Experiments on Ethics and Economic Behavior

Doctoral Thesis

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Preface

This doctoral thesis has three chapters. Each chapter is self-contained, and research topics are largely unrelated. The chapters do however share common elements. The two main commonalities reflect important themes of my research, and they are captured in the title "Experiments on ethics and economic behavior". Hence, the first one is methodological - the data for all three studies was collected using laboratory experimentation. The second commonality alludes to the class of decisions in which I was particularly interested from the outset of my graduate studies; in all three studies individuals face a situation that is characterized by a trade-off between ethical values and economic value. The following paragraphs provide a short discussion of these two broader aspects of my work. While all three projects shall be mentioned along the way, I refer the reader to the respective chapters for a more complete introduction into the research topics.

Laboratory experimentation in economics

During the time of my doctoral research I have spent a considerable amount of thought on methodology. Understanding and evaluating the merits and limits of different methodologies within economics I have found to be among the most challenging and oftentimes frustrating endeavors. To some extent this is also true for laboratory experimentation, which is used in many forms in economics. For instance, how does an experiment relate to theory? Is it used to test existing theory, or to inform theorists for improving theory, or both? How does the experimental setting (e.g., a game or a lottery) relate to natural settings? And then, how do the experimental results relate to behavior in natural environments? For instance, is it sensible to make quantitative or merely qualitative inferences from the results - or none at all? What is the influence of context – or the lack thereof - for this purpose? These questions have been raised in several articles, some of them quite recent, and there remains much controversy among scholars - see e.g., Smith (1994)

and Sugden (2005) on the different purposes of experimentation, Loewenstein (1999) on internal and external validity, Hogarth (2005) on representative design, Levitt and List (2006) on generalizability of experimental results. For each of the three chapters of my thesis I hope to provide – implicitly or explicitly – a sufficiently clear picture of how the experiment and the results fare with regard to these issues.

In general, I have the following three ambitions: first, each study should raise an interesting and (economically) relevant research question on a behavioral phenomenon; second, it should be clear why laboratory experimentation is a useful tool to address the question; and third, the design should be chosen such that it is a promising one in terms of relating results to behavior in natural settings.

The research question. My reasons for starting the three research projects of this dissertation were in the first instance based on my personal interest (and that of my co-authors), but I was further motivated and stimulated by previous literature on the issues. In the three chapters, the main questions are the following:

1. Do consumers pay a price premium for ethically differentiated products? If so, how much do they pay and under what conditions?
2. Does people's propensity to lie to others and to trust advice from others differ between a competitive environment and a cooperative one (e.g., in work environments)? If so, why?
3. Which among three prominent fairness notions – egalitarianism, meritocracy, and libertarian fairness - do people intuitively rely on for the division of economic gain, in particular for wage payments? How does the assignment of decision power affect allocations and fairness judgments in the division of economic gain?

Usefulness of laboratory experimentation. The most common argument for lab experimentation compared to other empirical methods is the researcher's explicit control over conditions, including information (see e.g., Kagel and Roth, 1995). Moreover, it is possible

to manipulate certain variables across treatments, ceteris paribus. These arguments hold for all three studies. In addition, in Chapter 1 the so-called "attitude-behavior gap" of survey literature on the issue, and the limited variation in naturally occurring price premia were reasons why lab experimentation appeared promising to complement other methodological approaches. In Chapter 2, the low cost and the relative ease with which experimental data can be collected may be noteworthy. An interesting additional aspect in Chapter 3 is that the experimental setting isolates relevant features of labor relations (asymmetric contribution to the generation of economic gain, different assignments of decision power, etc.), but it bars the additional contextual cues of natural settings. Whereas oftentimes the lack of context in experimental settings may give rise to concern about external validity, in this case it is rather welcome. Due to the normative implications of the research question – namely what is a fair division of economic gain – the experimental abstraction from natural context may provide interesting insights as to which fairness judgments arise due to intuitive moral reasoning, devoid of contemporary custom or ideology.

A suitable design. Experimental economists have different tastes about design. For instance, many theory-minded scholars emphasize the importance of a clear (game- or decision-) theoretical prediction. In my opinion, this is often reached only by additional artificiality of the experimental setting, which may compromise the generalizability of results to naturally occurring behavior. Moreover, once theory-testing is not the primary purpose of the experiment it may not be obvious which of rival theories should be applied for providing a clear-cut prediction. My approach in the present projects matches what Sugden (2005) calls **experiments as exhibits** with "an experimental design which reliably induces some specific regularity (or 'effect', or 'phenomenon') in human behavior (p.291)." As such, I gave first priority to capturing relevant features of natural settings in which the behavioral phenomenon takes place – of course within the restrictions imposed by a laboratory setting. Second, I tried to do so in a parsimonious way. Third, clear theoretical

predictions were welcome, but not a necessity. If possible and deemed instructive, I discussed different theories in view of the results. Last, I should note that I agree with Levitt and List (2006) in that qualitative results – in particular significant differences between experimental conditions – should be the primary source for interpretation, while precise quantitative findings need to be handled with care.

Ethics and economic behavior

I hardly heard anything of ethics during my coursework in economics. Stimulated by the thought-provoking class on international business policy by my then-prospective supervisor Marc Le Menestrel, it was personal curiosity that made me dig deeper into ethical issues and in particular into their relationship to economics. I still do not consider myself a specialist on ethics, but my foremost conclusion is that the neglect of ethics in contemporary economics is surprising as well as precarious, since at a closer look the relationship is intriguing and all-embracing. Consider the typical way of "economic thinking" which according to many economists is even the defining element of economics within the social sciences. Such thinking is the manifestation of a particular philosophy or ethics, a fact of which students are seldom aware. Boulding (1969) refers to it as "an ethic of total cost-benefit analysis", and he nicely illustrates why such "an ethic of calculation" can never represent exhaustively the complex ways of human motivation and decision-making. In my personal student career, Marc Le Menestrel was the first - and only - professor to point out the implications and limitations arising from the fact that the whole enterprise of economics is firmly based on consequentialist ethics (as opposed to deontological or virtue-based approaches). Within consequentialism, economic welfare analysis is typically rooted in the utilitarian tradition of J.S. Mill (1859). Likewise, and of more direct relevance for my present research, the analysis of individual behavior in economics usually assumes (ethical) egoism. Some scholars would deny this and point out that the notion of "utility" may

incorporate many components, some of them other-regarding or even procedural (see e.g., Becker, 1992, Maitland, 2002). Yet, within the paradigm of utility maximization something counts as valuable only if it ultimately enhances own utility. Thus, even in a more ample disguise it remains an egoistic approach to decision-making. To what extent this approach is descriptively valid is not perfectly clear to me. It may be so by definition as a purely technical "as-if" representation within revealed preference theory, but then in an unspectacular and tautological sense (see http://plato.stanford.edu/entries/game-theory/). If one attributes to it any normative implications (e.g., when "rational" is desirable), then - as Marc Le Menestrel rightly emphasizes - it propagates what Kohlberg (1973) classifies as the lowest level of moral development. Moreover, some scholars (see Frank et al, 1993, Wilber, 2004) claim that the current teaching of economic rationality inevitably transmits such normative content. My data in Chapter 1 may be seen as evidence for this claim. In any case, ethics and economics are deeply intertwined (see also Sen, 1990, Rothschild, 1993). As Hausman and Mc Pherson (1993, p.723) conclude in an overview article, "a clearer understanding of the moral perspectives that lie in the background of much of economic analysis can help economists to address the value-relevant aspects of their work".

The research in this thesis deals with a slightly different interaction between economics and ethics. In all three projects, we analyze individual behavior that is of relevance for economic phenomena, but which may reflect ethical values that conflict with economic value. Hausman and McPherson (1993, p.673) write that "the accepted morality of economic agents influences how they behave. It is among the causal factors that economists need to study." Much in line with their argument, I employ lab experimentation as an inductive method to study behavior under conflicting values. I emphasize at this point that I use "economic value" in the narrow sense of personal material (or monetary) benefit. This is restrictive, I admit, but I claim that it is a good practical restriction for the purpose of analysis. Moreover, probably no one would argue that maximizing personal benefit is

something explicitly ethical. Hence, I hope that the prevalence of conflicting values (i.e., a dilemma situation) is convincing. In fact, such dilemma situations are ubiquitous in private and professional life. Le Menestrel (2002) argues that recognizing dilemma situations instead of reducing motivations to one dimension may amplify and enhance the concept of rationality in decision-making.

