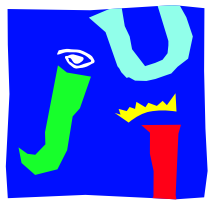

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Departamento de Economía

Gender Differences in Strategic and Risky Environments

Doctoral Thesis presented at the doctoral programme "Industrial and International Economics"

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[1] "Societal and economic effects on quality of life and well-being: preference identification and priority setting in response to changes in labour market status", financiado con fondos FEDER (SERD-2002-00057).

[2] "Ultimatum bargaining and preference elicitation in real-task experimental labor markets".

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Chapter I

Introducción General

1 Introducción

Esta tesis recoge cuatro trabajos de investigación en el campo de la economía experimental, realizados durante mis años de estudio como doctoranda en el programa de Economía Industrial e Internacional que detenta el Departamento de Economía de la Universitat Jaume I de Castellón.

El objeto de estudio y nexo de unión entre estos distintos trabajos que presentamos en los siguientes capítulos, queda perfectamente reflejado en el título de la tesis "diferencias de género en entornos estratégicos y de riesgo". Es bien conocida y estudiada la existencia de diferencias en el comportamiento entre mujeres y hombres en entornos sociales a lo largo de la historia, y la búsqueda de nuevas discrepancias entre ambos sexos continúa hoy en día siendo el principal objetivo de estudio en numerosas investigaciones. Por ejemplo, Croson y Gneezy (2004) realizan una revisión de la literatura principalmente experimental en el ámbito económico con el fin de entender las diferencias de género y ser un punto de partida para clarificar el debate en los resultados específicos del género en el trabajo y los mercados de bienes. En psicología existen diversos estudios que muestran una clara diferencia de género en el comportamiento, Eagly, Karau y Makhijani (1995) realizan una excelente revisión de 25 años de investigaciones en

al ámbito psicológico sobre las diferencias de género. El género es un elemento que forma parte de las relaciones sociales y humanas y es por ello que existe una extensa literatura en diferentes campos científicos, sociales, psicológicos, políticos y económicos. Esta tesis no pretende ser un análisis o una revisión sobre lo ya publicado, sino más bien aportar innovaciones sobre terrenos que hasta ahora no se habían investigado dentro del campo económico y, más concretamente, en el de la economía experimental.

Dichas diferencias que se observan entre hombres y mujeres, se refieren no sólo a su comportamiento, sino también a sus habilidades, aptitudes y a sus actitudes frente a entornos con riesgo. Nosotros nos centramos en el estudio de estas diferencias en entornos de naturaleza económica. De las múltiples diferencias que puedan existir entre ambos géneros, estudiamos dos de los que consideramos más fundamentales. Por un lado, en el capítulo III estudiamos las actitudes frente a situaciones de riesgo. En los capítulos IV y V analizamos la toma de decisiones de hombres y mujeres en entornos de negociación tipo ultimátum dentro del mercado de trabajo.

El motivo de adoptar la metodología experimental es porque permite el estudio controlado de entornos estratégicos interactuados por sujetos. Estos sujetos son voluntarios y toman decisiones siguiendo unas instrucciones, es decir, siguiendo las reglas del juego creadas por el experimentalista. Las decisiones de los sujetos forman la base de datos. Los participantes son incentivados monetariamente dependiendo de sus decisiones y las de sus compañeros en el experimento, para cubrir la compatibilidad en incentivos. A partir de esta base de datos, los investigadores desarrollamos nuestras conclusiones sobre las teorías económicas.

A lo largo de la historia, la Economía se ha considerado como una ciencia no experimental, pero durante las últimas décadas los experimentos se han convertido en uno de los métodos principales de investigación, en particular en el campo de la teoría de juegos. El juego de San Petersburgo de Bernoulli es considerado

el primer experimento económico[1], comúnmente conocido como la "Paradoja de San Petersburgo"[2]. Sin embargo, la culminación del reconocimiento de la economía experimental llegó con Vernon L. Smith al ganar el Nóbel de Economía de 2002 junto al refutado psicólogo Daniel Kahneman (por haber establecido los experimentos de laboratorio como un instrumento en el análisis económico empírico, en particular en el estudio de los distintos mecanismos de mercado).

Estudios experimentales previos afirman la existencia de diferencias en las actitudes frente al riesgo entre hombres y mujeres, así como en su comportamiento en contextos de negociación. Croson y Gneezy (2004) revisan estudios realizados sobre las diferencias de género en preferencias frente a entornos con riesgo, sociales y en entornos competitivos. Los autores indican que tanto la mayoría de estudios realizados en el laboratorio como investigaciones de campo señalan que las mujeres son más aversas al riesgo que hombres. Por otro lado, también concluyen que las preferencias de las mujeres por situaciones competitivas son inferiores a las de los hombres. Si bien estas diferencias han sido generalmente estudiadas de forma independiente, aquí realizamos un estudio conjunto de ambos fenómenos.

En nuestro caso, la identificación de las actitudes de los individuos frente al riesgo, se basa en el test de paneles de loterías de Sabater-Grande y Georgantzís (2002). Para el estudio sobre el comportamiento de los individuos en entornos de negociación, basamos nuestro estudio en situaciones tipo ultimátum.

El juego del ultimátum, en su versión más básica, consiste en un jugador que propone un reparto de un excedente y un segundo jugador que debe aceptar o rechazar esa oferta sin posibilidad de hacer una contraoferta. Si llegan a un

[1]Véase Alvin Roth (1995).

[2]Este juego fue diseñado para analizar la aversión al riesgo de las personas. Se propone un juego en el que primero las personas pagan una apuesta inicial fija por participar. El juego consiste en el lanzamiento de una moneda repetidamente hasta que salga "cara"; una vez aparece, el jugador recibe un premio de 2^n u.m, donde n es número de veces que se lanza la moneda hasta que sale cara. Recibe el nombre de paradoja porque dado que la utilidad esperada de ganar es infinita incitando a querer jugar y por tanto apostar una cantidad de dinero inicialmente, Bernoulli comprobó que las personas no apostaban.

acuerdo se reparten el excedente como se ha acordado. Sin embargo, si no se llegase a un acuerdo, en este tipo de juegos ninguno ganaría nada. Los datos utilizados en esta tesis han sido extraídos de una situación tipo ultimátum referida al mercado laboral. En este caso, por tanto, nuestro juego se basa en el reparto de un excedente a modo de salario para un sujeto A al que denominaremos *empleado*, y un beneficio para un sujeto B al que llamaremos *empresario*. El reparto está condicionado a alcanzar un acuerdo, ya que existe un interés común: preferir un acuerdo a un desacuerdo. También existe un conflicto entre la partición de dicho reparto, ya que cada jugador preferirá obtener la mayor proporción posible del excedente a repartir.

Todos los datos aquí utilizados son recopilaciones extraídas de varios experimentos, en los que los sujetos eran estudiantes de la rama de ciencias económicas y empresariales. Cabe mencionar que una parte importante de los datos utilizados entre los cinco capítulos que aquí se presentan, son fruto de un proyecto financiado por la UE[3], en el que han participado distintos países, como Grecia, Reino Unido y España. Estos datos son parte de un experimento diseñado para estudiar varios fenómenos relacionados con el mercado laboral, tales como el nivel de satisfacción en el puesto de trabajo, el desempleo, diferencias culturales y de género, etc.

El software estadístico utilizado para el análisis de datos ha sido principalmente el Stata (versiones 8 y 9), aunque también nos hemos apoyado en otros programas informáticos como SPSS o Retina Winpack[4]. En nuestro análisis de datos procedemos, en primer lugar, a la descripción de las variables del conjunto de datos objeto de estudio. Obtenemos de esta manera unas primeras conclusiones sobre las características de dicho conjunto, a partir de un estudio estadístico

[3]Proyecto Epicurus, "Societal and economic effects on quality of life and well-being: preferente identification and priority setting in response to changes in labour market status", financiado con fondos FEDER (SERD-2002-00057).

[4]Proporciona una guía rápida para la selección automática de un modelo con datos de corte transversal.

descriptivo apoyado con histogramas, gráficos de distribución acumulada o temporales. En segundo lugar, y dada la naturaleza de la muestra, calculamos tests no paramétricos, como Mann-Whitney, Wilcoxon, Kolmogorov-Smirnov o el test de Chow. Los tests en los que se rechaza la correspondiente hipótesi nula al nivel de significación del 10%, 5% y 1% están señalados en las tablas con *, ** y ***, respectivamente.

En los capítulos IV y V, se efectúan regresiones lineales con el objetivo de reconocer las variables explicativas más importantes. Dado que la estructura del experimento proporciona datos de panel, los modelos econométricos que aquí se presentan han sido estimados por Mínimos Cuadrados Generalizados Factibles y, en el caso de las variables endógenas dicotómicas por modelos Probit. Las estimaciones que son significativamente distintas de cero al nivel de significación del 10%, 5% y 1% están señalados en las tablas con *, ** y ***, respectivamente.

Esta tesis presenta los distintos capítulos como trabajos independientes, con ánimo de publicarlos independientemente. Sin embargo, dada la estrecha relación que existe entre los distintos trabajos, en algunas ocasiones, hemos considerado oportuno eliminar parte de textos para que no resulten redundantes. En otras ocasiones, nos ha parecido conveniente para su mejor comprensión, recordar algunos criterios, definiciones o diseños, repitiendo tablas o partes de un texto a lo largo de los diferentes capítulos.

1.1 Estructura de la Tesis

Previa a la presentación de los capítulos, creo oportuno comentar sobre la estructura de la tesis junto a un breve resumen del contenido de cada uno de los capítulos.

En primer lugar, analizamos dos experimentos independientes. Por un lado, estudiamos el comportamiento de los sujetos en general (sin diferenciar entre hombres y mujeres) en un juego tipo ultimátum bajo la estructura de un mercado

laboral con el efecto de introducir la realización de un esfuerzo real[5] por parte de los sujetos que no tiene poder de negociación en el juego.

Seguidamente estudiamos las actitudes frente al riesgo de los sujetos experimentales mediante un test basado en los paneles de loterías de Sabater-Grande y Georgantzís (2002).

Una vez analizados estos dos puntos, los incluimos en un tercer análisis, ampliando nuestras investigaciones a estudiar estos efectos en los comportamientos de los sujetos en las negociaciones en situaciones tipo ultimátum. Concretamente estudiamos la aversión al riesgo como una de las causas de los diferentes comportamientos entre hombres y mujeres en esas negociaciones, incluyendo la realización de un esfuerzo. Por último, analizamos estas diferencias de comportamiento entre hombres y mujeres comparando entre sujetos de distintos países: España, Grecia y Reino Unido.

1. **Ultimatum Salary Bargaining with Real Effort**

   En este capítulo analizamos los datos obtenidos en un juego tipo ultimátum en un contexto laboral, con la particularidad de introducir la realización de un esfuerzo real a realizar por el *empleado* si se llega a un acuerdo con el *empresario*. En el juego del ultimátum bajo un marco laboral, se considera objeto de la negociación el salario ofrecido por el *empresario* al *empleado*. Si el *empleado* acepta el salario debe llevar a cabo lo que llamamos "tarea real". Concretamente, el salario ofrecido oscila entre 0-10€ en intervalos de 0.10 céntimos y la "tarea real" consiste en relacionar 20 sobres numerados con sus correspondientes cartas también numeradas.

   El hecho de introducir la realización de una tarea por cada acuerdo que se ha alcanzado es una variable que hasta ahora no se había incluido en este tipo de experimentos y que consideramos se equipara a la realidad, ya

[5] A lo que denominamos "tarea real". Véase *Experimental design section* en el capítulo II, página 13.

que toda negociación conlleva un trabajo o esfuerzo que se debe realizar a cambio de un pago (normalmente monetario) o salario.

En este estudio se comparan dos tratamientos: uno con la realización de una tarea real desempeñada por los sujetos tipo *empleado* y otro donde la tarea es hipotética. Resumimos aquí nuestras principales conclusiones:

- La repartición del excedente de 60-40% para los jugadores se cumple en el caso standard del juego del ultimátum que en nuestro caso, se corresponde con el tratamiento con tarea hipotética.
- Cuando los empleados deben llevar a cabo la "tarea real", aumentan tanto las ofertas realizadas por los empresarios como los salarios finalmente aceptados.
- En el caso de la existencia de la "tarea real" se rechazan ofertas que serían aceptadas si la tarea fuese hipotética.

2. **Gender and Risk Attitudes**

En los modelos económicos, un tema fundamental es la actitud frente al riesgo de los individuos. Utilizando el test basado en los paneles de loterías de Sabater-Grande y Georgantzís (2002) analizamos aquí las actitudes de nuestros sujetos experimentales frente al riesgo. Intentamos contestar a preguntas fundamentales sobre el mismo, como cuáles son los elementos que influyen en determinadas actitudes o qué personas muestran mayor atracción hacia el riesgo.

Se diseñaron cuatro paneles de loterías[6] donde aparecía una relación de los pagos que pueden ganar los sujetos y la probabilidad de ganarlos. En estos paneles se premia con un incremento lineal en relación a las probabilidades, de manera que a medida que disminuyen, el pago aumenta. Por otro lado, ese incremento lineal varía entre paneles aumentando el premio de panel a

[6]Véase tabla VI.1, página 95.

panel. Cada sujeto debe elegir qué lotería prefiere de las 10 que se incluyen en cada panel.

Como conclusión general de este estudio decir que confirmamos, que las mujeres son más aversas al riesgo que los hombres. Además, las mujeres reaccionan de manera distinta ante los distintos incrementos lineales del pago esperado diseñados en este test.

3. **Gender and Risk Attitudes in Bargaining Experiments**

En este capítulo estudiamos la aversión al riesgo como una de las causas de las diferencias de género en las negociaciones del ultimátum.[7] En la literatura económica, bajo un marco experimental, con frecuencia se han considerado las decisiones sobre el riesgo como una causa de las diferencias de género en las negociaciones. Nuestros datos nos permiten llegar a los siguientes resultados:

- Las mujeres son más aversas al riesgo que los hombres.
- El efecto de la aversión al riesgo de los sujetos influye en las decisiones de las negociaciones tipo ultimátum.
- El género afecta significativamente en estas negociaciones.

Sin embargo, cabe señalar que esta última observación es inversamente proporcional a la influencia de la aversión al riesgo.

Como es de esperar, las personas más aversas al riesgo suelen ofrecer salarios más altos para tener, de esta manera, una probabilidad menor de rechazo. Desde otro punto de vista, las personas más aversas al riesgo aceptan ofertas más bajas, ya que prefieren obtener cualquier precio a no obtener nada. Sin embargo, encontramos que las mujeres, aun siendo más aversas al riesgo que

[7]Este trabajo fue presentado en el *IAREP (International Association for Research in Economic Psychology) 2005*, Praga, 2005, en el *ASSET (Association of Southern European Economic Theorists)*, Creta, 2005 y en el *XXX Simposio del Análisis Económico*, Murcia, 2005.

los hombres realizan ofertas de salarios más bajas y rechazan más ofertas que los hombres.

4. **A Cultural Perspective of Gender Effects in Bargaining Experiments**

   Ya hemos mencionado que el experimento se realizó en tres países miembros de la UE: España, Grecia y Reino Unido. No obstante, las conclusiones del capítulo anterior, donde observábamos la existencia de un efecto del género en la toma de decisiones en las negociaciones, se basaron en los datos extraídos de sesiones realizadas en España, concretamente en el *Laboratori d'Economia Experimental (LEE)* de la Universidad Jaume I de Castellón. Debido a que, podría parecer que el resultado anterior es un caso concreto en sujetos españoles, estudiamos en este último capítulo lo que llamamos *diferencias culturales* como causas de las diferencias de género.[8]

   En las sesiones realizadas en Grecia y en España obtenemos que las diferencias de género siguen una misma pauta: las mujeres realizan ofertas más bajas y el índice de rechazo es mayor que el de los hombres en ambos países. En el caso de las mujeres británicas, observamos que su comportamiento difiere del de las mujeres mediterráneas cuando adoptan el rol de *empleada*.

Referencias

[1] Bernoulli, D., 1954, first published 1738, "Exposition of a new theory on the measurement of risk", *Econometrica* 22 (1), 23-36.

[2] Croson, R. and U. Gneezy, 2004, "Gender differences in preferences", *mimeo*.

[8] Una versión ampliada de este trabajo fue presentada en el meeting del *IAREP/SABE (International Association for Research in Economic Psychology/ The Society for the Advancement of Behavioral Economics)*, París, 2006.

[3] Eagly, A., S.J. Karau and M.G. Makhijani, 1995, "Gender and the effectiveness of leaders: A meta-analysis", *Psychological Bulletin* 117, 125-145.

[4] Marinucci, M., 2005, Retina Winpack: Retina Winpack for real data a quick guide for automatic model selection, *mimeo*.

[5] Olcina, G. and V. Calabuig, 2002,"Conducta estratégica y economía". Editorial Tirant Lo Blanch.

[6] Roth, A.E., 1995, "Introduction to experimental economics". In: Kagel, J.H. and A.E. Roth (eds), *Handbook of Experimental Economics*. Princeton: Princeton University Press.

[7] Sabater-Grande, G. and N. Georgantzís, 2002, "Accounting for risk aversion in repeated Prisoners' Dilemma games: An experimental test". *Journal of Economic Behavior and Organization* 48, 37-51.

Chapter II

Ultimatum Salary Bargaining with Real Effort

1 Introduction

Experimental studies in labour market research have used different market clearing mechanisms like double or one-sided oral auctions. In fact, as Fehr and Falk (1999) point out, the market clearing method is crucial for the results, suggesting that a double auction is the most competitive environment. Other labour market experiments have used the alternative of one-side oral auctions (Brandts and Charness, 2004). Exceptionally, Burda et al. (1998) have used ultimatum bargaining as the market-clearing mechanism. It should be noted that this is a less transparent environment as individual information depends on own past information from wage offers, acceptances and rejections. It should, thus, be thought of representing labour markets in the lack of aggregate information and centralized clearing mechanisms. Rather than the labour market features of our results, we focus on the issues regarding individual behavior and its gender and country specific effects. We do not attempt an exhaustive review of experimental labour market research and the role of the aforementioned market clearing mechanisms on labour market phenomena like unemployment, efficiency wages,

incentive design and gift exchange[1]. However, here we discuss the effect of one of the novel aspects of our design: the existence of a real task performed by employers when accepting a given wage offer.

A well-known theoretical and experimental framework in which fairness and bargaining have been analyzed is that of ultimatum games. In an ultimatum game, two players bargain over a pie of size Y in the following way: The first player (leader) offers a share $X \in [0, Y]$ to the second (follower) one, claiming $Y - X$ for himself. The second player has to decide whether to accept or reject the offer. If the offer is accepted, the proposed shares are gained by the players. Otherwise, they both earn nothing. Since the seminal experiment by Güth et al. (1982), the game has inspired a vast literature. Bearden (2001) and Oosterbeek et al. (2004) make an exhaustive revision of previous studies concerning the ultimatum game. Bearden's (2001) exhaustive review indicates that results are sensitive to a number of factors. Oosterbeek et al. (2004) report the results of various papers from ultimatum game experiments. Typical findings include systematic deviations from the subgame perfect equilibrium[2] prediction of minimum offers by leaders and acceptance of all positive offers by followers. Instead, a fairer split of 60%-40% is the most frequently observed outcome.

An implicit assumption underlying ultimatum bargaining is that both parties' involvement is needed for the pie to be earned, first, and then divided. The most obvious real world example of such asymmetric negotiations can be found in salary formation resulting from employee-employer interaction. However, bargaining between employers and employees never occurs over "manna from heaven". If an employer had full control of the pie, why would he need a second agent with whom to share his own property? In the real world, firms result from combining complementary assets like, for example, labor and capital. Salaries offered by

[1] A companion paper of García-Gallego et al. (2006) undertakes part of this task.

[2] Using a labour set-up, in the subgame perfect Nash equilibrium, the employee accepts any positive offer, and the employer makes the minimum positive offer.

employers and accepted by employees should reflect each party's involvement in the common enterprize. Following standard economic theory, raising one's cost of participating in a partnership should increase the own aspired and actual share of the resulting profit. In this paper, we test this hypothesis. First, we frame ultimatum bargaining as a situation of salary negotiation. Second, we introduce a real task which has to be performed by employee-subjects as a consequence of accepting a given salary. We show that real effort raises salaries. In fact, this result is due to both higher salary offers by employers and higher rejection rates by employees.

This chapter is organized as follows. Section 2 presents the experimental design. In section 3 we discuss the results. Section 4 concludes.

2 Experimental design

All sessions were run in the *Laboratori d'Economia Experimental* (LEE) at Castellón, Spain. Forty subjects were recruited among Business Administration students. They were randomly assigned to one of the two treatments labelled hereafter as HT (Hypothetical Task) and RT (Real Task)[3]. At the beginning of each session, subjects were randomly assigned the role of an *employee* or an *employer*. Each subject's role was kept fixed along the whole session. To avoid end-game effects, sessions were randomly stopped between the 30th and the 35th period. In each period, subjects were randomly matched to form employer-employee pairs. In order to avoid undesirable session effects, subjects in each session were divided into two separate matching groups.[4]

At the beginning of each session, written instructions[5] were given to the subjects. The experiment was framed as a situation in which an employer offers

[3]These treatments are renamed as T1 and as SNERT in chapter IV and V.

[4]Differences across groups were found not to be statistically significant and data reported here are the result of aggregation within each treatment.

[5]See the General Appendix, pages 96-97.

his/her employee $x \in [0, 10]$€ in steps of .10. Acceptance by an employee in HT implies that the 10€ profit is realized by the firm and divided as proposed by the employer. In addition to realizing profit and sharing it as defined in HT, acceptance by an employee-subject in RT implies accepting to perform a real task: *filling each of 20 numbered envelops with its corresponding single-page letter.* The envelop-filling sub-session was organized in a separate room next to the computer lab. Payment and, when applicable, task performing obligations, were determined as the sum of earnings, respectively task units agreed, in 5 randomly chosen periods. Apart from their earnings in the experiment, subjects received a 5€ show-up fee to mitigate differences in earnings across player types. Average earnings were approximately 25€. The computerized[6] salary-negotiation sub-session (HT and RT) lasted on average one hour. The duration of the task-performing sub-session (RT only) never exceeded 30 minutes, but significantly varied across subjects, depending critically on the task load.

3 Results

For the sake of comparability, we have analyzed the same number of observations per treatment. Thus, we focus on the analysis of data obtained from the first 33 periods of each session. We summarize here our main findings.

Tables II.1 and II.2 present descriptive statistics on offers, salaries and rejections. A first finding concerns the resemblance of our HT treatment to standard ultimatum game experiments. Both salary offers and accepted salaries are not significantly different from 4. This means that in the absence of a real task, our experiments reproduce the results usually obtained in standard ultimatum experiments. We summarize this in the following result.

Result 1: *The "labor-market" label of ultimatum bargaining yields the standard 60%-40% split of earnings.*

[6]Programmed and conducted with the software z-Tree (Fischbacher, 1999).

Both the median (4 vs. 4.5) and the average (3.96 vs. 4.09) of salary offers posted by employers are lower when employees are faced with a fictitious task than when they have to perform a real one. Using a Mann-Whitney test and treating individual averages as independent observations shows that the difference is significant at a 10% level (p=0.694).

