

Dividing up an Inheritance Successfully – Significant International Variations Surprising Results of an Internet Experiment

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Introduction

In December 2009, we conducted an international research project on human behavior and decision making. We invited students from University of the Incarnate Word (US)¹ and the University of Applied Sciences Kaiserslautern (Germany) in classes and through the internet as well as the general public via newspaper articles to participate in a so-called **Ultimatum Bargaining Game**. The inheritance of aunt Luise in the amount of 1,200 EUR – app. 1,600 USD in funding provided by the German university - was to be split up between three beneficiaries.

Three randomly selected participants slipped into the roles of the beneficiaries – Andy, Berta and Carlos. Due to the will of aunt Luise, the inheritance is to be divided up according to the following rules: Andy has the right to propose the distribution of the 1,200 EUR. Berta can accept or reject this proposal. She therefore has the right to veto Andy's proposal. If Berta accepts Andy's proposal, the total amount will be split according to the proposed distribution. If Berta rejects Andy's proposal, none of the three will receive any money. It will all go to charity, or like in our experiment, three other beneficiaries are to be selected randomly. Carlos can neither influence the proposal of distribution nor its

¹ During the fall semester 2009, Marc Piazolo spent a sabbatical at the catholic University of the Incarnate Word (UIW), San Antonio, Texas. UIW is one of the sister schools of the University of Applied Sciences Kaiserslautern.

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acceptance or rejection.² In our basic version of the experiment, Andy's role as proposer is auctioned off. All participants were asked to place a bid for their right of proposing.

We extended this basic structure of the experiment by including a second version, in which the role of the proposer was to be selected randomly – only after – the proposer decided on his proposal. The division of the actual funds is based on the basic version of our three person ultimatum bargaining game.

We were hoping that this research project would provide answers to the following questions:

- (1.) What role does fairness and rationality play, when people got to make a decision on splitting up a considerable amount of funds?
- (2.) How do participants evaluate different kind of proposals – again taking fairness and rationality into account?
- (3.) Are there significant differences in human behavior between US-Americans und Europeans?

What does economic theory tell us?

Basic microeconomic theory in decision making usually assumes that economic agents behave rationally – no matter if they are employees, managers or politicians. The concept of a rational decision maker is called **Homo Oeconomicus**. The decision maker aims to maximize his financial wealth or personal utility. Though, past economic experiments – in the field and in the laboratory – have shown, that many participants behave in a reciprocal way (**Homo Reciprocans**). They honor friendly behavior and punish non-cooperative behavior. Sometimes, they are even willing to accept financial losses when punishing non-cooperative behavior. In our experiment, they would lose their proposed share of inheritance.

1 Characteristics of our participants

Out of 520 participants, 509 decision sheets were valuable. This is the highest rate of participation for our internet experiments so far. The majority of participants (43%) live within 100 km of Kaiserslautern, while another 20% are from other parts of Germany. Almost one third of all participants are US nationals.³ On average, the participants are 29.5 years old – the youngest being 10 and the oldest 76. This relative low average age is due to the fact that just more than half of our

² The general set-up of the experiment is based on Güth et al. (2003). One finds additional variations of Ultimatum Bargaining Games in Holt (2007).

³ The remaining five percent are mainly from Austria and Switzerland - in addition to individuals from Argentina, China, Hungary and Indonesia.

participants are still studying at a university. Less than a third are female, while half of the participants are business or economics majors.

There are several differences in characteristics of participants from **Europe**⁴ and the **United States**: less females in Europe (25% vs. 51%), a larger US-share of highly educated participants (27% with Master degrees & Ph.D.s vs. 18%) as well as a larger share of US-participants with a background in business & economics (57% vs. 47%). On the other hand, almost one fifth of our German participants have a background in engineering (only 4% in the US). In addition to our experiment, everyone participated in a simple test of intelligence as well as in describing his or her personal risk preference. Americans seem to be more risk prone, while they underperformed in the cognitive reflection test.⁵

2 List of Proposals and Decision making

Andy and Berta had to choose from 18 different proposals. First, each participant had to select one proposal in his or her role as Andy. Afterwards, they slipped into the role of Berta. Here, they had to decide to either accept or reject each of the individual 18 proposals. We made use of the acceptance rate for each proposal to calculate the expected payoff for Andy.

Table 1:
Choice of proposals and acceptance ratios

All participants n = 509	Andy's Choice	1.200 EUR proposals for split up			Berta's reaction		expected Payoff for Andy (EUR)
		Andy	Berta	Carlos	accept	reject	
	0.20%	0	600	600	78%	22%	0
	0	200	400	600	60%	40%	120
	0.79%	200	500	500	81%	19%	162
	0	200	600	400	82%	18%	164
	0	400	200	600	32%	68%	128
	0	400	300	500	42%	58%	168
Equal split	42.04%	400	400	400	95%	5%	380
	5.50%	400	500	300	84%	16%	336
	2.75%	400	600	200	81%	19%	324
	0	600	100	500	24%	76%	144

⁴ 95% of the 340 European participants are German residents.

