and Vesterlund (2007)[2] results suggest that men are substantially more overconfident than women. Moreover the authors claim that while "(…) women shy away from competition, (...) men embrace it".[3] These findings suggest that taste for competition may play an important role in explaining gender disparity at the top-level positions (also see survey by Croson and Gneezy 2009).

The results concerning gender differences in generosity in the dictator game are mixed. Bolton and Katok (1998) find no significant male-female differences when the dictators do not know the gender of their recipients. On the other hand, Eckel and Grossman (1996), conclude that all-female groups are more altruistic than the all-male groups.[4] Aguiar et al. (2009) explore how subjects perceive behavioral differences between men and women. Their results suggest that females consider males to be more generous but males do not reveal any gender bias.

---

[1] As in Bartling and Fischbacher (2012) we also use delegation as a tool to shift and bear responsibility.
[2] This experiment closely follows Gneezy, Niederle, and Rustichini (2003)
[3] Niederle and Vesterlund, 2007, p.1
[4] Notice that in Eckel and Grossman (1996) the dictators are informed about the gender of the recipients.

The link between responsibility and delegating decisions is studied by both Bartling and Fischbacher (2012) and Hamman et al. (2010). Bartling and Fischbacher (2012) consider a variation of the dictator game. They allow for delegation and employ a punishment option to elicit responsibility attributions. Their findings suggest that when delegation is followed by an unfair split of the initial endowment, the agent who makes the allocation decision is punished much more than the principal who passed over the decision. These results show that responsibility can be effectively shifted and that it is a powerful motive to delegate a decision right.[5] Note that Bartling and Fischbacher (2012) do not analyze gender differences.

Hamman et al. (2010) explore a dictator game with delegation. They look at the responsibility shifting motive behind it. They explore the hypothesis that a principal may feel more detached, and therefore less responsible, for an outcome when he delegates a decision. Comparing a baseline condition in which principals make the decision themselves against an agent condition in which principals select agents to make the decision on their behalf. They find that principals are significantly less generous toward recipients in the agent condition than when they act individually in the baseline condition. Moreover, principals in the baseline condition report feeling responsible for outcomes, but principals acting through agents do not feel responsible for the final allocation. Principals that delegate the allocation decision judge their behavior as significantly fairer than those who take the decision directly. The authors conclude that "through the use of agents (...) accountability for morally questionable behavior can become vertically diffused, with no individual taking responsibility" (Hamman et al. 2010, p.2).

In this paper we extend Hamman et al. (2010) to investigate gender biases in delegation. The paper is organized as follows. Section 2 presents the experimental design. The main results are discussed in section 3. Section 4 concludes and discusses possible extensions.

2. Experimental Design

The experiments were conducted via computer interface using z-Tree (Fischbacher 2007). Participants were recruited using Orsee from a randomly generated e-mailing list of students at Universidad Carlos III of Madrid. The recruitment email was standard and placed no emphasis on gender issues. Each participant took part in one treatment only. A 5€ show-up fee was paid in addition to the earnings from the experiment and a 2€ fees for completing a questionnaire. Including the instructions (Appendix B) the experiment lasted for approximately forty-five minutes. The average payoff, including the show up fees, was 12.11€. As no formal IRB procedure was in place approval for Economic experiments conducted at Carlos III was provided by the Dean of the Faculty of Social Sciences and Law.

[5]The idea that a person can avoid a punishment by passing on the decision is also explored by Coffman (2011). This author analyses settings in which the second party is blameless for the outcome.

We ran three treatments with a total of 19 sessions[6] (12 rounds/session) with a total of 254 subjects (see Table 1). Each player was assigned a number and a role at the start. These were kept the same during the experiment. Participants were given instruction hand-outs which were subsequently read aloud. To avoid framing Dictators, Recipients or Agents, were denoted as "players A", "B" and "C", respectively. Participants were informed that the experiment lasted for 12 rounds and that the matching in all rounds was random. For payment purposes, each envelope was marked with the number assigned to the players during the treatment. Once a subject finished answering the questionnaire, he/she could collect his/her envelope.

Table 1. Subjects per treatment

	Baseline	Compulsory Delegation	Compulsory Delegation and Gender Revelation
# Sessions	5	4	10
Total # of subject (Females/Males)	62 (27/35)	56 (22/34)	136 (56/80)
# Principals/ Recipients/Agents (of which females)	31/31/n.a. (14/13/n.a)	24/24/8 (12/6/4)	58/58/20 (28/18/10)

The first treatment (Baseline) was the standard dictator game. The other two treatments were Compulsory Delegation (Hamman et al. 2010) and Compulsory Delegation and Gender Revelation. Table 2 summarizes the main differences across treatments. Both players, dictators and recipients, were paid for one randomly chosen round at the end of the experiment. Agents meanwhile were paid the 5€ show up fee and received an additional 5€ as starting capital. They accumulate earnings in the experiment according to the following rule:

$$\pi_i = -0.45 + 0.15 * n_j$$

where n_j represents the number of principals[7] choosing agent i. The interpretation for π_i (Hamman et al., 2010) is that the agents face a constant, fixed cost (0.45€) and marginal revenue (0.15€), when making the allocation decision. Agents' earnings in a round are independent of the allocation decision(s) they make and only depend on the number of principals selecting them. By doing this the net total payment to all agents in a round is kept fixed at 0€. Moreover, such a scheme avoids directly linking the agent's reward and the principal's payoff.