Table II.1: Descriptive statistics by treatment.

		Offers	**Salaries**	**Rejections**
Treatment HT				
	N	330	275	55
	Mode	4.00	4.00	4.00
	Median	4.00	4.00	3.80
	Mean	3.96	4.00	3.75
	Std. Dev.	0.21	0.16	0.27
Treatment RT				
	N	330	222	108
	Mode	5.00	5.00	4.00
	Median	4.50	4.70	4.00
	Mean	4.09	4.55	3.15
	Std. Dev.	1.30	0.80	1.60

In Table II.2, the first column under each treatment's heading presents the number of salary offers per 1/2€ interval. Approximately 86% of all salary offers (284/330) collected under treatment HT concentrate on a single peak between 3.7 and 4.2€. The distribution of salary offers collected under the RT treatment exhibits two peaks. One of them is observed on the 3.7-4.2 interval, corresponding to 30% (100/330) of all salary offers. Another 40% (127/330) of the observed salary offers correspond to the interval between 4.7 and 5.2€. Finally, 50 observations correspond to salary offers between these two modes. These differences in the distribution of salaries across treatments give further support to the finding that salary offers are higher in RT than in HT.

Apart from the distribution of salary offers, Table II.2 can be used to study

Table II.2: Number (N) of offers and percentage of rejections within each offer interval. *C.D.* refers to the Cumulative Distribution of the number of rejections.

	Treatment HT			**Treatment RT**		
Offer (x)	N	*% Rej.*	*C.D.*	N	*% Rej.*	*C.D.*
$x \leq 0.7$	0			19	84	16
$0.7 \leq x < 1.2$	0			13	92	28
$1.2 \leq x < 1.7$	0			0		
$1.7 \leq x < 2.2$	0			1	100	29
$2.2 \leq x < 2.7$	0			3	100	32
$2.7 \leq x < 3.2$	3	100	3	2	100	34
$3.2 \leq x < 3.7$	25	64	19	9	90	42
$3.7 \leq x < 4.2$	284	13	55	100	42	84
$4.2 \leq x < 4.7$	17	0	55	50	24	96
$4.7 \leq x < 5.2$	1	0	55	127	9	107
$5.2 \leq x < 5.7$	0			2	50	108
$5.7 \leq x$	0			4	0	108

differences in employees' behavior expressed in terms of rejection rates. Under each treatment's heading, the second and third columns present, respectively, rejections in absolute numbers and as a percentage of offers. Salary offers below 3.2€ are rejected in almost all cases under both treatments (except for 4/38 offers in RT). We focus on offers above 3.2€. In both treatments, rejection rates decrease as salary offers increase. However, the percentage of rejections in each salary offer interval is higher under the RT treatment. This result receives significant support if we compare across treatments rejection rates for salary offers in the 3.7-4.2 interval (13% in HT vs. 42% in RT).

Below, we summarize these findings.

Result 2: *Employers make higher salary offers when employees have to perform the real task.*

Result 3: *A given salary offer is more frequently rejected by employees in the real task treatment.*

Going back to Table II.1, we observe that salaries are higher in RT than in HT. This is true for both the median (4 vs. 4.70) and the mean (4 vs. 4.55),

and the difference is significant as indicated by a Mann-Whitney test (p=0.000). This result is stated below.

Result 4: *Higher salaries (accepted offers) are observed when employees have to perform the real task.*

Figure II.1 presents histograms visualizing the results discussed so far. It can also be observed that both salary offers and actual salaries (accepted offers) present a higher dispersion in RT than in HT, as can be also confirmed by the standard deviations reported in Table II.1. The latter finding suggests that a real task increases the heterogeneity in employers' perception of their employees' participation costs.

The percentage of successful contracts over the number of employee-employer matchings is used as an indicator of efficiency in ultimatum bargaining. However, in our experiment, the costs and benefits of the real task should also be taken into account. Unfortunately, the realism-enhancing device of the real task makes it impossible to rigorously compare the two treatments in terms of efficiency, since the costs of performing the task are unknown. Instead, we concentrate on employment rates, measured as the percentage of accepted salary offers. From simple inspection of total rejection percentages (17% in HT vs. 33% in RT) provided under the third heading of Table II.1, we reach the following result.

Result 5: *Overall employment is lower when employees have to perform a real task.*

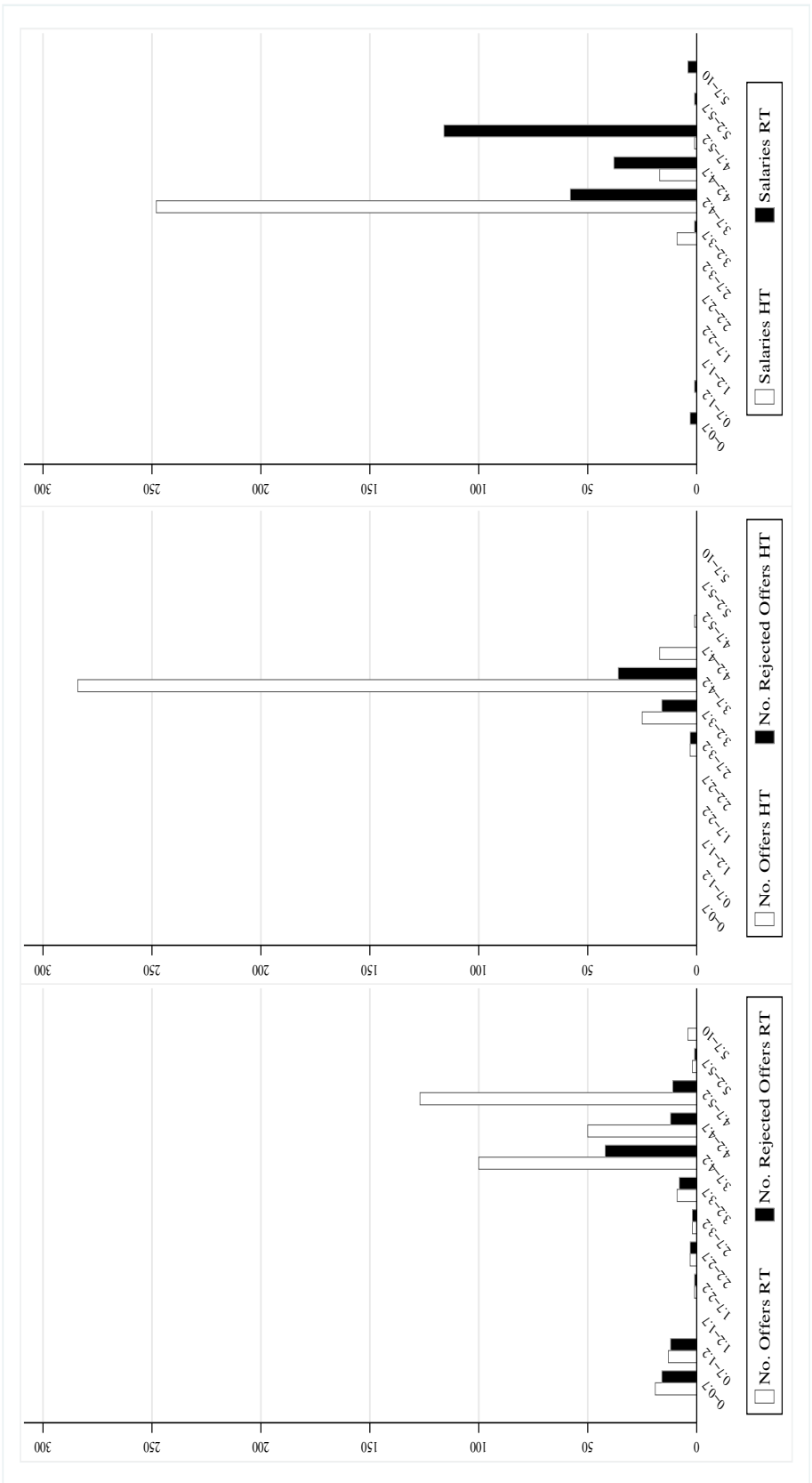


Figure II.1: Offers, rejected offers and salaries (accepted offers) per treatment.

4 Conclusions

We study salary formation as the result of ultimatum bargaining. Our main result can be stated in two steps. First, in comparison with standard ultimatum bargaining experiments, our baseline treatment, framed as a labor market with a hypothetical task, reproduces the usual 60%-40% "split of the pie". Second, when employee-subjects are asked to perform a real task, the resulting salaries are significantly higher than in the standard no-real-effort setting. Following the resemblance between our baseline treatment and previous abstract (non-labor framed) ultimatum games, the reported salary differences are unambiguously associated with employees' real effort. Furthermore, we show that the effect of real effort on observed salaries is due to differences in both employer- and employee-subjects' behavior. Specifically, in the real-effort treatment, employers post higher salary offers and employees are more likely to reject.

References

[1] Bearden, J., 2001, "Ultimatum bargaining experiments: the state of the art". Available at SSRN: http://ssrn.com/abstract=626183.

[2] Brandts, J. and G. Charness, 2004, "Do labour market conditions affect gift exchange? Some experimental evidence". *The Economic Journal* 114, 684-708.

[3] Burda, M., Güth, W., Kirchsteigerand, G. and H. Uhlig, 1998, "Employment duration and resistance to wage Rreductions: Experimental evidence". *Institute of SocioEconomics* 22, 169-189.

[4] Fehr, E. and A. Falk, 1999, "Wage rigidity in a competitive incomplete contract market". *Journal of Political Economy* 107, 106-34.

[5] Fischbacher, U., 1999, z-Tree: Zurich Toolbox for Readymade Economic

Experiments-Experimenter's Manual, Working Paper Nr. 21, Institute for Empirical Research in Economics, University of Zurich.

[6] García-Gallego, A., Georgantzís, N., Panos, G. and I. Theodossiou, 2006, "Ultimatum wage bargaining and preferences elicitation in real task experimental labor markets". *mimeo.*

[7] Güth, W., Schmittberger, R. and B. Schwarze, 1982, "An experimental analysis of ultimatum bargaining". *Journal of Economic Behavior and Organization* 75, 367-388.

[8] Oosterbeek, H., Sloof, R. S. and G. van de Kuilen, 2004, "Cultural differences in Ultimatum Game experiments: Evidence from a meta-analysis". *Experimental Economics* 7, 171-188.

Chapter III

Gender and Risk Attitudes

1 Introduction

In this chapter we study gender differences in individual decision making under uncertainty. The results reported here are based on a much larger data set than the one used in the other chapters of the thesis. The data analyzed here were collected from a number of occasions in which the *lottery panel test* introduced in Sabater-Grande and Georgantzís (2002) was used as a method to elicit risk preferences. In most of these occasions, the test was run prior to a *regular* experimental session in order to control for subjects' risk attitudes. For example, in Sabater-Grande and Georgantzís (2002) the test was used prior to a repeated prisoners' dilemma in order to study the relation between individual decision making under uncertainty and play in a full information noncooperative game. Since then, the test is run prior to all sessions organized by the experimental economics team of the *Laboratori d'Economia Experimental* in Castellón in an effort to better organize the observed behavior in a large number of contexts, including the Ultimatum Salary Bargaining experiment presented in the previous chapters.

The strategy of collecting external data on the risk attitudes of the subjects to explain behavior in a specific strategic context has been adopted by experimentalists in fewer occasions than one would expect. For example, Goeree et al.

(2003) use the binary lottery choice test by Holt and Laury (2002) to explain behavior in a Matching Pennies Game. However, most often, the effect of risk aversion on observed behavior is deduced by calibration of theoretical models which account for risk aversion without externally testing for the validity of the resulting measures of risk aversion. Here, we propose that risk aversion measures must necessarily be obtained from external tests or parallel experiments, if a rigorously scientific approach to this issue is pursued.

One should be aware of the problems associated with the capacity of specific tests to elicit risk preferences in a way which allows us to meaningfully use the measures obtained from one context as an explanatory variable of behavior in another context. In any case, the question would be *which tests should be used to elicit risk preferences* not *whether any of the existing tests serves for this purpose*. A negative answer to the second question would mean a severe critique to the experimental methodology altogether if none of the elements of observed behavior in one context related to the subjects' behavior in another, arbitrarily similar context. Fortunately, several results indicate that subjects' behavior across similar contexts presents reasonable patterns. For example, regarding the method used here to elicit risk attitudes García-Gallego et al. (2005) reports a significant but moderate correlation (0.3) between risk attitudes measured by the lottery panels and the measures obtained using the binary lottery choice method in Holt and Laury (2002, 2005). Furthermore, both tests are found to organize experimental data from a search market experiment in similar ways.

As it will be explained in detail, apart from these encouraging results concerning the compatibility between the two aforementioned methods of eliciting risk preferences, we would like to mention the fact that the lottery panel test provides the experimentalist with further information on subjects' sensitivity to increases in expected payoffs as an incentive for choosing riskier options. This dimension of risk preferences is labeled here as *sensitivity to risk premia* and it is the main reason for which we have chosen to use the panel lottery method in

order to elicit our subjects' risk preferences. In this chapter we focus on gender differences with respect to these dimensions of risky behavior. Many studies have already investigated gender differences in observed risk aversion. However, ours is the first study to establish the fact that gender differences are also present in subjects' sensitivity to risk premia.

The chapter is organized as follows. In section 2 we review the literature on risk and gender. Section 3 presents the lottery panel test. In section 4 we describe the experimental design. In section 5 we discuss the results. Section 6 concludes.

2 On risk and gender

It is a rather generally accepted fact that women are more risk averse than men. This is, for example, confirmed by Jianakoplos and Bernasek (1998) and Powel and Ansic (1997). Specifically, Powell and Ansic (1997) show that their female subjects are less risk seeking in laboratory tasks than men. However, Schubert et al. (1999), Powel and Ansic (1999) and Gadsby and Maynes (2005) argue that this finding is specific to some contexts, while it does not hold in others. In fact, Schubert et al. (1999) find that women are, on average, more risk averse in abstract gambling tasks in the gain domain, less risk averse in the loss domain, and not consistently different from men in context-rich tasks in either domain. They conclude that gender specific risk behavior in previous survey data may be due to differences in males' and females' opportunity sets rather than stereotypical risk attitudes. Harris et al. (2006) specify four different domains (gambling, health, recreation, and social) and they conclude that gender is not significant in their propensity towards taking social risk, however the genders differ in the other three domains.

Contrary to this moderately conclusive but systematic findings concerning women's higher risk aversion, psychologists, like Meier-Pesti (2005), have gone further to argue that risk aversion positively correlates with *feminity* measured

by specific personality tests. Thus, given that even women possess many *male* personality features and men *female* ones, the existing studies which are based on biological sex may underestimate the aforementioned effect of the female factor on individual decision making under uncertainty.

We address gender differences in decision making under risk, extending our focus beyond the risk aversion issue. We are also interested in gender differences regarding subjects' sensitivity to risk premia.

3 The lottery panel test

Let a lottery (q, X) imply a probability q of earning X (else nothing). Consider a continuum of a such lotteries constructed to compensate riskier options with an increase in the expected payoff. Formally, each continuum of lotteries will be defined by the pair (c, r) corresponding respectively, to the certain payoff c above which the expected payoff is increase by r times the probability of earning nothing. Therefore,

$$qX(q) = c + (1 - q) \cdot r \Rightarrow X(q) = \frac{c + (1 - q) \cdot r}{q} \tag{III.1}$$

In order to simplify the decision problem faced by our subjects, we have used *lottery panels*, each one corresponding to a discrete version of a continuum of lotteries. Subjects are asked to choose their preferred lottery from each one of the four panels. Table VI.1 (see the General Appendix, page 95) presents the payoff corresponding to the favorable outcome of each lottery whose probability (q) is given at the top of each column. These panels have been constructed using $c = 1$ and $r = 0.1, 1, 5, 10$ for panels 1 to 4 respectively.

3.1 Theoretical framework and predictions

Let reward X (obtained with probability q) be designed to compesate the risk implied in the probability $1-q$ of the unfavorable outcome ($X = 0$), as implied by expression (III.1). Assume that an individual chooses the lottery with $q_R \in (0, 1)$ in the panel offering a premium $R < r$. That is, we focus here on interior solutions and provide special discussion for extreme choices later.

It is easy to check that a subject with utility $U(X) = X^{1/t}$ who is offered a continuous[1] panel of all possible lotteries designed under the linear risk-premium scheme described in equation (III.1) would maximize his expected utility by choosing the lottery $(q^0, X(q^0))$, where

$$q^0 = (1 - \frac{1}{t}) \cdot (1 + \frac{c}{r}) \tag{III.2}$$

It is also easy to check that the second order conditions for a maximum are satisfied[2], as long as $t > 1$. This reflects the fact that risk-neutral ($t = 1$) and risk-loving ($t < 1$)- subjects would choose the riskiest option available to them[3], because their expected utility (by the design of the premium) is strictly decreasing in q.

From expression (III.2), it can be checked that $\partial q^0/\partial r < 0$, which implies that a consistent behavior across different scenarios involving different premia implies choosing lower q's for higher r's, as long as one's t is not too high for any risk to be preferred to the certain outcome c (given the obvious restriction $q^0 \leq 1$), in which case a subject might choose $q = 1$ in panels involving different risk premia. In fact, the necessary condition for any risk to be preferred to the certain payoff

[1]For the moment, we ignore the discrete space options available to our subjects in the experimental sessions.

[2]The condition is: $\frac{(1-t)\cdot(c+r)^2\cdot(\frac{c+(1-q)\cdot r}{q})^{1/t}}{q\cdot(c+(1-q)\cdot r)\cdot t^2} < 0$

[3]The Expected Utility hypothesis has been often criticized for its explanation of risk loving, neutrally or aversion by the shape of the utility function. However, given that in this first part of the exposition we assume Expected Utility maximization, we maintain the terminology according to which risk attitudes are due to the shape of the utility with respect to rewards.

is that $r > c \cdot (t-1)$.

A more detailed theoretical discussion with generalized formulations of the theories involved is offered in Georgantzís et al. (2003, http://www.uv.es/lineex/).

4 Experimental design

Subjects make a test which is based on the experiments by Sabater-Grande and Georgantzís (2002). The authors use lottery panels, each one of which corresponds to a discrete version of a continuum of lotteries (see panel lotteries Table in general Appendix, page 95). Each subject is asked to choose the most preferred lottery from each panel.

Observe that the farther right the subject chooses, the less risk averse he is, whereas risk neutral (and risk loving) subjects would choose $q = 0.1$ in all panels. Panels are designed in such a way that risk is compensated by a different (for each panel) linear (in the unfavorable outcome) increase in the expected monetary reward. Data obtained from this lottery choice task are used to construct an index of subjects' degree of risk aversion defined as the average choice across panels. Thus, a higher average probability chosen implies higher degree of risk aversion. Other properties of the test and its interpretation in terms of theories of risky decision making are discussed in Sabater-Grande and Georgantzís (2002) and Georgantzís et al. (2003).

The sessions were run in the Laboratori d'Economia Experimental (LEE) at the University of Castellón. A total of 668 subjects participated in this experiment. Subjects were university students studying economics-related subjects and they were assigned once to a single session.

5 Results

Our data set consists of 668 individual decisions in the four lottery panels presented in section 3. Among them, 36 correspond to behavior in real monetary reward sessions and 31 correspond to class-grade reward sessions. Given that our purpose is to use the test as a preliminary experiment on risk aversion, the hypothetical forming is a cheaper and faster way to elicit risk preferences because it does not require actually running the lotteries chosen and it does not create uncontrolled endowment effects. However, a Mann-Whitney test has shown no significant differences between hypothetical/stated and revealed behavior[4]. Given that in the main part of this thesis the test has been used in its hypothetical format, we concentrate here on the properties of the test when lottery rewards are fictitious.

Results are presented in a way which facilitates comparison between male and female subject populations.

Figure III.1 (see the tables and plots subsection in the Appendix) presents relative frequencies of choice averages over the four panels. Male subjects' choices are significantly more dispersed along the probability space. Therefore, female subjects' choices are more attracted towards the *central* choice of $q = 0.5$. Figure III.2 presents histograms of choices per panel. Although the previous finding is reproduced here, it is worth noting that male subjects choose more frequently the *safe* option $q = 1$ in all panels. These results can also be traced in the descriptive statistics provided in Table III.1. A clear result is obtained confirming the fact that female subjects' choices are less risky than male subjects' choices in all panels. This is despite the fact that, as mentioned before, males choose the safe option ($q = 1$) more often than females do. The significance of the difference reported here is confirmed by test results reported in Table III.2. The Table also tests for differences of choices across panels, within the male and the female

[4]Non parametric results are no significant, $q(z) = 0.138$ and $q(z) = 0.199$.

group. It is found that males' choices do not vary significantly across panels 2 and 3. Figure III.3 completes the picture of our findings, providing cumulative distributions of choices per panel. In all cases, females' behavior is more risk averse than males' and distributions are significantly different across genders as indicated by a Kolmogorov-Smirnov test.

Finally, Table III.3 reports results from a regression which is designed to test for structural differences in choice due to gender. The model estimated can be written as $q_{ij} = C + \beta \cdot r_j$, where q_{ij} is individual i's choice in panel j, C is a constant and r_j is the premium with which expected earnings are increased to compensate riskier options in panel j. The estimates indicate that:

Result 1: *Females are more risk averse than males.*

Result 2: *Females are less sensitive to risk premia than males.*

The first result is obtained due to the significance of the constant estimates for each group (*Male*, *Female*). The second result is due to the significance of the slope estimates (r_{male}, r_{female}). Both results are confirmed by the overall significance of the model, as indicated by the Chow test (p=0.000). Thus, there is a structural change in the estimated model across groups.

6 Conclusions

We report results from a lottery choice task designed to measure subjects' risk aversion and sensitivity to risk premia. Ours is the first study dealing with this second dimension of behavior in risky economic contexts, although previous studies have established the fact that the size of the stakes matters. We focus on the issue of gender differences.

Regarding risk aversion, our results confirm that female subjects are more risk averse than males. This is confirmed for the four contexts corresponding to the four panels, in which risk is more than compensated by linear increases in expected payoffs as the probability of winning the lottery decreases.

Regarding sensitivity to risk, female subjects are less attracted than men by the linear risk premia used in the design of the four panels. Thus, their decisions have a stronger tendency to agglomerate near the central option of $q = 0.5$. Further research must be carried out, trying to identify this pattern in other economic domains, like behavior in financial markets, insurance decisions, etc.

References

[1] Cadsby, C.B. and E. Maynes, 2005, "Gender, risk aversion, and the drawing power of equilibrium in an experimental corporate takeover game". *Journal of Economic Behavior and Organization* 56, 36-59.

[2] García-Gallego, A., Georgantzís, N., Pereira, P. and J.C. Pernías-Cerrillo, 2005, "Competing against simulated equilibrium price dispersions: An experiment on Internet-assisted search markets", *Net Institute Working Paper* #05-12.

[3] Goeree, J., Holt, C. and T. Palfrey, 2003, "Risk averse behavior in generalized Matching Pennies Games", *Games and Economic Behavior* 45, 97-113.

[4] Harris, C.R., Jenkins, M. and D. Glaser, 2006, "Gender differences in Risk Assessment: Why do women take fewer risks than men?". *Judgement and Decision Making* 1, 48-63.