⁵ Shane (2005). All participants should describe their risk proneness on a scale of 1 (risk averse) to 5 (risk prone). On average, US-Americans were statistically significant more risk prone than Germans (3.4 vs. 2.9). A result that resembles the one of Fehr et al. (2002) in: Falk et al. (2009).

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	0	600	200	400	30%	70%	180
	4.52%	600	300	300	50%	50%	300
	10.81%	600	400	200	64%	36%	384
Power coalition	17.87%	600	500	100	69%	31%	414
	0.20%	800	100	300	24%	76%	192
	1.38%	800	200	200	32%	68%	256
	5.30%	800	300	100	39%	61%	312
Homo Oeconomicus	8.65%	1000	100	100	25%	75%	250
<i>Average inheritance per person in EUR</i>		543	391	266			

Andy – the proposer (all participants)

Most of our participants (42%, first column in *table 1*) propose a fair and **equal split** of 400 EUR for each of the beneficiaries. The second most important proposals are the so-called **power coalition(s)** with 18% and 11% of the votes: Andy and Berta both profit from agreeing bilaterally on a reduced inheritance of Carlos, as the latter has no rights at all. Only 8.5% of our participants propose a split up that leaves Andy with the highest payoff possible (1.000 EUR), while Berta and Carlos only get 100 EUR each. This is the proposal that reflects a profit maximizing **Homo Oeconomicus** the closest.⁶ Half of all proposals were not chosen at all, or by less than 1% of the participants. Based on their different roles, it is not very surprising that the average financial sum proposed for Andy is more than twice the amount for the powerless Carlos (543 EUR vs. 266 EUR).⁷

Berta – with veto power (all participants)

As Berta, almost all participants accept an **equal split**. For the **power coalition** the rate of acceptance drops to 69%, while the proposal linked to the concept of **Homo Oeconomicus** is rejected by three quarters of our participants. This reaction is quite irrational, as Berta relinquishes an inheritance worth 100 EUR – for the sake of rebuffing Andy’s extremely unfair proposal. All of the proposals for which Berta receives only 100-200 EUR, are rejected by more than two thirds of all participants. Even though its acceptance rate is low, the expected payoff for Andy is still the highest in the case of the power coalition (414 EUR).⁸

⁶ Other experiments produced similar shares for the proposal of Homo Oeconomicus: e.g. 9% in a national newspaper in Germany with 5,000 participants (Güth et al. 2007) and 14% of 381 participants in Piazo (2007).

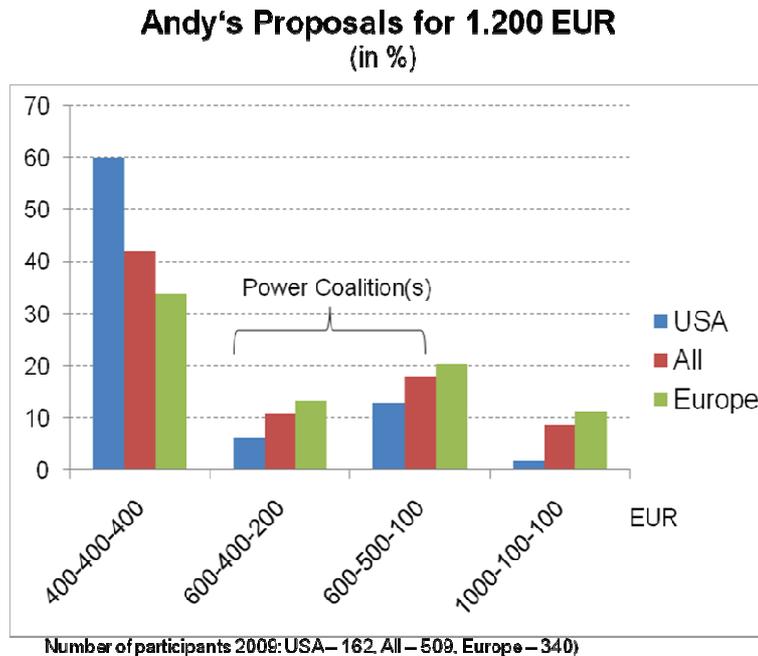
⁷ The amounts for the proposer Andy, are similar to the ones in Güth et al. (2007) with 516 EUR and in Piazo (2007) with 552 EUR.

⁸ In our field experiment of 2006, 92% of all 381 participants accepted the power coalition as Berta. Thus, the expected payoff for Andy was significantly higher: 552 EUR (Piazo 2007).

