How to Preserve a Fortune: An Experimental Comparison of Foundations and Direct Transfers to the Heir

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Abstract

Direct transfers allow heirs to freely use what has been passed on to them. Bequeathers who do not trust their descendants to make proper use of the fortune may prefer investing it in a safe foundation, thereby limiting their descendants' autonomy. In our study we compare experimentally these two institutional arrangements. Although bequeather and descendant have specific personal interests, they agree in their concern for preserving the fortune. Our results show that bequeathers tend to trust their descendant. When transfers to the descendant are less efficient than investments in a foundation, due to, e.g., inheritance taxation, overall bequests decrease significantly.

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1 Introduction

Consider an individual who is very rich but already rather old, and must therefore think of what to do with her fortune. Suppose that she can make three competing uses of her wealth: (1) spending it during her remaining lifetime; (2) leaving it to her relatives, who however may burn it up; and (3) donating it to a safe foundation, which cannot be sold or diminished as only its profits are disposable.[1] This decision involves two dilemmas: the individual has to choose not only how much of her fortune to consume and how much to preserve via bequest, but also how to allocate the bequest between the relatives and an anonymous foundation. In general, the transfer to children is more beneficial but riskier than investing in a foundation. The experiment reported here investigates how people behave when facing the above dilemmas.

More specifically, we try to answer the following research questions: Will individuals preserve their wealth even when this is not in their own best interest? If so, will they trust their descendant to make proper use of the fortune or will they prefer a safe fund? Addressing these questions is critical for a range of issues, including the transmission of inequality across generations and the effectiveness of inheritance taxes. High tax rates or different tax rates for different bequest options may strongly affect the bequeather's decision, and even discourage legacy.[2]

The extent to which bequests (and intergenerational transfers in general) are an important economic phenomenon has been debated extensively over the past two

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[1] See ROELOFS [2003] for a study on foundations.

[2] See GATES AND COLLINS [2003] OR GRAETZ AND SHAPIRO [2005] for some debates about inheritance taxes. See PAGE [2003], BERNHEIM, LEMKE, AND SCHOLZ [2004], AND JOULFAIAN [2005] for empirical investigations of the effects of taxes on the giving of *inter vivos* gifts.

decades. KOTLIKOFF AND SUMMERS [1981], for instance, present evidence that roughly 46% of U.S. wealth accumulation is due to bequests, although MODIGLIANI [1988] argues that a smaller 17% is more accurate. Alternative estimates of the importance of bequests have found inherited wealth to be in the range of 15% to 31% of total household wealth (see GALE AND SCHOLZ [1994]). Most studies obtain information on received inheritance via surveys and questionnaires.[3] Undoubtedly field data is essential in studying bequests. However, some authors are skeptical about the quality of survey data. KOPCZUK AND LUPTON (2005) expressly question the accuracy of the answers and the possibility of distinguishing between intended and accidental bequests.

A complementary approach to provide empirical evidence on whether and to what extent individuals wish to preserve their wealth relies on controlled laboratory experiments. Although this raises other objections (such as the external validity of the results),[4] a laboratory study allows for direct observation of both the amount of her resources a person intends to save and her most preferred way of doing so. WADE-BENZONI, SONDAK, AND GALINSKY [2005], for example, experimentally investigate the processes that underlie intergenerational allocations. Differently from them, we consider an environment with certainty about incomes and no temporal delay. These two features are regarded as interlinked: being uncertain about one's own and one's descendant future income may induce parents to delay transfers so that their children do not "strike it rich"

[3] For example, to gather information on the transfers from the parents to the child, ALTONJI, HAYASHI, AND KOTLIKOFF [1997] asked the following question: "During 1987, did (you/your family living here) receive any loans, gifts, or support worth $100 or more from your parents? About how much were these loans, gifts, or support worth altogether in 1987?".

[4] Experimental roles are arbitrarily assigned, thereby questioning entitlement (see HOFFMAN AND SPITZER [1985])

(see ALTONJI ET AL. [1997]). We want to rule out this kind of reasoning because we are not interested in time-preference factors or income considerations, but mainly in how the bequeather trades off consumption of her fortune against its preservation.