In the first chapter of my thesis, we study the dilemma of a consumer who can pay more money for a substantially equivalent product which has been produced in a more ethical way (here: without child labor). The data show that many people indeed paid a higher price for an ethical version of the product, and they did so independently of knowing the extra cost for the ethical producer. In the second chapter, an expert advisor had to decide whether to tell the truth to an uninformed decision-maker even though it may be costly. A significant fraction of people did tell the truth, and there was no correlation between truth-telling and expectations of what the decision-maker will do. In Chapter 3 we assigned decision power to allocate economic gain between two actors who contributed to generating the gain. Here, fairness intuitions of the decision-maker may go against the maximization of personal gain, and the data indicate that people did indeed trade off their material self-interest with a concern for fairness.

In short, my current approach to ethics and economic behavior is primarily to choose particular (dilemma) situations and to observe participants actual behavior together with some auxiliary data (e.g., expectations about other people's behavior, questionnaire data, etc.). Hence, there is no direct normative content. However, for the descriptive analysis and for the interpretation of the results I incorporate predictions from normative ethical theories to be side by side with standard economic theory and psychological explanations. During the course of my doctoral research such a broader perspective on decision-making has vastly enriched my own thinking and my view on the motives of human behavior. Paraphrasing Loewenstein's (1999, p.F25) definition of a behavioral economist, I would like to be "an

economist who brings psychological and ethical insights to bear on economic phenomena". In this spirit, I hope for an open-minded discussion among economists.

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Chapter 1

Ethical differentiation and market behavior:

An experimental approach

(with Robin M. Hogarth and Marc Le Menestrel)

Abstract: Does ethical differentiation of products affect market behavior? We examined this issue in triopolistic experimental markets where producers set prices. One producer's costs were higher than the others. In two treatments, the additional costs were attributed to compliance with ethical guidelines. In the third, no justification was provided. Many consumers reduced their experimental gains by purchasing the ethically differentiated products at higher prices. Individual differences were important (business/economics students paid smaller premia). Finally, we speculate about the observed "demand function" for ethics and emphasize using experimental methodology to complement empirical studies in assessing markets for ethically differentiated products.

1.1 Introduction

In recent years, an increasing number of firms have started to signal that their products are produced under "fair" conditions (e.g., no child labor or no exploitation of agricultural workers). In 2002, for example, the total market for such "ethical consumption" was estimated at £19.9 billion in the UK alone (Cooperative Bank 2003). In the EU and the USA, fair trade organizations reported increases in sales of labeled products for 2003 over 2002 that varied between 42% and 91%. Moreover, similar growth rates have been observed for several years (for data see FLO 2006, TransfairUSA 2004).

Prices of fair trade products are typically higher than those of the substantially equivalent products with which they compete in the marketplace, yet there is little empirical evidence about the conditions under which consumers are prepared to pay higher prices (i.e., “ethical premia”). In discussing the role of ethics in the market place, Shleifer (2004 p. 417) uses the example of child labor, stating that “if public opinion really turns against child labor, firms that do not hire children will be able to charge higher prices.” Knowing when and to what degree such shifts in preferences occur is clearly an important practical issue.

Several surveys have already estimated consumers’ willingness to pay for ethical products[1] (see, e.g., De Pelsmacker et al. 2003). These data are hypothetical and represent attitudes that may or may not result in purchases. Thus, it is legitimate to question whether they generalize to market behavior (Carrigan and Atalla 2001, Tallontire et al. 2001). In addition, although econometric studies using market data are more credible (cf., Bjorner et al. 2004), they are subject to market frictions (e.g., limited distribution to special stores, lack of consumer information), and the variability that consumers face in observed ethical premia is limited.

[1] We use the term “ethical” in a broad sense to cover considerations of so-called “fair trade” and more specific issues such as labor standards, discrimination, and the like.

Recently, some researchers have used field experiments as a methodology to overcome these problems. Anderson and Hanson (2004) report an experiment conducted at two Home Depot stores in Oregon, where "ecolabeled" and unlabeled plywood products were sold side by side. They found that the labeled version of the product accounted for 37 % of all sales when priced at a premium of 2%. Kimeldorf et al. (2006) use a "good working conditions" label to differentiate otherwise equivalent sport socks in a department store in Michigan. They show that, even at a price premium of 40%, nearly a quarter of sales are from the labeled version of the product. They further show that the share of "ethical" sales is sensitive to changes in the size of the premium. While field experiments have the advantage of unambiguously testing "true" purchasing actions in the presence of a labeled product, they also face serious difficulties. For instance, as the authors of both studies point out, consumer information about the label is difficult to assure in a field setting.[2] In addition, field studies cannot control for sample selection since customers may seek or avoid the choice between labeled and non-labeled versions of a product.

The purpose of this paper is to apply the methodology of experimental economics to assess how much consumers are prepared to pay for "ethically produced" goods and thereby complement evidence from field studies. The principal advantages are that tradeoffs between ethical values and monetary incentives are measured by consumers' choices in controlled settings and that all participants have to make these decisions under conditions of sufficient and equal information. More specifically, we constructed a triopolistic experimental market environment with fixed demand and posted-offer pricing, where three producers and six consumers interacted in a finitely repeated trading sequence. We chose oligopolistic price competition for its simplicity and close resemblance to commonly observed retail markets. Experimental studies of such price competition confirm theoretical

[2] Interviews in the sport socks study revealed that more than half of all consumers either did not notice or did not understand the label.

Bertrand predictions for three or more producers (Fouraker and Siegel 1963, Dufwenberg and Gneezy 2000). With this design, we sought to observe producers' pricing behavior and consumers' purchases when an ethical dimension is at play. We introduced an asymmetry in production costs, as done by Gneezy and Nagel (2001), for a comparison of symmetric and asymmetric cost in duopoly markets, but explicitly linked this to an ethical issue. For consumers, the ethical issue was that one firm's products were differentiated as involving no child labor. This was made operational by donating the amount of extra costs to an NGO fighting child labor. Moreover, experimental participants observed these payments being made on-line by internet.

We observed frequent premia for the ethically differentiated version of the product in the experimental markets. Our results showed that many consumers paid ethical premia of different sizes, thereby reducing their monetary gains. Ethical producers recovered profits per unit similar to other producers. Moreover, if consumers lacked explicit knowledge of costs incurred by producers to meet ethical standards, they still paid a premium for ethically produced goods. At the same time, we noted the importance of individual differences (students of business and economics were less willing to pay ethical premia than those from other social sciences and the humanities). We further demonstrated that willingness-to-pay as measured by attitudes was significantly lower for consumers who had previously participated in an ethical market session as opposed to those who had not. This has important implications for the use of surveys in determining the potential size of markets for ethical goods.

Our use of experimentation is in line with recent developments in experimental methodology, which propagates the use of context in experimental instructions when this is relevant to the research question (Harrison and List 2004 p.1028, Hogarth 2005, Cooper et al. 1999). In the present investigation, we are asking what happens in a market situation when a specific kind of label is attached to a product. In our case of an ethical label,

economic actors are faced with tradeoffs between ethical values and changes in their monetary gains. As such, manipulation of context is essential to our experimental design. Finally, we note that the importance of similar contextual effects has been recognized for some time in the related field of behavioral decision making (see, e.g., Einhorn and Hogarth 1981, Kahneman and Tversky 2000, Slovic et al. 2002).