3 Different International Perceptions - US-Americans vs. Europeans

In their role as proposers, the US-Americans selected the **equal split** at a significantly higher rate than their German or European counterparts (60% vs. 34%, *chart 1*). Females also prefer the equal split – and more Americans are women, but this cannot explain the large discrepancy fully.⁹ Just as many Europeans propose the **power coalition(s)** to the equal split, and even 11% of them suggested the wealth maximizing version of Homo Oeconomicus. For the USA, this rate is only 2%. Therefore, the average proposed sum for Andy by Americans is substantially less than the one by Europeans (461 EUR vs. 576 EUR).

Chart 1



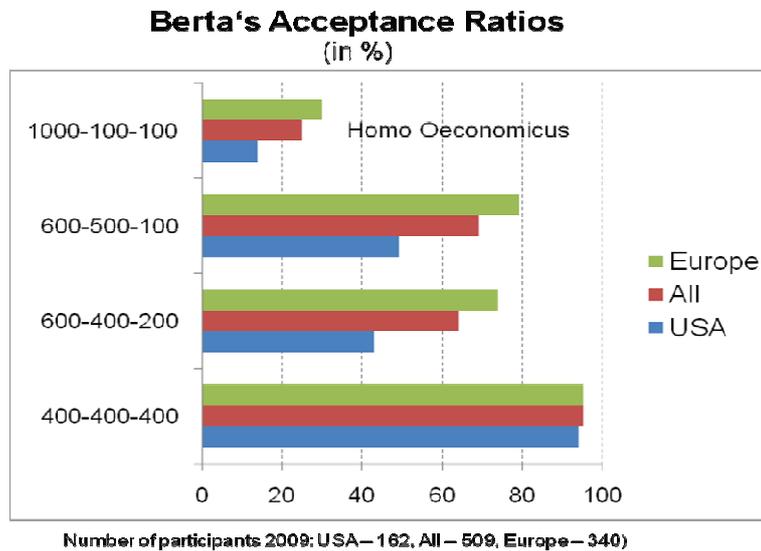
In addition it is not surprising that business and economics majors vote the most for **Homo Oeconomicus** (14%). Though, economists also suggest equal split and the power coalition(s) to a much higher extent (35% and 31% respectively).

⁹ 53% of all women vote in their role as proposer for an equal split – men only at a rate of 36%. Though, the female proposal rate is still less than that of all US-Americans with 60%.

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Chart. 2



High aversion of US-Americans towards inequality

In their role as acceptor or rejector (**Berta**), only 109 of all participants (21%) do accept all of the 18 different proposals. This would give them at least 100 EUR – instead of relinquishing these funds and receiving nothing at all. Consequently, this acceptance rate is 80% for participants that suggested the **Homo Oeconomicus** right from the beginning.

A quarter of the German or European participants decide rationally in accepting all proposals – for **US-Americans** this rate is a mere 10%. Therefore, just 14% of the US-participants accept the proposal of **Homo Oeconomicus**. Even for the power coalition there is no majority among US-participants (*chart 2*). Due to these low US-acceptance rates, the expected US-payoff for the equal split (376 EUR) is substantially above the ones for the power coalition (294 EUR).

Homo Oeconomicus is accepted by **Europeans** at rate of 30%. Though, the expected payoff as Andy is higher for the power coalition (479 EUR) – as this proposal registers a high acceptance rate of 79%. Females and non-business majors accept a 1,000-100-100 split significantly less often (20%) than business majors and Europeans.

4 Random Selection of the Proposer – International Gap is Leveled Out

In the second version of our experiment, the participants were asked to make the same decisions -though, none of the three beneficiaries would know in advance, which role they play, when the inheritance is to be split up. So, the proposer – Andy – does not know in advance, if he will benefit from his proposal. He might end up as Berta or even Carlos. Due to this change in conduct, we expect the rate of proposal for an equal split to increase substantially. The empirical data in *table 2* underlines our expectations. Now, three quarters of our participants propose the equal split. At same instance, the intercontinental differences in proposal rates decline substantially from 26 to 9 percentage points. The reason is the marked difference in decision making by the German or European participants. Therefore, the average inheritance per person is equalized quite a bit: the difference between Andy and Carlos drops from 277 EUR to 105 EUR (see last line in *table 1 & 2*).

