Employment Duration and Resistance to Wage Reductions: Experimental Evidence*

Michael Burda
Humboldt University and CEPR
Werner Güth
Humboldt University
Georg Kirchsteiger
CentER, Tilburg University
and Harald Uhlig
CentER, Tilburg Univ. and CEPR

First draft: February 1997
This revision: July 1, 1998

key words: wage flexibility, ratchet effect (of wages), (wage) bargaining, labour market, ultimatum game, fair wages

JEL codes: C72, C78, C91, C92, E24, J31, J41, J52

*We are grateful to Martin Dufwenberg for useful comments. Support from the Deutsche Forschungsgemeinschaft (SFB 373, Quantifikation und Simulation ökonomischer Prozesse) is gratefully acknowledged. The address of the first two authors is Institut für Wirtschaftstheorie, Humboldt-Universität zu Berlin, Spandauer Str. 1, D-10178 Berlin, Germany, fax +49 - 30 - 20935704, phone: +49 - 30 - 20935731, e-mail: burda@wiwi.hu-berlin.de; gueth@wiwi.hu-berlin.de; the second two authors are from CentER, Tilburg University, Postbus 90153, 5000 LE Tilburg, The Netherlands, fax: +31 - 13 - 4663066, phone: +31 - 13 - 4663104. e-mail: G.Kirchsteiger@kub.nl, uhlig@kub.nl.Home page: http://cwis.kub.nl/∼few5/center/STAFF/uhlig/home.htm.

Abstract

One of the long-standing puzzles in economics is why wages do not fall sufficiently in recessions so as to avoid increases in unemployment. Put differently, if the competitive market wage declines, why don't employers simply force their employees to accept lower wages as well? As an alternative to reviewing statistical data we have performed an experiment with a lower competitive wage in the second phase of an employment relationship that is known to both parties. Our hypothesis is that employers will not lower wages correspondingly and that employees will resist such wage cuts. Our experiment casts two subjects in the highly stylized roles of employer and employee. We find at most mild evidence for resistance to wage declines. Instead, the experimental results can be more fruitfully interpreted in terms of an "ultimatum game", in which some surplus between employers and employees is split. In this view, wages and their lack of decline are simply the mechanical tool for accomplishing this split.

1 Introduction

One of the long-standing puzzles in economics is the question, why wages do not fall sufficiently in recessions so as to avoid the rises in unemployment [1]. Put differently, if the competitive market wage declines, why don't employers simply force their employees to accept a lower wage as well? As an alternative to reviewing statistical data, we have performed an experiment with a lower competitive wage in the second phase of an employment relationship that is known to both parties.

Employment relationships as well as many other human relationships can either be opportunistically terminated or be turned into longer-term relationships in which opportunism is subordinated to other objectives. In the case of labor relations, an employer observing a decline in the "opportunity wage" available to workers might try to increase profits by cutting wages. If the employee rejects the wage cut, however, he can impose a cost on the employer; although a replacement worker can be hired at the low competitive wage, match-specific human capital accumulated in the former employee will be lost. Our hypothesis is that employers will not lower wages correspondingly, i .e. that they do not adjust wages according to market pressure, and that employees would reject such wage cuts [2].

Our experiment casts two subjects in highly stylized roles which can be readily interpreted as employer and employee. The experimental method allows us to confront decision makers with well-defined decision alternatives which are less clearly delineated in observable employment relationships. The tradeoff is clear: by concentrating on just a few features, we can completely analyze the game-theoretic situation with which experimental subjects are confronted, but as a result we must be circumspect in our conclusions for actual labour markets. We have explicitly refrained from "framing" the experiment (see Tversky and Kahneman, 1986) as the labor market situation discussed above, as this could induce behavior which is determined by general political views rather than by the structural relationships captured by our experimental situation.

Our experiment concentrates on the "microeconomics" of the bargaining problem between employers and employees as it is likely to be one of the key issue in resolving the

[1] The question was probably first posed by Keynes (1936) and has been most recently investigated empirically by Bewley (1995, 1997). The debate in the empirical literature has advanced considerably in recent decades, so that we know that individual wages are procyclical, even though the composition effect causes aggregate wage indexes to be acyclical (Bils (1985), Solon, et al. (1994)). The question remains, why don't wages for some individuals decline sufficiently to clear the labor market.

[2] Collard and de la Croix (1997) uses this "fair wage hypothesis" to explain business cycle fluctuations in the context of the real business cycle framework. One can view the present paper as examining the experimental micro-foundations for this hypothesis.

"macroeconomic" puzzle stated at the beginning. One might conceive of an experiment going all the way by actually embedding the microeconomic relationships into a full-blown "macroeconomic" environment, see e.g. Tietz, 1975. However, this would require many more and possibly contentious additional assumptions. Since our focus is purely on the bargaining relationship between employers and employees, we chose to abstract in our experimental setting from such "general equilibrium" effects.

Labor market relationships have been analyzed experimentally elsewhere and most notably in Fehr, Kirchsteiger and Riedl (1993, 1996) and Fehr, Gächter and Kirchsteiger (1996, 1997) [3]. While this paper has been influenced by this work, we deviate from these authors by treating the best outside alternative as the wage in an anonymous, competitive labor market: The employer can hire somebody else who is actually not present in the experiment, and the employee can turn to another firm at the competitive wage, even though that firm is not present either. One beneficial side effect is that we do not have to generate "market clearing" wages as part of the experimental design: as a result, far more independent data points are generated with a given number of subjects.

More importantly, this paper focuses on a different question by modelling the employment relationship as one in which the surplus can be destroyed to the disadvantage of both parties by the single-handed refusal of the employee to cooperate. This unilateral refusal to cooperate – ranging from withholding of effort to work slowdowns to strikes and sabotage – is a well-known response in industrial relations to wage reductions, and forms the basis for the "fair wage" literature (see Akerlof and Yellen (1990a, b)). Our experimental results can be interpreted as an "ultimatum game", in which some surplus between employers and employees is divided. In this view, wages and their flexibility are simply the mechanical tool for accomplishing this split. Of course, one could have imposed other, e.g. more symmetric rules of bargaining, for instance, the "split the difference" approach of Nash (1953) which is sometimes employed to model wage formation (see for example McDonald/Solow (1981), Oswald (1985), Layard et al. (1991), Pissarides (1991)) or the elaborate microfoundations proposed by Rubinstein (1982) and Binmore et al. (1986).

Although wages are flexible downward in our experimental results, our empirical evidence indicates some resistance to wage declines. While the ultimatum game has extensively been studied and repeated with the rather robust finding that approximately 40 percent of the allocable surplus is given to the second player [4], we did not think of employment relationships as representing ultimatum games initially. Given our findings, it now seems hard to us to

[3] In contrast to these authors, we do not investigate variation of effort in the spirit of the efficiency wage literature.

[4] see Güth, 1995, and Roth, 1995, for recent surveys.

avoid this perspective, and it is intriguing to speculate what this implies about actual labor markets.

The paper is organized as follows. Section 2 explains the experimental design. Section 3 contains some hypotheses. Section 4 provides a descriptive analysis of our results, whereas section 5 contains a statistical analysis. Section 6 concludes. The appendix includes all the documents necessary for conducting the experiment.

2 Experimental design

As already indicated in the introduction, the experimental instructions were framed in non-suggestive, neutral terms (see Appendix A). In the following we apply the notation described there. Let $t = 1, 2$ denote the period of interaction. In both periods $t = 1, 2$ "employer" X first proposes a non-negative wage x_t with an upper bound equal to the surplus S_t in period t, which is known to both players. "Employee" Y can reject this wage ($y_t = 0$) or not ($y_t = 1$). Only in case of $y_1 = 1$ does the relationship continue with period 2. The decision $y_t = 0$ results in replacing the former employee by an anonymous substitute who works for the competitive wage w_t, but requires an additional investment C in human capital (to be paid by X). This investment cost is non-recoverable and has zero value at the end of the game.

The surplus S_t and the competitive wage w_t of periods $t = 1, 2$ were chosen as

$$w_1 = 10, \quad w_2 = 5$$
$$S_1 = 25 \quad S_2 = 20$$

i.e. from period 1 to period 2 the competitive wage declines, while the difference $S_t - w_t$ remains constant. The cost level C is our only treatment variable; here two values were chosen, namely $\underline{C} = 2$ and $\bar{C} = 10$. C reflects the only structural threat of employee Y [5]. In case of $\underline{C} = 2$ we speak of *no essential threat* whereas $\bar{C} = 10$ is assumed to represent *considerable threat.*[6] To sum up, the earnings-functions for the participants were given as

[5]Non-structural threats could be *contempt* (Y characterizes X as opportunistic) or *feelings of guilt* (X condemns himself as an exploiter) and the like.