Intergenerational decisions are typically characterized by power asymmetry between generations, with the old generation determining the intergenerational resources allocation, and the young one having little or no voice in the decision process. Due to this feature, intergenerational decisions are similar to dictator games.[5] Along these lines, we grant the power of how allocating benefits to one party (i.e., the bequeather). Yet, direct allocations to the descendants can be freely used by them. To exclude the conflicts between several descendants as well as strategic bequest motives (as specified by, e.g., BERNHEIM, SHLEIFER, AND SUMMERS [1985]), we assume that the young generation consists of a single child.

To investigate the idiosyncratic attitude of people to preserve their fortune and their preferences over alternative means, our model features a bequeather who cares about her own consumption as well as her fortune's maintenance. Although the bequeather shares the concern for preserving the fortune with her descendant, the two parties have conflicting interests otherwise. Hence, if the "kid is rotten" (i.e., purely selfish; cf., BECKER [1974]), she would rather not preserve the received fortune.

The common concern for the family fortune can be thought of as a public good which is jointly appreciated by the bequeather and her descendant. Thus, to address our main research questions, we rely on a one-shot sequential public goods game with the bequeather moving first and the descendant afterwards, and with both parties acting as

[5] See ROTH [1995] or BOLTON [1998] for reviews on dictator games. See WADE-BENZONI ET AL. [2005] for some similarities between dictators and old generations.

voluntary contributors. Formally, the game proceeds as follows: the bequeather is endowed with a sum of money and asked to decide on the amount she wants to invest in a "safe" fund and the amount she wants to pass on to the descendant (thereby determining her own consumption as residual). After learning about the amount she has received, the descendant decides how much of it she wants to invest into a fund (keeping for herself the remaining). Investment is beneficial for both parties, although both of them earn more when consuming more. Similar to a dictator, the bequeather is able to distribute wealth. But, differently from a dictator, she is not able to influence the descendant's behavior once the latter has received the transfer. Hence, direct transfers to the descendant, albeit justifiable emotionally, require also trust in the sense of expecting the descendant not to consume all what she has got.[6]

Further details about the game model are presented in Section 2. The experimental procedures are laid out in Section 3. Section 4 reports the main results of our experimental study. Section 5 concludes.

2 The Game

The one-shot sequential two-person public goods game involves the bequeather *B*, and the descendant *D*. Let *E* (> 0) denote the monetary endowment that the bequeather can consume, invest in a foundation, or pass on to her descendant. The amount c (≥ 0) that the bequeather invests in the foundation, and the amount e (≥ 0) that she gives to the

[6] According to ROUSSEAU, SITKIN, BURT, AND CAMERER [1998, p. 395], trust is "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another". In the case at hand, the bequeather who leaves her money directly to the descendant is accepting vulnerability based on expectations of reciprocal behavior by the descendant.

descendant must satisfy $0 \le e + c \le E$. The foundation is autonomous, i.e., independent of the descendant's actions, and pays a *fixed* positive net return rate $\alpha_F < 1$. On the contrary, the transmitted wealth, e, can be freely used by the descendant who can either consume or invest it. The amount d invested by the descendant, satisfying $0 \le d \le e$, pays a positive net return rate $\alpha_I < 1$.

The game has two decision stages. In stage 1, B decides about c and e. In stage 2, D gets e, and decides about d. The monetary payoffs of bequeather and descendant are, respectively:

$$u_B = E - c - e + \alpha_F c + \alpha_I d \ ,$$

and

$$u_D = e - d + \alpha_F c + \alpha_I d$$

where $2\alpha_F$, $2\alpha_I > 1$ holds. We interpret $E-c-e$ as what B uses for her personal interests, e.g., her own consumption, and, similarly, $e-d$ as what D spends personally. Although, when $\alpha_F \neq \alpha_I$, their contributions differ in effectiveness, both B and D are equally concerned about the "family fortune" whose size is measured by $\alpha_F c + \alpha_I d$.

The game theoretic solution, assuming opportunistic (i.e., motivated by own monetary rewards) players and B's awareness of this, can be derived by backward induction. Due to $\alpha_I < 1$, the descendant's optimal strategy in stage 2 is to invest zero (i.e., $d^* = 0$) regardless of e; by anticipating this and because of $\alpha_F < 1$, the bequeather should pass on zero (i.e., $e^* = c^* = 0$), and consume all her endowment. The payoffs implied by the opportunistic play (e^*, c^*, d^*) are $u_B^* = E$, and $u_D^* = 0$. On the other hand, since $2\alpha_F$ and $2\alpha_I$ are greater than 1, efficiency (in the sense of maximizing $u_B + u_D$) requires both parties to give up their personal interests. Choosing how to allocate E is, for the bequeather, a dictator dilemma because she can never regain what she does not consume (see OCKENFELS [1999] and GÜTH, KLIEMT, AND OCKENFELS [2003]). On the other hand, a situation where both parties consume positive amounts can be interpreted as a voluntary contribution game since both would gain by reducing their private consumption.