[6]In general, 14 players participated in each session. However, we ran session 2 and 4 of the baseline treatment with 12 players, and session 3 with only 10 players. Only 10 students showed up to participate to the 1st session of the Compulsory Delegation and Gender Revelation treatment. We ran five sessions with six rounds each of the Compulsory Delegation and Gender Revelation for another experiment.

[7]In one session of the CD treatment only 10 players showed up. Four of them participated as dictators, four as recipients and two as agents. In this last case the payment scheme for agents was $\pi_i = -0.45 + 0.225 * n_i$, in order to be comparable with the one of the other sessions. Note that there were no major differences across the five sessions.

Table 2. Description of treatments

	Baseline	Compulsory Delegation	Compulsory Delegation and Gender Revelation
Game	Standard dictator game	Dictator game with delegation	Dictator game with delegation
Delegation	-	Compulsory	Compulsory
Allocation decision made by	-	Agents	Agents
Agents' gender	-	Not revealed	Revealed

Treatment 1: Baseline (BL)

This is the standard dictator game with no gender revelation. We run five sessions: two with 12 and 14 players, and one with 10 (see Table A.1, Appendix A, for details). In each session, half of the students are assigned the role of dictators and the other half the role of the recipients. Students know that the experiment is being conducted in pairs and that they will be randomly matched with another participant in each subsequent round. To enable comparisons with subsequent treatments we assign three female and male students the role of dictators.[8] The rest of the subjects are assigned the role of recipients. Among the 62 subjects who participated in this treatment, 27 were females.[9] All pairings were anonymous.

An initial endowment of 10€ is assigned to each player. Dictators decided how to allocate (in 10 cent increments) the initial endowment to recipients. Once the decision was made, recipients were informed about the amount of money they had been assigned.

[8] See Table A.1 in Appendix A for further details.

[9] Having an equal representation of men and women is not strictly necessary for our results. Consider the recipients first. They do not play an active role in the game. Moreover, as the dictators are not told the gender of the recipients, the latter is not of prime relevance in this treatment. Concerning the principals, the issue is more complex. The results remain valid even if we do not have an equal representation of men and women. For instance, Andreoni and Vesterlund (2001) do not select the participants according to their gender. They claim that this helps get "(...) a picture of the male-female difference that would naturally occur in an experiment not designed to test for such differences". On the other hand, having a gender balance in the dictator-group helps mitigate possible group effects. Moreover, an approximately equal number of males and females across treatments facilitate comparisons and interpretations.

Treatment 2: Compulsory Delegation (CD)

This structure game is the same as in Hamman et al. (2010). An initial endowment of 10€ is assigned to principals in each round who must then choose one of the two agents to make the allocation decision on their behalf. Following Hamman et al. (2010), each agent was matched with three principals in the first round. By doing this the two agents started with the same number of decisions. However, from round two, each principal was allowed to choose which agent they wanted to delegate the decision to. Further, if an agent is chosen by more than one principal then the allocation choice for each pair is independent of the other.

A total of 4 sessions were run with 14 participants per session (total = 56) providing us with 6 principals, 6 recipients and 2 agents. Note that agent's pair is always formed of a male and a female. This is done to enable comparison with the Gender Revelation treatment.

The gender of the agents is not revealed to the principals. Principal delegates the decision to allocate 10€ to either of the two agents. Agents then decide on how to allocate this amount between principals and recipients. From Bartling and Fischbacher (2012) and Hamman et al. (2010) we know that agents end up sharing substantially less under Compulsory Delegation. We want to see if their result replicates in our experiments and also whether there are differences across gender (for agents) and choice of agents when gender is not revealed.

Principals choose the agents according to the registration number assigned to each one of them.[10] The agents who are not selected in a round see a waiting screen while the other agents made the allocation decisions. Subsequently each player is informed about the allocation choice of his/her corresponding agent. Table 2 highlights the treatment details.

Treatment 3: Compulsory Delegation with Gender Revelation (CDGR)

In this treatment the gender of the agents is made known to the principals. Recall that the agents are made up of a male/female pair. Gender of the agents was revealed to see whether the knowledge of the gender affected the choice of the agent by the Principal. Ten sessions were run with 14 participants per sessions, except in the first one where 10 students participated (136 participants in total). In the last 5 sessions six rounds were obtained from another treatment where we ran six rounds with exactly the same conditions. See details in Table A.1 in Appendix.

A crucial issue in this experiment concerns the role of beliefs. In particular, anticipating here a point that will be made clear later on, we want to be able to control for principals' beliefs towards agents' fairness. Recall that our goal is to assess whether a "gender bias" in delegation arises. Eliciting beliefs in a repeated game is

[10] We modify this condition in the next treatment (Treatment 3, Compulsory Delegation and Gender Revelation).

tricky. Our belief-elicitation protocol shares some similarities with the one used by Charness and Dufwenberg (2006). At the beginning of the first round, before the delegation decision, we ask the principals to make a guess about what will be the average allocation of each of the four agents during the game. The principals are rewarded 50 cents for every correct answer.[11] Although very simple to implement, this procedure is not free from criticism. Eliciting beliefs may alter the way they play Rutström and Wilcox (2009) and motivate subjects to construct more sophisticated models of their opponents' behavior.

We justify our elicitation protocol considering that our main interest pertains regarding the innate beliefs that principals have about gender fairness. Eliciting these beliefs at the end of the game would definitely give biased opinions based on experience. Moreover, we believe that the incentives the principals face in the game are strong enough to overcome the possible influence of belief elicitation on their subsequently chosen actions.[12] Summing up, we try to capture the beliefs that each principal has about the attitude towards fairness of the alternative agents.