[6]From the perspective of the "employer" in the absence of strategic interaction, this situation is identical to one in which the competitive wage is respectively lower or higher in the second period. In the presence of strategic interactions - as in this case - the role of C as a third party cost is of essential importance.

What		What	
X has done	Y has done	X earns	Y earns
x_1	$y_1 = 0$	20	15
x_1, x_2	$y_1 = 1, y_2 = 0$	$30 - x_1$	$x_1 + 5$
x_1, x_2	$y_1 = 1, y_2 = 1$	$45 - x_1 - x_2$	$x_1 + x_2$

in case of $\bar{C} = 10$, wheras earnings in the $\underline{C}$-treatment where given by:

What		What	
X has done	Y has done	X earns	Y earns
x_1	$y_1 = 0$	28	15
x_1, x_2	$y_1 = 1, y_2 = 0$	$38 - x_1$	$x_1 + 5$
x_1, x_2	$y_1 = 1, y_2 = 1$	$45 - x_1 - x_2$	$x_1 + x_2$

These payment were made in German Marks or Dutch Guilders, respectively.

Our (student) participants received the instructions – identical for X and Y – after being seated. After reading the instructions, asking for private clarification and filling out the pre-experimental questionnaire (Appendix B), the subjects were subdivided equally into an X- and a Y-group. Then the groups received their decision forms (Appendix C) and proceeded as described by the sequential decision process. Without announcing this beforehand, participants then repeated the game with new partners (where 4 participants formed one matching group), but in the same position (X or Y). Necessary feedback information was provided according to the rules of the sequential decision process. In doing so, special care was taken to preserve anonymity. To save time, all payments were made one week later.

We conducted three experimental sessions with the same English instructions (see Appendix A), one with 24 student participants registered for a macroeconomic course at the University of Tilburg and two with 48 and 40 student participants of a macroeconomics undergraduate course at the Humboldt-University of Berlin. An experimental session lasted on average 45 minutes. The Dutch subjects received on average 43.2 HFL, whereas the German subjects earned 44.6 DM on average.

3 Solution behavior and hypotheses

We first describe the game-theoretic solution under payoff-maximization as a subgame perfect equilibrium (Selten, 1965). If period $t = 2$ is actually reached, employee Y should accept any wage offer $x_2 \geq 5$, i.e. not below the competitive wage $w_2 = 5$. To avoid the severance cost C employer X should therefore offer $x_2^* = 5$.

In period 1, similarly, employee Y will accept all wage offers $x_1 \geq 10$; i.e. not below the competitive wage $w_1 = 10$ in period 1. Thus the employer X will offer $x_1^* = 10$ in order to avoid the positive cost C which result when Y has to be substituted. Thus the game-theoretic hypothesis for rational, payoff-maximizing players is:

Hypothesis 1 *Employers offer competitive wages, i.e. $x_1 = 10$ and $x_2 = 5$, and employees accept all wages which do not fall below the competitive levels.*

A milder version of this hypothesis, which embodies the crucial behavior of wages adjusting according to market pressure is

Hypothesis 2 *The wage drop between the first and second period equals the drop in competitive wages, i.e. $x_1 - x_2 = 5$.*

In the introduction, we have speculated that this hypothesis fails, and thus explains, why wages do not adjust during recessions. It is interesting that the cost C do not matter at all except for the fact that they are positive. In game theoretic terms, the threat of having to pay C does not influence X's behavior since X confronts Y with a take-it-or-leave-it offer. An alternative hypothesis is that agents behave differently, with Y rejecting offers near competitive wage levels, and X anticipating this in its initial offer. This can be summarized as follows:

Hypothesis 3 *Employees will reject the competitive wage levels and employers will offer higher than competitive wages. Wage offers x_1 and x_2 as well as the highest rejected wages will be higher for $\bar{C} = 10$ than for $\underline{C} = 2$.*

Hypothesis 3 has been made plausible by recent work in abstract bargaining experiments (see Roth, 1995, for a survey) and more specific labor (market) experiments (see Fehr et al., 1993, 1996, 1997) which suggest that optimal take-it-or-leave-it offers $x_1^* = 10$ and $x_2^* = 5$ will not be accepted. If one wants someone's approval (here: the reactions $y_1 = 1$ and $y_2 = 1$), one had better offer a "fair share".

Our next hypothesis deals with the duration of an employment relation: Let $P(y_1 = 1)$ denote the share of pairs X and Y of a matching group who cooperate in the first period, making it to the second, and $P(y_1 = 1, y_2 = 1)$ the share of pairs X and Y who also cooperate in period 2. We postulate

Hypothesis 4 *1.* $\frac{P(y_1=1,y_2=1)}{P(y_1=1)} > P(y_1 = 1) > 0$

and

2. $x_2 - w_2 > x_1 - w_1 > 0$

Part 1 of Hypothesis 4 means that a considerable share of pairs X and Y will choose a "commitment" and that they are more eager to maintain that commitment (continue the relationship) the longer it has lasted already. Part 2 claims a higher *wage drift* in the sense of positive values $x_t - w_t$ when relationships last longer. In our view, this would indicate that "in commitments" one does not pay so much attention to relative (dis)advantages of one party, e.g. the sharp decrease of the competitive wage.

One might explain part 2 of Hypothesis 4 also by the effect of cost C. If Y is fired already in period $t = 1$, employer X is compensated for his cost C by low competitive wages in both periods, whereas firing Y in period 2 means that compensation is restricted to period 2. To distinguish between the two interpretations of part 2 of Hypothesis 4 one could impose the cost C for every period when a substitute worker is employed, i.e. when X would have to pay in total training costs of

$$(1 - y_1)2C + y_1(1 - y_2)C$$

instead of

$$(1 - y_1)C + y_1(1 - y_2)C$$

only.

Our final hypothesis comes from redefining the experiment as an ultimatum game with a surplus of C to be split between the employer and the employee. In line with the experimental results from the ultimatum game literature, we formulate:

Hypothesis 5 *In successful matches, the employee receives on average the competitive wage plus fourty percent of the surplus C, whereas the employer keeps sixty percent of C on average.*

4 Descriptive data analysis

What follows is a graphical summary of the results of the experiments. We conducted a total of three experiments, the details of which can be found in the appendix. Here, we treat the entire data as one sample.

Figure 1 contains the results for wage declines in both treatments, $\underline{C}$ and $\bar{C}$, with $\underline{C}$ shown at the top and $\bar{C}$ shown at the bottom. Hypothesis 1 would imply, that the wage decline should always be 5: the decline is usually lower than that, although some wage declines are dramatically larger. Hypothesis 2 does not seem to be strongly violated by this evidence: apparently, employers do by and large adjust wages according to market pressure.

Figure 2 shows, how much of the surplus the employee receives in successful matches. Note in particular, that more surplus is paid to the employee in treatment $\bar{C}$ as compared to treatment $\underline{C}$.

Figure 3 shows the same data as figure 2, but in percent of the total surplus to be distributed. What is remarkable is that the surplus distributed in treatment $\underline{C}$ is reasonably often below zero percent or above 100 percent. In treatment $\bar{C}$, the surplus distribution is tighter. In fact, the distribution for treatment $\bar{C}$ looks close to the distributions typically found in experimental ultimatum games, see our hypothesis 5.

Since the game was repeated once, one can also control for experience effects. In both treatments there is a slight rise in the wage level x_1 from the first to the second round (from 10.14 to 10.80 in treatment $\underline{C}$ and from 9.57 to 10.3 in treatment $\overline{C}$) which, in view of the large standard deviations, do not qualify as reliable experience effects. The average level of x_2 decreases in treatment $\underline{C}$ (from 6.23 to 5.68) and increases in treatment $\overline{C}$ (from 6.81 to 7.87). All acceptance rates, i.e. shares of $y_t = 1$, increase with experience where the acceptance increase of x_2 is with 50% to 65.22% (46.15% to 59.26%) for treatment $\underline{C}$ ($\overline{C}$) much clearer than of x_1 (from 39.29 to 41.07 and from 43.33 to 45.00 % for treatment $\underline{C}$, repectively $\overline{C}$).