Despite the game theoretic prediction (requiring the bequeather to consume all her endowment) and the lack of personal efficiency gains from cooperation, many studies have shown that people acting as dictators, and thereby deciding about resources' allocation, give their counterpart non-trivial amounts of benefits (see BOLTON, KATOK, AND ZWICK [1998], and ANDREONI AND MILLER [2002]). Consistent with the findings from dictator games, previous empirical work on intergenerational contexts indicates that people act against their own material benefit in favor of future generations (WADE-BENZONI [2002]).

One explanation for such results invokes the concept of altruism, or caring for others (BECKER [1974]), which has been specifically used to explain intergenerational bequests (see BERNHEIM AND STARK [1988], LINDBECK AND WEIBULL [1988], BERGSTROM AND STARK [1993], and FALK AND STARK [2001]). In our setting, a further explanation for *B*'s positive giving comes from models of social preferences, which assume that individuals value efficiency. A number of recent experimental studies of dictator-like games explore whether people act on efficiency motives and find that most do (see KRITIKOS AND BOLLE [2001], CHARNESS AND RABIN [2002], and ENGELMANN AND STROBEL [2004]), although experimental evidence also shows that efficiency motives become negligible when the necessary sacrifice is increased (GÜTH, KLIEMT, AND OCKENFELS [2003]). Since in our game both altruism and efficiency concerns may play a role in the bequeather's decisions, we expect most *B*-players to spend their endowment for the "common good" rather than for private purposes.

As we are interested in whether and how the net returns from the two feasible choices (inheritance or foundation) affect behavior, we systematically manipulate the relation between α_I and α_F. Let Δ be the difference between α_I and α_F. We consider three treatments depending on whether Δ is positive, equal to zero or negative.

When $\Delta = \alpha_I - \alpha_F > 0$, because of $2\alpha_I > 2\alpha_F > 1$, investing one's own endowment, *E*, into a foundation is safer but less productive than giving it to the descendant. An efficiency-minded bequeather who trusts her descendant should choose $c^+ = 0$ and $e^+ = E$, leading to $u_B = u_D = \alpha_I E$. Otherwise, she should invest all her endowment in the foundation, i.e., $c^+ = E$ and $e^+ = 0$, yielding $u_B = u_D = \alpha_F E$. Compared to the opportunistic benchmark solution, the bequeather would lose, and the descendant would gain notwithstanding the mistrust of the former. Hence, the $\Delta > 0$-treatment allows us to examine whether *B*-players take the risk of trusting *D*-players or not. One can justify the assumption $\Delta > 0$ by arguing that the descendant can invest the inherited fortune more profitably than a foundation, which has fixed and limited activities.[7]

When $\Delta = 0$, due to $\alpha_F = \alpha_I$, a risk-neutral bequeather who wants to preserve her endowment should be indifferent between foundation and direct transfer to the

[7] In Germany, for instance, the foundations' average return is 5%, which is much lower than the return of other investments.

descendant, although distrust in the descendant may induce the bequeather to prefer the former to the latter.

Finally, when $\Delta < 0$, since $2\alpha_F > 2\alpha_I > 1$, donating everything to the foundation is both safer and more productive. Here, an efficiency-minded bequeather should opt for $c^+ = E$ and $e^+ = 0$, regardless of whether she is trustful or not. This case can be justified by thinking of a situation with inheritance taxes and tax-privileged foundation. In this sense, inheritance taxation has the same effect as mistrust in the descendant.

3 Experimental Procedures and Parameters

The computerized experiment was performed at the experimental laboratory of the Max Planck Institute in Jena using the software z-Tree (FISCHBACHER [1999]). Participants were undergraduate students from different disciplines at the University of Jena. After being seated at a computer terminal, they received written instructions (see the Appendix for an English translation). Questions regarding clarification of the rules were answered privately.