[5] Holt, C. and S. Laury, 2002, "Risk aversion and incentive effects". *American Economic Review* 92, 1644-1655.

[6] Holt, C. and S. Laury, 2005, "Risk aversion and incentive effects: New data without order effects". *American Economic Review* 95, 902-904.

[7] Jianakoplos, N. and A. Bernasek, 1998, "Are women more risk averse?". *Economic Inquiry* 36, 620-630.

[8] K. Meier-Pesti, 2005, "Effects of masculinity and femininity on Financial Risk-Taking: Some evidence from an expermental study on gender salience". XXX meeting of the *International Association of Research in Economic Psychology*, Prague.

[9] Powell, M. and D. Ansic, 1997, "Gender differences in risk behavior in financial decision making: An experimental analysis". *Journal of Economic Psychology* 18(6), 605-628.

[10] Powell, M. and D. Ansic, 1999, "Gender differences in financial decision-making: a new approach for experimental economic analysis". Unpublished manuscript (presented at the AEA Conference, New York, January 1999).

[11] Sabater-Grande, G. and N. Georgantzís, 2002, "Accounting for risk aversion in repeated Prisoners' Dilemma games: An experimental test". *Journal of Economic Behavior and Organization* 48, 37-51.

[12] Schubert, R., Brown, M., Gysler, M. and H. Brachinger, 1999, "Financial decision making: are women really more risk averse?". *American Economic Review (Papers and Proceedings)* 89, 381-385.

7 Appendix

7.1 Tables and Plots

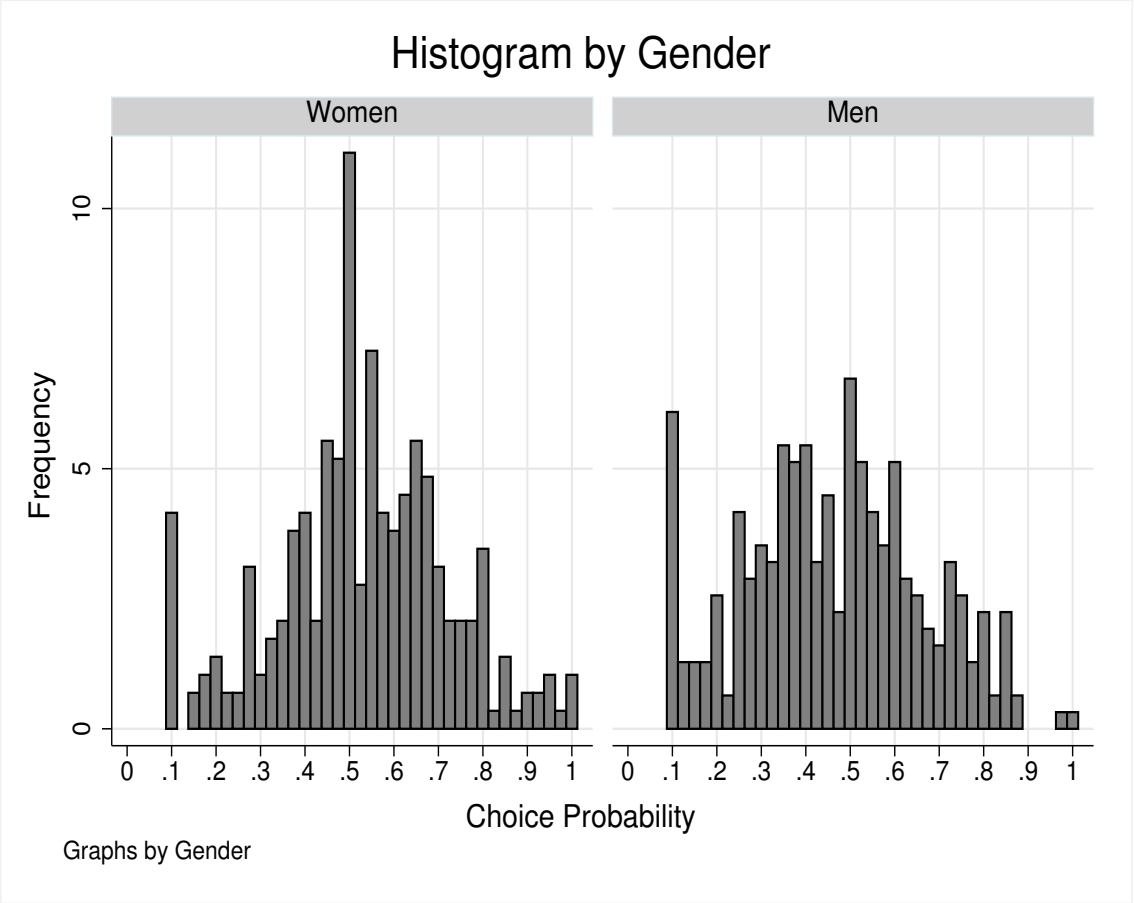
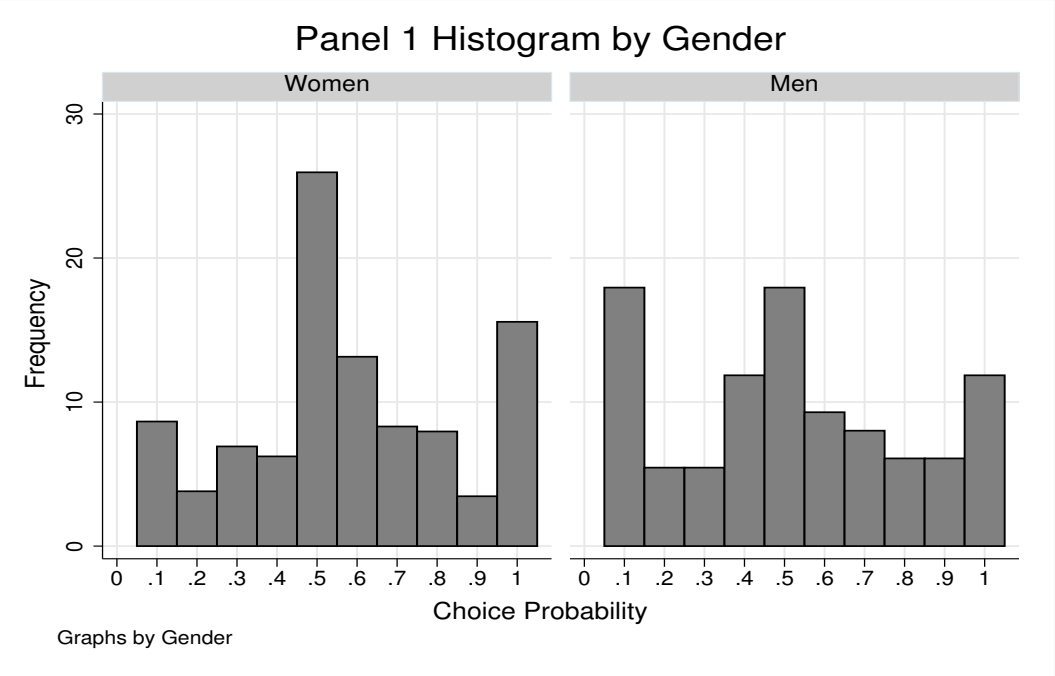
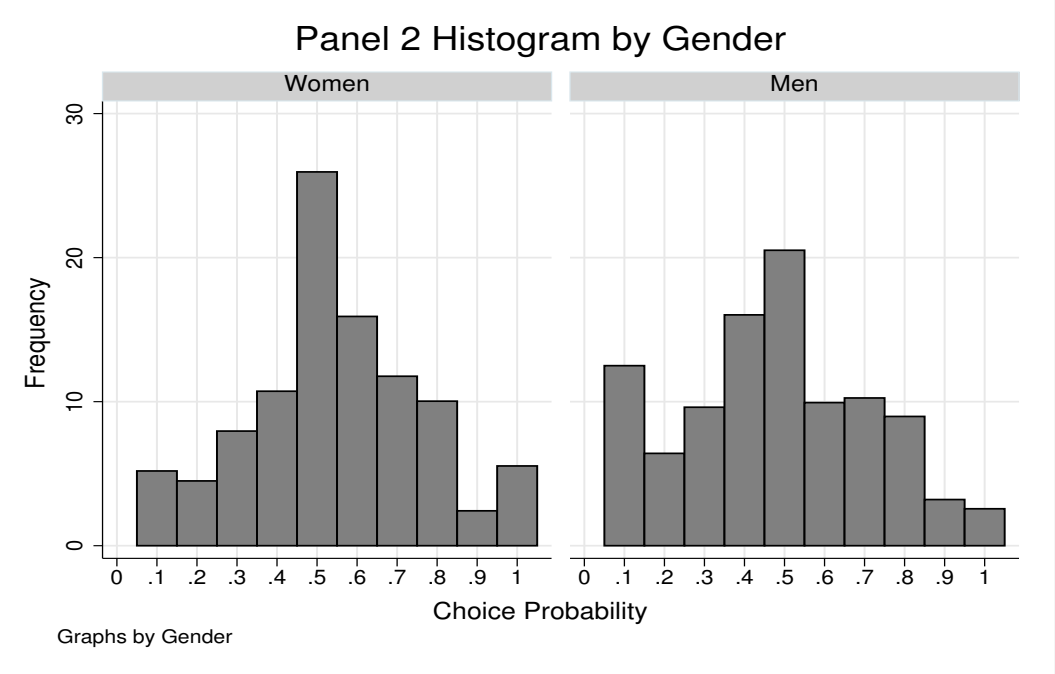


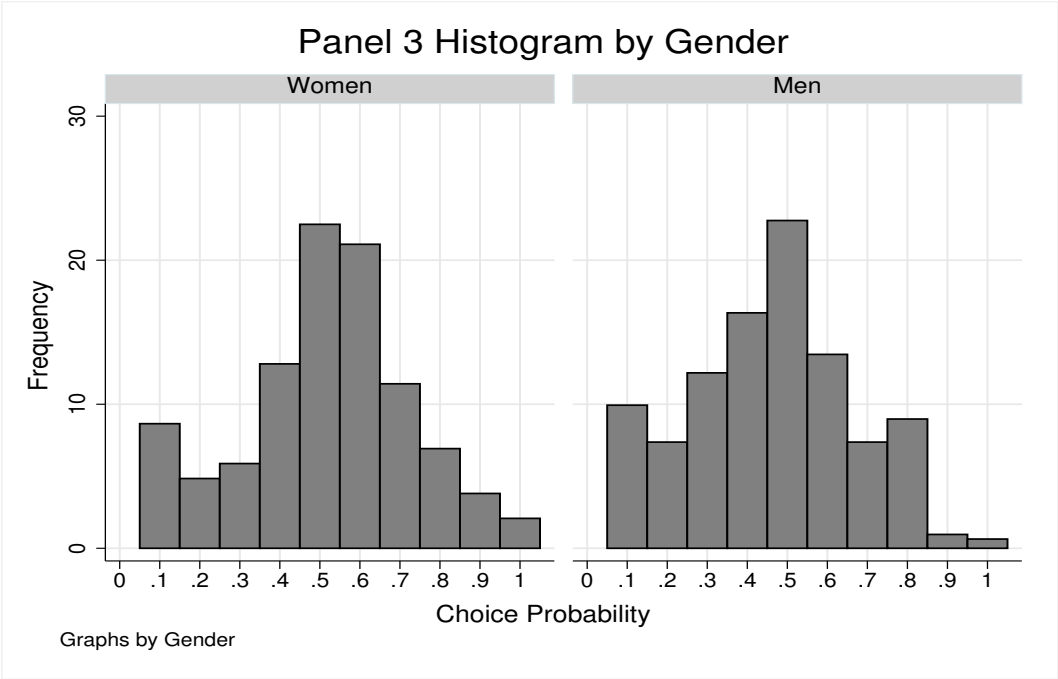
Figure III.1: Average panel choice histogram by gender



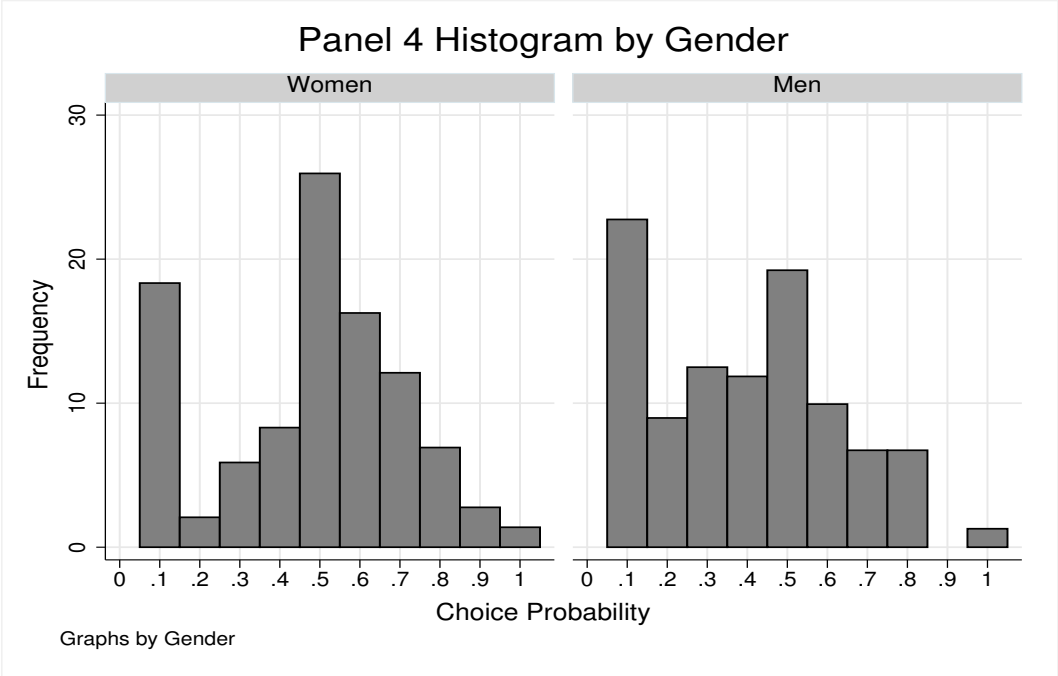
a) Panel 1



b) Panel 2



c) Panel 3



d)Panel 4

Figure III.2: Panel choice probability histograms by gender

Table III.1: Average Probabilities

	Panel 1	Panel 2	Panel 3	Panel 4
Women				
N	289	289	289	289
Median	0.50	0.50	0.50	0.50
Mean	0.58	0.55	0.52	0.50
Std. Dev.	0.27	0.22	0.21	0.23
Men				
N	312	312	312	312
Median	0.50	0.50	0.50	0.40
Mean	0.52	0.49	0.46	0.39
Std. Dev.	0.29	0.24	0.21	0.23

Table III.2: Non parametric Test

		Women			
		P. 1	P. 2	P. 3	P. 4
Men	P. 1	**2.828**	2.281	2.576	2.996
		(0.005)	(0.022)	(0.010)	(0.003)
		2.605			
		(0.010)			
	P. 2	-	**3.610**	-	-
			(0.000)		
		0.950			
		(0.342)			
	P. 3	-	-	**3.506**	-
				(0.000)	
		6.955			
		(0.000)			
	P. 4	-	-	-	**4.552**
					(0.000)

Bold characters correspond to Mann-Whitney test results. All other results correspond to a Wilcoxon rank test.

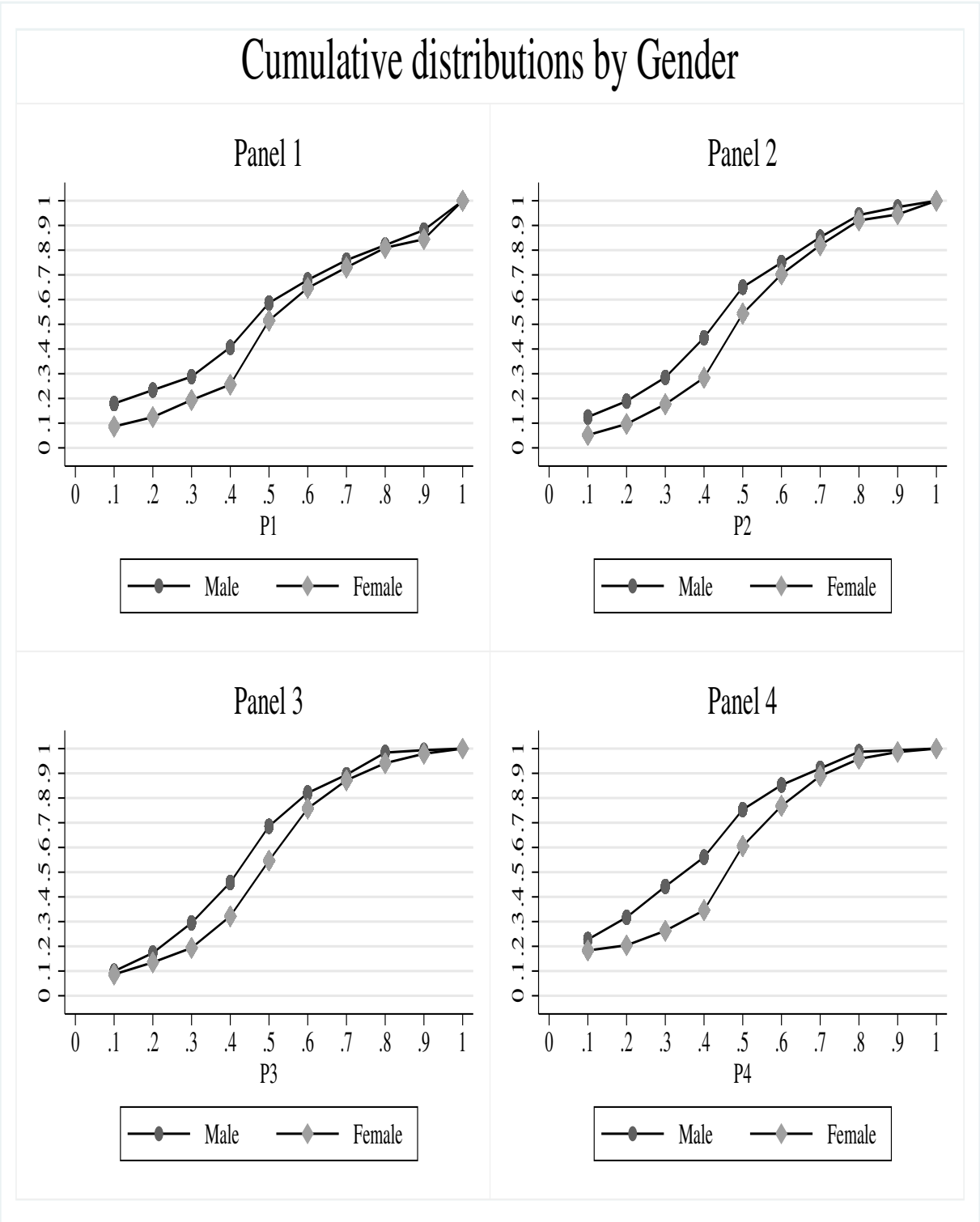


Figure III.3: Cumulative distributions by gender

Table III.3: Probability Regressions

Choice Probability	*coefficient*	*t-statistic*
Male	0.506	0.010***
r_{male}	-0.011	0.002***
Female	0.567	0.010***
r_{female}	-0.009	0.002***
R^2	0.813	
$\hat{\sigma}$	0.812	
$F(4, 2400)$	2604.16***	

Chow test	$\alpha_1(male)$	$=$	$\alpha_2(female)$
	$\beta_1(r_{male})$	$=$	$\beta_2(r_{female})$
	$F(2, 2400)$	$=$	24.47
	$Prob > F$	$=$	0.000

Chapter IV

Gender and Risk Attitudes in Bargaining Experiments

1 Introduction

A well-known theoretical and experimental framework in which fairness and bargaining have been analyzed by economists is that of ultimatum games. Since the seminal article by Güth et al. (1982), the game has inspired a vast literature.

Ultimatum games have been broadly used by experimentalists as a simple way of studying bargaining behavior between partners with asymmetric roles (leader-follower). In fact, ultimatum games can be considered as a middle point between extremely asymmetric situations like dictator games (the follower's role is reduced to passive compulsory acceptance of the leader's proposal) and symmetric ones (like traditional face-to-face bargaining). Typical results obtained from experimental ultimatum games include systematic deviations from both benchmark game-theoretic predictions of minimum offers by leaders and global acceptance by followers. Bearden's (2001) exhaustive overview of almost two decades of results obtained from various versions of the standard setup run by behavioral and experimental economists in the laboratory, indicates that results are sensitive to a number of features related to the experimental design and the subjects'

idiosyncratic characteristics.

We focus here on gender as one of the determinants of behavior in ultimatum game experiments. The experimental sessions in which our analysis is based do not *ex ante* control for the composition of sessions and employee-employer pairs in terms of gender. We use the lottery panel method introduced in Sabater-Grande and Georgantzís (2002) as a pre-play test capturing our subjects' attitudes towards risky choice. In that way, we can explicitly and rigorously address the question of whether, and to what extent, gender differences in bargaining experiments are due to differences in risk attitudes and whether the gender-effect persists after risk attitudes have been accounted for.

This chapter is organized as follows. In section 2 we review the literature on gender differences in bargaining experiments. Section 3 summarizes the main design features of the experiment on which our analysis is based. In section 4 we discuss the main results. Section 5 concludes.

2 Gender and Bargaining in the Literature

The role of gender in human decision making has been extensively analyzed in the literature. More specifically, gender differences have been investigated in the laboratory using several environments like the Prisoner's Dilemma Game (PDG), the Dictator Game (DG) and the Ultimatum Game (UG).[1]

An exhaustive review of the experimental evidence on gender differences in subjects' bargaining behavior is beyond our scope here. However, we will try to focus on some intrinsic flaws in the analysis of gender as a determinant of a subjects' economic decisions.

Studies on gender differences arrive, generally speaking, to different conclusions. For example, in a PDG context, authors like Rapoport and Chammanh

[1]See Eckel and Grossman (2005) for an exhaustive revision of differences in the economic decisions of men and women. They examine these differences in several experimental scenarios.

(1965), Kahn et al. (1971) and Mack et al. (1971) find that men are more cooperative than women. However, work by Aranoff and Tedeschi (1968), Meux (1973) and Ortmann and Tichy (1996) find the opposite result. Alternatively, some studies find that gender is not a determinant factor of economic behavior. Such is the case -in a context of public goods- of Sell and Wilson (1991), Brown-Kruse and Hummels (1993), Sell et al. (1993), Nowell and Tinkler (1994), Seguino et al. (1996), Sell (1997) and Cadsby and Maynes (1998).

The same lack of consensus is found in the context of the Dictator's Game[2] (DG). Whereas Bolton and Katok (1995) or Frey and Bohnet (1995) find no gender differences, authors like Eckel and Grossman (1996, 1998) and Andreoni and Vesterlund (2001) report significant differences in the behavior of men and women.