3. Results

We first look at the summary statistics. Average amount earned (by gender) by principals and allocated by agents in each treatment are presented in Table 3 and 4, respectively. Including the show-up and the questionnaire fees, on average, principals, recipients and agents earned 15.02€, 9.32€ and 11.57€, respectively.[13]

Table 3. Average earnings by principals in each treatment

	BL	CD	CDGR
Females	7.83 (2.56)	8.41 (2.40)	7.17 (2.49)
Males	7.55 (2.26)	7.52 (2.43)	7.41 (2.19)
Both	7.68 (2.40)	7.96 (2.45)	7.39 (2.34)

Note: Standard deviation in parentheses

[11] The guess was considered correct if it is contained in an interval of width 50 cents around the outcome.

[12] A pre-play belief elicitation approach is applied for instance by McKelvey and Page (1990).

[13] When asked to evaluate their payoffs in the questionnaire at the end of the game, the subjects expressed on average a moderate level of satisfaction (79% of the students agree with the statement that the total profit offered in the experiment was quite relevant to them).

Table 4. Average allocation from agents to principals

	CD	CDGR
Females	6.45 (1.69)	7.03 (2.11)
Males	8.68 (2.43)	7.44 (2.49)
Both	7.57 (2.37)	7.24 (2.32)

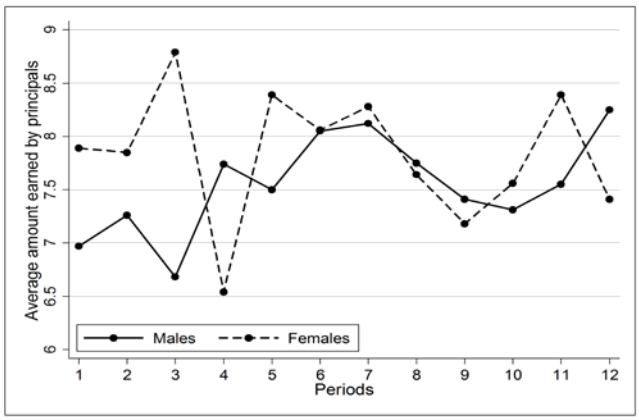
Note: Standard deviation in parentheses

One can see from the tables that the actions of females are conditioned by the role they play. In the CD treatment, as principals females earn more (8.41€) than males (7.52€) on average, meanwhile, as agents females allocate less to principals (6.45€ in average) than their male counterparts (8.68€ in average). Below we look at the results by treatments in depth.

3.1 Baseline:

Average earnings for principals in the BL treatment were 7.68€.[14] One can see (Figure 1) the average amount earned by principals in the BL treatment (by period and gender). A Kolmogorov-Smirnov (KS) test shows that there are no significant differences between the average amount allocated by males and females (*KS p-value=0.536*). This result is along the lines of Bolton and Katok (1998) where they found no statistically significant gender differences in the standard dictator game.

Figure 1. BL treatment: Average amount earned by principals

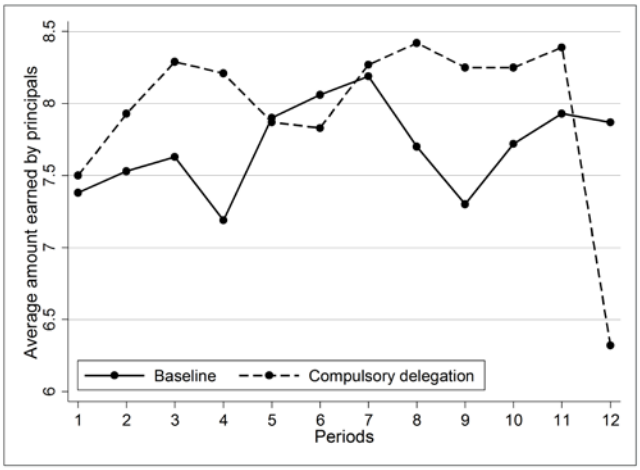


[14] Average earnings in Hamman et al. (2010) were 7.82€.

3.2 Compulsory delegation treatment

Relative to the BL the earnings of the principals increase in the CD treatment. This confirms the result in Hamman et al. (2000) where delegation produced a decrease in the amount allocated to the receivers relative to the standard dictator game.[15] One can observe in Figure 2 that the average amount earned by principals in CD treatment is higher in almost all the periods. Note that we found end-game effects in the last round under compulsory delegation. In 4 out of 24 cases, the agents chose to give nothing to principal in the last round. Our results are significant even if we include the last period (*KS p-value=0.031*).

Figure 2. BL vs. CD treatments: Average amount earned by principals



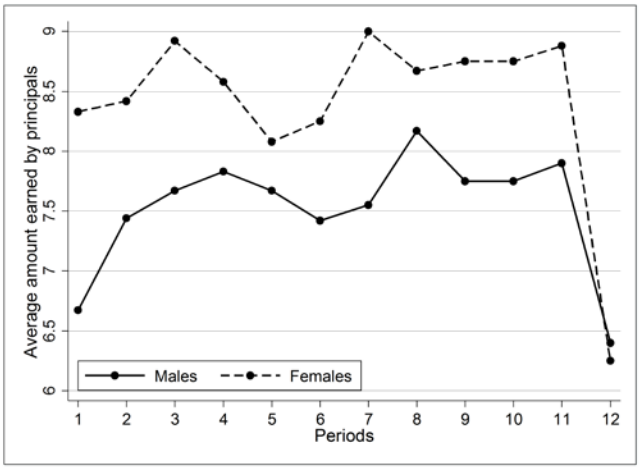
Result 1: The amount shared by agents under compulsory delegation significantly decreases relative to the baseline treatment.