Overall, we ran three sessions with the three different treatments as between-subjects factor. Each session involved 32 participants who played the specific treatment only once (this provides 16 independent observations for *B*-players and 16 observations for *D*-players in each treatment). Sessions lasted about 45 minutes. In all three treatments, *B*'s initial endowment was *E* = 100 ECU (Experimental Currency Units) worth €20. Only integer choices, *c*, *e*, and *d*, were allowed. As for the other parameters values, we chose α_I=0.8 and α_F=0.6 in the $\Delta > 0$-treatment, $\alpha_F = \alpha_I = \alpha$= 0.7 in the $\Delta = 0$-treatment, and α_I=0.6 and α_F=0.8 in the $\Delta < 0$-treatment, so that efficiency gains were kept constant across treatments.

To observe which choice, *d*, the bequeather expects by the descendant in each treatment, we elicited in an elementary way *B*-players' first order beliefs. Actually, we did not force participants to state their expectations. The first question *B*-players were asked to answer was whether or not they had expectations. Only those who answered positively proceeded to the computer screen with the corresponding expectation elicitation. Expectations were always elicited after choices about *c* and *e* had been made.

4 *Experimental Results*

Figure 1 displays, for each of the 16 *B*-players and for each of the three treatments, the total amount of non-consumed endowment (i.e., $c + e$).

Insert Figure 1 about here

The opportunistic benchmark solution of zero savings can be rejected. In all treatments, most *B*-players preserve positive amounts, although bequeathers tend to consume less for private purposes when Δ is positive or zero than when Δ is negative. Average non-kept ECU are 33.25, 32.75, and 17.81 in $\Delta > 0$, $\Delta = 0$, and $\Delta < 0$, respectively. Between-treatment comparisons reveal that, while the $\Delta > 0$- and the $\Delta = 0$-treatments do not differ significantly with respect to total non-consumed amounts (p=0.47, one-tailed Wilcoxon rank sum test), the $\Delta < 0$-treatment triggers significantly more private consumption (p<0.05 for both $\Delta < 0$ vs. $\Delta > 0$ and $\Delta < 0$ vs. $\Delta = 0$). Hence, we can state:

RESULT 1 *Average saved amounts are positive in all treatments although a negative Δ increases private consumption significantly.*

Next we ask which of the two feasible choices (foundation or transfer to *D*) *B*-players prefer. Table 1 provides summary statistics on amounts invested in the foundation (*c*-rows) and amounts given to the descendant (*e*-rows).

Insert Table 1 about here

No treatment effect seems to be present in the data regarding average amounts invested in the safe fund. On the contrary, there is a clear treatment order with respect to average amounts given to *D*, with the $\Delta < 0$-treatment triggering the lowest average *e*. Wilcoxon rank-sum tests (two-tailed) confirm that *B*-players do not react significantly to variations in Δ when deciding about *c* ($p>0.1$ for each of the three comparisons). Concerning amounts passed on to the descendants, we cannot reject the null hypothesis that they are equal in the $\Delta > 0$- and $\Delta = 0$-treatments ($p=0.863$), whereas we can reject the hypothesis of equality when comparing the $\Delta < 0$-treatment with either the $\Delta > 0$-treatment ($p=0.013$) or the $\Delta = 0$-treatment ($p=0.012$). This justifies:

RESULT 2 *Variations in the Δ parameter do not affect significantly investments in the safe foundation, while they have a significant impact on amounts transferred to the descendant, which are significantly lower when Δ is negative.*

Result 2 is a refinement of Result 1 in that the higher private consumption observed in the $\Delta < 0$-treatment is mainly due to a sharp decline in amounts passed on to the descendant. This is corroborated by within-treatment comparisons showing that for Δ positive or zero, generous *B*-players give more money to *D* than to the safe fund: the difference between *c* and *e* is highly significant only for the $\Delta > 0$-treatment (two-tailed Wilcoxon signed-rank test, $p=0.01$ for $\Delta > 0$, but $p=0.58$ for $\Delta = 0$). However, when Δ

becomes negative (due to, e.g., inheritance taxes), amounts given to *D* are smaller than investments into the tax-privileged foundation, although not significantly so (p=0.56).

RESULT 3 *B-players favor direct transfers to D-players when* α_I *is greater than or equal to* α_F*, and investments in the foundation when* α_I *is smaller than* α_F.