As far as the Ultimatum Game (UG) is concerned, Eckel and Grossman (2001) run the first UG experiment specifically designed to test for gender effects in the bargaining process. In their design, they implement a repeated -along eight rounds- ultimatum game in which proposers and respondents are matched using a face to face protocol. Each subject plays four rounds as a proposer and four rounds as a respondent. The sex of a subject's partner is made known by having a group of four proposers seated facing a group of four respondents. The design matches players with partners of their own gender, partners of the opposite gender or a mixed group. Subjects have no information on their partner's identity. They find that women's proposals are, on average, more generous than men's, regardless of the sex of the partner, and women respondents are more likely to accept an offer of a certain amount. Furthermore, a given offer is more likely to be accepted if it comes from a woman, a result which is interpreted as chivalry. Women paired with women almost never fail to reach an agreement, a fact that is interpreted by the authors as solidarity.

[2]In the DG, player 1 (the allocator) gives a fixed amount of money to divide between himself and player 2.

Saad and Gill (2001) conduct a one-shot UG in which subjects face randomly a subject of the same or contrary gender (i.e. man to woman, man to man, woman to man and woman to woman). Each subject knows the sex of his/her partner. They find that males make more generous offers when pitted against a female. Furthermore, females made equal offers independently of the other's sex.

In a set up similar to ours, Solnick (2001) conducts an one-shot UG game using the strategy method[3]. The analysis involves two treatments. In a first treatment, subject anonymity is preserved, while in the second treatment both types of players know the other player's gender. She finds that both sexes make lower offers to women and that both sexes choose higher minimum accepted offers when he/she faces a woman-employer. In general, the highest rejection rate exists when a woman-employer faces a woman-employee.

A less game-specific result is that of Sutter et al. (2003), where the influence of gender on economic decision making is analyzed in a bargaining experiment of the principal-agent type. They conclude that gender *per se* has no significant effect on behavior, whereas gender pairing has a strong influence. Much more competition and retaliation and, thus, lower efficiency, is observed when the bargaining partners are of the same gender than when they are of the opposite gender. Close to this result, Gneezy et al. (2003) find a significant gender gap in performance in tournaments and that this effect is stronger when women have to compete against men than in single-sex competitive environments. The authors argue that women may be less effective than men in competitive environments and that maybe the explanation is that women are more risk averse.[4]

In this chapter we are interested in the relation between gender differences and subjects' attitudes towards risk as explanatory factors of behavior in the

[3]Under the strategy method, the type 1 player decides the offer and, at the same time, the type 2 player records a minimum acceptable offer. If player 1's offer equals or exceeds player 2's minimum acceptable offer, the offer is accepted and the pie divided according player 1's proposal.

[4]See Byrnes et al. (1999) and Meier-Pesti (2005) for the relation between gender and risk from a psychological perspective.

ultimatum game. More specifically, we offer a more rigorous test of the usual conjecture that gender differences in experimental games are partly due to differences in risky decision making. Having a look at the literature relating these two aspects of human decision making in economics, we identify a major point of intersection in the hypothesis that experimental data can isolate the effect of risk preferences from other idiosyncratic characteristics. There are many important studies which confirm the view that women tend to be more risk averse than men. Powell and Ansic (1997) show that their female subjects are less risk seeking in laboratory tasks than men. However, other experimental studies reach different conclusions. For example, Schubert et al. (1999) find that women are, on average, more risk averse in abstract gambling tasks in the gain domain, less risk averse in the loss domain, and not consistently different from men in context-rich tasks in either domain. They conclude that gender specific risk behavior in previous survey data may be due to differences in males' and females' opportunity sets rather than stereotypical risk attitudes. Intuitively, gender differences in risky decision making should affect behavior in bargaining environments. For example, risk averse subjects should be expected to post higher offers. In that case, there may be two co-existing effects of gender on bargaining behavior: a *pure* gender effect and a *risk-related* one. The coexistence of *pure* and *risk-related* gender differences in bargaining behavior has not been explicitly addressed in the literature so far.

3 Experimental design

In the context of an UG, employer/employee pairs negotiate over their respective shares from a 10€ profit earned from a given task which must be performed by the employee. In the baseline treatment, hereafter the Salary Negotiation Experiment with a Real Task or SNERT, the task is *real* and a unit of it corresponds to filling 20 numbered envelops with their corresponding numbered single-page letters.

The SNERT was divided into two different sub-sessions: One during which Ultimatum Salary Negotiation took place and another one, in which employees performed their Real Task obligations. After this, all subjects were paid as explained below. The first sub-session consisted of two parallel procedures. Namely, *i*) randomly formed employee-employer pairs play the salary negotiation ultimatum game, which is repeated over a minimum of 30 and a maximum of 35 periods (randomly determined)[5] and *ii*) each subject responds to a payment-card type of control question designed to elicit subjects' valuations (certainty equivalent) of the game.

In five randomly chosen periods of the main experiment, the control question format is repeated using an incentive-compatible design to control for variations in a subject's valuation of the game due to learning and due to changing from a hypothetical to a real-incentive environment. The hypothetical valuations of the game are denoted by HV and the 5 incentive compatible ones by RV_1 to RV_5. Given the lack of any systematic hypothetical bias (measured as differences between hypothetical and real valuations), in the econometric models, we have used V_{er} and V_{ee} which are constructed as the average of each employer/employees' valuations obtained as responses to the hypothetical and the incentive compatible formats of the control questions.

After the negotiation periods were completed and data were collected for the whole session, 5 periods were randomly chosen by the computer to determine each employer-subject's earnings and each employee-subject's salaries and real task obligations for the Real Task performing sub-session. Real rewards were paid to employees at the end of this sub-session, after each one of them had completed his corresponding task units, while employers were rewarded just before the second sub-session started.

Additional to the SNERT, 4 alternative treatments were run in Spain. They

[5]In order to avoid undesirable session effects, subjects in each session were divided into two separate matching groups. Differences across groups were found not to be statistically significant and data reported here are the result of aggregation within each treatment.

are labeled as T1, T2, T3 and T4 and they are used to study the effects of some design features on the observed behavior. In all of them, the task-performing obligations are fictitious. In that sense, T1 can be seen as an exact replication of the SNERT but with a fictitious task. In T2 employee-employer pairs are kept constant over the whole session. Treatments T3 and T4 are exact replications of T1 and T2, respectively, but with the Control Question responded at the end rather than at the beginning of the session. Furthermore, following a standard recruiting protocol used in the LEE, subjects participating in the Spanish sessions were faced with a pre-play test designed to elicit risk preferences.

The experimental sessions were conducted at the Laboratori d'Economia Experimental (LEE), at the University of Castellón (Spain). A total of 100 subjects (10 employers and 10 employees per session) participated in this experiment. Subjects were university students studying economics-related subjects and they were assigned once to a single session. Sessions lasted an average of one hour and a half each. Approximately, average per subject earnings were slightly below 25€. Specific software was written using Urs Fischbacher's z-Tree toolbox.

We explain next the details of each part of the experiment.

3.1 A pre-play test of risk attitudes

At the beginning of the experimental session, subjects make a pre-play test which is based on the experiments by Sabater-Grande and Georgantzís (2002).[6] In this test we use lottery panels, each one of which corresponds to a discrete version of a continuum of lotteries. Table VI.1 in general appendix (page 95) presents the payoffs corresponding to the favorable outcome of each lottery whose winning probability (q) is given at the top of each column. Each subject is asked to choose the most preferred lottery from each panel. Observe that the farther right the subject chooses, the less risk averse he is, whereas risk neutral (and

[6]This part of the experimental sessions corresponds to the experimental design described in *chapter III*.

risk loving) subjects would choose $q = 0.1$ in all panels. Panels are designed in such a way that risk is compensated by a different (for each panel) linear (in the unfavorable outcome) increase in the expected monetary reward. Data obtained from this lottery choice task are used to construct an index of subjects' degree of risk aversion defined as the average choice across panels. Thus, a higher average probability chosen implies higher degree of risk aversion.

3.2 The baseline experiment (SNERT)

In a session of the Salary Negotiation Experiment with a Real Task (SNERT), 20 participants are randomly assigned to two groups: employers and employees. In each period, employers dispose of $Y = 10€$, which correspond to the total value of a task, which has to be performed by an employer-employee pair.

Employers have to post an amount X to be given to this period's employee-partner (randomly assigned and communicated to each one of them at the beginning of each period). If the employee accepts the offer, the task is "executable" and the two players' period earnings are $(\Pi_{er}, \Pi_{ee}) = (10 - X, X)$. If the employee rejects the offer, the task is not performed and they both earn nothing: $(\Pi_{er}, \Pi_{ee}) = (0, 0)$.

A unit of the real task consists of filling 20 numbered envelopes with their corresponding (also numbered) one-page letters. At the end of the bargaining part of the session, 5 periods among the total number of periods actually played, are randomly chosen to be the ones which will determine subjects' earnings and real-task obligations. Each period in which a "successful negotiation" has taken place generates the obligation of a unit of the real task to be performed by the employee-subject who will also perceive the reward agreed in the corresponding period of the negotiation part of the session. After all executable units of the task are performed, employer - and employee - subjects receive their monetary rewards.

3.3 Game-theoretic prediction and expected results

In the one-shot version of the game, the equilibrium prediction involves a (selfishly) rational employer offering a minimum amount, say $X = 0.10$, to the employee and the latter accepting the offer. Numerous studies have produced evidence favoring systematic deviations from this prediction on both sides of the employer-employee pair (the former often offers more than minimum amounts and the latter often rejects "unfair" offers). Furthermore, the repetition of the game over an unknown (by the subjects) number of periods (theoretically equivalent to an infinitely repeated game) leads to "fairer" equilibrium predictions, given that "altruistic" behavior by employers and equity-seeking behavior by employees can be explained on the ground of inter-temporal rationality. Typically, idiosyncratic differences among subjects (inequity aversion, toughness in bargaining, patience in "punishment" strategies to convince the employer for a better salary, etc.) result in a variety of outcomes, which crucially depend on whether pairs are formed by randomly matching employers to employees over a long number of periods ("partners" protocol) rather than changing the pairs every period ("strangers" protocol) in which case "punishment" strategies by unfairly treated employees aim at a "social" rather than a "partner-targeted" learning of fairness rules. Of course, the real task implies some cost to be borne by the employees, which should have a positive impact on wages offered by employers and on the minimum acceptable offer for employees as compared to abstract ultimatum bargaining games.

3.4 Treatments

Apart from the main experiment (SNERT) discussed above, we study four different wage bargaining settings. The main characteristics of each treatment are included in Table IV.1:

- TREATMENT 1 (T1): Random pairs formed in each period; permanent

Table IV.1: Main characteristics of the experimental design

Treatment	**N**	**Men**	**Women**	**Markets**	*HV*	**Matching**	**Task**
SNERT	20	6	14	10	Ex-ante	Random	Real
T1	20	11	9	10	Ex-ante	Random	Hypothetical
T2	20	10	10	10	Ex-ante	Fixed	Hypothetical
T3	20	15	5	10	Ex-post	Random	Hypothetical
T4	20	10	10	10	Ex-post	Fixed	Hypothetical
Total	100	52	48	50			

roles, randomly assigned at the beginning of the session. The task is fictitious in order to control for the effect of the real task on observed behavior.

- TREATMENT 2 (T2): Randomly formed (once) fixed pairs. We aim at studying the effects of a permanent and repeated relation between an employer and an employee. The task is hypothetical and subjects answer the control question before the game starts.

- TREATMENT 3 (T3): Like in Treatment 1, but with control questions answered after, rather than before the experiment. We aim at studying the effect of own experience from the experimental labor market on subjects' hypothetical valuation of it.

- TREATMENT 4 (T4): Like in Treatment 2, but with control questions answered after, rather than before the experiment.

4 Results

In this section we present, first, some descriptive statistics and then discuss the results obtained from a more thorough econometric analysis.

In Table IV.2, we show average hypothetical valuations (HV) of the game considering all subjects (i.e. both employer- and employee-subjects) distinguish-

ing between men and women. In addition, this table includes mean salary offers (MO) proposed in each experimental treatment, also distinguishing between salary offers made by men and by women.

Except for female's offers in T2, all actual offers (MO) lie below subjects' hypothetical valuations of the game from an employee's point of view. Interestingly, this result is also confirmed, but with more exceptions, if we focus only on those subjects who actually acted as employers during the experiment. Table IV.3 presents MO and average hypothetical valuations of this restricted sample (denoted as HV_{er}). Again, actual mean offers are lower than average minimum acceptable offers, with the exception of T2 in which the contrary occurs for the whole sample and males (no difference exists for females) and T4, in which females make higher offers than their stated hypothetical valuations from an employee's point of view. That is, permanent employee-employer matching leads employers to make salary offers which may lie closer to and even higher than their own HV_{er} reported under the hypothetical situation in which they acted as an employee. Whether the elicitation of the HV took place before or after the session does not seem to play any systematic role in this finding, indicating that our subjects' valuation of this bargaining environment from an employee's point of view does not depend on experience gained over the session.

Table IV.2: Average Hypothetical Valuation (HV and Mean Offers (MO)

	HV	HV-M	HV-F	MO	MO-M	MO-F
SNERT	4.65	4.75	4.61	4.09	4.53	3.80
T1	4.78	4.77	4.78	3.96	3.95	3.97
T2	4.65	4.90	4.40	4.46	4.36	4.50
T3	4.53	4.63	4.20	4.04	4.07	4.01
T4	4.65	4.65	4.65	4.30	4.23	4.58

Table IV.4 includes average salaries of successful contracts and average period profits earned by employers and employees in each treatment. Observe that

Table IV.3: Average Hypothetical Valuation of employer-subjects (HV_{er}) and Mean Offers (MO)

	HV_{er}	HV_{er}-M	HV_{er}-F	MO	MO-M	MO-F
SNERT	5.25	5.00	5.42	4.09	4.53	3.80
T1	4.55	4.50	4.58	3.96	3.95	3.97
T2	4.45	5.33	4.50	4.46	4.36	4.50
T3	4.25	4.30	4.20	4.04	4.07	4.01
T4	4.55	4.56	4.50	4.30	4.23	4.58

the highest average salary corresponds to the baseline treatment, which is the only one in which employee subjects had to perform the real task. The differences of 0.55€ between SNERT and T1 and 0.26€ between SNERT and T3 are statistically significant[7] and can be interpreted as the shadow market price of the cost borne by employees when performing the task of filling 20 envelops with their corresponding one-page letters. Other differences are in the expected direction: Fixed-matching treatments (T2 and T4 over T1 and T3) yield higher salaries, confirming the analogies that can be drawn between our experiment and real world labor markets, where repeated employer-employee interaction should be expected to mitigate opportunistic or excessively selfish behavior by the employers. Non systematic evidence is obtained on the possible effects of the *HV'* elicitation procedure on observed behavior, given that T1-T3 differences are significant, whereas T2-T4 differences are not (see Table IV.12 in the appendix).

Moreover, non parametric test indicate that, despite the significant gender effect on both employee and employer behavior no systematic difference is observed between males' and females earnings[8].

In Tables IV.5, IV.6 and IV.7 we show the evolution of offers and the rate of rejections per treatment. We observe some learning effects.

[7]The results obtained from non parametric (Mann-Whitney) tests on the comparison of treatment pairs in terms of salaries is provided in Table IV.12.

[8]Available from the authors upon request.

Table IV.4: Salaries-Employers' Profits

	Average Salaries			Employers' Profits							
						Male			***Female***		
	N	*Sal.*	*St.D.*	*Prof.*	*St.D.*	*N*	*Prof.*	*St.D.*	*N*	*Prof.*	*St.D.*
SNERT	222	4.55	0.80	3.66	2.64	132	3.88	2.37	198	3.52	2.81
T1	275	4.00	0.16	5.00	2.24	132	5.18	2.07	198	4.87	2.35
T2	231	4.50	0.60	3.85	2.57	99	4.98	1.87	231	3.37	2.68
T3	234	4.29	0.71	4.05	2.66	165	4.08	2.70	165	4.02	2.63
T4	261	4.45	0.52	4.39	2.31	264	4.24	2.45	66	4.97	1.50

Tables IV.6 and IV.7 show two different sides of rejected offers. The former focuses on the gender of rejected proposers, whereas the latter focuses on the gender of the rejecting employee. The significance of the observed differences is tested using regression analysis whose results are reported below. We present, first, graphics with the evolution and the distribution of offers and subjects' hypothetical valuation. Figure IV.1 indicates that employees' HV differ across treatments, whereas some (moderate) gender differences are observed in figure IV.2. Figure IV.3 reflects the increasing time trend which is a common feature of all treatments and both male and female subjects' behavior. Figure IV.4 presents offer frequencies, which exhibit very similar patterns across treatments. Figure IV.5 presents moderate gender effects. Finally, figure IV.6 presents the distribution of accepted and rejected offers.

We rigorously test here the significance of the effects reported in the previous pages. Table IV.8 includes regression results from a model in which treatment dummies (DT1-DT4), gender and period number introduced as explanatory variables. The baseline treatment is used as the reference group. With respect to the main question addressed here, we find that a significant gender effect exists. Namely, females offer lower salaries than male subjects do.

However, our design allows us to test for the validity of the usual claim made in the literature that gender effects in bargaining experiments are partly due to

females' higher degree of risk aversion. First of all, it is worth reporting that the basis for this claim should be the relationship between gender and risky decision making. This finding is also confirmed by our data as shown by the result of a simple regression (Table IV.9) in which females are found to choose safer lotteries in our lottery-panel task. This result seems to agree with a large part of the literature on this matter[9]. Thus, the next step is to run a model simultaneously including gender and risk aversion among the explanatory variables of the observed offers.

Table IV.10 reports results from such a model. Apart from the expected result that the fixed matching protocol has a positive impact on offers[10], we find that offers present an increasing trend over time. The real task has no significant effect on offers.[11] Finally, both previous findings indicate that, in the random matching protocol, whether the HV are answered before or after the session has no impact on the observed behavior with respect to salary offers. On the contrary, in the fixed matching protocol, offers are higher[12] when the HV are answered at the beginning than when they are answered at the end of the session.

With respect to our main question, we confirm that risk aversion affects[13] posted offers in the expected direction: the more risk averse a subject is, the higher the offers he/she posts. However, this contrasts with the fact that females (who are found to be more risk averse than males) make lower salary offers, which suggests that the genuine gender and the risk-related effects go into two opposite directions: the former tends to lower offers, while the latter yields higher ones. By inspection of the estimates obtained, it can be checked that, once subjects' risk

[9] An interesting way of attributing this finding to feminine behavior independently of biological sex is reported in Meier-Pesti (2005).

[10] As implied by the positive coefficient of DT2 and DT4.

[11] As indicated by the non significant coefficients of DT1 and DT3. This result is in some contradiction to **Result 2** in Chapter II (page 16), which shows that this finding is less robust than the one corresponding to employees' behavior

[12] As reflected on the corresponding estimates of DT2 (0.36) and DT4 (0.17).

[13] At a 10% significance level.

attitudes are accounted for, the gender effect becomes even stronger[14], because the risk-related counter-effect is now absorbed by the risk attitude coefficient. Another interesting aspect of this model's estimation is the significance of the V_{er} variable. The negative sign indicates that the lower an employer-subject's valuation of the game is, the higher are the subject's salary offers.

We move now to a model designed to identify the factors affecting an employee-subject's probability of rejecting a certain salary offer. Table IV.11 presents the results. As expected, a higher salary offer entails a lower rejection probability. In fact, we have estimated a model including the quadratic transformation of salary offers, as preliminary explorative analysis indicated a superior performance of this specification with respect to the linear one. Contrary to the offer model, the period variable is non significant, indicating a stationary behavior of rejection probabilities over time. Obviously, subjects with a higher hypothetical valuation of the game have a higher probability of rejecting a given salary offer. All treatment dummies appear to be significant.[15]

With respect to our central issue, both risk aversion and gender variables are significant. The former indicates that the more risk averse a subject is, the lower is his or her probability of rejecting a given salary offer. This finding seems striking of we consider that there is no uncertainty involved in an employee's behavior. However, an alternative way of interpreting a rejection is to look at it as a contribution to a public good raising other employees' profits in the future. In that sense, rejecting a positive salary may be a risky investment in higher collective future benefits to employees. Finally, females tend to reject more than males. Like in the case of the offer model whose results were reported above, the combination of these two findings indicates that the tendency of females to reject more is a pure gender effect going into the opposite direction as compared to

[14]As reflected on the difference of the corresponding coefficient estimates obtained across the two alternative offer models (1 and 2 in tables IV.8 and IV.10, respectively), rising from 0.09 to 0.16.

[15]DT3 at a 10%.

the risk-related effect, according to which more risk averse subjects have a lower rejection probability.

5 Conclusions

As many researchers have claimed or proved, female subjects are more risk averse than male ones.[16] Furthermore, as confirmed by our results, lower salary proposals entail a higher risk of rejection, although they may imply a higher expected payoff to the proposer. Thus, risk averse subjects should have a higher propensity to offer a relatively high salary. The combination of these two findings (both confirmed by our results) has often been proposed as the explanation of the fact that in some studies females were found to post higher offers in bargaining experiments like the ultimatum game studied here. However, in all previous studies this has only been a conjecture which has not been explicitly tested or controlled for.

Our experimental design allows us to jointly study gender and risk aversion effects on behavior in an ultimatum game framed and implemented as a salary negotiation environment. Alternative treatments include various novel aspects like the existence of a real task performed by the employees and a method for eliciting game valuations and minimum acceptable offers before or after each session.

Our main finding is that gender differences affect behavior with respect to both salary offers and rejection probabilities. Females offer lower salaries and this effect becomes stronger after risk attitudes are accounted for. Thus, a genuine, non risk-related, gender effect exists. Furthermore, the risk-related and the genuine gender effects go into opposite directions: the former yielding higher and the latter lower offers. Thus, the claim that gender differences are due to risk attitudes is not

[16]Studies by Powell (1997), Schubert et al., (1999), and Eckel and Grossman (2000), among others, find evidence that women are more risk averse in financial decision-making in experimental settings.

confirmed by our analysis, because, if gender differences were due to differences in risk attitudes, females should be found to post higher, not lower, salary offers. In the same fashion, we find a significant gender effect among employee-subjects. Female employees tend to reject more. However, risk aversion leads to lower rejection probabilities. Like in the case of employers' behavior, the pure and the risk-related effects go into two opposite directions. Both findings with respect to the interplay between gender and risk aversion as explanatory variables of behavior in bargaining experiments contradict the usual claim that gender effects are due to differences in risky decision making. Female players of the ultimatum game do not offer less and reject more than males *because of* but rather *despite* their higher risk aversion.

Further research is needed to study the interaction between risk aversion and gender in the presence of other bargaining contexts and competitive environments, like for example the prisoner's dilemma or coordination games.

References

[1] Andreoni, J. and L. Vesterlund, 2001, "Which is the fair sex? Gender differences in altruism". *Quarterly Journal of Economics* 116, 293-312.

[2] Aranoff, D. and J. Tedeschi, 1968, "Original stakes and behavior in the Prisoner's Dilemma Game". *Psychonomic Science* 12(2),79-80.

[3] Bearden, J., 2001, "Ultimatum bargaining experiments: the state of the art". Available at SSRN: http://ssrn.com/abstract=626183.

[4] Binmore, K., Shaked, A. and J. Sutton, 1985, "Testing noncooperative bargaining theory". *American Economic Review* 75, 1178-1180.

[5] Binmore, K., Shaked, A. and J. Sutton, 1988, "A further test of noncooperative bargaining theory: Reply". *American Economic Review* 78, 837-839.