1.2 Experimental design

In the experiment, three producers and six consumers exchanged units of a product during 15 periods. In each period, producers first simultaneously posted their prices per unit. Subsequently, consumers purchased the product simultaneously. Consumers had to buy three units in each period, but they were free to choose from which producer(s) they wanted to buy. After each period, producers received the full history of prices and sales. Hence, each experimental session involved 15 periods of a triopolistic experimental market with a fixed demand of 18 units per period (i.e., 270 units per experimental session). Consumers were allocated a fixed budget of 300 ECU (Experimental Currency Units) per period and kept the money unspent. Two producers, A and B, incurred production costs of 20 ECU per unit. Producer C had a production cost of 25 ECU. Producers were free to choose a price between their cost of production (the minimum) and a maximum of 100 ECU. For every unit sold, producers' profits were the difference between their price and production cost.

We ran three treatments. Treatments 1 and 2 were meant to create an experimental analogue to ethical differentiation as experienced in the marketplace. In these treatments, producers were described as international firms whose production facilities were in regions where child labor was prevalent. Producer C was said to comply with the conditions of an internationally recognized NGO fighting child labor.[3] We provided details of the NGO's

[3] This was part of the hypothetical market frame. Participants knew that producers were randomly assigned by us to play the role of producer A, B, or C.

activities and the conditions necessary for use of its label. Meeting these requirements, however, implied an increase in production costs. Producer C thus incurred an additional cost per unit. On the screen, Producer C was labeled with an asterisk (*). Participants were further informed that, for every unit sold by Producer C*, a donation equal to the additional production cost would be paid to an NGO fighting child labor (the specific industry in which the NGO operates was not revealed). At the end of each experimental session, the accumulated ethical contributions were transferred on-line to the NGO in the presence of the participants (cf., Eckel and Grossman 1996). Hence, by providing specific ethical reasons for the additional costs and by linking purchasing decisions to real donations, we created an ethical differentiation. When Producer C* was not the cheapest, consumers faced a trade-off between wealth and ethics.

In treatment 1 (labeled "ethical differentiation - extra cost known"), consumers knew that the amount of extra cost incurred by producer C* for complying with the NGO's standard was 5 ECU. In treatment 2 (labeled "ethical differentiation - extra cost unknown"), consumers were aware that producer C* incurred extra costs, but did not know the amount. For both treatments we conducted six experimental sessions with 54 participants (i.e., a total of 108 participants).

Treatment 3 was a control condition with "pure cost differentiation – extra cost known". Here, the instructions simply stated that producers were three international firms competing in a market, and that producer C incurred production costs that were 5 ECU per unit higher than those of A and B. Thus, in this control treatment no reason was provided for the extra production cost. Six sessions were run with 54 participants.

Treatment 1 served as a benchmark. We gave consumers as much information as possible. In treatment 2 we wanted to approximate the more natural setting where the amount of extra production costs is unknown. The goal of treatment 3 (pure cost

differentiation) was simply to test whether results in treatments 1 and 2 could be attributed to the ethical dimension.

The experiments were conducted in the Experimental Economics Laboratory at Pompeu Fabra University. Subjects were undergraduate volunteers from various fields of study (mostly economics, business, humanities, political sciences). A session lasted between sixty and ninety minutes. This included completing a post-experimental questionnaire. Participants earned on average €8.06 plus a show-up fee of €5. At the beginning of the experiments, participants were randomly assigned to computers, then the instructions were distributed and also read out aloud. Participants learned their roles when the first screen appeared. They stayed in the same roles throughout the entire session. For further details, see the Appendix.

1.3 Results

Treatment 1: "ethical differentiation - extra cost known." In all six sessions, the average posted price of producer C* was higher than the average posted price of producers A and B. Over all six sessions, the average price posted by C* was 39.8 ECU while the average price posted by producers A and B together was 33.3 ECU. The dynamics of average prices over all six sessions for C* compared to A and B is shown in Figure 1.1a. In 14 out of 15 periods, producer C* posted on average higher prices than producers A and B.

In the upper left section of Table 1.1, we show how the prices of C* compared with those of A and B. Producer C* posted the highest price in 64 of the 90 periods (71%) and accounted for 195 purchased units (17% of the total). In 24 periods (27%), C*'s price lay between that of A and B, yielding a market share of 25%. When C*'s price was the lowest, it captured 97% of the market (but this only occurred in 2 periods). Overall, producer C* sold 337 (21%) of all units, for which consumers paid an average price of 34.7 ECU. Producers A and B together sold 1,283 units (79%) at an average price of 26.8 ECU; 1,261 of these units

(i.e., 98%) were purchased at the minimum price posted in the respective periods (not shown in Table 1.1). In contrast, only 35 of the 337 units sold by producer C* (i.e. 10%) were purchased at the minimum price.

Figure 1. 1a -- Average Pricing Dynamics A&B vs. C*
Treatment 1 – "ethical differentiation - extra cost known"

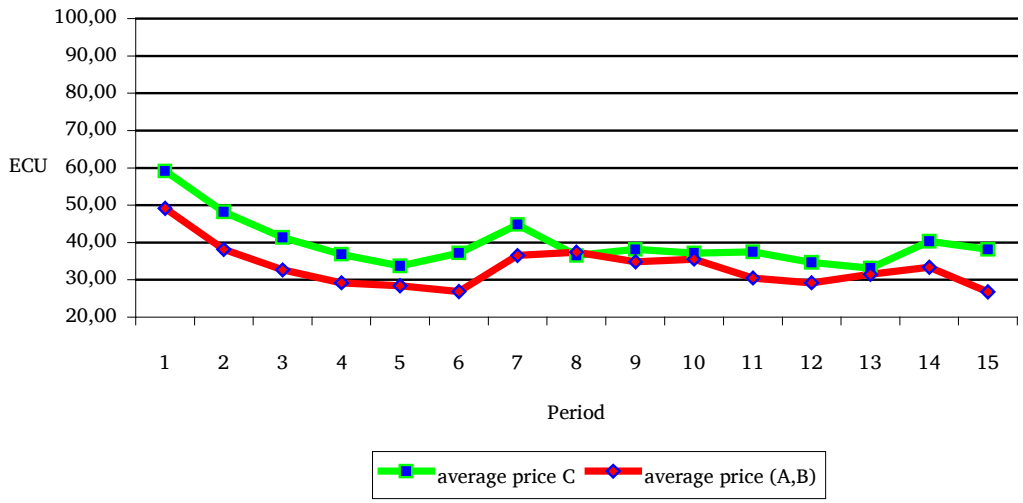
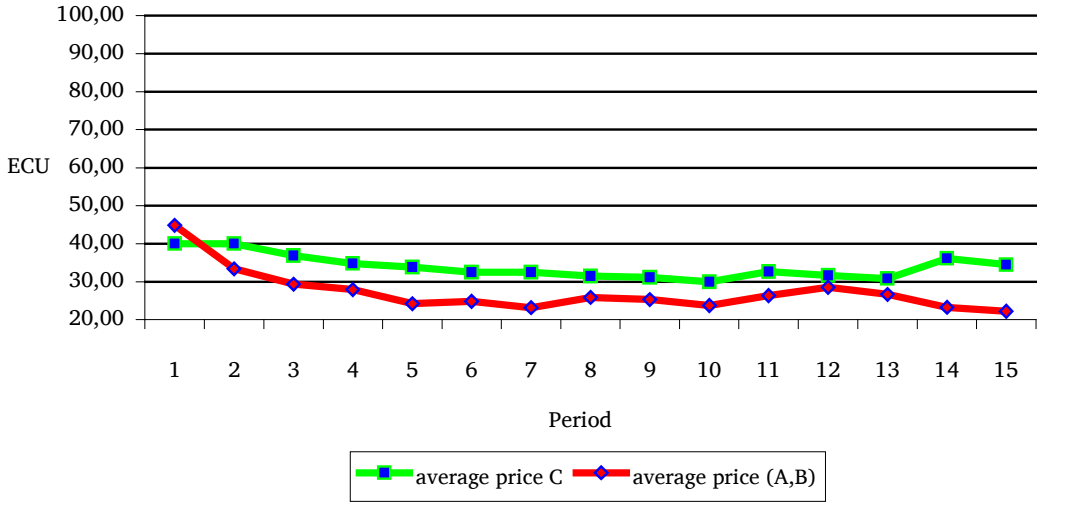


Figure 1. 1b -- Average Pricing Dynamics A&B vs. C*
Treatment 2 – "ethical differentiation - extra cost unknown"



Treatment 2: "ethical differentiation - extra cost unknown." In five out of six sessions the average price of producer C* was higher than the average price of A and B. Over all six sessions, producer C* posted an average price of 33.93 ECU, while producers A and B posted an average price of 24.87 ECU; see Figure 1.1b.