Overall, our findings concerning *B*'s decisions indicate a predisposition of bequeathers to trust descendants that they will invest most of what has been passed on to them. The elicited expectations appear to support this claim. The Spearman's rank correlation coefficients between amounts given to *D* (i.e., *e*) and elicited expectations about *d* are positive and highly significant for $\Delta > 0$ ($\rho = 0.83$, $p<0.001$) and $\Delta = 0$ ($\rho = 0.67$, $p<0.05$), but not for $\Delta < 0$ ($\rho = 0.53$, $p=0.171$), where however we can rely only on 8 observations.

Are expectations about *d* rational? To answer this question, we turn to the descendant's behavior. Table 2 summarizes *D*'s investment decisions in each of the three treatments. Overall average percentages invested by *D* (for positive amounts sent) are 15%, 15%, and 19% in $\Delta > 0$, $\Delta = 0$ and $\Delta < 0$, respectively. These percentages already indicate that trust was somehow misplaced.

<u>Insert Table 2 about here</u>

Figure 2 displays for each player pair for whom $e > 0$ (on the horizontal axis), the amount received and then invested by *D*. With only one exception in the $\Delta > 0$-treatment, we have $d < e/2$. Moreover, 66.7%, 58.3% and 40% of the descendants invest 0 when receiving a positive amount in $\Delta > 0$, $\Delta = 0$, and $\Delta < 0$, respectively. This finding stands against previous studies showing that "strong" reciprocity is a behaviorally relevant phenomenon (see FEHR AND HENRICH [2003]),[8] and appears more in line with the work of GÄCHTER AND FALK [2002] and BROWN, FALK, AND FEHR [2004], who predict reciprocity mainly for repeated interaction.

RESULT 4 *Regardless of Δ, trust in descendants is poorly rewarded. This is in sharp contrast to bequeathers' expectations.*

Insert Figure 2 about here

Due to the meager levels of investment by the descendants, efficiency (measured by $u_B + u_D$) is not significantly higher than predicted by the opportunistic benchmark solution. Overall average joint payoffs equal to €20.92, €21.31and €21.42 in the $\Delta > 0$-, $\Delta = 0$-, and $\Delta < 0$- treatments, respectively.[9] These amounts are only slightly higher than €20 (i.e., the payoff in case of *B*'s opportunistic behavior). Furthermore, efficiency is not statistically significant different between treatments ($p > 0.2$ for each comparison; two-tailed Wilcoxon rank-sum test).

RESULT 5 *The greater efficiency potential of trust for Δ > 0 and Δ = 0 does not show up because of the minor efficiency gains in all treatments.*

5 Conclusions

We reported on an experiment designed to explore whether and how relatively affluent individuals wish to preserve their wealth when two options are available: direct transfer to the descendant and investment into a safe foundation. Our model and its experimental

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[8] A strong reciprocator is predicted to react (un)kindly to friendly (hostile) actions even in non-repeated interactions and when material gains are absent.

[9] In particular, *B*-players' average earnings are €15.20, €15.73 and €18.42 in $\Delta > 0$, $\Delta = 0$ and $\Delta < 0$, respectively. The corresponding average earnings for *D*-players amount to €5.58, €5.57 and €2.98.

implementation completely neglected possible emotional ties between involved parties, and only captured their common concern for preserving the fortune as well as their conflicting personal interests (namely, their private consumption). Furthermore, we systematically manipulated the relative profitability of the two feasible alternatives so as to investigate the extent to which this affects behavior.

In line with earlier work on dictator-like games (KRITIKOS AND BOLLE [2001], CHARNESS AND RABIN [2002], GÜTH ET AL. [2003], and ENGELMANN AND STROBEL [2004]) and on intergenerational settings (WADE-BENZONI ET AL. [2005]), we find that most bequeathers/dictators do not keep their own endowment for themselves. Rather, they prefer "preserving" it, mainly by passing it on to the descendant. When this option is less efficient than the other, private consumption is found to increase significantly to the detriment of social welfare. Higher tax rates may render direct transfers to the descendant less advantageous than donations to a foundation. Thus, our results are in line with earlier empirical research (KOPCZUK AND SLEMROD [2003], PAGE [2003], and JOULFAIAN [2005]) indicating that the higher the inheritance taxes, the lower the bequeathed amount.