Principals' in the CD treatment earn more than in the baseline as they choose the agent who returned more to them. It is clear that the principals are less sensitive about the allocation decisions when given the opportunity to pass the responsibility of the decision (Hamman et al. 2010) to an agent and behave more in their own self-interest.

Recall that the results from the BL treatment suggest that female and male principal´s behave similarly. Now we check whether they show similar patterns in their allocation decisions under compulsory delegation. One can observe in Figure 3 that female principals earned significantly more than their male counterparts in all periods except the last one (*KS p-value=0.000*).

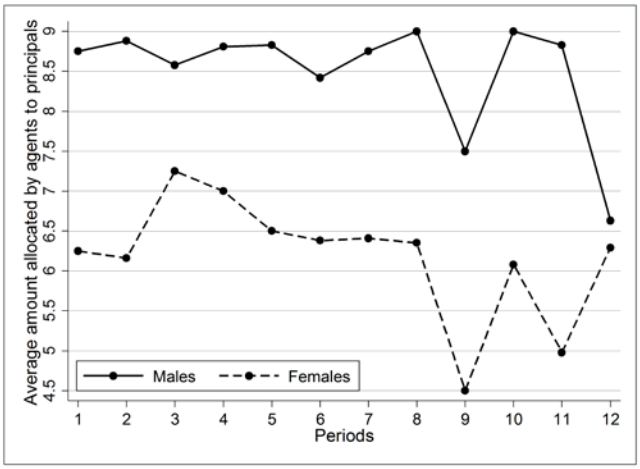
[15] In Hamman et al. (2010), the average agent allocation to principal´s was 8.27€.

Figure 3. CD treatment: Average amount earned by principals



Higher earnings for principal´s in the CD treatment are entirely driven by allocations made by male agents (Figure 4). Allocations made by male agents are significantly different from those of female agents (*KS p-value=0.000*). It is clear that, while being rational in agent selection as principals, female agents allocate less to the principal.

Figure 4. CD treatment: Average amount allocated by agents



Result 2: As principals, females (similar to males) select agents that maximize their payoffs. This behavior is, however, not carried over when they act as agents where they share more with the recipients.

So far our results show that in a simple dictator game, the behavior of men and women does not significantly differ. Once we introduce compulsory delegation, female principals appoint as agents those who

show less concern about fairness. Contrarily, female agents show greater distributional concerns relative to their male counterparts. In what follows we ask whether we find the same results under gender revelation.

3.3. Compulsory delegation with gender revelation

In this treatment the information regarding agents' gender is common information. We find that once the identity of female agents is revealed they are more responsive to the incentive scheme. Relative to CD the average earnings of principals' decrease (Figure 5) significantly under gender revelation (*KS p-value=0.031*). Further, under gender revelation, the behavior of female agents, contrary to what was observed earlier, changes and they transfer significantly more to the principals (Figure 6, *KS p-value=0.031*). Compared with the CD treatment, male agents reduce their transfers to principals (Figure 7, *KS p-value=0.008*). This tells us that once agents' gender is revealed to the principals, female agents become sensitive to the incentive scheme and respond by behaving in a more self-interested manner. Female agents react to the incentive scheme only when the information about their "identity" is revealed.