As shown in the upper right section of Table 1.1, C* posted the highest price in 75 periods (83%); in these periods he sold 27% of all units. In 9 periods C*'s price lay between that of A and B and accounted for 28% of sales. In the 6 periods where C*'s price was the lowest, he sold 100 of 108 units (92%). Over all periods, C* sold 510 units (31%) for which consumers paid an average price of 31.70 ECU. Producers A and B sold a total of 1110 units (69%) for an average price of 23.60 ECU; 1094 of these units (i.e., 99%) were purchased at the minimum price posted in the respective periods (not shown in Table 1.1), whereas only 100 of the 510 units sold by producer C* were purchased at minimum price (i.e., 20%).

Control treatment: "pure cost differentiation – extra cost known." In all six sessions the average price of producer C was higher than the average price of A and B. The high-cost producer C posted an average price of 41.23 ECU, while producers A and B posted an average price of 34.56 ECU. As shown in the lower left section of Table 1.1, C posted the highest price on the market in 61 periods (68%), in which he made 2% of all sales (i.e., 24 of 1098 units). In 15 periods, C had the intermediate price and sold only 15 units (6%). In the 14 periods (16%) for which he posted the lowest price, he made 79% of all sales (i.e., 198 of 252 units).

Overall, C sold a total of 237 units (15%), for which consumers paid an average price of 38.72 ECU. A and B sold a total of 1383 units (85%) for an average price of 27.30 ECU; 1318 of the units sold by A and B (i.e. 95%) were purchased for the minimum price posted in the respective periods (not shown in Table 1.1). Of the 237 units sold by C, 207 (i.e., 87%) were purchased for the minimum price.

Table 1. 1 -- Unit sales of producers as a function of C's price relative to those of A and B

		Extra cost known			Extra cost unknown		
		Numbers of periods	Units sold*		Numbers of periods	Units sold*	
			A & B	C		A & B	C
Ethical differentiation	C posts maximum price	64	957 (59%)	195 (12%)	75	986 (61%)	364 (22%)
	C's price between A and B	24	325 (20%)	107 (7%)	9	116 (7%)	46 (3%)
	C posts minimum price	2	1 (0%)	35 (2%)	6	8 (0%)	100 (6%)
		90	1,283 (79%)	337 (21%)	90	1,110 (69%)	510 (31%)
		Numbers of periods	Units sold*				
			A & B	C			
Pure cost differentiation	C posts maximum price	61	1,074 (66%)	24 (1%)			
	C's price between A and B	15	255 (16%)	15 (1%)			
	C posts minimum price	14	54 (3%)	198 (12%)			
		90	1,383 (85%)	237 (15%)			

* Percentage of total number of units (1,620) in parentheses

1.4 Discussion

Pricing behavior. We constructed the experiment to reflect an ethical differentiation in a market for an otherwise substantially equivalent product. We suspected that producers incurring extra production costs for an ethical reason would price their product at a premium. Indeed, as noted previously, C*'s average price was significantly higher in both treatments with ethical differentiation (ethical differentiation - extra cost known: 39.8 ECU for C* vs. 33.3 ECU for A and B, $t = 4.13$, $p < .01$, $df = 5$; Wilcoxon Rank Sum test (WRS): $Z = -2.2$, $p < .05$; ethical differentiation - extra cost unknown: 33.9 ECU for C* vs. 24.9 ECU for A and B, $t = 2.28$, $p < .1$; WRS: $Z = -2.0$, $p < .05$). In contrast, the difference between the mean premia of A and B is not statistically significant (ethical differentiation - extra cost known: $t = 0.52$, ns, $df = 5$; WRS: $Z = -1.2$, ns; ethical differentiation - extra cost unknown: $t = 0.10$, ns, $df = 5$; WRS: $Z = -.1$, ns).

The control treatment shows that pure cost differentiation also induced producers to price higher (41.2 ECU for C and 34.6 ECU for A and B; $t = 2.36$; $p < .1$; WRS: $Z = -2.2$, $p < .05$). Thus, it is difficult to disentangle the effects of ethical and cost differentiation on price setting. In any case, the experiments show that producers do not price substantially equivalent products identically.[4]

Purchasing actions. We refer to prices that exceed the minimum posted price as involving positive premia (i.e., premium equals price less minimum price posted in period). For substantially equivalent products, one might expect consumers to buy all units from the lowest price producer (i.e., at a zero premium). We refer to this as the "standard prediction."

In both treatments with ethical differentiation, purchases from producers A and B were largely in line with this prediction. In treatment 1, only 22 of 1283 units (2%) were sold at

[4] As noted previously, both theory and experimental evidence (Fouraker and Siegel 1963; Dufwenberg and Gneezy 2000) suggest Bertrand outcomes for three producers. Our results deviate significantly from this prediction; see Figure 1.1. The inelastic demand in our design may contribute to this difference in market outcomes.

prices above the minimum, and 16 out of 1110 units (1%) in treatment 2. In contrast, consumers paid a premium for 302 of 337 units (90%) of C*'s version of the good in treatment 1 and for 410 of 510 units (80%) in treatment 2, thereby suggesting that these purchases were motivated by ethical considerations. Moreover, in the control treatment with pure cost differentiation, the high-cost firm C sold only 34 of its 237 units (13%) at a positive premium, compared to 65 of 1383 units (5%) sold by firms A and B. Figures 1.2a, b and 1.3a,b show premia and corresponding market shares for all periods of all six sessions in each of the two ethical differentiation treatments. To be consistent with the standard prediction, all observations should lie either on the horizontal axes (i.e., positive premia imply zero market shares) or on the vertical axes (i.e., positive market shares with zero premia). Across both treatments, for all 360 observations for producers A and B, 337 (94%) do indeed lie on one of the two axes. In contrast, this is only true for 29 of 180 periods (16%) for the ethical firm C*. In 151 cases consumers paid positive premia. In the control treatment with pure cost differentiation, consumer behavior is largely consistent with the standard prediction. For the 90 periods, this is true for 76, 73, and 71 periods for the products of A, B, and C, respectively. The pattern of the data in Figure 1.4a is similar to that of producers A and B in Figure 1.4b and not to that of producer C* in Figures 1.2a and 1.3a. Consumers do not pay positive premia for a purely cost differentiated product.

In conclusion, many consumers paid positive premia for ethically differentiated products. Without ethical differentiation, consumers typically purchased at the lowest price, irrespectively of the producers' costs. Interestingly, paying an ethical premium does not require knowledge of the extra costs needed to conform to ethical guidelines. If anything, in our experiments higher premia were paid when such extra production costs were unknown.[5]

[5] In the "extra cost unknown" treatment, it seems natural to ask what prior distributions consumers might have had concerning the additional costs incurred by Producer C*. Surprisingly, post-experimental questionnaires revealed that less than two-thirds of consumers had such expectations at all.