Overall, our results show that, notwithstanding the absence of emotional ties between parties, there exists considerable trust in reciprocity, namely that one's own descendant will use the resources transferred to her in responsible ways. However, in our setting, such a trust is misplaced due to most descendants' opportunistic behavior. This seems to suggest, in line with the work of GÄCHTER AND FALK [2002] and BROWN ET AL. [2004], that material incentives are not irrelevant for reciprocal behavior.

Appendix

This appendix reports the instructions (originally in German) we used for the $\Delta > 0$-treatment. The instructions for the other treatments were adapted accordingly.

Welcome and thanks for participating in this experiment. Please read the following instructions carefully. If you have any questions or concerns, please raise your hand. From now on any communication with other participants is forbidden. It is very important that you follow this rule; otherwise we will exclude you from the experiment and from all payments.

The experiment allows you to earn money. Your experimental income will be calculated in ECU (Experimental Currency Units), where 1 ECU = € 0.2. At the end of the experiment the ECU you have earned will be converted to Euros and the obtained amount will be paid to you in cash.

DETAILED INFORMATION ON THE EXPERIMENT

In this experiment, participants are randomly divided into pairs. This means that you will be interacting with one other participant, whose identity will not be revealed to you at any time.

In each two-person group, there will be one person of type *X* and one person of type *Y*. You will learn your type at the beginning of the experiment.

X-participants' task

The *X*-type of each two-person group will receive an endowment of 100 ECU, and must decide:

- how many of the 100 ECU (s)he wants to give to *Y*, and
- how many (s)he wants to invest in project *A*.

X can choose only integer amounts; i.e., 0, 1, 2, …, 98, 99, 100 ECU.

Whatever *X* does not give to *Y* and/or does not invest in project *A*, (s)he keeps for him/herself ("ECU *X* keeps").

Y-participants' task

The *Y*-type of each two-person group is informed about the amount of ECU (s)he receives from *X*. If *Y* receives something, (s)he must decide:

- how many of the received ECU, (s)he wants to invest in project *B*.

Similarly to *X*, *Y* can choose only integer amounts from 0 to what (s)he received from *X*. Whatever *Y* does not invest in project *B*, (s)he keeps for him/herself ("ECU *Y* keeps").

The earnings of both *X* and *Y* consist of two parts:

(1) the "ECU each keeps for him/herself";

(2) the "income from the projects".

Therefore,

X's earnings = [100 – ECU given to *Y* – ECU invested in project *A*] + Income from the projects

and

Y's earnings = [ECU received from *X* – ECU invested in project *B*] + Income from the projects

The income from the projects is the same for both types (*X* and *Y*) and is:

Income from the projects = 0.6 × [ECU invested by X] + 0.8 × [ECU invested by Y]

In words, the "income from the projects" is determined by multiplying the number of ECU invested by *X* in project *A* by 0.6, the number of ECU invested by *Y* in project *B* by 0.8, and adding up the resulting amounts. Therefore, each ECU invested by *X* in project *A* increases "income from the projects" and the earnings of both types by 0.6 ECU. Likewise, each ECU invested by *Y* in project *B* increases "income from the projects" and the earnings of both types by 0.8 ECU.

EXAMPLE 1

Suppose that the *X*-member of the pair invests 20 ECU in project *A*, and gives 40 ECU to member *Y*. Suppose also that, out of the received 40 ECU, *Y* invests 20 ECU in project *B*. The "income from the projects" will therefore be: [(0.6 × 20) + (0.8 × 20)] = 12 + 16 = 28 ECU. As a consequence, *X*'s earnings are [100 – 20 – 40] + 28 = 40 + 28 = 68 ECU, and *Y*'s earnings are [40 – 20] + 28 = 20 + 28 = 48 ECU.

EXAMPLE 2

Suppose now that the *X*-member of the pair does not invest any ECU in project *A*, and gives 50 ECU to member *Y*. Suppose also that, out of the received 50 ECU, *Y* invests 10 ECU in project *B*. The "income from the projects" will be: [(0.6 × 0) + (0.8 × 10)] = 8 ECU. Thus, *X*'s earnings are [100 – 0 – 50] + 8 = 50 + 8 = 58 ECU, and *Y*'s earnings are [50 – 10] + 8 = 40 + 8 = 48 ECU.