[6] Bolton, G. and E. Katok, 1995, "An experimental test for gender differences in beneficent behavior". *Economics Letters* 48, 287-292.

[7] Byrnes, J.P., Miller, D.C. and W.D. Schafer, 1999, "Gender differences in risk taking: A meta-analysis". *Psychological Bulletin* 125, 367-383.

[8] Brown-Kruse, J. and D. Hummels, 1993, "Gender effects in laboratory public goods contributions: do individuals put their money where their mouth is?". *Journal of Economic Behavior and Organization* 22, 255-268.

[9] Cadsby, C. and E. Maynes, 1998, "Gender and free riding in a threshold public goods game: Experimental evidence". *Journal of Economic Behavior and Organization* 34, 603-620.

[10] Eckel, C. and P. Grossman, 1996, "The relative price of fairness: Gender differences in a punishment game". *Journal of Economic Behavior and Organization* 30, 143-158.

[11] Eckel, C. and P. Grossman, 1998,"Are women less selfish than men? Evidence from dictator experiments". *Economic Journal* 108, 726-735.

[12] Eckel, C. and P. Grossman, 2001, "Chivalry and solidarity in ultimatum games". *Economic Inquiry* 39, 171-188.

[13] Eckel, C. and P. Grossman, 2005, "Differences in the economic decisions of men and women: Experimental evidence". In: C. Plott and V. Smith (eds.) *Handbook of Experimental Economics Results* 1, New York: North Holland.

[14] Fehr, E. and K. Schmidt, 2000, "Theories of fairness and reciprocity: Evidence and economic applications". *CESifo Working Paper Series*, Working Paper No. 403.

[15] Fischbacher, U., 1999, "z-Tree: Zurich Toolbox for readymade economic experiments. Experimenter's manual". *Working Paper 21, Institute for Empirical Research in Economics*, University of Zurich.

[16] Frey, B. and I. Bohnet, 1995, "Institutions affect fairness: Experimental investigations". *Journal of Institutional and Theoretical Economics* 151, 286-303.

[17] García-Gallego, A., Georgantzís, N., Panos, G. and I. Theodossiou, 2006, "Ultimatum wage bargaining and preferences elicitation in real task experimental labor markets". *mimeo.*

[18] Gneezy, U. Niederle, M. and A. Rustichini, 2003, "Performance in competitive environments: Gender differences". *The Quarterly Journal of Economics*, 1049-1073.

[19] Güth, W., Schmittberger, R. and B. Schwarze, 1982, "An experimental analysis of ultimatum bargaining". *Journal of Economic Behavior and Organization* 75, 367-388.

[20] Kahn, A., Hottes, J. and W. Davis, 1971, "Cooperation and optimal responding in the Prisoner's Dilemma Game: Effects of sex and physical attractiveness". *Journal of Personality and Social Psychology* 17(3), 267-279.

[21] Mack, D., Auburn, D. and G. Knight, 1971, "Sex role identification and behavior in a reiterated Prisoner's Dilemma Game". *Psychonomic Science* 24(6), 280-282.

[22] Meier-Pesti, K., 2005, "Effects of masculinity and femininity on financial risk-taking: Some evidence from an experimental study on gender salience". XXX meeting of the *International Association of Research in Economic Psychology*, Prague.

[23] Meux, E., 1973, "Concern for the common good in an n-person Game". *Journal of Personality and Social Psychology* 28(3), 414-418.

[24] Nowell, C. and S. Tinkler, 1994, "The influence of gender on the provision of a public good". *Journal of Economic Behavior and Organization* 25, 25-36.

[25] Ortmann, A. and L. Tichy, 1999, "Gender effects in the laboratory: Evidence from Prisoners' Dilemma Games". *Journal of Economic Behavior and Organization* 39(3), 327-339.

[26] Powell, M. and D. Ansic, 1997, "Gender differences in risk behaviour in financial decision-making: An experimental analysis". *Journal of Economic Psychology* 18(6), 605-628.

[27] Rapoport, A. and A. M. Chammah, 1965, "Sex differences in factors contributing to the level of cooperation in the Prisoner's Dilemma Game". *Journal of Personality and Social Psychology* 2, 831-838.

[28] Roth, A., 1995, "Bargaining experiments", In: J. Kagel and A. Roth (eds.) *The Handbook of Experimental Economics*, 235-348. Princeton University Press, Princeton.

[29] Saad, G. and T. Gill, 2001, "Sex differences in the Ultimatum Game". *Journal of Bioeconomics* 3, 171-193.

[30] Sabater-Grande, G. and N. Georgantzís, 2002, "Accounting for risk aversion in repeated Prisoners' Dilemma Games: An experimental test". *Journal of Economic Behavior and Organization* 48, 37-51.

[31] Schubert, R., Brown, M., Gysler, M. and H.W. Brachinger, 1999, "Financial decision making: Are women really more risk averse?". *American Economic Review (Papers and Proceedings)* 89(2), 381-385.

[32] Seguino, S., Stevens, T. and M. Lutz, 1996, "Gender and cooperative behaviour: Economic man rides alone". *Feminist Economics* 2, 1-21.

[33] Sell, J., 1997, "Gender, strategies, and contributions to public goods". *Social Psychology Quarterly* 60, 252-265.

[34] Sell, J., Griffith, W. and R. Wilson, 1993, "Are women more cooperative than men in social dilemmas?". *Social Psychology Quarterly* 56, 211-222.

[35] Sell, J. and R. Wilson, 1991, "Levels of information and contributions to public goods". *Social Forces* 70(1), 107-124.

[36] Solnick, S. J., 2001, "Gender differences in the Ultimatum Game". *Economic Inquiry* 39(2), 189-200.

[37] Sutter, M., Bosman, R., Kocher, M. and F. van Winden, 2003, "Experimental evidence of the importance of gender pairing in bargaining". Discussion paper on Strategic Interacction, 2003-27, Max Planck Institute of Economics, Germany.

[38] Thaler, R., 1988, "Anomalies: The Ultimatum Game". *Journal of Economic Perspectives* 2, 195-206.

6 Appendix

6.1 Tables and Plots

Table IV.5: Evolution of offers

	1st period			First 5 periods			Last 5 periods			Last period		
Treatment	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*
SNERT												
Total Offers	10	3.36	1.41	50	3.68	1.27	50	4.18	1.23	10	4.17	1.26
Male Offers	4	4.38	0.75	20	4.18	0.80	20	4.63	0.43	4	4.63	0.48
Female Offers	6	2.68	1.37	30	3.35	1.42	30	3.88	1.49	6	3.87	1.57
T1												
Total Offers	10	3.90	0.33	50	3.85	0.30	50	4.01	0.18	10	3.99	0.03
Male Offers	4	3.75	0.50	20	3.75	0.38	20	4.04	0.14	4	4.00	0.00
Female Offers	6	4.00	0.13	30	3.92	0.23	30	3.99	0.18	6	3.98	0.04
T2												
Total Offers	10	3.58	0.81	50	3.89	0.68	50	4.84	0.66	10	4.78	0.69
Male Offers	3	4.00	0.87	15	4.01	0.57	15	4.71	0.64	3	4.43	0.51
Female Offers	7	3.40	0.77	35	3.84	0.73	35	4.89	0.66	7	4.93	0.73
T3												
Total Offers	10	3.98	1.87	50	3.72	1.44	50	4.14	0.88	10	4.27	0.68
Male Offers	5	3.90	0.55	25	4.14	0.77	25	3.85	0.94	5	4.04	0.32
Female Offers	5	4.06	2.75	25	3.30	1.80	25	4.44	0.72	5	4.50	0.90
T4												
Total Offers	10	4.23	1.20	50	4.06	0.78	50	4.28	0.91	10	4.29	0.79
Male Offers	8	4.10	1.32	40	3.91	0.78	40	4.20	0.97	8	4.24	0.84
Female Offers	2	4.75	0.35	10	4.68	0.37	10	4.60	0.52	2	4.50	0.71

Table IV.6: Evolution of rejected Male and Female Subjects' Offers

	1st period		First 5 periods		Last 5 periods		Last period		All periods	
Treatment	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
SNERT										
Total Rejections	10	50%	50	36%	50	30%	10	20%	330	33%
Male Of. Rej.	4	25%	20	45%	20	10%	4	0%	132	27%
Female Of. Rej.	6	67%	30	30%	30	43%	6	33%	198	37%
T1										
Total Rejections	10	10%	50	30%	50	10%	10	10%	330	17%
Male Of. Rej.	4	25%	20	35%	20	0%	4	0%	132	14%
Female Of. Rej.	6	0%	30	27%	30	17%	6	17%	198	19%
T2										
Total Rejections	10	40%	50	38%	50	20%	10	20%	330	30%
Male Of. Rej.	3	0%	15	13%	15	7%	3	0%	99	11%
Female Of. Rej.	7	57%	35	49%	35	26%	7	29%	231	38%
T3										
Total Rejections	10	30%	50	38%	50	26%	10	10%	330	29%
Male Of. Rej.	5	20%	25	28%	25	28%	5	20%	165	30%
Female Of. Rej.	5	40%	25	48%	25	24%	5	0%	165	28%
T4										
Total Rejections	10	40%	50	52%	50	14%	10	20%	330	21%
Male Of. Rej.	8	50%	40	63%	40	18%	8	25%	264	24%
Female Of. Rej.	2	0%	10	10%	10	0%	2	0%	66	8%

Table IV.7: Evolution of offers rejected by Male and Female Employees

	1st period		First 5 periods		Last 5 periods		Last period		All periods	
Treatment	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
SNERT										
Total Rejections	10	50%	50	36%	50	30%	10	20%	330	33%
Male Reject.	2	50%	10	10%	10	0%	2	0%	66	5%
Female Reject.	8	50%	40	43%	40	38%	8	25%	264	40%
T1										
Total Rejections	10	10%	50	30%	50	10%	10	10%	330	17%
Male Reject.	7	14%	35	31%	35	9%	7	14%	231	15%
Female Reject.	3	0%	15	27%	15	13%	3	0%	99	21%
T2										
Total Rejections	10	40%	50	38%	50	20%	10	20%	330	30%
Male Reject.	7	43%	35	34%	35	17%	7	14%	231	29%
Female Reject.	3	33%	15	47%	15	27%	3	33%	99	31%
T3										
Total Rejections	10	30%	50	38%	50	26%	10	10%	330	29%
Male Reject.	10	30%	50	38%	50	26%	10	10%	330	29%
Female Reject.	-	-	-	-	-	-	-	-	-	-
T4										
Total Rejections	10	40%	50	52%	50	14%	10	20%	330	21%
Male Reject.	2	50%	10	90%	10	10%	2	0%	66	30%
Female Reject.	8	38%	40	43%	40	15%	8	25%	264	19%

Table IV.8: Offers Model (1)

Offer	*Coefficient*	*t-statistic*
cons	4.06	92.68***
period	0.01	8.22***
gender	0.09	2.64***
T1	-0.40	-7.71***
T2	0.11	2.06**
T3	-0.33	-6.36***
T4	-0.10	-1.90*
χ^2	182.66	
N	1650	

Table IV.9: Gender-Risk Aversion Model

Lotteries	*Coefficient*	*t-statistic*
cons	0.52	19.49
gender	-0.14	-3.78
R^2	0.13	
N	100	

Table IV.10: Offers Model (2)

Offer	*Coefficient*	*z*
cons	4.40	33.91***
period	0.07	7.85***
V_{er}	-0.14	-6.99***
Lotteries	0.17	1.68*
gender	0.16	3.38***
T1	-0.07	-1.16
T2	0.36	5.66***
T3	-0.03	-0.42
T4	0.17	2.61***
χ^2	205.46	
N	1650	

Table IV.11: Rejection Probability Model

Prob. of Rejctn.	*Coefficient*	*z*
cons	2.73	8.13***
period	0.00	0.09
V_{ee}	0.12	3.18***
Offer^2	-0.16	-14.94***
lotteries	-1.34	-3.89***
gender	-1.01	-6.49***
T1	-0.90	-5.44***
T2	0.47	2.89***
T3	0.37	1.69*
T4	-0.47	-3.09***
χ^2	296.07	
N	1650	

Table IV.12: Mean Salaries

	Statistics			Difference Significance (M-W test, p-values in parentheses)				
	N	*Mean*	*St.Dev.*	**SNERT**	**T1**	**T2**	**T3**	**T4**
SNERT	222	4.55	0.80	-	-	-	-	-
T1	275	4.00	0.16	12.997 (0.000)	-	-	-	-
T2	231	4.50	0.60	3.004 (0.003)	-13.900 (0.000)	-	-	-
T3	234	4.29	0.71	6.000 (0.000)	-7.805 (0.000)	-3.291 (0.001)	-	-
T4	261	4.45	0.52	2.251 (0.024)	-12.357 (0.000)	0.434 (0.665)	-3.265 (0.001)	-

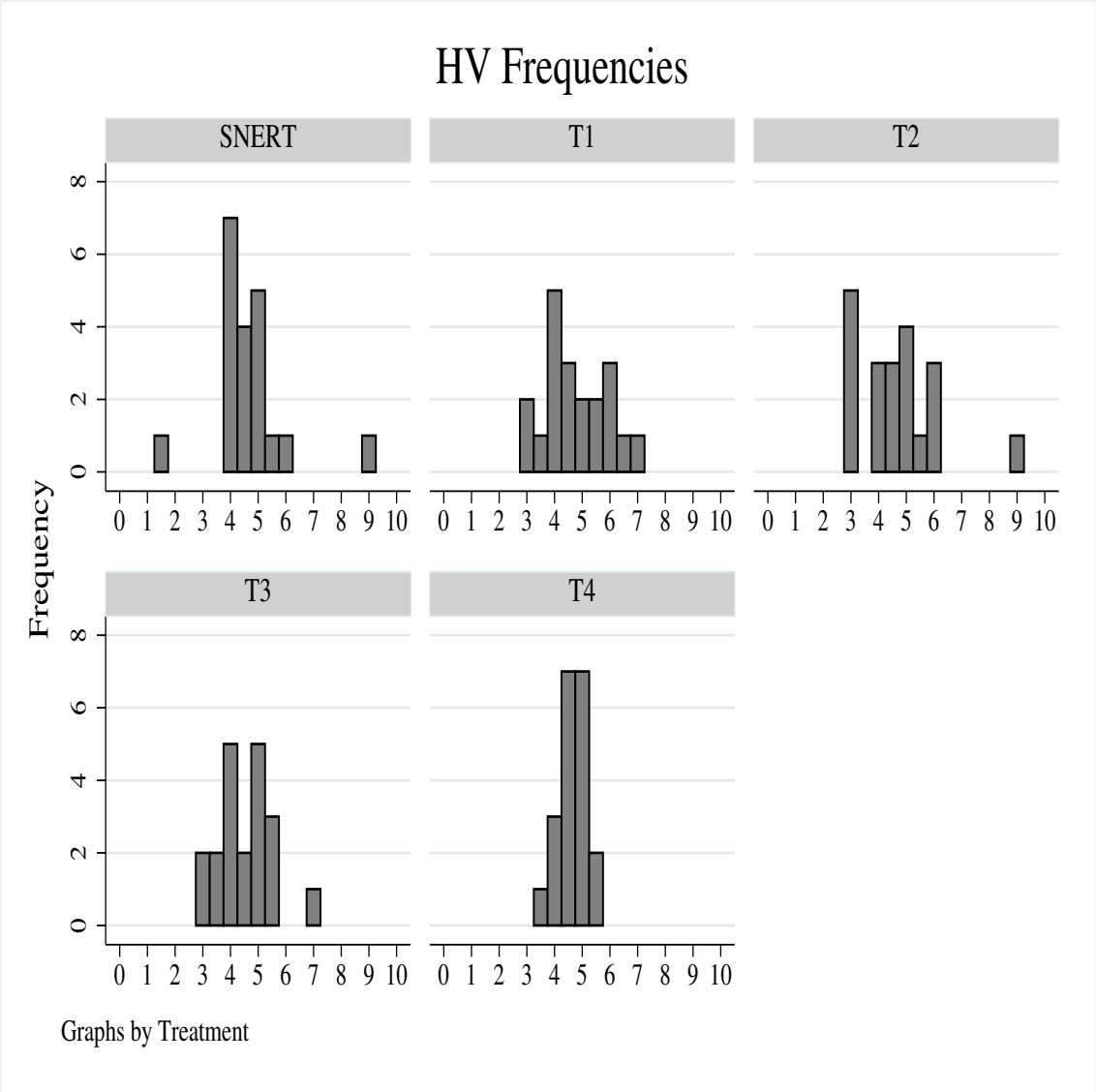


Figure IV.1: Frequencies of hypothetical valuation (HV) of the game.

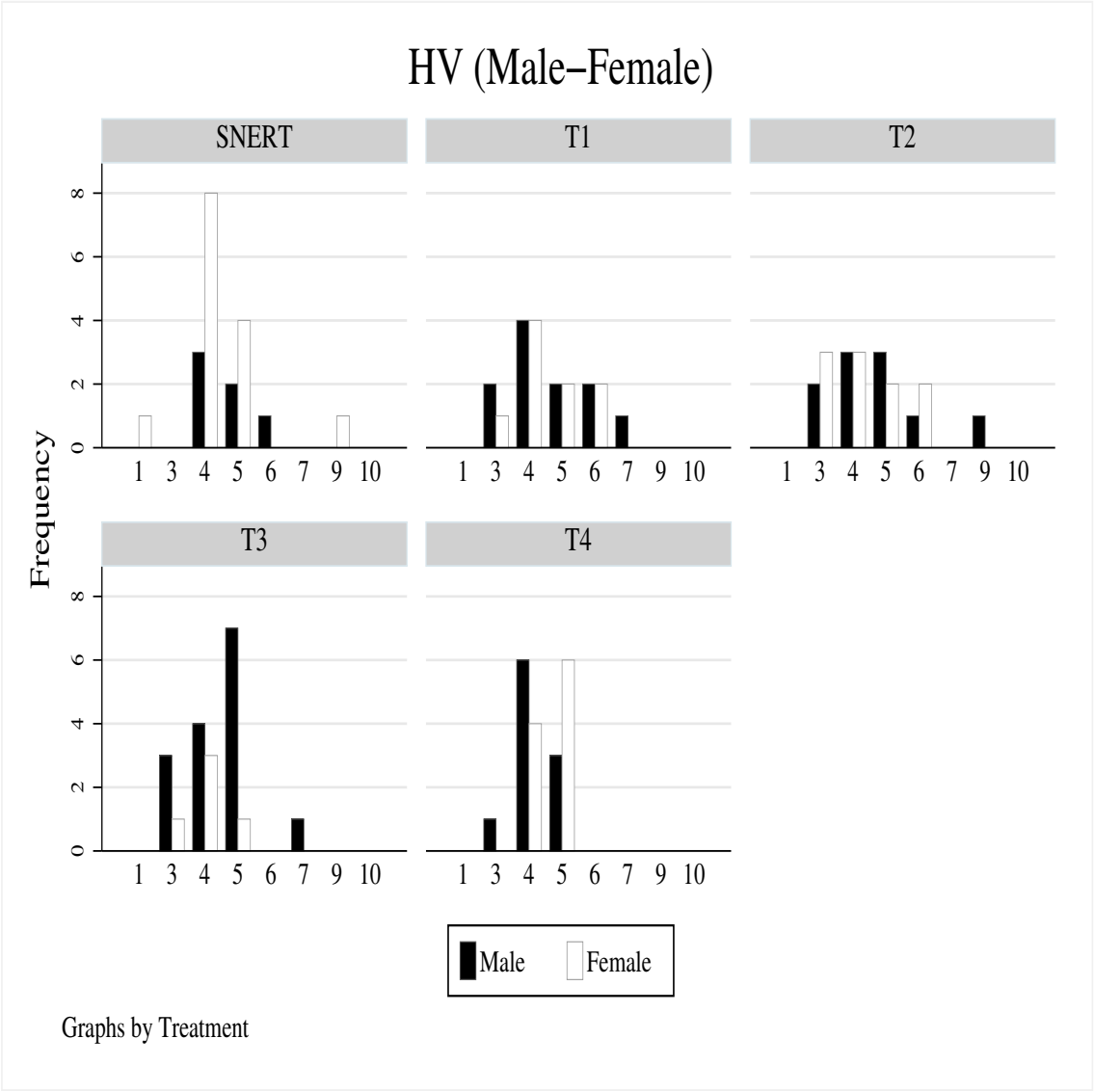


Figure IV.2: Frequencies of hypothetical valuation (HV) of the game by gender.

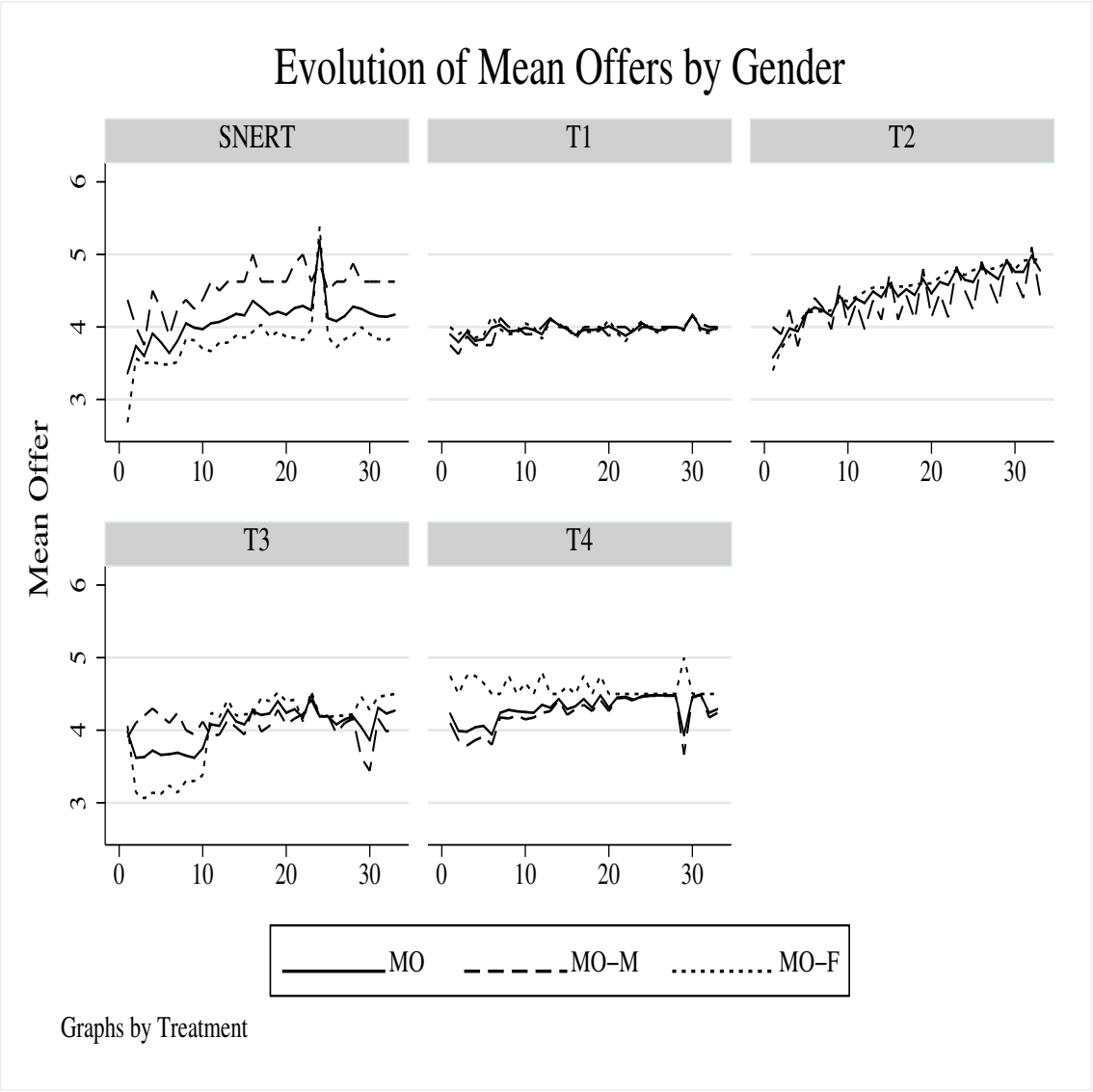


Figure IV.3: Evolution of offers.