Figure 1. 2a -- Premium and Market Share Producer C*

Treatment 1 - "ethical differentiation - extra cost known" (90 observations)

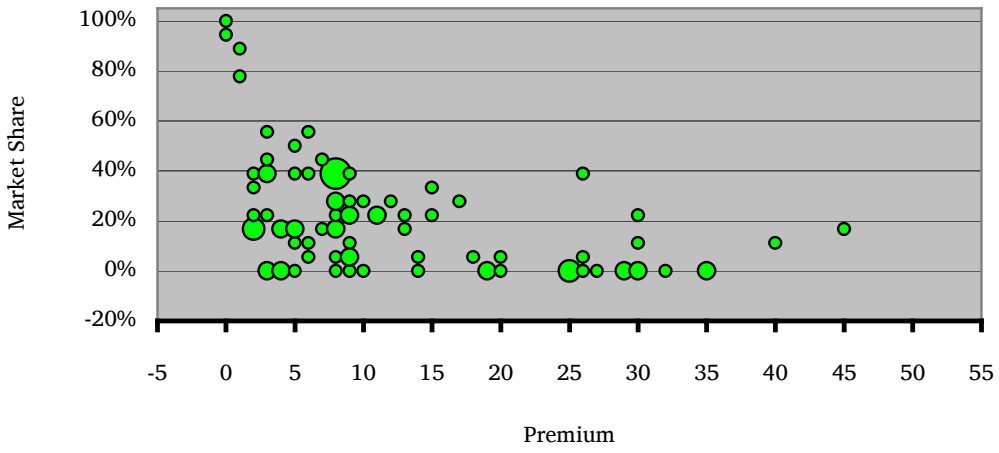


Figure 1.2b -- Premium and Market Share Producers A & B

Treatment 1 - "ethical differentiation - extra cost known" (180 observations)

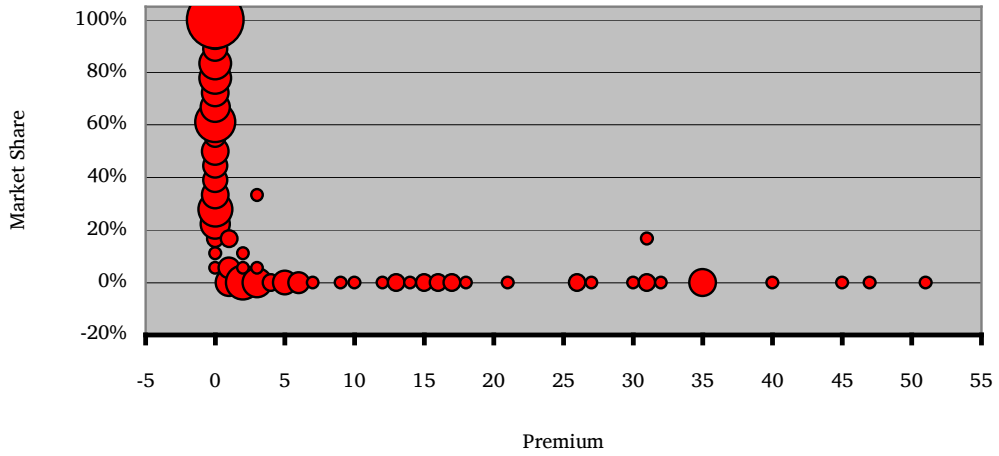


Figure 1.3a -- Premium and Market Share Producer C*

Treatment 2 - "ethical differentiation - extra cost unknown" (90 obs.)

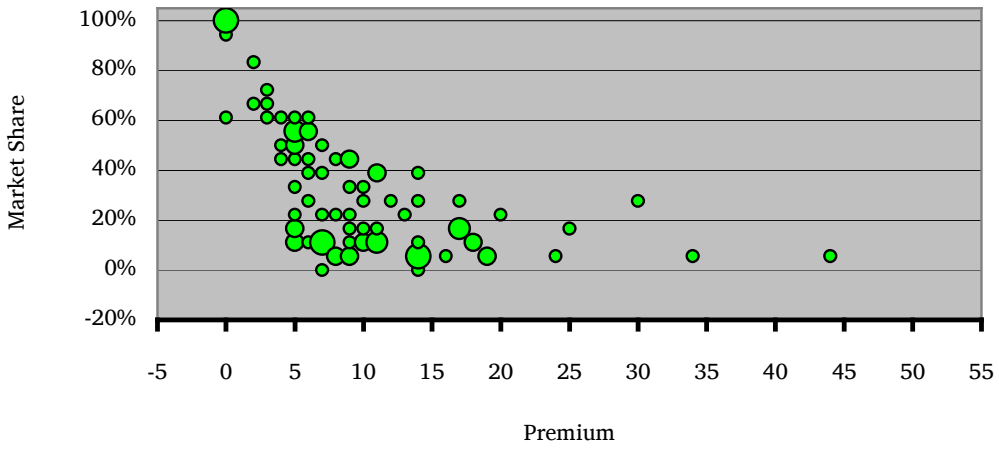


Figure 1.3b -- Premium and Market Share Producers A & B

Treatment 2 - "ethical differentiation - extra cost unknown" (180 obs.)

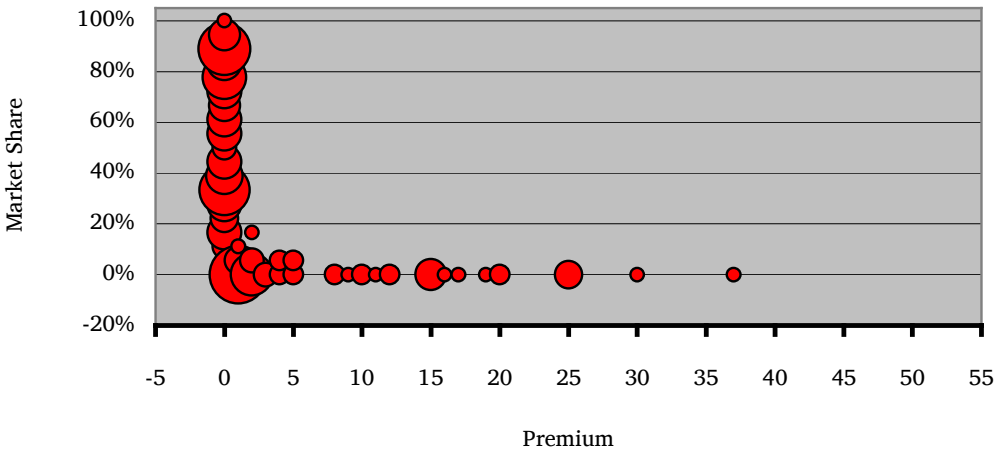


Figure 1.4a -- Premium and Market Share Producer C

Control treatment - " pure cost differentiation - extra cost known" (90 obs.)

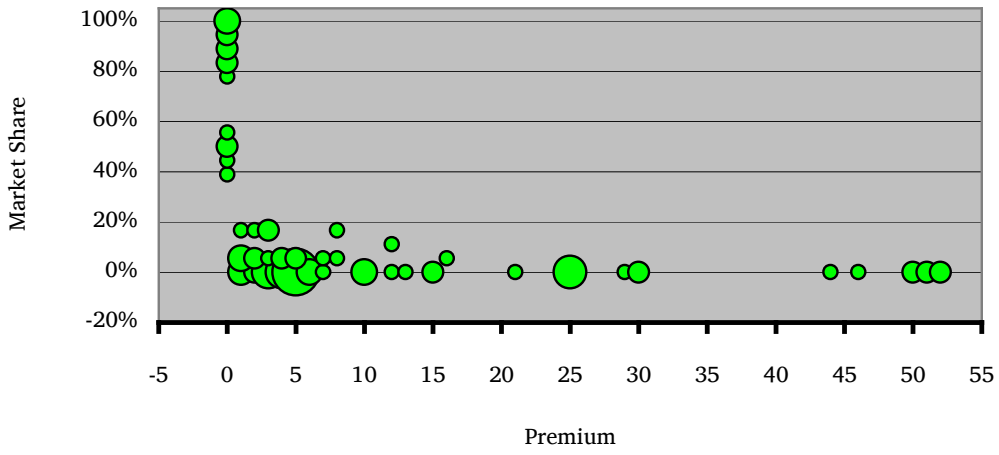
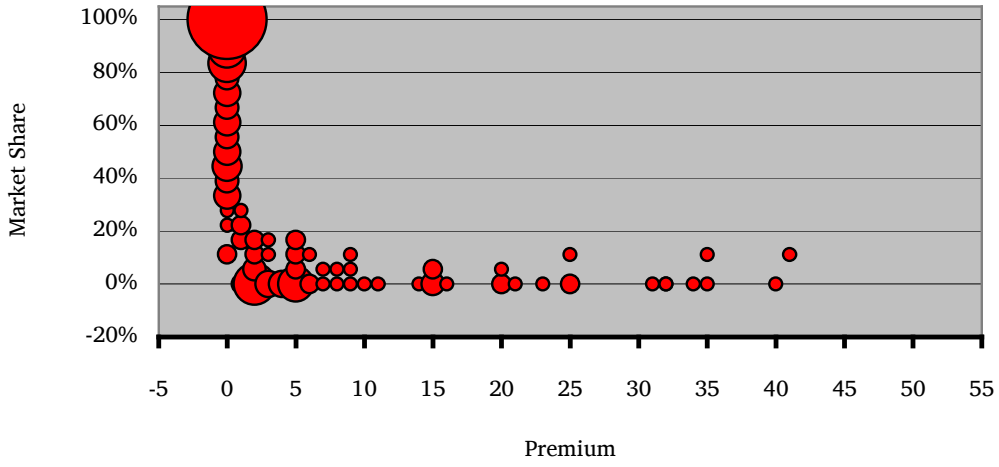


Figure 1.4b – Premium and Market Share Producers A, B

Control treatment – “pure cost differentiation - extra cost known” (180 obs.)