5 Statistical analysis

In this section, we provide some simple statistics related to our hypotheses. Given the graphical analysis above, we concentrate on the analysis of hypothesis 3 to 5. The results can be found in table 1. We find that:

1. The first claim of hypothesis 3, that employers offer wages above the competitive levels, is supported by the data for treatment $\bar{C}$: the average surplus offered to the employee is 4.13 with a standard deviation of 2.84: this allows to reject the null hypothesis of an average offered surplus of zero at a five percent significance level with a one-sided test, assuming normality. For treatment $\underline{C}$, however, the null of no surplus offered in successful matches cannot be rejected. Furthermore, there is no support for the part of hypothesis 3, which postulates, that the offered first period wages x_1 as well as the rejected first period wages will be higher, if the costs C are higher: Conducting a robust rank-order test [7]a no-change hypothesis cannot be rejected at any conventional significance levels.This holds for the individual observations of the first round as well as

[7]For a description of this test see Siegel and Castellan 1988, p. 137.

		Treatment $\underline{C}$	Treatment $\bar{C}$
Total matches:		56	60
of which unsuccessful ($y_1 = 0$ or $y_2 = 0$):		19	25
of which $y_1 = 0$:		11	7
Hypothesis 3:			
offers rejected at stage 1	max	10	11
	mean	5.22	5.43
	std. dev.	4.32	5.00
offers rejected at stage 2	max	6	10
	mean	4.92	6.06
	std. dev.	0.74	2.80
Hypothesis 4:			
Part 1:			
$\frac{P(y_1=1,y_2=1)}{P(y_1=1)}$		0.822	0.66
$P(y_1 = 1)$		0.80	0.88
Part 2: (succ. matches)			
$x_2 - w_2$	mean	1.21	3.01
	std. dev.	1.52	1.94
$x_1 - w_1$	mean	1.05	1.11
	std. dev.	3.28	2.15
Hypothesis 5:			
(successful matches)			
Aver. surplus offered	mean	2.26	4.13
	std. dev.	4.65	2.84
in percent of C:	mean	113	41
	std. dev.	232	28

Table 1: *This table shows some summary statistics as well as statistics relevant for testing some of the postulated hypotheses. To calculate standard deviations, we have not corrected for the dependence of the observations within each group.*

	accepted	rejected	total
treatment $\underline{C}$:			
offers above equil.	34	3	37
offers at equil.	0	7	7
offers below equil.	3	9	12
treatment $\bar{C}$:			
offers above equil.	35	14	49
offers at equil.	0	5	5
offers below equil.	0	6	6

Table 2: *This table shows the distribution of accepted and rejected offers vis-a-vis the quality of the offer. For first period rejections, we used a first period offer of* $x_1 = 10$ *as equilibrium, whereas we used* $x_1 + x_2 = 15$ *as equilibrium for games which reached the second period.*

for the average of a matching group of the second round. A different picture arises if we look at the second period wages x_2. A robust rank-order test reveals that the offered wages as well as the rejected wages are significantly higher in the high cost than in the low cost treatment at a 5% level. Again, this holds for the individual observations of the first round as well as for the average of a matching group of the second round. Hence, employment offers above the competitive wage mainly occured in the second period of the high cost treatment. Table 2 sheds further light on hypothesis 3 by tabulating the accept-reject decisions vis-a-vis the quality of the offer.

2. For hypothesis 4, notice first that in all matching groups at least one first period offer was accepted. In the high cost treatment 88% of the first period offers were accepted and 84% in the low cost treatment. Hence, as stipulated by Hypothesis 4, most pairs X and Y chose a "commitment in the first period. However, the claim that $\frac{P(y_1=1,y_2=1)}{P(y_1=1)} > P(y_1 = 1)$ is not supported by the data: Conducting a Wilcoxon signed rank test[8] equality cannot be rejected. This holds for the low cost as well as for the high cost treatment. The claim that $x_2 - w_2 > x_1 - w_1$ is not supported in case of the low cost treatment. A Wilcoxon signed rank test[9] reveals no difference. In the high cost treatment, however, the difference between the first-and the second period wage drift is highly significant. Hence, we can conclude that there is a positive correlation

[8]For a description of this test see Siegel and Castellan 1988, p. 87.

[9]For a description of this test see Siegel and Castellan 1988, p. 87.

	less than 25%	25% - 35%	35% - 45%	at least 45%
treatment $\underline{C}$:	8	0	0	92
treatment $\bar{C}$:	37	14	3	46

Table 3: *This table shows the percentage of the total surplus C, which is received by the worker in successful matches*

between employment duration and wage drift, but only if there is enough "surplus" to divide.

3. Concerning hypothesis 5, one indeed cannot reject that the offered surplus is 33 percent for both treatment $\underline{C}$ and treatment $\bar{C}$. The standard error in treatment $\underline{C}$ is huge, though, whereas it is much smaller for treatment $\bar{C}$: a symmetric one-standard error interval would be $[13; 69]$ for the surplus offered to the employee in percent. The evidence thus provides support to hypothesis 5. Table 3 sheds further light on this hypothesis by examining the distribution of the total available surplus.

The number of rejections – failure to reach an outcome in which there was positive surplus to apportion – was significant. In both treatments the fraction of rejections were of similar proportions, with 41.7 (for $\underline{C}$) and 33.9 (for $\overline{C}$). Interestingly, the fraction of total failures occuring in the first stage was significantly higher in the low surplus case (57.9) - a result which merits further attention.

6 Conclusions

We wanted to explore experimentally whether and why wages do not seem to decline in recessions to mitigate rises in unemployment. Put differently, if the competitive market wage declines, why do employers not simply force their employees to accept lower wages as well? In our experiments the competitive wage in the second phase of an employment relationship could already be anticipated by both parties, so uncertainty over the best-available alternatives is nonexistent. [10]

Our hypothesis was that employers would not lower wages correspondingly and that employees would reject such wage cuts. We found at most mild evidence for resistance to

[10] Notice, however, that we could have easily avoided this by revealing in period 1 only the parameters S_1, w_1 and C and the total number of periods of interaction.

wage declines. Wages appeared downward flexible in treatments involving large costs to noncooperation as well as in which these costs are relatively low.

The experimental results can be interpreted as analogous to an "ultimatum game", in which some surplus between employers and employees is split and wages (and their lack of decline) are simply the mechanical tool for accomplishing this split. A possible reason for this result could be that we provided the conditions for perfect foresight as far as the structural relationship is concerned: Both partners knew that they will interact for at most two periods and how the structural variables (C_t, w_t) develop over time. Thus a partnership for the long race cannot be viewed as a risk sharing venture in which a lucky partner (the employer in the present case) is supposed to help the unlucky one (the employee).[11] By ruling out this insurance interpretation (Rosen 1985, Boldrin and Horvath 1995), our study can be regarded as worst case scenario for testing our basic conjecture that wages will not decline in recessions in contrast to the theory of competitive labor markets.

References

[1] Akerlof, G. and J. Yellen (1990a): The Fair-Wage Effort Hypothesis andUnemployment, *Quarterly Journal of Economics*, 195, 255-284.

[2] Akerlof, G. and J. Yellen (1990b): Fairness and Unemployment, *American Economic Review*, 78, 44-49.

[3] Bewley, T. (1995): A Depressed Labor Market as Explained by Participants, *American Economic Review*, 85, 250-259.

[4] Bewley, T. (1997): There's no Harm in Looking: A Close Look at Wage Rigidity, *Alfred Marshall Lecture, 12th Congress of the European Economic Association*, Toulouse, September.

[5] Bils, M. J. (1985): Real Wages over the Business Cycle: Evidence from Panel Data, *Journal of Political Economy*, 93 (4), 666 - 689.

[6] Binmore K., A. Rubinstein, and A. Wolinsky (1986): The Nash Bargaining Solution in Economic Modelling, *Rand Journal of Economics*, 17, 176-188.

[11] As indicated above, we could have easily tested this experimentally by not informing the participants already in the first period what economic situation will prevail in period 2.

[7] Boldrin, M. and M. Horvath (1995): Labor Contracts and Business Cycles, *Journal of Political Economy*, 103, 972-1004.

[8] Collard, F. and D. de la Croix (1997): The Fair Wage Hypothesis and the Business Cycle Puzzle, draft, *IRES*, Université catholique de Louvain.

[9] Fehr, E., G. Kirchsteiger and A. Riedl (1993): Does Fairness Prevent Market Clearing? An Experimental Investigation, *Quarterly Journal of Economics*, 108, 437-459.

[10] Fehr, E., G. Kirchsteiger, and A. Riedl (1996): Involuntary Unemployment and Non-compensating Wage Differentials in an Experimental Labour Market, *Economic Journal*, 106, 106-121.

[11] Fehr, E., S. Gächter and G. Kirchsteiger (1996): Reciprocal Fairness and Noncompensating Wage Differentials, *Journal of Institutional and Theoretical Economics*, 152(4), 608-40.