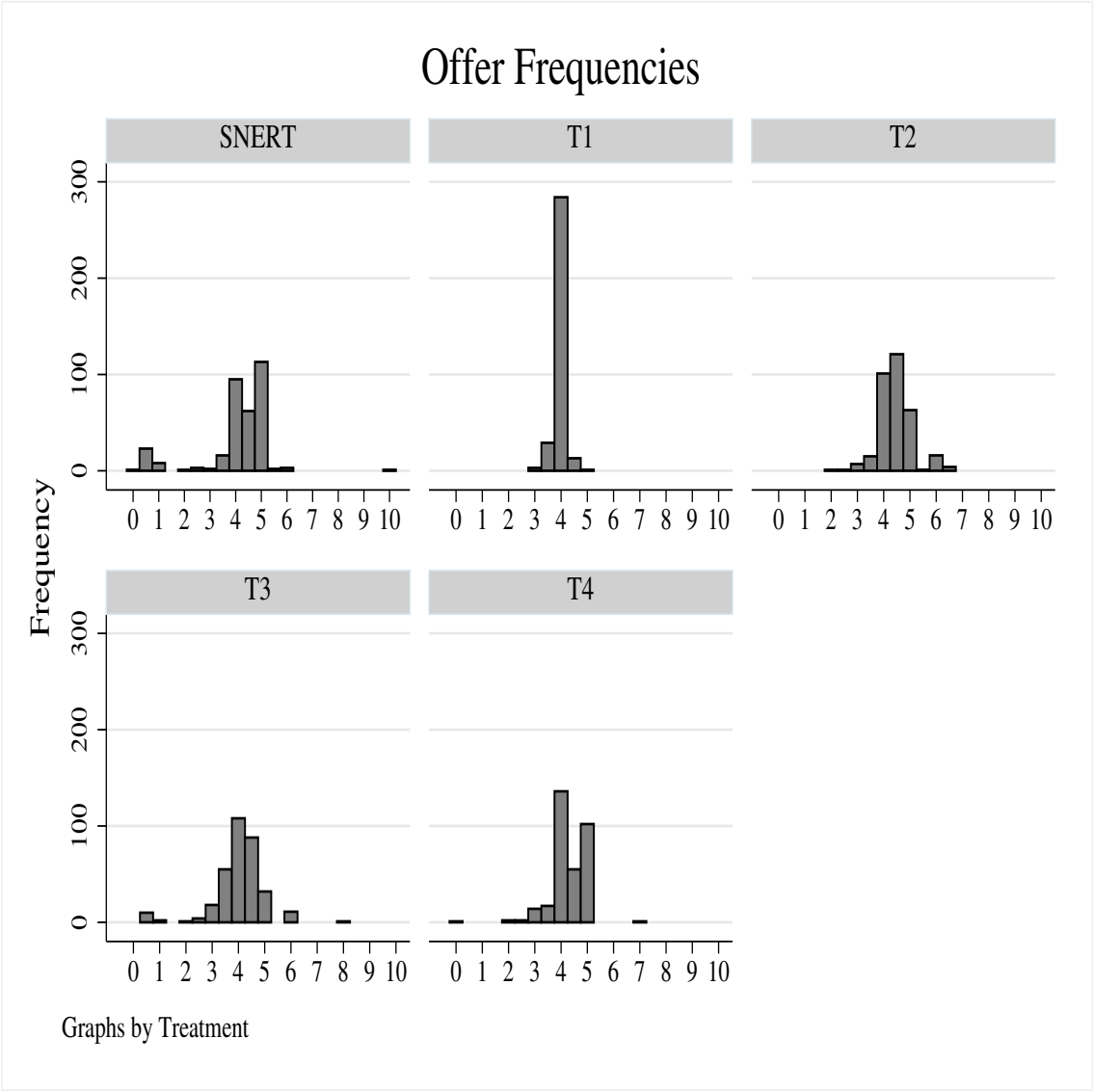


Figure IV.4: Offer frequencies.

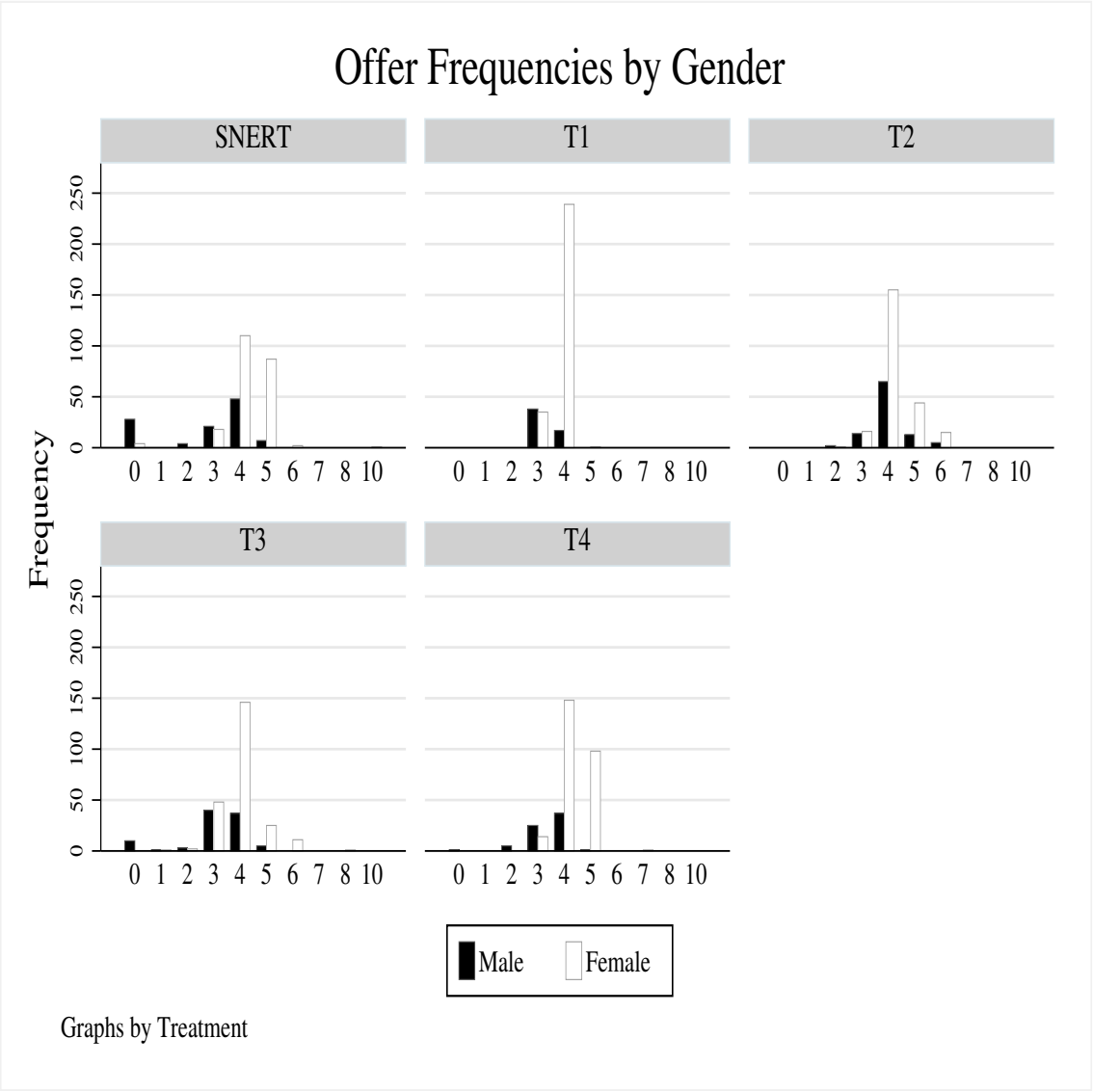


Figure IV.5: Offer frequencies by gender.

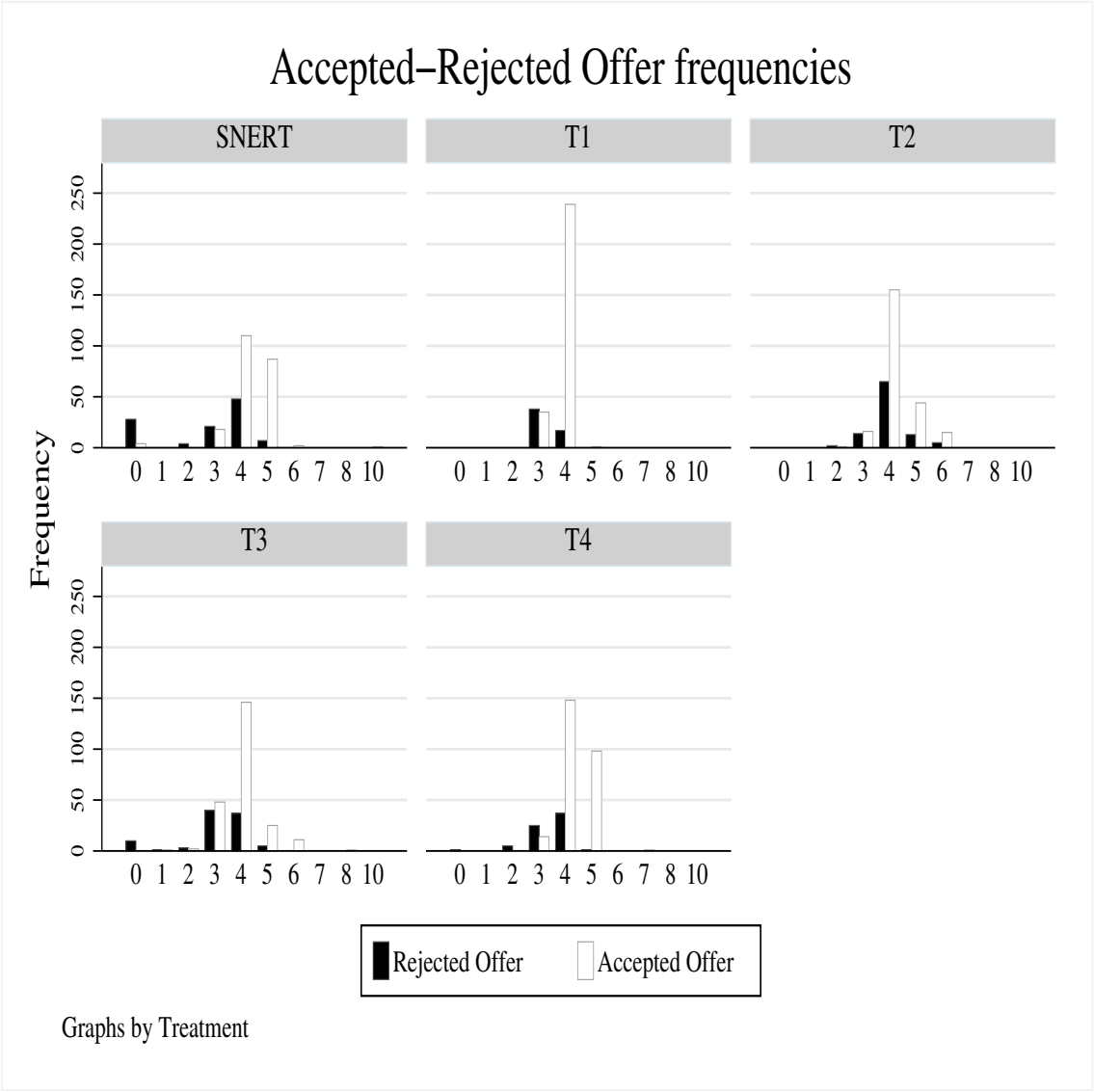


Figure IV.6: Frequencies of accepted and rejected offers.

Chapter V

A Cultural Perspective of Gender Effects in Bargaining Experiments

1 Introduction

Bearden's (2001) exhaustive overview of almost two decades of results obtained from various versions of Ultimatum game's the standard setup run by behavioral and experimental economists in the laboratory, indicates that results are sensitive to a number of features related to the experimental design and the subjects' idiosyncratic characteristics like, for example, social and cultural aspects across countries, educational disciplines, gender, etc. A general conclusion is that fairness seems to be a rather universal consideration in bargaining.

More recently, several studies report cultural differences in UG experiments. In their meta-analysis, Oosterbeek et al. (2004) find that country differences are reflected on respondents' behavior only and not on the shares offered to them. The paper by Chuah et al. (2005) identifies attitudinal dimensions (like altruism and fairness) of culture which significantly influence experimental behavior of Malaysian and UK subjects. However, none of these papers addresses the issue

of how gender effects vary across countries and cultures.

In this paper we are interested in the relation between gender differences as explanatory factors of behavior in the ultimatum game.

Our analysis is based on a series of experimental sessions which do not *ex ante* control for the composition of sessions and employee-employer pairs in terms of gender. Among a number of novel design aspects introduced in these experiments[1]

The question whether gender effects are due to cultural differences, we compare behavior of subjects from three countries: Spain, Greece and the UK.

Our main finding is that gender differences are significant in both employer and employee behavior. Females offer lower salaries and female employees tend to reject more. Gender differences of similar sign and sizes are obtained for Greek and Spanish subjects, whereas a qualitatively different gender effect is found for British subjects.

The chapter is organized as follows. In section 2 summarizes the main design features of the experiment on which the analysis is based. In section 3 the main results are discussed. Section 4 concludes.

2 Experimental design

In the baseline treatment, hereafter the Salary Negotiation Experiment with a Real Task or SNERT, the task is *real* and a unit of it corresponds to filling 20 numbered envelops with their corresponding numbered single-page letters. The SNERT was run in three different countries: Spain[2], Greece[3] and the UK[4].

Additional to the SNERT, 4 alternative treatments were run in Spain. They

[1]The most prominent novel feature is a real task performed by the employees in the baseline treatment.

[2]In the *Laboratori d'Economia Experimental (LEE)* at the University of Castellón.

[3]In the Computer Lab of the Economics Department at the University of Macedonia.

[4]In the Computing Laboratory of the Economics Department at the University of Aberdeen

are labeled as T1, T2, T3 and T4 and they are used to study the effects of some design features on the observed behavior. In all of them, the task-performing obligations are fictitious. In that sense, T1 can be seen as an exact replication of the SNERT but with a fictitious task. In T2 employee-employer pairs are kept constant over the whole session. Treatments T3 and T4 are exact replications of T1 and T2, respectively, but with the Control Question responded at the end rather than at the beginning of the session. Furthermore, following a standard recruiting protocol used in the LEE, subjects participating in the Spanish sessions were faced with a pre-play test designed to elicit risk preferences.

A total of 140 subjects (10 employers and 10 employees per session) participated in this experiment. Subjects were university students studying economics-related subjects and they were assigned once to a single session. Sessions lasted an average of one hour and a half each. Approximately, average per subject earnings were slightly below 25 Euros. Specific software was written using Urs Fischbacher's z-Tree toolbox.

Table V.1: Main characteristics of the experimental design

Treatments	**N**	**Male**	**Female**	**Markets**	*HV*	**Matching**	**Task**
SNERT SP	20	6	14	10	Ex-ante	Random	Real
SNERT GR	20	9	11	10	Ex-ante	Random	Real
SNERT UK	20	12	8	10	Ex-ante	Random	Real
T1	20	11	9	10	Ex-ante	Random	Hypothetical
T2	20	10	10	10	Ex-ante	Fixed	Hypothetical
T3	20	15	5	10	Ex-post	Random	Hypothetical
T4	20	10	10	10	Ex-post	Fixed	Hypothetical
Total	140	73	67	70			

In Table V.1 we describe some important details of each treatment: the number of subjects in each treatment, distinguishing between males and females. The *Hypothetical valuations (HV)*[5] were answered before (ex-ante) or after (ex-post)

[5]Each subject responds to a payment-card type of control question designed to elicit subjects'

the experiment. The matching was fixed or random, and, finally, if the task is real or hypothetical.

3 Results

3.1 General results and descriptive statistics

In this section we present, first, some descriptive statistics and then discuss the results obtained from a more thorough econometric analysis.

In Table V.2, we show average hypothetical valuations (HV) of the game considering all subjects (i.e. both employer- and employee-subjects), as well as disaggregated HV for males and females. In addition, this table includes mean salary offers (MO) proposed in each experimental treatment, distinguishing between salary offers made by men and by women. Except for female's offers in T2, all actual offers lie below subjects' hypothetical valuations of the game from an employee's point of view. Interestingly, this result is also confirmed, but with more exceptions, if we focus only on those subjects who actually acted as employers during the experiment. Table V.3 presents mean salary offers (MO) and average hypothetical valuations of this restricted sample (denoted as HV_{er}). Again, actual mean offers are lower than hypothetical valuations of the setting from an employee's point of view, with the exception of T2 in which the contrary occurs for the whole sample and for males (no difference exists for females), and T4 in which females make higher offers than their stated hypothetical valuations from an employee's point of view. That is, permanent employee-employer matching leads employers to make salary offers which may lie closer to and even higher than their own HV_{er} reported under the hypothetical situation in which they acted as an employee. Whether the elicitation of the hypothetical valuation took place before or after the session (T1 vs. T3 and T2 vs. T4) does not seem to

valuations (certainty equivalent) of the game. See the Questionnaire subsection in the General Appendix, pages 98-99.

play any systematic role in this finding, indicating that our subjects' valuation of this bargaining environment from an employee's point of view does not depend on experience gained over the session.

Table V.2: Average Hypothetical Valuation (HV) and Mean Offers (MO)

	HV	HV-M	HV-F	MO	MO-M	MO-F
SNERT SP	4.65	4.75	4.61	4.09	4.53	3.80
SNERT GR	5.13	4.89	5.32	4.06	4.11	3.98
SNERT UK	4.45	3.92	5.25	4.97	4.91	5.06
T1	4.78	4.77	4.78	3.96	3.95	3.97
T2	4.65	4.90	4.40	4.46	4.36	4.50
T3	4.52	4.63	4.20	4.04	4.07	4.01
T4	4.65	4.65	4.65	4.30	4.23	4.58

Table V.3: Average Hypothetical Evaluation of employer-subjects (HV_{er}) and Mean Offers (MO)

	HV_{er}	HV_{er}-M	HV_{er}-F	MO	MO-M	MO-F
SNERT SP	5.25	5.00	5.42	4.09	4.53	3.80
SNERT GR	5.40	5.25	5.63	4.06	4.11	3.98
SNERT UK	5.45	4.92	6.25	4.97	4.91	5.06
T1	4.55	4.50	4.58	3.96	3.95	3.97
T2	4.45	4.33	4.50	4.46	4.36	4.50
T3	4.25	4.30	4.20	4.04	4.07	4.01
T4	4.55	4.56	4.50	4.30	4.23	4.58

Table V.4 includes average salaries of successful contracts and average period profits earned by employers and employees in each treatment. Taking the Spanish data set into account, the highest average salary corresponds to the baseline treatment, which is the only one in which employee subjects had to perform the real task. The differences of 0.55 Euros between SNERT and T1 and 0.26 Euros between SNERT and T3 are statistically significant[6] and can be interpreted as

[6]The results obtained from non parametric (Mann-Whitney) tests on the comparison of treatment pairs in terms of salaries is provided in Table V.12.

the shadow market price of the cost borne by employees when performing the task of filling 20 envelops with their corresponding one-page letters. Other differences are in the expected direction: Fixed-matching treatments (T2 and T4 over T1 and T3) yield higher salaries, confirming the analogies that can be drawn between our experiment and real world labor markets, where repeated employer-employee interaction should be expected to mitigate opportunistic or excessively selfish behavior by the employers. Non systematic evidence is obtained on the possible effects of the *HV'* elicitation procedure on observed behavior, given that T1-T3 differences are significant, whereas T2-T4 differences are not (see Table V.12 in the appendix).

The SNERT has yielded the lowest salaries in Greece and the highest in the UK. Spain lies in between and all differences are statistically significant. It is interesting that the observed salaries in the SNERT reproduce the ranking of the three countries in terms of GDP, consumer price indices and wage levels. This implies that replicating the same experimental setup in different countries may lead to differences which depend on the levels of income and other macroeconomic determinants of subjects' opportunity costs and target earnings. Following these differences, but not trivially, the resulting average period earnings of employees are also significantly different across countries. The ranking follows the aforementioned ranking with UK in the first, Spain in the second and Greece in the third place. In that sense, employers' profits in Table V.4 follow exactly the opposite ranking, implying a more egalitarian sharing of the 10€ pie in the UK and a more unequal one in Greece. A more detailed analysis of the forces underlying this finding is provided later in the text, where econometric models of offer and rejection determinants are estimated using panel techniques.

In Tables V.5, V.6 and V.7 we show the evolution of offers and the rate of rejections per treatment. We observe some learning effects.

Tables V.6 and V.7 show two different sides of rejected offers. The former focuses on the gender of rejected proposers, whereas the latter focuses on the

Table V.4: Salaries-Employers' Profits

	Average Salaries			Employers' Profits							
						Male			***Female***		
	N	*Sal.*	*St.D.*	*Prof.*	*St.D.*	*N*	*Prof.*	*St.D.*	*N*	*Prof.*	*St.D.*
SNERT SP	222	4.55	0.80	3.66	2.64	132	3.88	2.37	198	3.52	2.81
SNERT GR	231	4.21	0.40	4.05	2.68	198	4.14	2.63	132	3.93	2.76
SNERT UK	225	5.19	0.60	3.28	2.30	198	3.23	2.35	132	3.36	2.22
T1	275	4.00	0.16	5.00	2.24	132	5.18	2.08	198	4.87	2.35
T2	231	4.50	0.60	3.85	2.57	99	4.98	1.87	231	3.37	2.68
T3	234	4.29	0.71	4.05	2.66	165	4.08	2.70	165	4.02	2.63
T4	261	4.45	0.52	4.39	2.31	264	4.24	2.45	66	4.97	1.50

gender of the rejecting employee. These differences will be discussed in more detail using regression analysis. We present, first, graphics with the evolution and the distribution of offers and and subjects' hypothetical valuation. Figure V.1 indicates that employees' *HV* differ across treatments, whereas some (moderate) gender differences are observed in Figure V.2. Figure V.3 reflects the increasing time trend which is a common feature of all treatments and both male and female subjects' behavior. Figure V.4 presents offer frequencies, which exhibit very similar patterns across treatments. Figure V.5 presents moderate gender effects. Finally, Figure V.6 presents the distribution of accepted and rejected offers.