Profits and sales from ethical production. The sales figures shown in Table 1.1 indicate that across both ethical differentiation treatments, the ethical producer C* had an overall market share of 26% (847 of 3,240 units). C*'s average price per unit sold was higher than those of A and B (32.9 vs. 25.3), and the difference between them (7.6 ECU) exceeds the additional 5 ECU production cost paid by C*. Thus, the sales margin per unit is higher for C*. Also, the ethical producer makes more profits than A and B. C*'s average profits per session are 557 ECU, while A and B gain 529 ECU on average. The average donations per session are 353 ECU.

Separating the data for treatments 1 and 2, however, profits and sales are quite different. In the "extra cost known" treatment, C*'s market share is 21% with an average sales price per unit sold of 34.7 ECU (vs. 26.8 for A and B). Due to the low market share, C* in this treatment makes less average profit than producers A and B (545 ECU vs. 724 ECU). In the "extra cost unknown" treatment, C*'s market share is 31% with an average sales price per unit sold of 31.7 ECU (vs. 23.6 for A and B), which leads to a higher average profit for C* (570 ECU vs. 333 ECU). In accordance with the differences in market share, the average amount of donations in this treatment is higher than in the "extra cost known" treatment (425 ECU vs. 281 ECU).

These figures suggest, almost paradoxically, that ethical firms stand to gain when consumers are ignorant of the costs of compliance with ethical standards. The direction of the difference, however, may be specific to the amount of extra cost that we examined (i.e., 5 ECU).

Ethical purchasing behavior

Each of the two ethical treatments (i.e., "extra cost known" and "extra cost unknown") with 36 consumers who faced 15 periods of different price constellations provides a data set of 540 purchasing observations. For both treatments, we want to explain the number of

units a consumer purchases from the ethical producer in a certain period. By construction of the experiment, this is limited to 0, 1, 2, or 3 units.

We specify models of the following form:

(1) $$y_{it} = x_{it}^{'}\beta + u_i + e_{it},$$

where the index i denotes the different individuals ($i = 1,\ldots, 36$) and t denotes different time periods ($t = 1,\ldots,15$). The vector x consists of explanatory variables (to be defined below), and the error term differentiates between unobserved individual effects, u_i, and idiosyncratic errors, e_{it}.

We considered three types of explanatory variables: price, individual characteristics, and time/wealth. To show the effects of price, we included both the ethical premium and the minimum price in each period using the latter to represent the price level. These variables vary across both time and individuals. The only individual variable (codified by a dummy) we considered was whether participants were students of economics/business. To filter out possible primacy effects, we included dummy variables for the “first 3 periods”. Last, we included the gain a consumer had already accumulated prior to the purchasing decision (wealth).

We tested different specifications of equation (1), the results of which are summarized in Table 1.2. The standard OLS regression does not use the panel characteristics of the data nor take into account the categorical nature of the dependent variable but can serve as a first approximation. We next performed both fixed effects (FE) and random effects (RE) analyses. We rejected the fixed effects model by testing that there was significant variance in u, the individual effects for both data sets (χ^2 (1) = 289.8 for "extra cost known"; χ^2 (1) = 509.4 for "extra cost unknown"). For the data from "extra cost known", the Hausman test allows us to reject the null hypothesis that there is correlation between x and u (p = .36). For the data from "extra cost unknown" we cannot reject this hypothesis (p = .01). However, since we are primarily interested in directional effects and their statistical

significance, and since the individual effects are of particular importance to our analysis, we decided to prefer a random effects over a fixed effects specification for both data sets. We next sought to improve model specification by matching distributional assumptions with the count data characteristics of the dependent variable (0, 1, 2, or 3 ethical units, cf. Cameron and Trivedi 1998). Specifically, we estimated the Poisson RE and negative binomial RE models and found little difference between their coefficients. Since the negative binomial RE is less restrictive (i.e., allowing for over-dispersion), we deem this model to be the most plausible for these data. In general, the results in Table 2 are remarkably robust across the different specifications.

Price dependence. It is reasonable to assume that higher ethical premia are less likely to be accepted by consumers than lower ones. Indeed, for both treatments this is confirmed in our data by the coefficient for the ethical premium variable that is negative and highly significant.[6] The coefficient for the price level variable tests dependence of purchases on the general price level. This is positive and significant for both treatments and indicates that a given premium is more likely to be accepted at a higher price level. It also raises the issue of whether consumers accept to pay premia based on their absolute value or relative to the price of the regular product. However, this issue requires further research.

Effects of university education. Whereas much evidence exists documenting a relation between type of reasoning and educational discipline (see, e.g., Nisbett et al. 1987), does training in economics and business affect the paying of ethical premia? Larrick et al. (1990) showed important effects across different contexts for economic cost-benefit reasoning (see also, Larrick et al. 1993); and Frank et al. (1993) have documented that economics students act less cooperatively in Prisoner Dilemma games. However, it is not clear whether this apparently more self-interested behavior generalizes to participants' natural environments

[6] Out of 439 purchases that involved ethical units, consumers bought all 3, 2, or only 1 unit of the ethical version in 177, 54, and 208 cases, respectively.

(see Yezer et al. 1996). Of the 72 undergraduates playing the roles of consumers in our ethical treatments, 45 (63%) were students of economics or business and the rest from other fields (law, humanities, and other social sciences). Thus, given that these participants made choices under market conditions, our experiment provides a sharp test of the effects of economics or business training on the payment of ethical premia. The models specified in Table 1.2 show a significant and negative impact of the relevant dummy variable in both ethical treatments. That is, students of economics or business at Pompeu Fabra University bought fewer units of an ethically differentiated good than students from other fields of studies. It would, of course, be interesting to test whether this result generalizes to other student populations. More generally, the finding raises the issue of identifying segments of populations of consumers who are more or less likely to pay ethical premia.

Primacy and wealth effects. One might expect greater prominence of the ethical dimension at the outset of the experiment when the salience of the ethical issue in the instructions is most recent. We test this suspicion by introducing a dummy for the first three periods. Table 1.2 shows that this does not seem to be the case, since for both treatments coefficients in the OLS regression are not significantly different from zero. We dropped this variable for the other models. Furthermore, greater gains prior to the purchasing action could lead to higher acceptance of ethical premia, in the sense that one can better afford to be ethical at higher wealth levels. Here, the results of our data are ambiguous. While the coefficient in the "extra cost known" treatment is insignificant, it has the expected positive sign and is significant ($p < .05$) for all models in the "extra cost unknown" treatment. A possible explanation may be that both wealth and information about production costs can serve as justifications for purchasing actions, but that, when available, cost information is the dominant factor. Only when such information is missing does wealth influence acceptance of ethical premia.