[12] Fehr, E., S. Gächter and G. Kirchsteiger (1997): Reciprocity as a Contract Enforcement Device: Experimental Evidence, *Econometrica*, 65(4), 833-860.

[13] Güth, W. (1995): On Ultimatum Bargaining Experiments: A Personal Review, *Journal of Economic Behavior and Organization*, 27(3), 329-44.

[14] Keynes, J. (1936): *The General Theory of Employment, Interest, and Money*, London: Macmillan.

[15] Layard, R., S. Nickell, and R. Jackman (1991): *Unemployment*, Oxford: Oxford University Press.

[16] McDonald, I. and R.Solow (1981): Wage Bargaining and Employment, *American Economic Review*, 71, 896-908.

[17] Oswald, A. (1985): The Theory of Trade Unions: A Survey, *Scandinavian Journal of Economics*, 87, 160-193.

[18] Nash, J. (1953): Two-Person Cooperative Games, *Econometrica*, 21, 128-140.

[19] Pissarides, C. (1991): *Equilibrium Unemployment*, Oxford: Basil Blackwell Press.

[20] Rosen, S. (1985): Implicit Contracts: A Survey, *Journal of Economic Literature*, 23, 1144-1175.

[21] Roth, A. E. (1995): Bargaining Experiments, in: *The Handbook of Experimental Economics*, J. Kagel and A. E. Roth (eds.), Princeton, N. J.: Princeton University Press, 253 - 348.

[22] Rubinstein, A. (1982): Perfect Equilibrium in a Bargaining Model, *Econometrica*, 50, 97-109.

[23] Selten, R. (1965): Spieltheoretische Behandlung eines Oligopolmodells mit Nachfrageträgheit, *Zeitschrift für die gesamte Staatswissenschaft (JITE)*, 121, 301-324, 667-689.

[24] Siegel, S. and Castellan, J. (1988): *Nonparametric Statistics for the Behavioral Sciences*, Singapore: McGraw-Hill Book Co.

[25] Solon, G., R. Barsky, and J. A. Parker (1994): Measuring the Cyclicality of Real Wages: How Important Is Composition Bias?, *Quarterly Journal of Economics*, 109 (1), 1 - 25.

[26] Tietz, R. (1975): An Experimental Analysis of Wage Bargaining Behavior, *Zeitschrift für die gesamte Staatswissenschaft (JITE)*, 131(1), 44-91.

[27] Tversky, A. and D. Kahnemann (1986): Rational Choice and the Framing of Decisions, *Journal of Business*, 59(4), Part 2, 251-78.

Figures

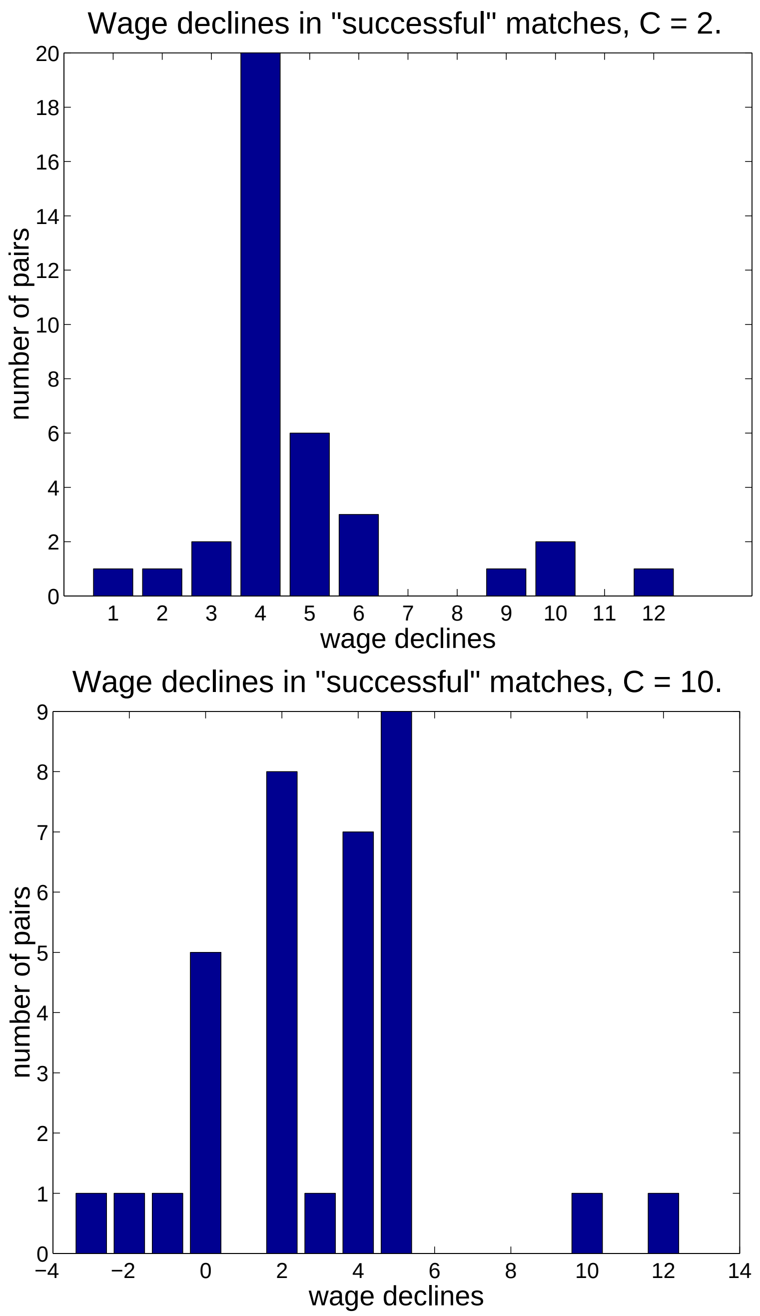

Figure 1: *A histogram of declines of wages offered between the first and the second round in successful matches. Treatment* $\underline{C}$ *is the upper figure and treatment* $\bar{C}$ *is the lower figure. According to "pure theory" found in hypothesis 1, the wage decline should be 5. The experimentally observed wage declines are often less, but not by much. Some wage declines are dramatically larger.*