After all participants have made their choice, you will receive information about your own earnings and the earnings of your group member. If you are an *X*-type, you will also be informed about the number of ECU *Y* invested in project *B*. Similarly, if you are a *Y*-type, you will be informed about the number of ECU *X* invested in project *A*.

Before the experiment starts, you will have to answer some control questions to verify your understanding of the experiment. Once everybody has answered all questions correctly, *one trial period* will be played. During this period, you will not be matched with a person in this room, but with a computer that will determine randomly the other's decision. You will get NO payment for this trial period.

Please remain quiet until the experiment starts. If you have any questions, please raise your hand now.

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Table 1

Averages and Standard Deviations of Absolute Investments of *B* in each Treatment

Treatment	ν [a]	Choice variable	Mean	Std. Deviation
Δ>0	16	*c*	12.06	13.92
		e	21.19	18.49
Δ=0	16	*c*	13.69	13.95
		e	19.06	17.85
Δ<0	16	*c*	11.25	25.07
		e	6.56	10.6

[a] ν denotes the number of observations.

Table 2

Averages and Standard Deviations of Relative Investments of *D* in each Treatment

Treatment	ν [a]	Choice variable	Mean	Std. Deviation
Δ>0	12	*d/e*	0.15	0.31
Δ=0	12	*d/e*	0.15	0.22
Δ<0	5	*d/e*	0.19	0.24

[a] ν has the same interpretation as in Table 1.

Figure 1

Absolute Amount Non-Consumed ($c + e$) by Each B-Player in each Treatment
(Sorted by Amount Non-Consumed)

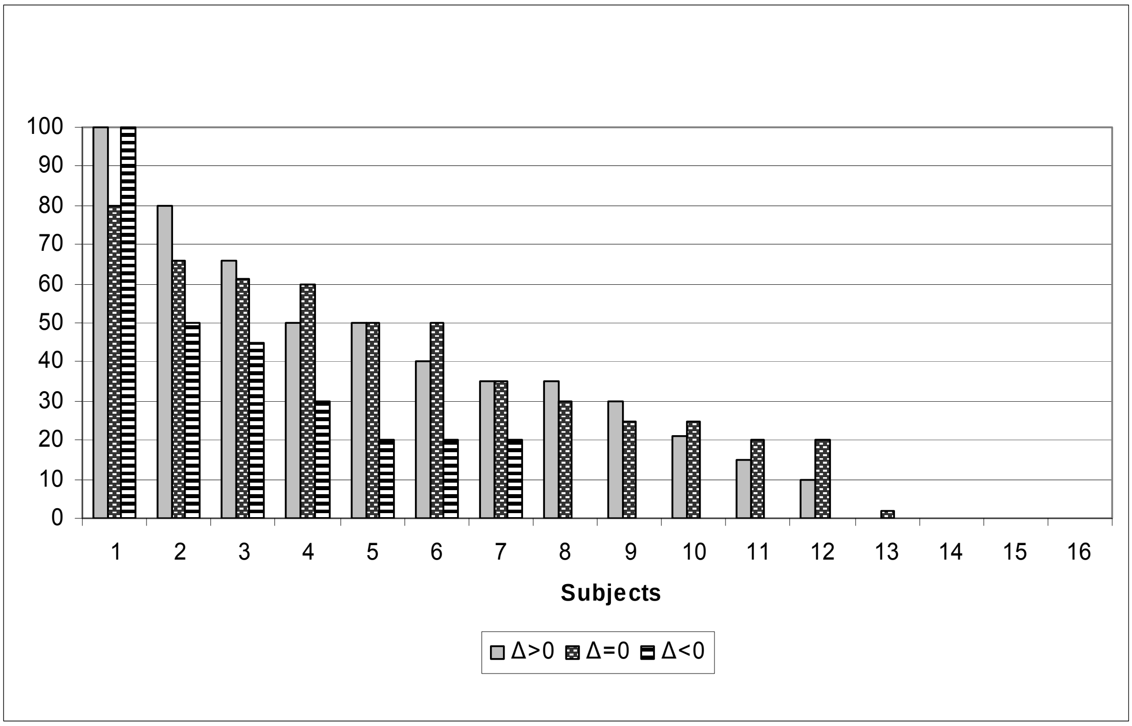

Figure 2

Amount Sent to *D* and Invested by *D* per Player Pair in each Treatment
(Sorted by Amount Invested).