Table 1.2 -- Regression models for purchases of ethical units

	OLS Regression	FE Regression	RE Regression	Poisson RE Regression	Neg. Binomial RE Regression
			Treatment 1: "extra cost known"		
Price variables:					
Price level	.012	.022	.021	.035	.037
	*(2.02)**	*(3.84)***	*(3.69)***	*(3.38)***	*(3.19)***
Ethical premium	-.027	-.030	-.030	-.097	-.112
	*(-7.71)***	*(-9.30)***	*(-9.27)***	*(-9.92)***	*(-9.28)***
Individual effects:					
Econ/Business	-.613		-.622	-.912	-.888
	*(-6.87)***		*(-3.06)***	*(-2.41)**	*(-2.42)**
Other effects:					
First 3 Periods	.064				
	(-.44)				
Wealth	-.004				
	(-.21)				
Constant	1.066	0.423	0.872	0.040	2.215
	*(4.63)***	*(2.65)***	*(3.91)***	*(.10)*	*(3.83)***
Observations	540	540	540	540	540
# of individuals	36	36	36	36	36
R-squared	.161	.158	.158		
Log Likelihood				-461.6	-456.8
			Treatment 2: "extra cost unknown"		
Price variables:					
Price level	.078	.113	.097	.071	.071
	*(4.39)***	*(7.96)***	*(6.62)***	*(3.85)***	*(3.85)***
Ethical premium	-.047	-.055	-.050	-.089	-.089
	*(-6.81)***	*(-8.44)***	*(-7.85)***	*(-7.06)***	*(-7.06)***
Individual effects:					
Econ/Business	-.501		-.491	-.491	-.492
	*(-5.62)***		*(-3.81)***	*(-1.77)+*	*(-1.77)+*
Other effects:					
First 3 Periods	-.026				
	(-0,15)				
Wealth	.038	.064	.054	.050	.050
	*(2.00)**	*(4.94)***	*(3.88)***	*(2.68)***	*(2.68)***
Constant	-.398	-1.625	-.933	-1.108	15.109
	(-.81)	*(-3.94)***	*(-2.12)**	*(-1.78)+*	*(.05)*
Observations	540	540	540	540	540
# of individuals	36	36	36	36	36
R-squared	.235	.260	.234		
Log Likelihood				-582.5	-582.5

- Values of t statistics in parentheses
- + significant at 10%; * significant at 5%; ** significant at 1%

Willingness-to-pay statements and experienced behavior

One goal of the present work was to circumvent the attitude-behavior gap that renders questionable willingness-to-pay statements in survey studies. Whereas we could not assess the size of such a gap in our experiments, the post-questionnaire completed by all participants can illuminate the more general role of prior experience in making willingness-to-pay statements. Specifically, we compare such statements between the 36 participants who had acted as consumers in the "ethical differentiation - extra cost known" treatment (henceforth labeled "experienced"), and the 36 participants who had acted as consumers in the "pure cost differentiation – extra cost known" control treatment, where no ethical dimension was involved (henceforth labeled "inexperienced"). In the post-questionnaire, the inexperienced were presented with details of the ethical issue and the NGO in the same manner as the instructions for the ethical differentiation treatments of the experiment. Both groups of participants were asked how much more they would be willing to spend for a product that was produced without child labor and had been certified by the NGO as such, when the corresponding, unlabeled product was priced at 25 ECU and 50 ECU, respectively.[7]

The results in Table 1.3 show large differences between the two groups. For a regular price of 25 (50), experienced participants stated an average acceptable premium of 6.6 (6.8), much lower than the average acceptable premium of 16.2 (13.2) stated by inexperienced participants. The differences between the means of the two groups are statistically significant – $t = 4.14$ (2.95), $p < .01$ (.01).

These results show the effect of recent behavioral experience on willingness-to-pay statements (a possible "anchoring" effect). They suggest potential bias in surveys that are not grounded in experience. They further support the use of experimentation to minimize the gap between attitudes and behavior.

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[7] We do not rule out that the extra cost of 5 ECU in the experiment influenced the amounts stated. We used only data from consumers in both "extra cost known" treatments to assure comparability.

Finally, the average stated premia for 25 ECU and 50 ECU are similar within both experienced and inexperienced, and the within-group differences are not statistically significant. However, we do not emphasize this result because the data exhibit considerable individual variability.

Table 1.3 -- Comparisons of willingness to pay: Experienced vs. Inexperienced

	For regular price of	
Average acceptable premium in willingness-to-pay statements	25 ECU	50 ECU
Experienced (n = 36)	6.6	6.8
Inexperienced (n = 36)	16.2	13.2

1.5 Conclusion and implications

We conducted market experiments to explore the behavior of economic actors when a traded good involves an ethical dimension and when selling the ethically differentiated version of the good implies an increase in production costs. We show that producers price products with higher costs at a premium and that many consumers accept to pay this premium when it is linked to an ethical differentiation. In our experiments, we also found that consumers pay such premia when they lack knowledge of the amount of extra costs incurred by ethical producers.

The role of individual differences was emphasized by the finding that students of economics and business are less prepared to pay ethical premia than students from other fields. Our work further demonstrates that people with experience in the ethical

experimental market state a significantly lower willingness-to-pay than those without such experience.

Our data can be viewed from perspectives of both consumers and firms. Purchasing data can be thought of as illustrating a demand for ethics. The general trend is downward sloping as confirmed by the negative coefficients for the price premium variable of the regression analysis reported in Table 1.2. Figures 1.2a and 1.3a show that demand for the ethical good falls rapidly between premia of 0 to approximately 5 and is quite flat thereafter. However, as noted above, our data are marked by important individual differences, and it is unclear how the "demand function" might vary for different segments of the population. (See also Carrigan et al. 2004, concerning the "older" market.) Understanding such variation is an important topic for future research. Moreover, we suspect that this could be sensitive to contextual variables that are typically not studied in economic analyses (cf., Hsee and Rottenstreich 2004).

As to producers, the existence of distinctive regions of price sensitivity suggests discontinuities in optimal price setting for ethical goods. More specifically, when the general price level is close to marginal cost, profit is maximized by posting a large premium thereby obtaining high profit from a small fraction of ethical consumers. In contrast, the ethical producer's optimal premium is zero for higher prices where maximal profits are captured by a large market share. Indeed, this analysis demonstrates the potential of experimental methods to illuminate the consequences of different pricing strategies that would be difficult to examine in field studies characterized by inattentive consumers and noisy data – in particular, in regions involving low premia and high market shares. Firms can, of course, elect to become ethical producers for many reasons. Our work suggests the possibility of assessing the economic consequences of such decisions.

In our experiment, we cannot eliminate the possibility that ethical purchasing behavior was subject to a so-called experimenter effect; that is, participants wanted experimenters to

see that they had acted "ethically." Such effects have been documented in dictator-game experiments (Hoffman et al. 1996). However, it is important to note that our experiments differ significantly from dictator games in that they involved repeated market transactions as opposed to single social actions. If indeed there were such experimenter effects, they could go both ways.[8] In addition, unlike dictator-game experiments, our primary goal was not to identify and separate the contributions of different motivations. Indeed, we strongly suspect that purchasing ethical goods in the presence of others can induce similar social demand effects in the marketplace. Whether and to what extent ethical purchasing is sensitive to higher and lower levels of social presence is an important question for further research.[9]

As noted at the outset, this work recognizes that contextual variables can play an important role in economic phenomena. Specifically, we introduced one contextual modification (concerning ethical differentiation) into an otherwise abstract market setting and observed the consequences. Our use of a specific contextual variable (i.e., ethical product differentiation) was guided by the observation of a specific market phenomenon (the existence of "fair trade"). We do not claim that all contextual variables would have similar impacts. Finally, given the ambiguity of interpreting empirical studies on the market for "ethical" goods, we believe our approach provides a valuable complement for what is becoming an increasingly important issue for both firms and consumers.

[8] After all, economics students seem to be willing to adhere to an "economic normative" of buying at lowest cost. Indeed, some of our experimental participants explicitly justified their actions using this argument in the post-experimental questionnaire.

[9] For effects of social presence on preferences in another context, see List et al. (2004).