Figure 5. CD vs. CDGR treatments: Average amount earned by principals

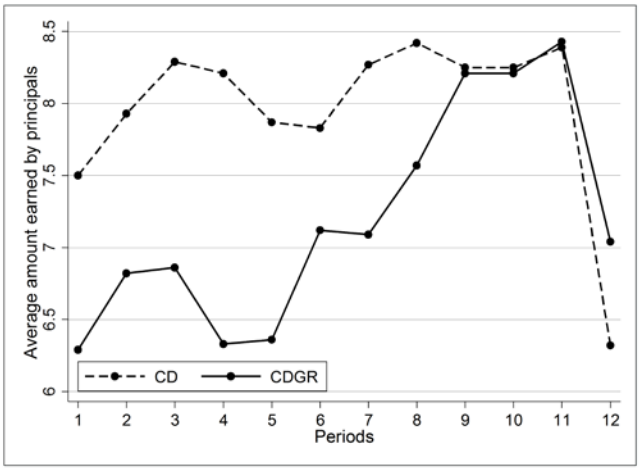


Figure 6. CD vs. CDGR treatments: Average amount allocated by female agents

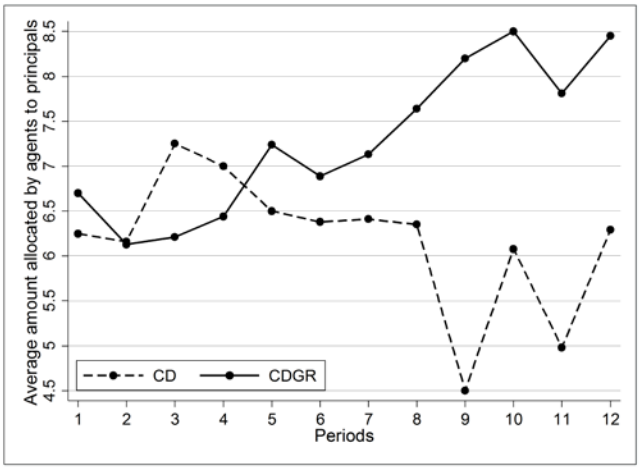
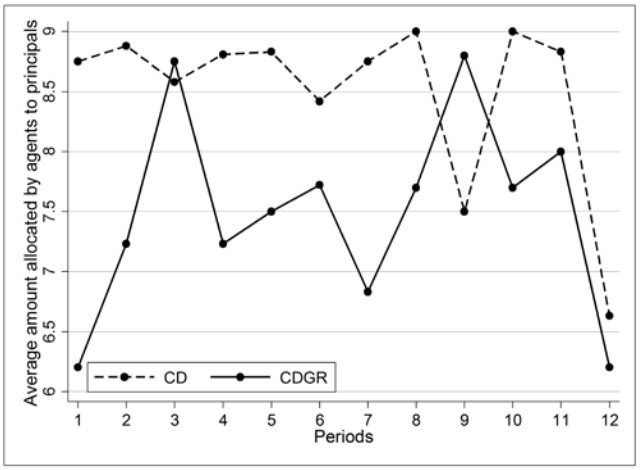


Figure 7. CD vs. CDGR treatments: Average amount allocated by male agents



We will now further study this result in detail. We first define the following variables:

- dif_alloc_{it} is the difference between the amount allocated by the agent *i* in period *t* minus the amount allocated in period *t-1*.
- $less\_chosen_{it}$ is a dummy that equals one if the agent *i* is chosen by the principals less frequently in period *t* than in period *t-1* and zero otherwise.

If the incentive scheme works, when an agent is chosen less times in *t* than in the previous period, she/he will allocate more amount to the principal to so that the principal chooses them in the following periods. If this were the case then the variable *dif_alloc* will increase. As is observed in Figure 6, females increase their

allocation with the time. Given this we include the variable *period* in our models and the interaction between *period* and the dummy *less_chosen* to see how this affects the incentive scheme along time.

We use panel data regression models to look at female and male behaviors under the two treatments: CD and CDGR. The used panel data model is

$$dif\_alloc_{it} = \beta\ less\_chosen_{it} + \eta\ period_t + \delta\ interaction_{it} + \alpha_i + \nu_{it}$$

where $i = 1,\ldots,N$ *(agents),* $t = 1,\ldots,12$ *(periods);* β, η and δ are parameters; α_i denotes the unobserved individual-specific time-invariant effects that are assumed as random[16] and ν_{it} is the residual disturbance term with zero mean, constant variance, and uncorrelated across time and individuals. Generalized least squares regressions with cluster-robust standard errors are used as estimation method. Results are presented in Table 5 for CD treatment and Table 6 for CDGR treatment.

Table 5. Regressions on allocation differences between periods in CD treatment

CD Treatment				
FEMALES	Model 1	Model 2	Model 3	Model 4
less_chosen	0.22 (0.99)		0.19 (0.64)	0.69 (0.48)
period		-0.02 (-0.68)	-0.01 (-0.27)	0.01 (0.12)
interaction				-0.09 (-0.44)
Number of agents		4		
Observations		42		
MALES	Model 1	Model 2	Model 3	Model 4
less_chosen	0.62 (1.58)		0.70 (1.70)*	-0.71 (-0.92)
period		-0.10 (-0.86)	-0.11 (-0.91)	-0.17 (1.14)
interaction				0.19 (1.26)
Number of agents		4		
Observations		43		

Note: z-statistics in parentheses. *, **, *** significant at 10%, 5% and 1%

[16] After running Hausman tests for all regressions.

In the CD treatment, the incentive schemes is useful only for males, if in the current period they are chosen less times, they increase their allocation in 0.70€. This suggests that, in response to the incentive scheme, male agents behave in favor of their own principals. So far our results show that in a simple dictator game, the behavior of men and women does not significantly differ. Once we introduce delegation, female principals appoint as agents those who show less concern about fairness. Contrarily, female agents show greater distributional concerns relative to their male counterparts.

Table 6. Regressions on allocation differences between periods in CDGR treatment

CDGR treatment				
FEMALES	Model 1	Model 2	Model 3	Model 4
less_chosen	1.01 (1.57)		1.07 (1.57)	2.20 (2.16)**
period		0.05 (1.29)	0.07 (1.43)	0.09 (1.82)*
interaction				-0.21 (-1.62)
Number of agents		10		
Observations		70		
MALES	Model 1	Model 2	Model 3	Model 4
less_chosen	1.37 (2.64)***		1.35 (2.66)**	0.85 (0.47)
period		-0.11 (-1.26)	-0.10 (-1.23)	-0.12 (-1.01)
interaction				0.08 (0.35)
Number of agents		10		
Observations		72		

Note: z-statistics in parentheses. *, **, *** means significant at 10%, 5% and 1%

In CDGR treatment, the incentives scheme is useful for both gender. If the number of times that male is chosen decreased, in the next period agent increased the allocation with respect the previous period by *1.35€*. Similarly for females, the allocation increased by *2.20€*, however, with time this amount decreases (interaction sign is negative, *p-value* of Wald test about joint significance of variable *less_chosen* and *interaction* is *0.0975*). Observe that for females the difference between consecutive allocations increases with time (positive coefficient for *period* variable)

Result 3: Female agents respond to the incentive scheme once their gender is revealed. Male agents respond to incentive scheme both with and without gender revelation.