Table 2:

Choice of proposals and international acceptance ratios (random proposer)

ALL (n = 509) USA (n = 162) EUROPE (n = 340)	Division of 1.200 EUR			ALL		USA		EUROPE	
	Andy	Berta	Carlos	proposal Andy	Berta accept	proposal Andy	Berta accept	proposal Andy	Berta accept
Equal Split	400	400	400	73,08%	97%	79,01%	97%	70,00%	98%
	400	500	300	1,96%	75%	3,70%	60%	1,18%	82%
	600	300	300	5,11%	59%	2,47%	39%	6,47%	69%
	600	400	200	5,30%	56%	4,94%	40%	5,59%	64%
Power Coalition	600	500	100	4,13%	48%	0,62%	34%	5,59%	55%
Homo Oeconomicus	1000	100	100	3,93%	27%	1,85%	15%	5,00%	33%

ALL – average inheritance per person in EUR

459	388	353
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The acceptance rates for Berta do not change significantly. Europeans will still accept unequal distributions far more often than their US-counterparts. Therefore, the highest expected payoff for Andy in Europe is 414 EUR for the following proposal: 600-300-300. Compared to our first version, Europeans seem to punish an unfair treatment of (powerless) Carlos now – at least compared to the power coalition(s). For US-Americans, equal split still pays off the best for Andy

5. Final Remarks

- More than 500 people took part in this unique mixed classroom, newspaper and internet experiment of an **ultimatum bargaining game**.

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Three beneficiaries had to decide, how to split up an inheritance of 1,200 EUR (or 1,600 USD). One third of the participants were US-Americans – mainly from the University of the Incarnate Word in San Antonio, Texas.

- In their role as proposer (**Andy**) 42% of all participants vote for an equal split (400 EUR each); followed by 18% for the **power coalition** (600 EUR – 500 EUR – 100 EUR). Only 8,5% of all participants select the wealth maximizing alternative of **Homo Oeconomicus** (1,000 EUR – 100 EUR – 100 EUR). On average, the participants are willing to bid 251 EUR for the role as proposer.
- When having to accept or reject each of the 18 different proposals (**Berta**), the notions of **fairness** and **inequality aversion** dominate decision making. Every proposal, which result in 200 EUR or less for **Berta**, is rejected by 68%-76% of the participants. These individuals relinquish up to 260 USD, rather than accepting an unequal distribution of inheritance. Only one fifth of our economic agents behave fully rational by accepting everyone of the 18 different proposals.
- There are statistically significant differences in behavior of US-Americans and Europeans (95% German). **US-Americans** are much more equality oriented: 60% of them propose an equal split, while they reject in their role as **Berta** unequal distributions of inheritance far more often than **Europeans**. Just as many Europeans or Germans vote for the power coalition(s) and the equal split. Also, the Germans are bidding substantially more money for their role as proposer (270 EUR vs. 203 EUR).
- **Aversion against inequality** in splitting up an inheritance of 1,200 EUR is much stronger among **US-Americans**. This is a result, the author would have expected from the **Germans** living in a social market economy with substantial characteristics of a welfare state and being less riskprone than their US-counterparts. The role of the cultural and ethnic background of Hispanics studying at a catholic institution – which represent the majority of our US-participants – might explain some of the intercontinental divide. This gives plenty of room for additional research to be undertaken in the future.
- On the other hand, the US-Americans might have expected the strong inequality aversion of their peers. In that case, it may be rational to propose an equal split – since the expected payoff for **Andy** is the highest for the equal split with 376 EUR.¹⁰
- The moment the role of the beneficiaries is randomly assigned to each of the three – only after placing their decisions - the proposal rate for the equal split rises substantially (>70%). At same instance, the intercontinental divide vanishes almost totally.

¹⁰ Güth (2009) mentioned this also.

Appendix - International winners

We chose the following three representative participants randomly as potential beneficiaries: Erika T. (Germany), Jose J. (US) und Mathias R. (Switzerland). The role of the proposer is based on their bids for Andy. In our case Jose bid 400 EUR, while Mathias only placed 100 EUR and Erika no cent at all. Jose's proposal as Andy was 400-500-300 – a proposal that was chosen by only 6% of all participants. Jose apparently wanted to make sure, that Berta is going to accept his proposal.¹¹ Erika was drawn for the role as Berta. She accepted the proposal of Jose.¹² As half of the bid for the role of the proposer (Andy) has to be payed by the winning Andy (Jose), 200 EUR go to the US, 300 EUR to Switzerland and 500 EUR remain in Southern Germany.

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¹¹ The bids for the role of the proposer were in the range of 0-2,000 EUR. The highest bids were placed by participants that would have proposed the Homo Oeconomicus alternative. For this subgroup of 43 participants, the average bid is 550 EUR. Schmidt (2009) expects that the competition in bidding for the role of proposer would lead to a more pronounced wealth maximizing behaviour of all participants. Our data does not support his hypothesis, since the European proposal rate for Homo Oeconomicus of 11% is less than in our field experiment of 2006 with 14% and no competition for the role of the proposer at all (Piazzolo 2007).

¹² Erika T. rejects all proposals that would have resulted in 100 EUR and 200 EUR for her. The rates of rejection are even more pronounced for the other two beneficiaries. Mathias R. would have accepted Jose J. proposal too.

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