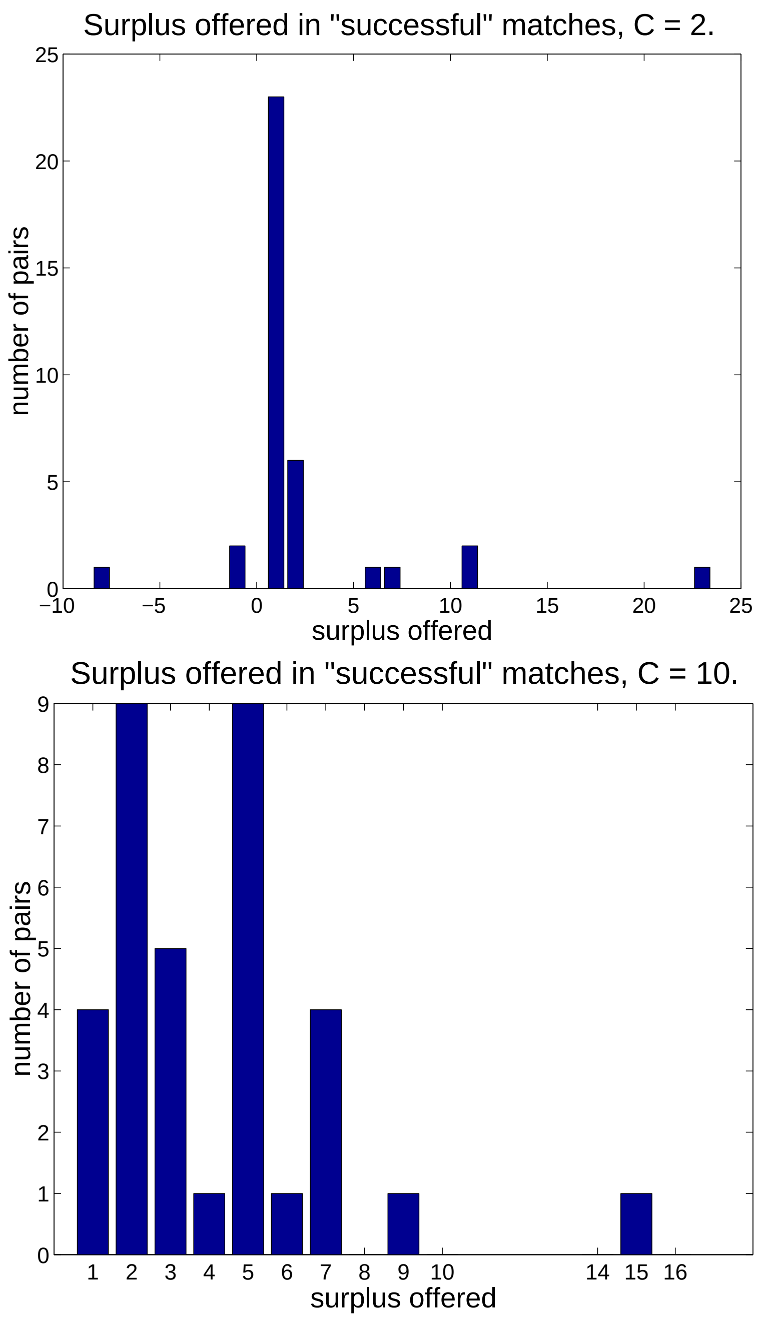

Figure 2: *A histogram of the surplus split between the employer and the employee: shown is the surplus paid to the employee. Treatment* $\underline{C}$ *is the upper figure and treatment* $\bar{C}$ *is the lower figure. Note that the total surplus is* $\underline{C} = 2$ *for treatment* $\underline{C}$ *and* $\bar{C} = 10$ *for treatment* $\bar{C}$*.*

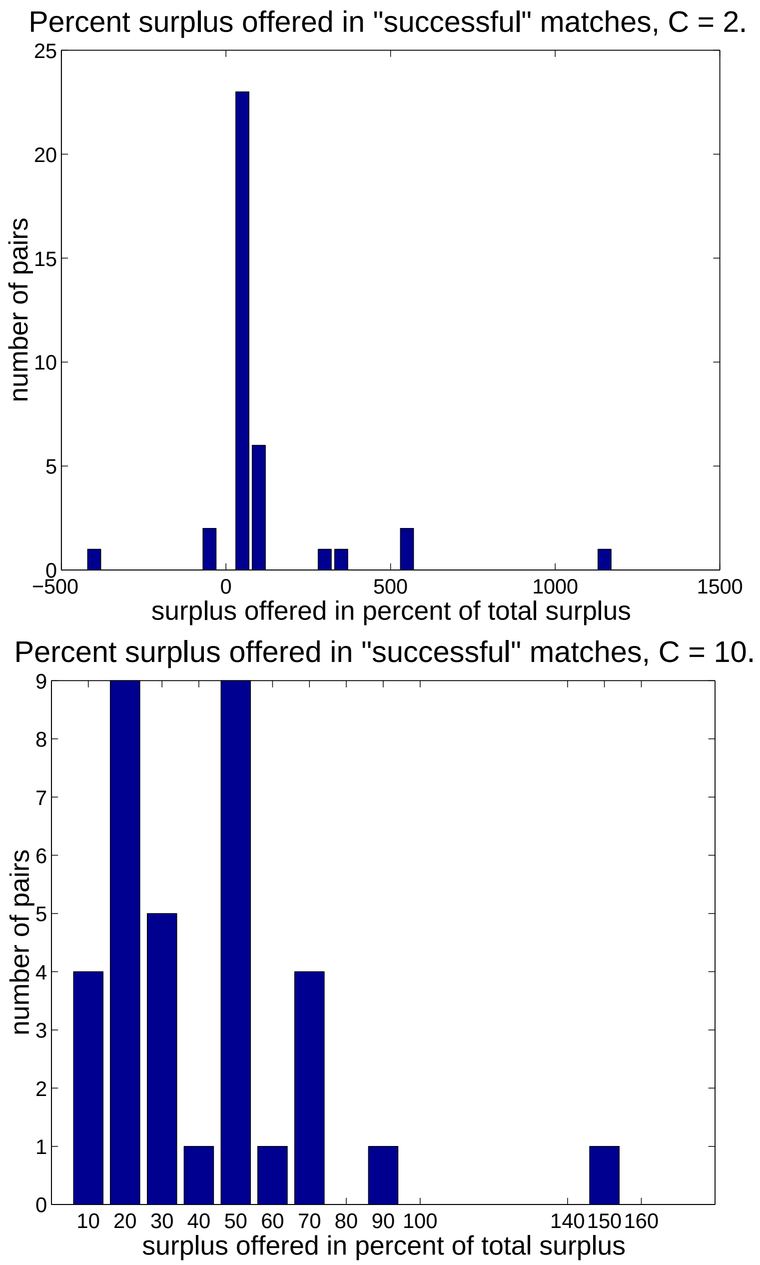

Figure 3: *A histogram of the surplus split between the employer and the employee: shown is the surplus paid to the employee in percent of the total surplus C. Treatment $\underline{C}$ is the upper figure and treatment $\bar{C}$ is the lower figure. Note that the total surplus is $\underline{C} = 2$ for treatment $\underline{C}$ and $\bar{C} = 10$ for treatment $\bar{C}$.*

Appendix

A Instruction Sheets

A.1 Instruction sheet for for treatment $\underline{C}$: costs $\underline{C} = 2$

Instructions

In the experiment two parties, each represented by one person called X and Y, are going to interact. Both, X and Y, receive the same instructions. Only before deciding you will learn whether you are going to be X or Y. You will not learn from us with whom you will be interacting. We kindly ask you to refrain from any public remarks, etc.

How will X and Y interact? The decision process is as follows:

- First X chooses x_1 with $25 \geq x_1 \geq 0$, i.e. x_1 cannot exceed 25 and must be non-negative.
- Knowing the range $25 \geq x_1 \geq 0$ for x_1 and the actual decision x_1 then Y can either accept x_1 (we denote this by $y_1 = 1$) or not (denoted by $y_1 = 0$).

In case of $y_1 = 0$ this is the end. In case of $y_1 = 1$:

- X again must choose, namely x_2 with $20 \geq x_2 \geq 0$.
- Knowing the range $20 \geq x_2 \geq 0$ for x_2 and the actual decision x_2 then Y again can accept x_2 (denoted by $y_2 = 1$) or not (denoted by $y_2 = 0$). After that the interaction ends.

How do decisions affect what the two parties X and Y earn? This is described by the following table:

What		What	
X has done	Y has done	X earns	Y earns
x_1	$y_1 = 0$	28	15
x_1, x_2	$y_1 = 1, y_2 = 0$	$38 - x_1$	$x_1 + 5$
x_1, x_2	$y_1 = 1, y_2 = 1$	$45 - x_1 - x_2$	$x_1 + x_2$

As you can see, the maximum amount that X and Y together can earn is 45. That maximum amount is reduced to 43 if $y_1 = 0$ or $y_2 = 0$.
Here the earnings are expressed in Dutch guilders (Hfl.). Since we need time to check your earnings, you can collect the money only a week later. **A code card will be attached to your decision form. You will have to show this when collecting your earnings. So you should keep it.**

These are the simple rules. Please raise your hand if you did not understand something. We will try to answer your questions privately. Do not ask loud questions and, please, refrain from any communication. Thank you for your cooperation!

How will we proceed? After answering questions privately you will have to fill out a short questionaire concerning the experiment. We then proceed with the experiment exactly as described in these instructions. Enjoy the experiment!

A.2 Instruction sheet for treatment $\bar{C}$: costs $\bar{C} = 10$

Instructions

In the experiment two parties, each represented by one person called X and Y, are going to interact. Both, X and Y, receive the same instructions. Only before deciding you will learn whether you are going to be X or Y. You will not learn from us with whom you will be interacting. We kindly ask you to refrain from any public remarks, etc.

How will X and Y interact? The decision process is as follows:

- First X chooses x_1 with $25 \geq x_1 \geq 0$, i.e. x_1 cannot exceed 25 and must be non-negative.
- Knowing the range $25 \geq x_1 \geq 0$ for x_1 and the actual decision x_1 then Y can either accept x_1 (we denote this by $y_1 = 1$) or not (denoted by $y_1 = 0$).

In case of $y_1 = 0$ this is the end. In case of $y_1 = 1$:

- X again must choose, namely x_2 with $20 \geq x_2 \geq 0$.
- Knowing the range $20 \geq x_2 \geq 0$ for x_2 and the actual decision x_2 then Y again can accept x_2 (denoted by $y_2 = 1$) or not (denoted by $y_2 = 0$). After that the interaction ends.