A utility maximizing principal should rationally delegate to the agent that maximizes their payoff without taking account her/his gender. During the experiment we ask the principals about their *beliefs* towards an agents' fairness. On average, principals expect to receive *5.22€* if the agent is a male and *5.23€* for females'. A test on equality of means shows that *a priori* principals do not hold different expectations on agents' fairness.

Now we study if these beliefs are reflected in the delegation process. That is, do subjects begin the experiment with prior beliefs on gender? The behavior of the principals at the beginning of the game, when the agent behavior is not known, should reveal innate preferences towards a specific gender. In Table 7 the percentage of male agents chosen by principals in CDGR treatment in each period is presented. If there is no gender preference these percentages should be closer to 50%. Percentages significantly different to 50% are marked with asterisks.

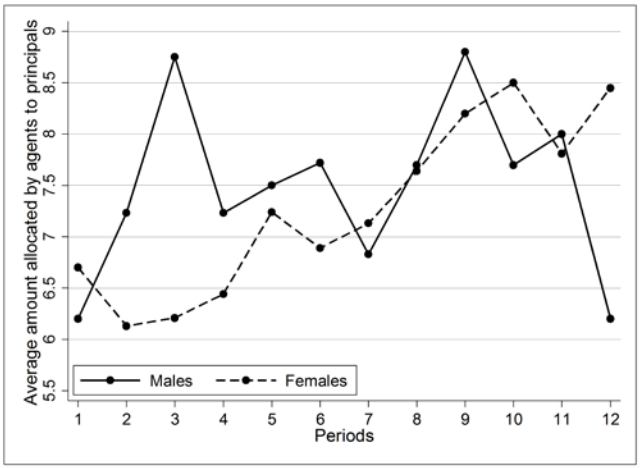
Table 7. Percentages of male agents in each period

Period	1	2	3	4	5	6
% male agents chosen	50	39.66*	43.10	56.89	62.07**	65.51***
Period	7	8	9	10	11	12
% male agents chosen	64.29*	46.43	46.43	53.57	39.29	42.86

Note: *, **, *** significant at 10%, 5% and 1%

In the second period the percentage of male decrease significantly from 50%. In this period, principal do not have sufficient information about agent behavior and there is a tendency to choose a female. When their allocation decisions in the early periods become common knowledge, i.e. the smaller amounts they allocated to the principals (see Figure 8), this tendency changes. Now we study if this result is maintained when we control the average amount allocated by agent in previous period.

Figure 8. CDGR treatment: Average amount allocated by agents to principals



We define the following variables:

- n_chosen_{it} is the number of time that agent i is chosen by principals in period t.
- $agent\ is\ male_{it}$ is a dummy variable that is equal one if agent i is male in period t.
- av_alloc_{it-1} is average amount allocated by agent i in period $t-1$.

We study the relationship between these variables using the panel data model:

$$n\_chosen_{it} = \beta\ agent\ is\ male_{it} + \eta\ av\_alloc_{it-1} + \alpha_i + \nu_{it}$$

where $i = 1,\ldots,N$ *(agents),* $t = 1,\ldots,12$ *(periods);* β and η are parameters; α_i denotes the unobserved individual-specific time-invariant effects that are assumed as random[17] and ν_{it} is the residual disturbance term with zero mean, constant variance, and uncorrelated across time and individuals. Cluster-robust standard errors are used during estimation. Results are presented in Table 8.

Table 8. Regressions on number of times that an agent is chosen

	All periods	Periods 1-3	Periods 4-8	Periods 9-12
Agent is male	0.27 (0.54)	-1.24 (-1.85)*	1.21 (2.10)**	-0.51 (-0.62)
Average amount allocated in t-1	0.23 (3.21)***	0.47 (4.03)***	0.18 (3.55)***	0.33 (2.11)**
Number of agents	20	20	20	10
Observations	148	37	73	38

Note: z-statistics in parentheses. *, **, *** means significant at 10%, 5% and 1%

[17] We consider a random model because the variable "agent is male" does not vary across a period.

The coefficient for gender is negative and significantly different from zero at 10% during the first three rounds. This means that the number of times that an agent is chosen increases if the agent is female in the early periods of the experiment. In periods between 4 and 8, this coefficient is positive (and significant). This result can be interpreted as: initially female agents are not discriminated against, however, as their allocation decisions in the early periods become common knowledge, i.e. the smaller amounts they allocated to the principals, male agents are chosen more frequently. This makes good sense, as the average amount allocated increases, the agent is chosen more frequently.

Result 4: No gender bias in agent selection is observed in the early periods. Male agents are chosen more often in later periods as the allocation decisions of females in the early periods become common knowledge.

Summing up, under gender revelation principals' earnings suffer a drop relative to the no-revelation treatment. The drop in the earnings is explained mainly due to a decrease in the amount allocated to the principals by male agents. Investigating the relation between the gender of the principal and the agent we discover that, at least in the first rounds, female agents are not discriminated against. However, they share more with the recipients than their male counterparts in the early rounds. This creates a negative reputation for them, which in the end results in the principals preferring male agents in later periods.

4. Comments and Further Extension

In this paper we use a variation of the dictator game to explore gender biases towards delegation. The results from our experiments allow us to unveil some interesting patterns in the delegating process. There are no significant gender differences in the simple dictator game. Allowing for delegation we find that both female and male principals select the agent who shows less fairness concerns. As pointed out by Hamman et al. (2010) this shows that delegation may be a mechanism that relieves them from any responsibility towards the action. That is, once removed from the final decision, principals act in a more self-interested manner.