3.2 Country differences and gender effects

Table V.8 reports results from the estimation of the baseline offers model capturing the main features of employer behavior. It can be seen that a significant gender effect is obtained. Overall, female subjects make lower offers than males. Furthermore, the UK dummy is significant, implying that subjects in the Aberdeen session have been posting higher wage offers than Greek employer-subjects, whose corresponding coefficient is nonsignificant, and the Spanish who are used here as the reference group. T1-T4 dummies confirm a significant positive effect

of permanent matching on the wage offered to employees. On the contrary, T1 and T3 dummy coefficients are nonsignificant, indicating that whether a real or a hypothetical task is used or whether the control question is responded before or after the session, has no impact on employer's behavior.

However, our interest is in the interplay between country and gender differences. Table V.9 presents three country-specific models on employers' behavior. The gender dummy coefficient is nonsignificant for British employers. In the other two countries, female employers have posted significantly lower wage offers. In fact, both coefficient estimates and the corresponding statistics are of very similar sizes. Both the baseline model and the country-specific models confirm an increasing tendency of offers over time. That is, employers learn to make higher offers, probably because they gain experience on employees' revealed minimum acceptable wages. Also, we estimate a negative effect of the employer's V_{er} elicited on the hypothetical case that the employer acted as an employee. This is an interesting finding, as it shows that the higher a subject values a given bargaining environment, the lower he/she is offering a compensation for "others" to accept participating in it.

Tables V.10 and V.11 present the results from the estimation of rejection models describing employees' behavior. As we should expect, higher offers entail a lower rejection probability. In fact, we have estimated a model including the quadratic transformation of salary offers, as preliminary explorative analysis indicated a superior performance of this specification with respect to the linear one. This may be due to the fact that employees tend to accept with total certainty offers above a given (high) threshold and reject offers below another (low) threshold. Thus, rejection probabilities are not linearly correlated with offers. Greek employees have a lower and British employees a higher rejection probability. Overall, females reject more than males. The country-specific rejection models in Table 14 indicate that Greek and Spanish female employees reject more than males, whereas British female employees reject less than males. No system-

atic findings can be reported on the effects of the T1-T4 dummies in rejection behavior. The expected positive effect of a subject's hypothetical valuation on his/her rejection probability is only confirmed in the case of Spain.

As a preliminary conclusion, we observe that significant gender differences exist and they significantly vary across countries. Greek and Spanish females behave similarly to each other and they both differ from British subjects in the same way. Females from the two Mediterranean countries offer lower wages than males and reject with a higher probability, whereas females from the UK post similar wage offers and reject less than males.

4 Conclusions

We focus on country-specific determinants of gender effects in ultimatum bargaining. We find that females from Spain and Greece behave in similar ways, whereas they both differ in similar ways from British female bargainers. Specifically, female subjects from Spain and Greece make lower offers than males, whereas no difference is obtained between male and female subjects' offers in the UK. As far as rejections are concerned, female subjects from Spain and Greece reject more, while female subjects from the UK reject less than the corresponding male subjects do.

References

[1] Andreoni, J. and L. Vesterlund, 2001, "Which is the fair sex? Gender differences in altruism". *Quarterly Journal of Economics* 116, 293-312.

[2] Aranoff, D. and J. Tedeschi, 1968, "Original stakes and behavior in the Prisoner's Dilemma Game". *Psychonomic Science* 12(2), 79-80.

[3] Bearden, J., 2001, "Ultimatum bargaining experiments: The state of the art". Available at SSRN: http://ssrn.com/abstract=626183.

[4] Binmore, K., Shaked, A. and J. Sutton, 1985, "Testing noncooperative bargaining theory". *American Economic Review* 75, 1178-1180.

[5] Binmore, K., Shaked, A. and J. Sutton, 1988, "A further test of noncooperative bargaining theory: Reply". *American Economic Review* 78, 837-839.

[6] Bolton, G. and E. Katok, 1995, "An experimental test for gender differences in beneficent behavior". *Economics Letters* 48, 287-292.

[7] Brown-Kruse, J. and D. Hummels, 1993, "Gender effects in laboratory public goods contributions: Do individuals put their money where their mouth is?". *Journal of Economic Behavior and Organization* 22, 255-268.

[8] Cadsby, C. and E. Maynes, 1998, "Gender and free riding in a threshold Public Goods Game: Experimental evidence". *Journal of Economic Behavior and Organization* 34, 603-620.

[9] Chuah, S-H, Hoffmann, M. J. and G. Williams, 2005, "An economic anatomy of culture: Attitudes and behaviour in inter- and intra-national Ultimatum Game experiments". *Occasional Papers* 13, Industrial Economics Division.

[10] Eckel, C. and P. Grossman, 1996, "The relative price of fairness: Gender differences in a punishment Game". *Journal of Economic Behavior and Organization* 30, 143-158.

[11] Eckel, C. and P. Grossman, 1998,"Are women less selfish than men? Evidence from dictator experiments". *Economic Journal* 108, 726-735.

[12] Eckel, C. and P. Grossman, 2001, "Chivalry and solidarity in Ultimatum Games". *Economic Inquiry* 39, 171-188.

[13] Eckel, C. and P. Grossman, 2005, "Differences in the economic decisions of men and women: Experimental evidence". In: C. Plott and V. Smith (eds.) *Handbook of Experimental Economics Results* 1, New York: North Holland.

[14] Fehr, E. and K. Schmidt, 2000, "Theories of fairness and reciprocity: Evidence and economic applications". *CESifo Working Paper Series*, Working Paper No. 403.

[15] Fischbacher, U., 1999, "z-Tree: Zurich toolbox for readymade economic experiments. Experimenter's manual". *Working Paper 21, Institute for Empirical Research in Economics*, University of Zurich.

[16] Frey, B. and I. Bohnet, 1995, "Institutions affect fairness: Experimental investigations". *Journal of Institutional and Theoretical Economics* 151, 286-303.

[17] Gneezy, U. Niederle, M. and A. Rustichini, 2003, "Performance in competitive environments: Gender differences". *The Quarterly Journal of Economics*, 1049-1073.

[18] Güth, W., Schmittberger, R. and B. Schwarze, 1982, "An experimental analysis of ultimatum bargaining". *Journal of Economic Behavior and Organization* 75, 367-388.

[19] Kahn, A., Hottes, J. and W. Davis, 1971, "Cooperation and optimal responding in the Prisoner's Dilemma game: Effects of sex and physical attractiveness". *Journal of Personality and Social Psychology* 17(3), 267-279.

[20] Mack, D., Auburn, D. and G. Knight, 1971, "Sex role identification and behavior in a reiterated Prisoner's Dilemma Game". *Psychonomic Science* 24(6), 280-282.

[21] Meux, E., 1973, "Concern for the common good in an n-person Game". *Journal of Personality and Social Psychology* 28(3), 414-418.

[22] Nowell, C. and S. Tinkler, 1994, "The influence of gender on the provision of a public good". *Journal of Economic Behavior and Organization* 25, 25-36.

[23] Oosterbeek, H., Sloof, R. S. and G. van de Kuilen, 2004, "Cultural differences in Ultimatum Game experiments: Evidence from a meta-analysis". *Experimental Economics* 7, 171-188.

[24] Ortmann, A. and L. Tichy, 1999, "Gender effects in the laboratory: Evidence from Prisoners' Dilemma Games". *Journal of Economic Behavior and Organization* 39(3), 327-339.

[25] Roth, A., 1995, "Bargaining experiments", In: J. Kagel and A. Roth (eds.) *The Handbook of Experimental Economics*, Princeton University Press, Princeton, 235-348.

[26] Saad, G. and T. Gill, 2001, "Sex differences in the Ultimatum Game". *Journal of Bioeconomics* 3, 171-193.

[27] Seguino, S., Stevens, T. and M. Lutz, 1996, "Gender and cooperative behaviour: Economic man rides alone". *Feminist Economics* 2, 1-21.

[28] Sell, J., 1997, "Gender, strategies, and contributions to public goods". *Social Psychology Quarterly* 60, 252-265.

[29] Sell, J., Griffith, W. and R. Wilson, 1993, "Are women more cooperative than men in social dilemmas?". *Social Psychology Quarterly* 56, 211-222.

[30] Sell, J. and R. Wilson, 1991, "Levels of information and contributions to public goods". *Social Forces* 70(1), 107-124.

[31] Solnick, S.J., 2001, "Gender differences in the Ultimatum Game". *Economic Inquiry* 39(2), 189-200.

[32] Sutter, M., Bosman, R., Kocher, M. and F. van Winden, 2003, "Experimental evidence of the importance of gender pairing in bargaining". Discussion paper on Strategic Interaction, 2003-27, Max Planck Institute of Economics, Germany

[33] Thaler, R., 1988, "Anomalies: The Ultimatum Game". *Journal of Economic Perspectives* 2, 195-206.

5 Appendix

5.1 Tables and Plots

Table V.5: Evolution of offers

	1st period			First 5 periods			Last 5 periods			Last period		
Treatment	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*	*N*	*Mean*	*St.D.*
SNERT SP												
Total Offers	10	3.36	1.41	50	3.68	1.27	50	4.18	1.23	10	4.17	1.26
Male Offers	4	4.38	0.75	20	4.18	0.80	20	4.63	0.43	4	4.63	0.48
Female Offers	6	2.68	1.37	30	3.35	1.42	30	3.88	1.49	6	3.87	1.57
SNERT GR												
Total Offers	10	3.80	1.36	50	3.80	0.91	50	4.20	0.24	10	4.17	0.30
Male Offers	6	4.33	0.84	30	4.20	0.55	30	4.25	0.24	6	4.23	0.29
Female Offers	4	3.00	1.71	20	3.21	1.04	20	4.14	0.22	4	4.08	0.28
SNERT UK												
Total Offers	10	3.92	1.42	50	4.69	1.24	50	4.90	0.58	10	5.06	0.24
Male Offers	6	3.78	1.39	30	4.30	1.05	30	4.95	0.32	6	5.00	0.19
Female Offers	4	4.13	1.65	20	5.27	1.31	20	4.83	0.84	4	5.15	0.30
T1												
Total Offers	10	3.90	0.33	50	3.85	0.30	50	4.01	0.18	10	3.99	0.03
Male Offers	4	3.75	0.50	20	3.75	0.38	20	4.04	0.14	4	4.00	0.00
Female Offers	6	4.00	0.13	30	3.92	0.22	30	3.99	0.18	6	3.98	0.04
T2												
Total Offers	10	3.58	0.81	50	3.89	0.68	50	4.84	0.66	10	4.78	0.69
Male Offers	3	4.00	0.87	15	4.01	0.57	15	4.71	0.64	3	4.43	0.51
Female Offers	7	3.40	0.77	35	3.84	0.73	35	4.89	0.66	7	4.93	0.73
T3												
Total Offers	10	3.98	1.87	50	3.72	1.44	50	4.14	0.88	10	4.27	0.68
Male Offers	5	3.90	0.55	25	4.14	0.77	25	3.85	0.94	5	4.04	0.32
Female Offers	5	4.06	2.75	25	3.30	1.80	25	4.44	0.72	5	4.50	0.90
T4												
Total Offers	10	4.23	1.20	50	4.06	0.78	50	4.28	0.91	10	4.29	0.79
Male Offers	8	4.10	1.32	40	3.91	0.78	40	4.20	0.97	8	4.24	0.84
Female Offers	2	4.75	0.35	10	4.68	0.37	10	4.60	0.52	2	4.50	0.71

Table V.6: Evolution of rejected Male and Female Subjects' Offers

	1st period		First 5 periods		Last 5 periods		Last period		All periods	
Treatment	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
SNERT SP										
Total Rejections	10	50%	50	36%	50	30%	10	20%	330	33%
Male Of. Rej.	4	25%	20	45%	20	10%	4	0%	132	27%
Female Of. Rej.	6	67%	30	30%	30	43%	6	33%	198	37%
SNERT GR										
Total Rejections	10	20%	50	28%	50	20%	10	30%	330	30%
Male Of. Rej.	6	17%	30	20%	30	17%	6	17%	198	28%
Female Of. Rej.	4	25%	20	40%	20	25%	4	50%	132	33%
SNERT UK										
Total Rejections	10	50%	50	38%	50	30%	10	20%	330	32%
Male Of. Rej.	6	50%	30	37%	30	30%	6	33%	198	34%
Female Of. Rej.	4	50%	20	40%	20	30%	4	0%	132	29%
T1										
Total Rejections	10	10%	50	30%	50	10%	10	10%	330	17%
Male Of. Rej.	4	25%	20	35%	20	0%	4	0%	132	14%
Female Of. Rej.	6	0%	30	27%	30	17%	6	17%	198	19%
T2										
Total Rejections	10	40%	50	38%	50	20%	10	20%	330	30%
Male Of. Rej.	3	0%	15	13%	15	7%	3	0%	99	11%
Female Of. Rej.	7	57%	35	49%	35	26%	7	29%	231	38%
T3										
Total Rejections	10	30%	50	38%	50	26%	10	10%	330	29%
Male Of. Rej.	5	20%	25	28%	25	28%	5	20%	165	30%
Female Of. Rej.	5	40%	25	48%	25	24%	5	0%	165	28%
T4										
Total Rejections	10	40%	50	52%	50	14%	10	20%	330	21%
Male Of. Rej.	8	50%	40	63%	40	18%	8	25%	264	24%
Female Of. Rej.	2	0%	10	10%	10	0%	2	0%	66	8%

Table V.7: Evolution of offers rejected by Male and Female Employees

	1st period		First 5 periods		Last 5 periods		Last period		All periods	
Treatment	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
SNERT SP										
Total Rejections	10	50%	50	36%	50	30%	10	20%	330	33%
Male Reject.	2	50%	10	10%	10	0%	2	0%	66	5%
Female Reject.	8	50%	40	43%	40	38%	8	25%	264	40%
SNERT GR										
Total Rejections	10	20%	50	28%	50	20%	10	30%	330	30%
Male Reject.	3	0%	15	13%	15	7%	3	33%	99	18%
Female Reject.	7	29%	35	34%	35	26%	7	29%	231	35%
SNERT UK										
Total Rejections	10	50%	50	38%	50	30%	10	20%	330	32%
Male Reject.	6	67%	30	53%	30	33%	6	33%	198	41%
Female Reject.	4	25%	20	15%	20	25%	4	0%	132	17%
T1										
Total Rejections	10	10%	50	30%	50	10%	10	10%	330	17%
Male Reject.	7	14%	35	31%	35	9%	7	14%	231	15%
Female Reject.	3	0%	15	27%	15	13%	3	0%	99	21%
T2										
Total Rejections	10	40%	50	38%	50	20%	10	20%	330	30%
Male Reject.	7	43%	35	34%	35	17%	7	14%	231	29%
Female Reject.	3	33%	15	47%	15	27%	3	33%	99	31%
T3										
Total Rejections	10	30%	50	38%	50	26%	10	10%	330	29%
Male Reject.	10	30%	50	38%	50	26%	10	10%	330	29%
Female Reject.	-	-	-	-	-	-	-	-	-	-
T4										
Total Rejections	10	40%	50	52%	50	14%	10	20%	330	21%
Male Reject.	2	50%	10	90%	10	10%	2	0%	66	30%
Female Reject.	8	38%	40	43%	40	15%	8	25%	264	19%

Table V.8: Offers' Baseline Model

Offer	*Coefficient*	*t-statistic*
cons	4.43	48.96***
period	0.01	9.00***
V_{er}	-0.12	-8.16***
gender	0.10	2.86***
SNERT GR	-0.01	-0.13
SNERT UK	0.83	13.97***
T1	-0.09	-1.52*
T2	0.36	6.20***
T3	-0.04	-0.75
T4	0.18	3.07***
χ^2	582.36	
N	2310	

Table V.9: Country Specific Models of Offers

	Spain		**Greece**		**UK**	
Offer	*Coeff.*	*t-statistic*	*Coeff.*	*t-statistic*	*Coeff.*	*t-statistic*
cons	4.49	37.79***	4.12	35.07***	5.43	27.74***
period	0.02	7.85***	0.02	5.41***	0.01	1.34
V_{er}	-0.14	-6.94***	-0.07	-3.80***	-0.10	-2.72***
gender	0.13	2.96***	0.13	2.39***	-0.07	-0.88
T1	-0.08	-1.31	-	-	-	-
T2	0.37	5.85***	-	-	-	-
T3	-0.04	-0.71	-	-	-	-
T4	0.18	2.72***	-	-	-	-
χ^2	202.27		42.94		12.59	
N	1650		330		330	

Table V.10: Rejection Probability Baseline Model

Prob. of Rejctn.	*Coefficient*	*z*
cons	2.08	7.62***
period	-0.00	-0.69
V_{ee}	0.09	2.60***
Offer^2	-0.16	-17.95***
gender	-0.62	-4.28***
SNERT GR	-0.72	-2.57***
SNERT UK	1.58	5.29***
T1	-0.81	-3.48***
T2	-0.01	-0.05
T3	0.86	3.56***
T4	-0.27	-1.16
χ^2	373.22	
N	2310	

Table V.11: Country Specific Rejection Probability Models

	Spain		**Greece**		**UK**	
Prob. of Rejctn.	*Coeff.*	*t-statistic*	*Coeff.*	*t-statistic*	*Coeff.*	*t-statistic*
cons	1.96	6.19***	3.55	3.57***	2.02	3.08***
period	-0.00	-0.08	0.01	1.15	-0.02	-2.02***
V_{ee}	0.09	2.28***	0.16	0.94	0.08	1.28
Offer^2	-0.16	-13.85***	-0.31	-8.03***	-0.14	-7.50***
gender	-0.53	-2.96***	-0.83	-2.58***	1.05	2.08***
T1	-0.82	-3.30***	-	-	-	-
T2	0.20	0.79	-	-	-	-
T3	-0.08	-0.25	-	-	-	-
T4	-0.28	-1.19	-	-	-	-
χ^2	241.31		67.61		63.89	
N	1650		330		330	

Table V.12: Mean Salaries

	Statistics			Difference Significance (M-W test, p-values in parentheses)						
	N	*Mean*	*St.D.*	**SNERT SP**	**SNERT GR**	**SNERT UK**	**T1**	**T2**	**T3**	**T4**
SNERT SP	222	4.55	0.80	-	-	-	-	-	-	-
SNERT GR	231	4.21	0.40	-8.336 (0.000)	-	-	-	-	-	-
SNERT UK	225	5.19	0.60	-10.490 (0.000)	-16.636 (0.000)	-	-	-	-	-
T1	275	4.00	0.16	12.997 (0.000)	9.533 (0.000)	19.236 (0.000)	-	-	-	-
T2	231	4.50	0.60	3.004 (0.003)	-5.086 (0.000)	12.302 (0.000)	-13.900 (0.000)	-	-	-
T3	234	4.29	0.71	6.000 (0.000)	-1.430 (0.153)	13.975 (0.000)	-7.805 (0.000)	-3.291 (0.001)	-	-
T4	261	4.45	0.52	2.251 (0.024)	-4.666 (0.000)	12.433 (0.000)	-12.357 (0.000)	0.434 (0.665)	-3.265 (0.001)	-

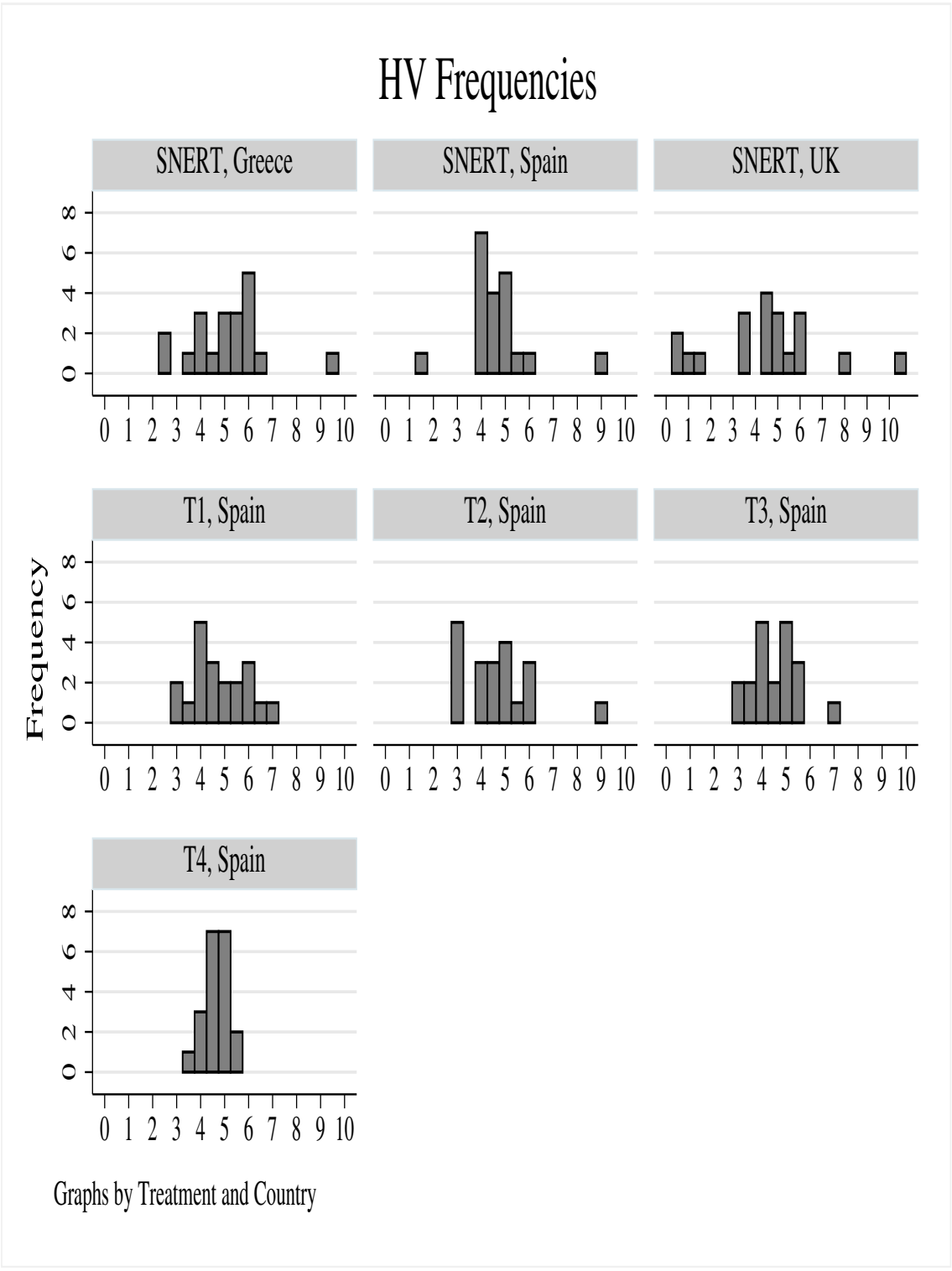


Figure V.1: Frequencies of hypothetical valuations (HV) of the game.