How do decisions affect what the two parties X and Y earn? This is described by the following table:

What		What	
X has done	Y has done	X earns	Y earns
x_1	$y_1 = 0$	20	15
x_1, x_2	$y_1 = 1, y_2 = 0$	$30 - x_1$	$x_1 + 5$
x_1, x_2	$y_1 = 1, y_2 = 1$	$45 - x_1 - x_2$	$x_1 + x_2$

As you can see, the maximum amount that X and Y together can earn is 45. That maximum amount is reduced to 35 if $y_1 = 0$ or $y_2 = 0$.
Here the earnings are expressed in Dutch guilders (Hfl.). Since we need time to check your earnings, you can collect the money only a week later. **A code card will be attached to your decision form. You will have to show this when collecting your earnings. So you should keep it.**

These are the simple rules. Please raise your hand if you did not understand something. We will try to answer your questions privately. Do not ask loud questions and, please, refrain from any communication. Thank you for your cooperation!

How will we proceed? After answering questions privately you will have to fill out a short questionaire concerning the experiment. We then proceed with the experiment exactly as described in these instructions. Enjoy the experiment!

B Questionaire

Code	

Questionaire

Remember the range for x_1 is $25 \geq x_1 \geq 0$ whereas for x_2 it is $20 \geq x_2 \geq 0$. If X would choose $x_1 = 13$ and $x_2 = 19$ what will X and Y earn under following assumptions for Y's behavior?

(a) x_1 and x_2 are accepted, i.e. $y_1 = 1$ and $y_2 = 1$:

X earns [ ] Y earns [ ]

(b) x_1 is accepted, x_2 not, i.e. $y_1 = 1$ and $y_2 = 0$:

X earns [ ] Y earns [ ]

(c) x_1 and x_2 are rejected, i.e. $y_1 = 0$: X earns [ ] Y earns [ ]

Which of the two positions X or Y do you prefer? I prefer position [ ] (X or Y)

What would you do in case you were party X?

As X I would choose $x_1 =$ [ ] $(25 \geq x_1 \geq 0)$

If x_1 would be accepted, i.e. $y_1 = 1$, I would choose $x_2 =$ [ ] $(20 \geq x_2 \geq 0)$

How would you react in case you were party Y?

As Y I would never reject any x_1 [ ]

As Y I would reject some values x_1 [ ]

In case of the latter, please describe which values x_1 you would reject:

....

As Y I would never reject any x_2 [ ]

As Y I would reject some values x_2 [ ]

In case of the latter, please describe which values x_2 you would reject:

....

C Decision Forms

Code	

X-Decision Form:

I offer $x_1 =$ ☐ (only offers $25 \geq x_1 \geq 0$ are possible)

To be filled out by experimenter:

Your offer x_1 is accepted ☐ ($y_1 = 1$)

Your offer is not accepted ☐ ($y_1 = 0$)

Only if x_1 is accepted, please continue:

I offer $x_2 =$ ☐ (only offers $20 \geq x_2 \geq 0$ are possible)

To be filled out by experimenter:

Your offer x_2 is accepted ☐

Your offer x_2 is not accepted ☐

Please compute when ready: I have earned ☐

Code	

Y-Decision Form:

To be filled out by experimenter:

X has offered $x_1 =$ ☐

I do **not** accept ($y_1 = 0$) the offer ☐

I accept ($y_1 = 1$) the offer ☐

To be filled out by experimenter:

X has offered $x_2 =$ ☐

I do **not** accept ($y_2 = 0$) the offer ☐

I accept ($y_2 = 1$) the offer ☐

Please compute when ready: I have earned ☐

D Messenger Form

Messenger Form

Pair	x_1	y_1	x_2	y_2

E Raw data

E.1 Experiment 1, February 1997, Dutch economics students

E.1.1 Choices:

Code	Treat-ment	Grp.	Role	No.	Round 1				Round 2				round		Tot.
					x1	y1	x2	y2	x1	y1	x2	y2	1	2	paym.
AX11	$\underline{C}$	1	X	1	12	1	10	1	10	1	6	1	23	29	52
AX12	$\underline{C}$	1	X	2	15	1	6	1	11	1	6	1	24	28	52
AY13	$\underline{C}$	1	Y	3	12	1	10	1	11	1	6	1	22	17	39
AY14	$\underline{C}$	1	Y	4	15	1	6	1	10	1	6	1	21	16	37
AX21	$\underline{C}$	2	X	1	11	1	5	1	11	1	5	1	29	29	58
AX22	$\underline{C}$	2	X	2	10	1	3	0	11	1	6	1	28	28	56
AY23	$\underline{C}$	2	Y	3	11	1	5	1	11	1	6	1	16	17	33
AY24	$\underline{C}$	2	Y	4	10	1	3	0	11	1	5	1	15	16	31
AX31	$\underline{C}$	3	X	1	10	1	6	1	10	1	6	1	29	29	58
AX32	$\underline{C}$	3	X	2	10	1	5	0	10	1	6	1	28	29	57
AY33	$\underline{C}$	3	Y	3	10	1	6	1	10	1	6	1	16	16	32
AY34	$\underline{C}$	3	Y	4	10	1	5	0	10	1	6	1	15	16	31
BX11	$\bar{C}$	1	X	1	10	1	6	1	10	1	6	1	29	29	58
BX12	$\bar{C}$	1	X	2	11	1	6	1	11	1	6	1	28	28	56
BY13	$\bar{C}$	1	Y	3	10	1	6	1	11	1	6	1	16	17	33
BY14	$\bar{C}$	1	Y	4	11	1	6	1	10	1	6	1	17	16	33
BX21	$\bar{C}$	2	X	1	11	0	-	-	13	1	9	1	20	23	43
BX22	$\bar{C}$	2	X	2	10	1	10	1	10	1	10	1	25	25	50
BY23	$\bar{C}$	2	Y	3	11	0	-	-	10	1	10	1	15	20	35
BY24	$\bar{C}$	2	Y	4	10	1	10	1	13	1	9	1	20	22	42
BX31	$\bar{C}$	3	X	1	10	1	5	0	10	1	6	0	20	20	40
BX32	$\bar{C}$	3	X	2	10	1	8	1	10	1	8	0	27	20	47
BY33	$\bar{C}$	3	Y	3	10	1	5	0	10	1	8	0	15	15	30
BY34	$\bar{C}$	3	Y	4	10	1	8	1	10	1	6	0	18	15	33

E.1.2 Questionaire:

Code	a)X	Y	b)X	Y	c)X	Y	I prefer:	x1	x2	never/ some	never/ some
	earns										
AX11	13	32	25	18	28	15	X	13	10	never	never
AX12	13	32	25	18	28	15	Y	5	5	< 15	< 5
AY13	13	32	25	18	28	15	X	10	5	< 10	< 5
AY14	13	32	25	18	28	15	X	7	6	<= 10	<= 5
AX21	13	32	25	18	28	15	X	11	8	< 10	< 5
AX22	13	32	25	18	28	15	X	10	9	< 10	< 5
AY23	13	32	25	18	28	15	X	13	19	13/5, 7	13/18, 8
AY24	13	32	25	18	28	15	X	0	0	< 10	< 5
AX31	13	32	25	18	28	15	X	10	5	< 10	< 5
AX32	13	32	25	18	28	15	Y	10	5	>= 10	>= 5
AY33	13	32	25	18	28	15	X	0	0	never	never
AY34	13	32	25	18	28	15	Y	1	1	<= 16	< 6
BX11	13	32	17	18	20	15	Y	10	6	< 10	<= 5
BX12	13	32	17	18	20	15	Y	11	6	< 10	< 5
BY13	13	32	17	18	20	15	X	11	6	< 10	< 5
BY14	13	32	17	18	20	15	Y	0	0	never	x2=0
BX21	13	32	17	18	20	15	Y	11	6	< 10	$x_1 + x_2 < 15$
BX22	13	32	17	18	20	15	Y	0	0	< 10	< 15
BY23	13	32	17	18	20	15	Y	10	10	never	never
BY24	13	32	17	18	20	15	X	10	6	< 10	< 5
BX31	13	32	17	18	20	15	Y	10	15	< 10	never
BX32	13	32	17	18	20	15	X	10	8	< 10	<= 5
BY33	13	32	17	18	20	15	b	10	12	< 10	< 12
BY34	13	32	17	18	20	15	X	0	0	< 10	< 5

E.2 Experiment 2, May 1997, Dutch law students

E.2.1 Choices:

Code	Treat-ment	Grp.	Role	No.	Round 1				Round 2				round		Tot.
					x1	y1	x2	y2	x1	y1	x2	y2	1	2	paym.
BX11	$\bar{C}$	1	X	1	9	1	11	1	3	0			25	20	45
BX12	$\bar{C}$	1	X	2	10	0			15	1	6	0	20	15	35
BY13	$\bar{C}$	1	Y	3	9	1	11	1	15	1	6	0	20	20	40
BY14	$\bar{C}$	1	Y	4	10	0			3	0			15	15	30