However, male/female behavior differs significantly when they act as agents and changes as the experiment progresses. Under no gender revelation, female agents show greater distributional concerns, even if this is detrimental to their own benefit. However, a dichotomy in females' behavior is observed. As principals they make choices similar to males, whereas as delegating agents they have greater concerns for fairness than their male peers'. This suggests that female concern for fairness is environmental specific.

Under gender revelation we find that, at the beginning, female agents are not discriminated against. However, the smaller amounts they allocated to the principals contribute in creating a negative reputation for them. Due to this (and regardless of their gender) principals prefer male agents.

In the CD and CDGR, agents are forced to compete against each other in order to be selected by the principals. The question that naturally arises is how much this competition affects agents' sharing decisions. The results by Hamman et al. (2010) provide a partial answer to this question. They conduct a control treatment in which principals and recipients are re-matched every round but each principal remains paired with the same agent for the entire duration of the experiment. In each round, principals decide whether to make allocation decisions individually or to delegate it to his/her paired agent. The payment structure is such that the agent wants to be selected by the principal. However, the competition among agents is eliminated since each principal/agent pair is independent of all other agents.

Comparing this result with their other treatments, Hamman et al. (2010) suggest that competition between agents does not affect the conclusion drawn before. Principals generally prefer to act through agents and that such delegation results in very little sharing with recipients. In conclusion, Hamman et al. (2010) findings suggest that agents' sharing decision is not highly affected by competition.

Concerning new strands of research, the dictator game is a rather special setting and is far from being sufficient for explaining discrimination in the marketplace. As mentioned earlier, our main focus was to study how the two genders reacted to delegation both in the case where they delegate the decision right and in the case where they are delegated the responsibility of some kind of decision, i.e. decisions which involve unfair outcomes. Indeed, it would be worth extending this analysis to other types of settings and games. Specifically, one can consider gender neutral games which involve real effort by the subjects. Such contexts provide an ideal environment to analyze the relationship between self-confidence, delegation and gender difference. Our intuition is that gender specific preferences on delegation may depend on the difficulty of the task.

A further step would consist of extending the study to include delegation in a team. This would allow us to directly address the problem of scarce representation of female leaders in top-rank job positions. Is it harder for women to be elected leaders of a group or do women hesitate to lead?[18]

Acknowledgments

Teresa García-Muñoz would like to thank MICINN (ECO2013-44879-R) and Junta de Andalucía (SEJ-1436) for financial support. Kujal would like to thank seminar participants at Middlesex, Newcastle and SEET 2014.

[18] See Grossman and Komai (2008).

References

Aguiar F, Brañas-Garza P, Cobo-Reyes R, Jimenez N, Miller LM (2009) Are women expected to be more generous? *Experimental Economics* 12: 93-98.

Andreoni J, Vesterlund L (2001) Which is the fair sex? Gender differences in altruism. *The Quarterly Journal of Economics* 116(1): 293-312.

Bartling B, Fischbacher U (2012) Shifting the blame: on delegation and responsibility. *Review of Economic Studies* 79(1): 67-87.

Bolton GE, Katok E (1998) An experimental test of the crowding out hypothesis: the nature of beneficent behavior. *Journal of Economic Behavior & Organization* 37(3): 315-331.

Booth A, Francesconi M, Frank J (2003) A Sticky Floors Model of Promotion, Pay, and Gender. *European Economic Review* 47: 295-322.

Charness G, Dufwenberg M (2006) Promises and partnership. *Econometrica* 74(6): 1579-1601.

Coffman LC (2011) Intermediation reduces punishment (and reward). *American Economic Journal: Microeconomics* 3(4): 77-106.

Croson R, Gneezy U (2010) Gender Differences in Preferences. *Journal of Economic Literature* 47(2): 1-27.

Eckel C, Grossman PJ (1996) The relative price of fairness: gender differences in a punishment game. *Journal of Economic Behavior and Organization* 30(2): 143-158.

Fischbacher U (2007) z-Tree: Zurich Toolbox for Ready-made Economic Experiments. *Experimental Economics* 10(2): 171-178.

Gneezy U, Niederle M, Rustichini A (2003) Performance in competitive environments: gender differences. *Quarterly Journal of Economics* CXVIII: 1049-1074.

Grossman PJ, Komai M (2008) Leadership and gender: an experiment. Economics Faculty Working Papers. Paper 8.

Hamman J, Loewenstein G, Weber R (2010) Self-interest through agency: an alternative rationale for the principal-agent relationship. *American Economic Review* 100(4): 1826-1846.

McKelvey R, Page T (1990) Public and Private Information: An Experimental Study of Information. *Pooling Econometrica* 58(6): 1321-1339.

Niederle M, Vesterlund L (2007) Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics* 122(3): 1067-1101.

Rutström E, Wilcox NT (2009) Stated beliefs versus inferred beliefs: A methodological inquiry and experimental test. *Games and Economic Behavior* 67(2): 616-632.