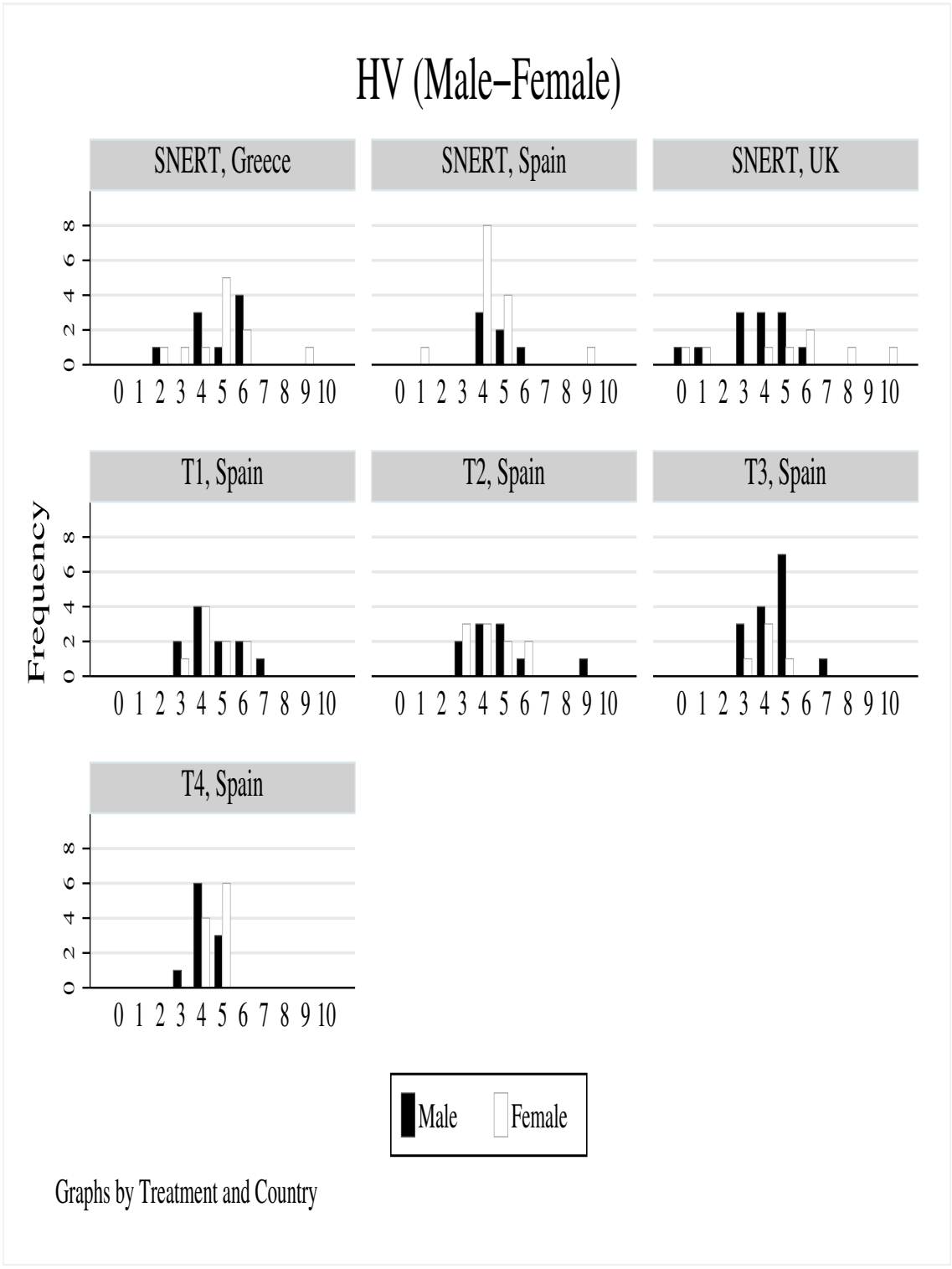


Figure V.2: Frequencies by gender of hypothetical valuations (HV) of the game.

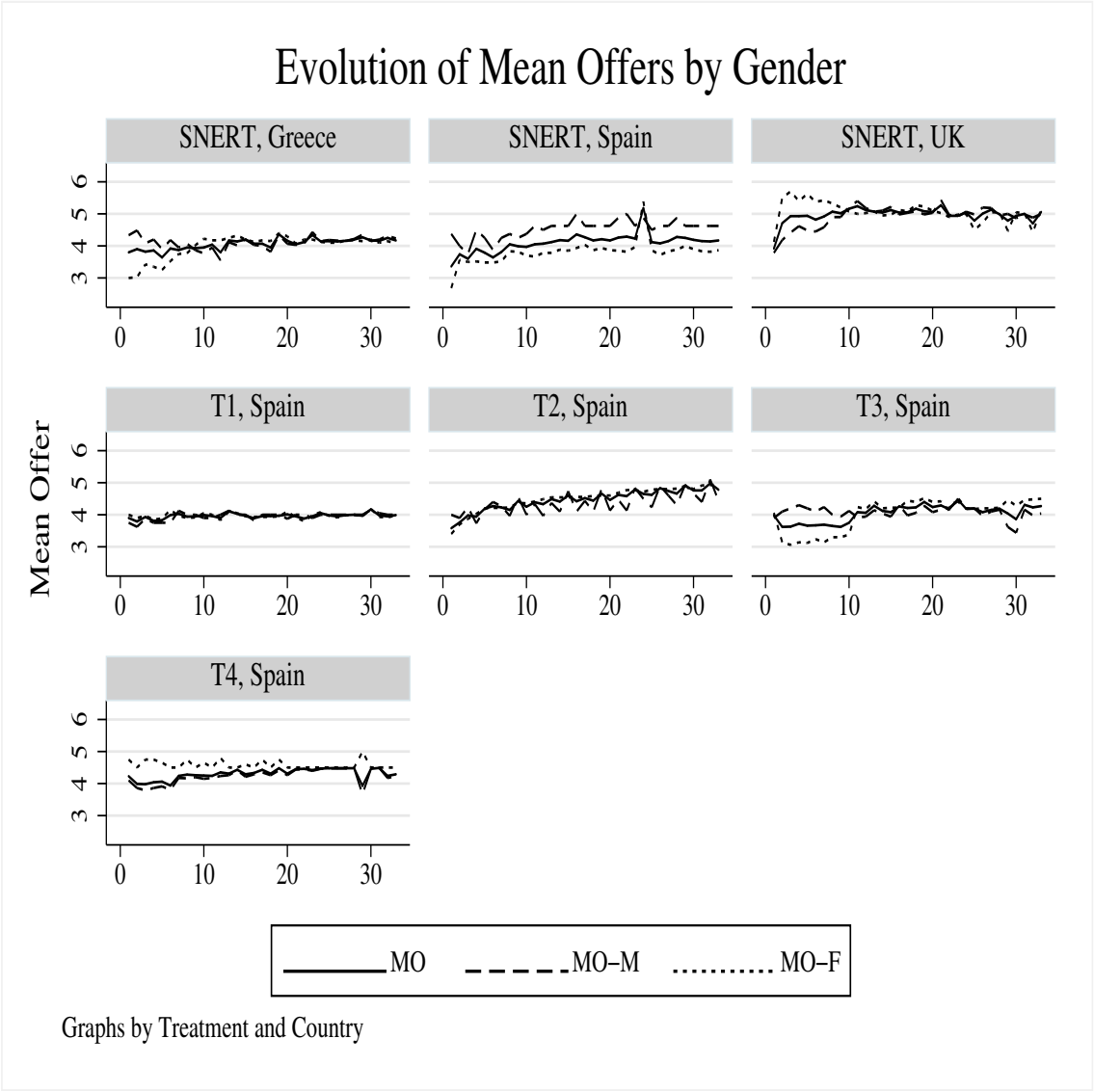


Figure V.3: Evolution of offers.

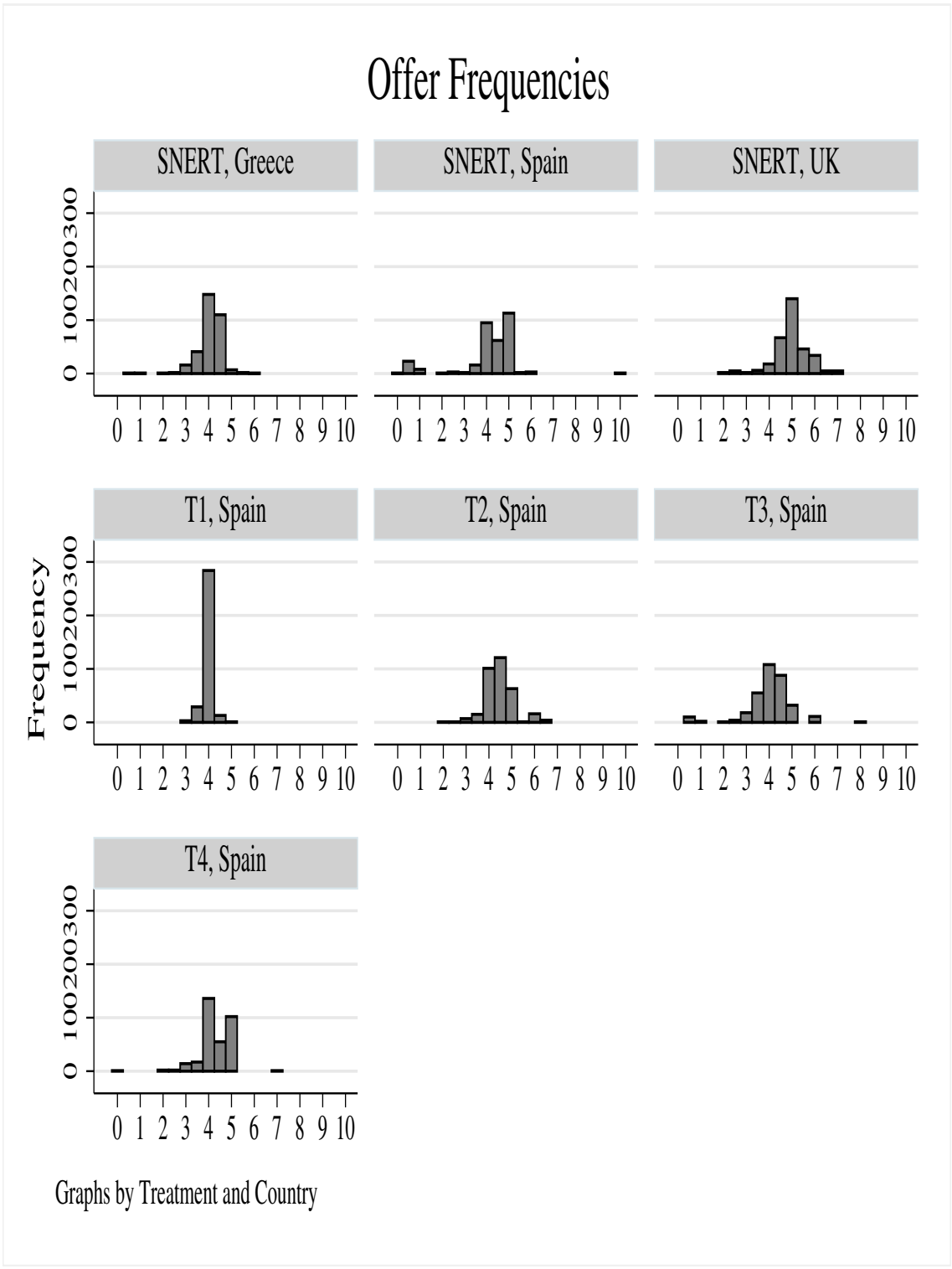


Figure V.4: Offer frequencies.

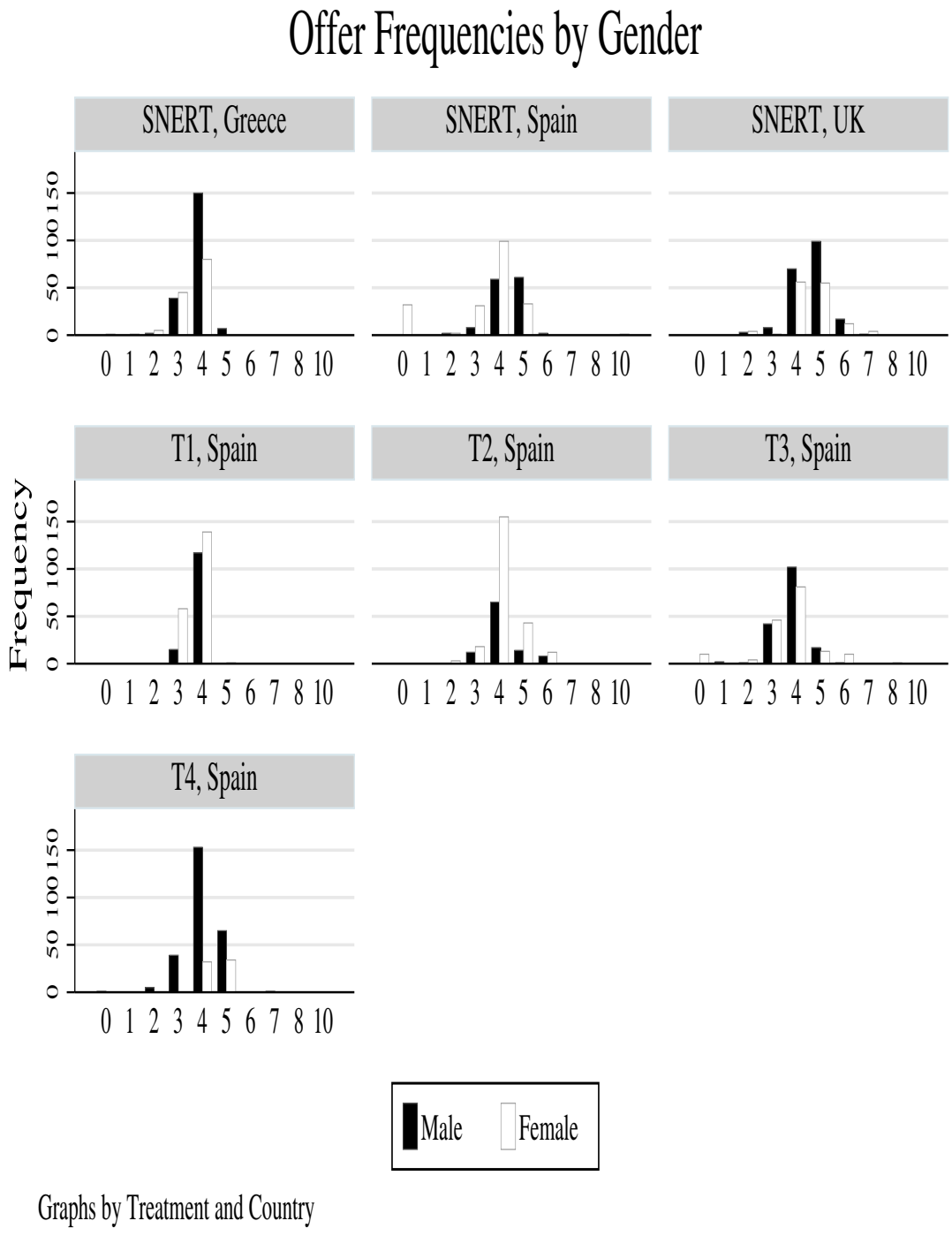


Figure V.5: Offer frequencies by gender.

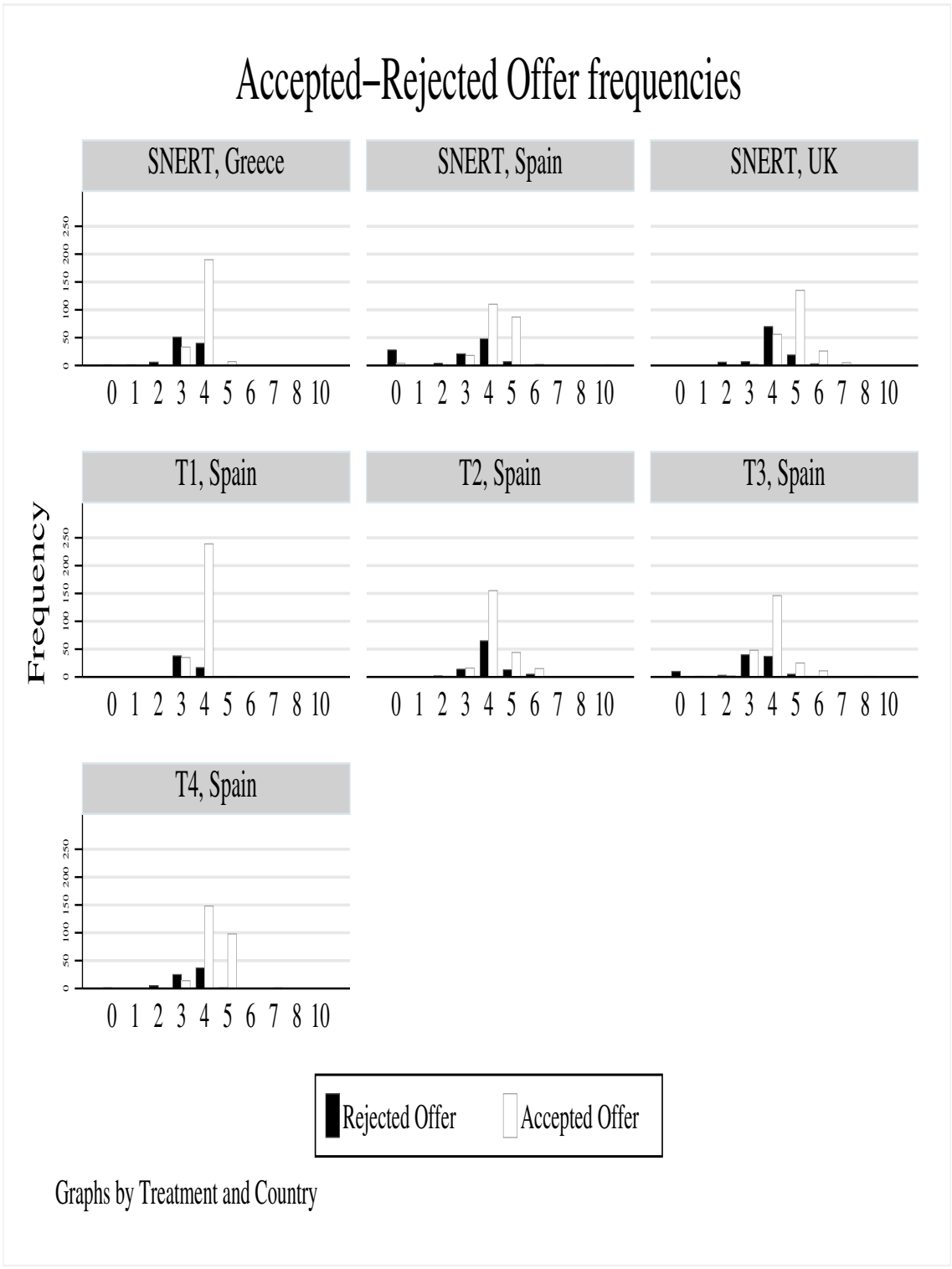


Figure V.6: Frequencies of accepted and rejected offers.

VI

General Appendix

1 Lottery Panels

Table VI.1: The four panels of lotteries

Panel 1

q	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
X €	1.00	1.12	1.27	1.47	1.73	2.10	2.65	3.56	5.40	10.90
Choice										

Panel 2

q	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
X €	1.00	1.20	1.50	1.90	2.30	3.00	4.00	5.70	9.00	19.00
Choice										

Panel 3

q	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
X €	1.00	1.66	2.50	3.57	5.00	7.00	10.00	15.00	25.00	55.00
Choice										

Panel 4

q	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1
X €	1.00	2.20	3.80	5.70	8.30	12.00	17.50	26.70	45.00	100
Choice										

2 Instructions to Experimental Subjects (translated from Spanish)

You are going to participate in an experiment about individual decision making, that will last approximately 90 minutes. You must follow the instructions carefully and, depending on your performance, you may earn a considerable amount of money. The context in which you will have to take your decisions, is described below.

This session will consist of two main parts:

- **First part**: 30-35 rounds of a salary-and-task-negotiation session.
- **Second part**: Result session: task-performing and payment.

- **First Part**:

  An equal number of employers and employees are in a group of 20 individuals. At the beginning of the session, you will be randomly assigned the role of employer or employee. In each period [**treatment 2 and 4 sessions: "the session"**], you will be randomly matched with a player of the other type (if you are an employer, you will be matched with an employee and vice versa). The experiment will be repeated over 30 to 35 periods (randomly determined by the server).

  In each period, each employer-employee pair is faced with the following situation: The employer offers the employee a share from a 10-Euro profit yielded from the task (filling 20 envelopes numbered, from 1 to 20, with their respective one-page letter, also numbered from 1 to 20) which will be performed (in the second part of the session) by the employee (**not applicable in T1, T2, T3, T4)**. If the employee accepts, the task will have to be performed by the employee (see "Second Part") and the two

players' earnings are determined as proposed by the employer. Otherwise, the task is not performed and both players earn nothing.

If you are an employer, your decision will consist of offering a salary to the employee. Such a salary will be a quantity between 0 and 10 Euros, in multiples of 0.10 Euros. If you are an employee, your decision will consist of accepting or rejecting the salary offered by the employer.

- **Second part**:

  Your payment (and the tasks to perform if you are an employee; **not applicable in T1, T2, T3, T4**) will be determined according to the outcome of five periods, which will be randomly chosen among the total number of periods played during this session. A minimum of 90% (at least 18 out of 20 envelopes must contain the correct sheet) reliability will be required for each task unit to be considered successfully performed.

3 Questionnaire

Control Question

Imagine you are assigned the role of an "employee" in the following hypothetical market situation:
An equal number of employers and employees are in a group of 20 individuals, forming random employee-employer pairs. You are going to negotiate your share over a total of 10 Euros earned by one of the employers from the task you will perform (filling 20 envelopes numbered, from 1 to 20, with their respective one-page letter, also numbered from 1 to 20). If you accept the salary, you will perform the task and earnings for both, you and your employer, will be determined as proposed by the employer. If you reject the salary, the task is not performed and you both earn nothing.
Alternatively to your earnings and task-performing obligations, you may prefer a certain payoff, whose value is provided below, under 20 different scenarios. Please mark with an "X" your preferred option in each one of the following scenarios:

- **SCENARIO 1**: You are offered an alternative of a certain payment of 0.5 Euros.

  Do you prefer the certain payoff? ..... ☐

  Or your earnings from the above hypothetical market situation?.. ☐

- **SCENARIO 2**: You are offered an alternative of a certain payment of 1 Euro.

  Do you prefer the certain payoff? ..... ☐

  Or your earnings from the above hypothetical market situation?.. ☐

- **SCENARIO 3**: You are offered an alternative of a certain payment of 1.5 Euros.

  Do you prefer the certain payoff? ..... ☐

  Or your earnings from the above hypothetical market situation?.. ☐

- **SCENARIO 4**: You are offered an alternative of a certain payment of 2 Euros.

  Do you prefer the certain payoff? ..... ☐

  Or your earnings from the above hypothetical market situation?.. ☐

  . . .

  . . .

- **SCENARIO 20**: You are offered an alternative of a certain payment of 10 Euros.

  Do you prefer the certain payoff? ..... ☐

  Or your earnings from the above hypothetical market situation?.. ☐