E.2.2 Questionaire:

Code	a)X earns	Y	b)X	Y	c)X	Y	I prefer:	x1	x2	never/ some	never/ some
BX11	13	32	17	18	20	15	X	9	11	< 10	never
BX12	13	32	17	18	20	15	Y	1	1	< 10	< 5
BY13	13	32	17	18	20	15	X	1	1	< 11	< 6
BY14	13	32	17	18	20	15	X	13	10	< 11	< 10

E.3 Experiment 3, June 1997, German economics students

E.3.1 Choices:

Code	Tr.	Gr.	Rl.	#	Round 1				Round 2				round		Tot.
					x1	y1	x2	y2	x1	y1	x2	y2	1	2	paym.
A1X1	$\underline{C}$	1	X	1	10	1	6	1	10	1	6	1	29	29	58
A1X2	$\underline{C}$	1	X	2	18	1	8	1	18	1	8	1	19	19	38
A1Y1	$\underline{C}$	1	Y	1	10	1	6	1	18	1	8	1	16	26	42
A1Y2	$\underline{C}$	1	Y	2	18	1	8	1	10	1	6	1	26	16	42
A2X3	$\underline{C}$	2	X	3	10	1	5	0	10	1	6	1	28	29	57
A2X4	$\underline{C}$	2	X	4	10	1	6	1	10	1	6	1	29	29	58
A2Y3	$\underline{C}$	2	Y	3	10	1	5	0	10	1	6	1	15	16	31
A2Y4	$\underline{C}$	2	Y	4	10	1	6	1	10	1	6	1	16	16	32
A3X5	$\underline{C}$	3	X	5	25	1	13	1	0	0			7	28	35
A3X6	$\underline{C}$	3	X	6	5	0			4	1	3	1	28	38	66
A3Y5	$\underline{C}$	3	Y	5	25	1	13	1	4	1	3	1	38	7	45
A3Y6	$\underline{C}$	3	Y	6	5	0			0	0			15	15	30
A4X7	$\underline{C}$	4	X	7	10	1	6	1	10	1	5	0	29	28	57
A4X8	$\underline{C}$	4	X	8	11	1	6	1	10	1	5	0	28	28	56
A4Y7	$\underline{C}$	4	Y	7	10	1	6	1	10	1	5	0	16	15	31
A4Y8	$\underline{C}$	4	Y	8	11	1	6	1	10	1	5	0	17	15	32
A5X9	$\underline{C}$	5	X	9	9	0			10	1	6	1	28	29	57
A5X10	$\underline{C}$	5	X	10	10	1	5	0	10	1	6	1	28	29	57
A5Y9	$\underline{C}$	5	Y	9	9	0			10	1	6	1	15	16	31
A5Y10	$\underline{C}$	5	Y	10	10	1	5	0	10	1	6	1	15	16	31
A6X11	$\underline{C}$	6	X	11	8	0			10	1	6	1	28	29	57
A6X12	$\underline{C}$	6	X	12	0	0			5	0			28	28	56
A6Y11	$\underline{C}$	6	Y	11	8	0			5	0			15	15	30
A6Y12	$\underline{C}$	6	Y	12	0	0			10	1	6	1	15	16	31
A7X13	$\underline{C}$	7	X	13	11	1	6	1	10	0			28	28	56
A7X14	$\underline{C}$	7	X	14	11	1	6	1	10	1	6	1	28	29	57
A7Y13	$\underline{C}$	7	Y	13	11	1	6	1	10	1	6	1	17	16	33
A7Y14	$\underline{C}$	7	Y	14	11	1	6	1	10	0			17	15	32
A8X15	$\underline{C}$	8	X	15	10	0			10	1	6	1	28	29	57
A8X16	$\underline{C}$	8	X	16	10	1	6	1	10	1	6	1	29	29	58
A8Y15	$\underline{C}$	8	Y	15	10	0			10	1	6	1	15	16	31
A8Y16	$\underline{C}$	8	Y	16	10	1	6	1	10	1	6	1	16	16	32
A9X17	$\underline{C}$	9	X	17	10	1	6	1	10	1	5.01	0	29	28	57
A9X18	$\underline{C}$	9	X	18	9	1	5.5	1	9	1	5.5	1	30.5	30.5	61
A9Y17	$\underline{C}$	9	Y	17	10	1	6	1	9	1	5.5	1	16	14.5	30.5
A9Y18	$\underline{C}$	9	Y	18	9	1	5.5	1	10	1	5.01	0	14.5	15	29.5
A10X19	$\underline{C}$	10	X	19	11.05	1	5.47	1	10.75	1	5.28	1	28.48	28.97	57.45
A10X20	$\underline{C}$	10	X	20	10	1	6	1	10	1	6	1	29	29	58
A10Y19	$\underline{C}$	10	Y	19	11.05	1	5.47	1	10	1	6	1	16.52	16	32.52
A10Y20	$\underline{C}$	10	Y	20	10	1	6	1	10.75	1	5.28	1	16	16.03	32.03
A11X21	$\underline{C}$	11	X	21	8	1	6	0	10	1	5.2	0	30	28	58
A11X22	$\underline{C}$	11	X	22	0	0			11	1	5	0	28	27	55
A11Y21	$\underline{C}$	11	Y	21	8	1	6	0	11	1	5	0	13	16	29
A11Y22	$\underline{C}$	11	Y	22	0	0			10	1	5.2	0	15	15	30

Code	Tr.	Gr.	Rl.	#	Round 1				Round 2				round		Tot.
					x1	y1	x2	y2	x1	y1	x2	y2	1	2	paym.
B1X1	$\bar{C}$	1	X	1	6	1	0	0	10	1	12.5	1	24	22.5	46.5
B1X2	$\bar{C}$	1	X	2	10	1	10	0	10	1	10	1	20	25	45
B1Y1	$\bar{C}$	1	Y	1	6	1	0	0	10	1	10	1	11	20	31
B1Y2	$\bar{C}$	1	Y	2	10	1	10	0	10	1	12.5	1	15	22.5	37.5
B2X3	$\bar{C}$	2	X	3	10	1	6	0	10	1	8	1	20	27	47
B2X4	$\bar{C}$	2	X	4	10	1	8	1	10	1	8	0	27	20	47
B2Y3	$\bar{C}$	2	Y	3	10	1	6	0	10	1	8	0	15	15	30
B2Y4	$\bar{C}$	2	Y	4	10	1	8	1	10	1	8	1	18	18	36
B3X5	$\bar{C}$	3	X	5	12	1	10	1	12	1	8	1	23	25	48
B3X6	$\bar{C}$	3	X	6	10	1	5	0	10	1	8	1	20	27	47
B3Y5	$\bar{C}$	3	Y	5	12	1	10	1	10	1	8	1	22	18	40
B3Y6	$\bar{C}$	3	Y	6	10	1	5	0	12	1	8	1	15	20	35
B4X7	$\bar{C}$	4	X	7	11	1	6	1	11	1	6	1	28	28	56
B4X8	$\bar{C}$	4	X	8	10	1	5	0	10	1	7	1	20	28	48
B4Y7	$\bar{C}$	4	Y	7	11	1	6	1	10	1	7	1	17	17	34
B4Y8	$\bar{C}$	4	Y	8	10	1	5	0	11	1	6	1	15	17	32
B5X9	$\bar{C}$	5	X	9	11	1	6	1	11	1	6	0	28	19	47
B5X10	$\bar{C}$	5	X	10	10	1	10	0	10	1	11	1	20	24	44
B5Y9	$\bar{C}$	5	Y	9	11	1	6	1	10	1	11	1	17	21	38
B5Y10	$\bar{C}$	5	Y	10	10	1	10	0	11	1	6	0	15	16	31
B6X11	$\bar{C}$	6	X	11	10	1	10	1	10	1	10	1	25	25	50
B6X12	$\bar{C}$	6	X	12	0	1	0	0	0	0			30	20	50
B6Y11	$\bar{C}$	6	Y	11	10	1	10	1	0	0			20	15	35
B6Y12	$\bar{C}$	6	Y	12	0	1	0	0	10	1	10	1	5	20	25
B7X13	$\bar{C}$	7	X	13	12	1	10	1	10	1	10	0	23	20	43
B7X14	$\bar{C}$	7	X	14	10	1	6	0	10	1	6	1	20	29	49
B7Y13	$\bar{C}$	7	Y	13	12	1	10	1	10	1	6	1	22	16	38
B7Y14	$\bar{C}$	7	Y	14	10	1	6	0	10	1	10	0	15	15	30
B8X15	$\bar{C}$	8	X	15	1	0			11	0			20	20	40
B8X16	$\bar{C}$	8	X	16	11	1	9	1	11	1	9	1	25	25	50
B8Y15	$\bar{C}$	8	Y	15	1	0			11	1	9	1	15	20	35
B8Y16	$\bar{C}$	8	Y	16	11	1	9	1	11	0			20	15	35
B9X17	$\bar{C}$	9	X	17	2	0			20	1	10	1	20	15	35
B9X18	$\bar{C}$	9	X	18	18	1	6	1	12	1	7	1	21	26	47
B9Y17	$\bar{C}$	9	Y	17	2	0			12	1	7	1	15	19	34
B9Y18	$\bar{C}$	9	Y	18	18	1	6	1	20	1	10	1	24	30	54
B10X19	$\bar{C}$	10	X	19	10	1	6	1	11	1	6	1	29	28	57
B10X20	$\bar{C}$	10	X	20	11	1	6	1	11	1	6	1	28	28	56
B10Y19	$\bar{C}$	10	Y	19	10	1	6	1	11	1	6	1	16	17	33
B10Y20	$\bar{C}$	10	Y	20	11	1	6	1	11	1	6	1	17	17	34
B11X21	$\bar{C}$	11	X	21	10	1	5	0	10	1	6	0	20	20	40
B11X22	$\bar{C}$	11	X	22	11	1	7	1	11	1	7	0	27	19	46
B11Y21	$\bar{C}$	11	Y	21	10	1	5	0	11	1	7	0	15	16	31
B11Y22	$\bar{C}$	11	Y	22	11	1	7	1	10	1	6	0	18	15	33