Appendix A – Table A.1. Details of treatments

# Principals/Recipients/Agents *(of which females)*	**Baseline treatment**	**Compulsory Delegation treatment**	**Compulsory Delegation and Gender Revelation treatment**
Session 1	7/7/na *(4/0/na)*	6/6/2 *(3/0/1)*	4/4/2 *(1/2/1)*
Session 2	6/6/na *(3/6/na)*	6/6/2 *(3/5/1)*	6/6/2 *(5/0/1)*
Session 3	5/5/na *(2/1/na)*	6/6/2 *(3/0/1)*	6/6/2 *(3/0/1)*
Session 4	6/6/na *(3/5/na)*	6/6/2 *(3/1/1)*	6/6/2 *(2/1/1)*
Session 5	7/7/na *(2/1/na)*	-	6/6/2 *(3/4/1)*
Session 6	-	-	6/6/2 (4/1/1)
Session 7	-	-	6/6/2 (1/3/1)
Session 8	-	-	6/6/2 (2/4/1)
Session 9	-	-	6/6/2 (3/1/1)
Session 10	-	-	6/6/2 (4/2/1)

Appendix B – Instructions (translated from Spanish)

Treatment 1

Introduction:

Thanks for participating in the experiment!

Please remember that from this moment on and till the end of the experiment no communication is permitted. If you have a question at any moment please raise your hands and we will answer your question in private.

All identities in this experiment are anonymous. No one in the experiment will get to know your identity during or after the experiment. Please read the instructions with care.

At the end of the experiment you will be paid your earnings and a 5 € show up fees. Your earnings are your private information. This project has been funded by grants from public institutions.

Experiment Description:

The experiment has twelve periods. The structure is explained of the experimentis the following.

There are two types of players in this experiment: player A and player B. Each group will be made up of seven layer seach of players type A and B.

At the start of the experiment you will be assigned a personal identification number by the computer. The computer will also inform you regarding the type of player you have been chosen to be.

In each period, each player A is randomly paired with player B. In any period there are seven such pairings, each formed by a player A and a player B.

At the start of the period 10€ will be assigned to each pairing. We will now explain to you the structure of the game.

At the start of each period, player A decides how to allocate the 10€ to player B and herself. The allocations can be made in increments of 10 cents. The amount of 10€ will be fully allocated between players A and B. That is, the amount assigned to player B plus the amount player A decides to keep will always add to 10€.

Once player A has taken their decision, each player A will be informed about the amount they have been assigned.

At the end of each period all players, A and B, will see the information regarding the current and past periods, the identification numbers of their pairings and the amount assigned to them in each period.

Payment:

Besides the 5€ show up fees, each participant will be paid in the following manner.

At the end of the experiment one of the periods will be randomly chosen for each player A and B. Each player will be paid the amount they earned in that period.

You will be individually called at the end of the experiment to be paid. You will inform the experiment about you ID number and you will be paid accordingly.

Any questions?

Treatment 2,3

Introduction:

Thanks for participating in the experiment!

Please remember that from this moment on and till the end of the experiment no communication is permitted. If you have a question at any moment please raise your hands and we will answer your question in private.

All identities in this experiment are anonymous. No one in the experiment will get to know your identity during or after the experiment. Please read the instructions with care.

At the end of the experiment you will be paid your earnings and a 5 € show up fees. Your earnings are your private information. This project has been funded by grants from public institutions.

Experiment Description:

The experiment has twelve periods. The structure is explained of the experimentis the following.

There are three types of players in this experiment: player A, player B and player C. Each group will be made up of six players each of players type A and B, and two players of type C.

At the start of the experiment you will be assigned a personal identification number by the computer. The computer will also inform you regarding the type of player you have been chosen to be.

In each period, each player A is randomly paired with player B. In any period there are six pairings, each formed by a player A and a player B.

At the start of the period 10€ will be assigned to each pairing. We will now explain to you the structure of the game.

Period 1:

In period 1 each pair of players A and B will be assigned a player C. This implies that each player C is assigned to three different pairs of players A and B.

Player C decides how to assign the 10€ between each pair of players A and B. The allocations can be made in increments of 10 cents. The amount of 10€ will be fully allocated between players A and B. That is, the amount assigned to player B and player A always add to 10€.

The decisions made by player C, regarding how much to assign to players A and B, across different pairs are independent and need not be the same for each of the three pairs she has been assigned.

Once player C has made their decision, each player A and B will then be informed about the amount they have been assigned.

Subsequent periods:

In the subsequent periods, from period two on wards, player A's screen will show two boxes. Each box shows the player ID (player ID and gender) of one of the two players C.

Each player A has to select one of the two C players to make the decision regarding how to allocate the 10 euros between players A and B. To select player C, player A simply needs to click on the asssociated box with that player C.

Once all players A have made their decisions, Player C is then informed about the number of players A who have chosen him. Each player C decides how to allocate 10€ between players A and B. The allocations can be made in increments of 10 cents. The amount of 10€ will be fully allocated between players A and B. That is, the amount assigned to player B and player A always add to 10€.

The allocation made by player C to a pair (A,B) is independent of the allocation made to another pair (if player C has been chosen by more than one player). If a player C has not been chosen by any player A then their screen will show a waiting message.

Once player C has made their decision then all players A and B will be informed about the quantity allocated to them.

At the end of each period all players, A and B, will see the information regarding the current and past periods, the identification numbers of their pairings and the amount assigned to them in each period.

The screen of Player C will show the information regarding the allocation they have made in each period.

Payment:

Besides the 5€ show up fees, each participant will be paid in the following manner.

At the end of the experiment one of the periods will be randomly chosen for each player A and B. Each player will be paid the amount they earned in that period. That is, this will be amount that was allocated to them by player C in that period.

At the start of the experimente ach player C is given an additional quantity of 5€. However, player C loses 0.45€ in each period and earns 0.15€ for each player that selects him. Player C´s earnings are the sum total of the earnings in the entire experiment.

You will be individually called at the end of the experiment to be paid. You will inform the experiment about you ID number and you will be paid accordingly.

Any questions?