E.3.2 Questionaire:

Code	a)X	Y	b)X	Y	c)X	Y	I prefer:	x1	x2	never/ some	never/ some
	earns										
A1X1	13	32	25	18	28	15	X	10	6	<10	<6
A1X2	13	32	28	15	25	18	Y	0	20	13..18	12..15
A1Y1	13	32	25	18	28	15	X	10	1	<10	<15
A1Y2	13	26	25	18	28	15	X	0	0	<10	0
A2X3	45-13-19	13+19	38-13	13+5	28	15	X	1	1	<=10	<=5
A2X4	13	32	25	18	28	15	X	0	0	<10	<5
A2Y3	13	32	25	18	28	15	X	1	1	<10	<5
A2Y4	13	32	25	18	28	15	Y	10	5	<10	<10
A3X5	22	23	25	18	28	15	X	25	20		
A3X6	13	32	25	18	28	15	X	5	7	never	2
A3Y5	13	32	25	18	28	15	X	0	0	<=8	<=6
A3Y6	23	32	25	18	28	15	X	23	19		
A4X7	13	32	25	18	28	15	X	1	1	<10	<5
A4X8	13	32	25	18	28	15	Y	11	2	some	some
A4Y7	13	32	25	18	28	15	X	11	4	<10	<4
A4Y8	13	32	25	18	28	15	Y	1	1	>=10	>=5
A5X9	13	32	25	18	28	15	X	9	1	10..25	some
A5X10	13	32	25	18	28	15	X	10	1	<=10	<=5
A5Y9	11	32	25	18	28	15	Y	0	0	<=10	<=5
A5Y10	13	32	25	18	28	15	X	10	5	>=11	>=7
A6X11	13	32	25	18	28	15	X	14	18	never	
A6X12	13	32	25	18	28	15	Y	11	0	<10	0
A6Y11	13	32	25	18	28	15	X	9	6	<10	<6
A6Y12	13	32	25	18	28	15	X	14	20	never	some
A7X13	13	32	25	18	28	15	X	0	0	<10	<5
A7X14	13	32	25	18	28	15	X	11	6	>=11	>=6
A7Y13	13	32	25	18	28	15	Y	10	10	<=10	<=5
A7Y14	23	32	25	18	28	15	X	9	0	<=10	<=5
A8X15	13	32	25	18	28	15	X	10	6	<10	<7
A8X16	13	32	25	18	28	15	Y	10	5	<10	<5
A8Y15	13	32	25	18	28	15	X	10	16	never	19
A8Y16	13	32	25	18	28	15	Y	8	8	<8	<8
A9X17	13	32	25	18	28	15	X	10	6	<10	<6
A9X18	13	32	25	18	28	15	X	9	6	<10	<6
A9Y17	13	22	25	18	28	15	X	25	0	>=20	never
A9Y18	13	32	25	18	28	15	X	0	6	<11	<=5
A10X19	13	32	25	18	28	15	X	10.9	5.3	>11.5	>6
A10X20	13	32	25	18	28	15	X	10	6	<10	<6
A10Y19	13	32	25	18	28	15	X	11	6	<11	<5
A10Y20	13	32	25	18	28	15	X	0	0	<17	some
A11X21	13	32	25	18	28	15	X	0	0	<10	<5
A11X22	13	32	25	18	28	15	X	0	0	<10	<5
A11Y21	13	32	25	18	28	15	X	11	5	<10	<5
A11Y22	13	32	25	24	28	15	Y	0	0	<10	<5

Code	a)X	Y	b)X	Y	c)X	Y	I pre-	x1	x2	never/	never/
	earns						fer:			some	some
B1X1	13	32	17	18	20	15	X	0	0	<13	0
B1X2	13	32	17	18	20	15	X	10	10	<10	<5
B1Y1	13	32	17	18	20	15	X	10	0	0 or 5	low val.
B1Y2	13	32	17	18	20	15	Y	13	9	<10	some
B2X3	13	32	17	18	20	15	Y	0	0	<=10	<=1
B2X4	13	32	17	18	20	15	X	10	0	>15	>15
B2Y3	13	32	17	18	20	15	X	10	10	>=10	some[12]
B2Y4	13	32	17	18	20	15	Y	1	1	<10	never
B3X5	13	32	17	18	20	15	Y	12	4	<=11	<=3
B3X6	13	32	17	18	20	15	Y	10	1	<10	never
B3Y5	13	32	17	18	20	15	Y	11	6	<10	<5
B3Y6	13	22	17	18	20	15	X	10	5	<10	<5
B4X7	13	32	17	18	20	15	Y	0	0	0	0
B4X8	13	32	17	18	20	15	X	11	6	<10	<5
B4Y7	13	32	17	18	20	15	Y	10	5	never	some
B4Y8	13	32	17	18	20	15	Y	0	0	<=14	never
B5X9	13	32	17	18	20	15	Y	1	1	>10	>5
B5X10	13	32	17	18	20	15	Y	10	5	<10	<5
B5Y9	13	32	17	18	20	15	X	0	0	<=10	<=5
B5Y10	13	32	17	18	20	15	X	11	6	<11	<6
B6X11	13	32	17	18	20	15	Y	6	1	never	
B6X12	13	32	17	18	20	15	Y	0	0	0	0
B6Y11	13	32	17	18	20	15	X	10	5	<10	<5
B6Y12	13	32	17	18	20	15	Y	10	6	<20	<10
B7X13	13	32	17	18	20	15	X	10	10	>10	>9
B7X14	13	32	17	18	20	15	X	10	6	<10	<5
B7Y13	13	32	17	18	20	15	Y	0	20		
B7Y14	13	32	20	18	20	15	X	13	0		<=10
B8X15	45-x1-x2	x1+x2	30-x1	x1+5	20	15	X	5	1	never	never
B8X16	13	32	17	18	20	15	X	11	6	<10	<10
B8Y15	13	32	17	18	20	15	X	10	6	>10	>5
B8Y16	13	32	17	18	20	15	Y	20	20	13	19
B9X17	18	32	17	18	0	15	Y		0	some	some
B9X18	13	32	17	18	20	15	Y	20	10	20	10
B9Y17	13	32	17	18	20	15	Y	5	10	<=10	<=5
B9Y18	13	32	17	18	20	15	X	12	6	1..9	1..4
B10X19	13	32	17	18	20	15	X	0	0	<=10	<=5
B10X20	13	32	17	18	20	15	X	11	6	<=9	<=4
B10Y19	13	32	20	15	0	0	Y	19	20	never	never
B10Y20	13	32	17	18	20	15	Y	11	12	<10	<6
B11X21	13	32	17	18	20	15	Y	0	0	<10	<15
B11X22	12	32	17	18	20	15	X	11	0	<11	<=5
B11Y21	13	32	17	18	20	15	Y	11	6	<10	<5
B11Y22	13	32	17	18	20	15	Y	10	5	<=12	<=5