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Chapter 2

Truth and Trust in Communication -
An experimental study of behavior under asymmetric information

Abstract: The paper presents an experimental study of truth telling and trust in communication under asymmetric information. In a two-player Communication Game (cf., Gneezy, 2005), an informed "advisor" sends a message to an uninformed "decision maker", who then has to decide whether to follow the advice. The advisor may gain more by lying in the message. In two treatments, either a cooperative or a competitive context is induced before participants play the Communication Game. Advisors are unaffected by this contextual variation. In contrast, decision makers in the competitive context trust the advice less than in the cooperative context. The data provide evidence that this change in trust is due to different perceptions of the incentive structure. Individual differences in behavior can be related to certain personal characteristics (field of studies, gender, personality test scores). The data are largely in line with Subjective Equilibrium Analysis (Kalai & Lehrer, 1995).

2.1 Introduction

It has been shown that trust in institutions and in fellow citizens is related to the smooth functioning of societies and to their economic development (Knack and Keefer, 1997). Trust promotes cooperation, especially in large organizations, including firms (La Porta et al., 1997).[10] As such, trust is a main component of "social capital". In his famous work on trust and prosperity, Fukuyama (1995) provides a very general definition of **trust.** In his view, "trust is the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on part of other members of that community". In this study, the focus is on trust with respect to honesty in communication, i.e., telling the truth. Telling the truth is a particularly important norm, which is shared by communities around the globe. Trust with respect to truth telling is also what Rotter (1971, 1980) emphasizes when he defines trust as a "generalized expectancy held by an individual that the word, promise, oral or written statement of another individual or group can be relied on". In short, such trust can be described as the **belief that others tell the truth.**[11]

Both truth telling and trust - as specified here - play a role in situations of information asymmetry, where people have to rely on a report or on advice from a better informed person. These situations have received great attention in the theoretical economic literature, which is by no means surprising if one considers their ubiquity in social and economic life, e.g. any sales situation where the seller has superior knowledge (cf., Akerlof, 1970). Far more surprising is the fact that truth telling and trust have been neglected for so long in empirical work. This may be due to the dominance of the economic rationality paradigm, which assumes that people lie whenever they have an incentive to do so. According to such

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[10] These studies use survey data to measure the level of trust, more specifically the question "Generally speaking, would you say that most people can be trusted, or that you can´t be too careful in dealing with people?".

[11] The notion of trust both in everyday usage and in the interdisciplinary literature is broad (McKnight and Chervany, 2001). Some experimental work in economics employs a game which was introduced by Berg,

analysis, “cheap talk” conveys informational content only in a limited number of settings, where both parties know that incentives are aligned (Farrell and Rabin, 1996; Crawford, 1998)[12]. Yet, it is questionable whether that kind of confidence should be called trust at all, or whether trust should rely on a belief in truth telling independently of the incentive structure (see Knack, 2001; Rotter, 1980; Yamagishi and Yamagishi, 1994). Moreover, experimental testing of the theoretical predictions have frequently reported “overcommunication”, i.e., more truth telling than economic equilibrium theory would predict (e.g., Blume et al., 2001, Cai and Wang, 2006). Recently, Gneezy`s (2005) contribution on the role of consequences for lying started a discussion about the motivations behind such costly truth telling (Charness and Dufwenberg, 2005; Sutter, 2006; Hurkens and Nartik, 2006).

A central motivation for this work is to test the influence of a competitive context on truth telling and trust. The importance of context for individual perception and decision-making is increasingly recognized in the Economics literature (Levitt and List, 2006). But this insight is not novel. Lewicki et al (1998) note that the influence of the social context on trust has been neglected in research across all social sciences. With respect to truth telling, Ross and Robertson (2000) find in a survey study that people's inclination to deceive others changes depending on the role of the counterpart, e.g. own firm, a client, or a competitor. One may argue that if there were an effect of competition on the disposition to lie, this would also suggest an effect on the degree of trust on the side of the uninformed decision maker. In fact, numerous authors have investigated to what extent competition may potentially change human behavior. Hegarty and Sims (1978) find in a lab experiment that increased competition results in more unethical behavior when this serves to enhance own

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Dickhaut and McCabe (1995) as a behavioral measure of trust. That “Trust Game” tests whether and to what extent participants’ reveal trust that a counterpart will reciprocate and return a “fair” share of money.

[12] It is even consistent with rationality to treat cheap talk as meaningless in all settings (Farrell and Rabin, 1996, p. 108; Crawford, 1998, p.288).

profits. Ford and Richardson (1994) point out that, among others, specifics of the reward systems and competitiveness of the organizational structure are contextual variables that may influence how ethical decisions are made and that this should be examined further. Recently, Brandts, Riedl and Van Winden (2004) demonstrate experimentally that competition has a negative effect on the emotional disposition towards others, and that it decreases the subjective well being of the competing parties. The present study pursues this line of research by investigating experimentally the effect of a competitive context on truth telling and trust. From a practical perspective, this can be related to work environments where competition can be induced through a ranking-based reward scheme. If increased competition affected truth telling and trust in communication, then a dimension that is difficult to observe and to measure may undermine overall efficiency. On the other hand, inducing cooperation may have positive effects due to an increase in trust.

In the experiment, participants interact in a two-player Communication Game with asymmetric information (Crawford and Sobel, 1982; Gneezy, 2005). An uninformed decision maker can rely on a message from a better-informed advisor for his choice between three options. The data provide evidence that decision makers do not regard the messages as meaningless. Instead, they condition their behavior on the message that they receive, i.e., their decision depends on their belief of how likely the message is truthful. Advisors, in turn, base their decision on the belief of how likely the decision maker will follow the advice. Since individual beliefs about the counterpart's behavior vary widely, Subjective Equilibrium Analysis (Kalai and Lehrer, 1995) is suggested as a theoretical model. In this model, players are said to be “subjectively rational” if they maximise their gains in accordance with subjective beliefs. Indeed, barring the fraction of truth-telling advisors, this model is in line with most of the remaining data.

In two experimental treatments, either a cooperative or a competitive context is induced before participants play the Communication Game. Results show that the context

does not influence advisors' propensity to lie. However, decision makers have less trust in the advice of others when the interaction takes place in a competitive context. When decision makers lack information, the context influences their perception of the situation. More specifically, decision makers who have been involved in competition are more likely to perceive the situation as one of opposing interests. Last, behavior in the Communication Game is compared to personal characteristics of the participants. Regression analysis relates some of the individual differences to gender, field of studies, and the score on a personality test.

The paper is organized as follows. Section 2.2 motivates and specifies the experimental design. Section 2.3 introduces Subjective Equilibrium Analysis (SEA) (Kalai and Lehrer, 1995) as a model for behavior in the Communication Game. Section 2.4 presents the results of behavior and subjective beliefs in the Communication Game. In section 2.5 I analyze the results and discuss the questions raised above. Section 2.6 concludes.

2.2 Experimental design

The experiments were conducted in the Experimental Economics Laboratory at Pompeu Fabra University. Subjects were 216 undergraduate volunteers from various fields of studies who had signed in via a computerized recruiting system and earned on average € 7.72. Each experimental session consisted of 18 participants and lasted around sixty minutes – this included completing the post-experimental questionnaire. At the beginning of the experiment, participants were randomly assigned to computers, and then the basic instructions were distributed and also read out aloud. Detailed instructions for the different parts of the experiment were shown on the computer screen (for further details, see Appendix). The analysis focuses on behavior in the Communication Game, which was played by nine pairs of advisors and decision makers per experimental session. However, the Communication Game was embedded into a series of exercises and interactions, for which a

cooperative and a competitive treatment are distinguished. Six sessions were run for each treatment.

The Communication Game

Communication Games represent situations in which communication links the information of one person with the action of an uninformed other (Crawford and Sobel, 1982). In this specific version there are three options (A, B, or C) with consequences for the two players. One player – the **decision maker** – has to choose one of the three options. However, she has only limited knowledge about the consequences. In particular, she only knows that one option leads to a high payoff (€ 5) for her, another one to a medium payoff (€ 3), and a third to a low payoff (€ 1). She does not know which of the three options brings about which of the payoffs. Also, she does not know the consequences for the other player. The second player – the **advisor** – has full information of the consequences, and both participants know this. The options give the following gains:

option A: **€ 1** to the advisor **€ 1** to the decision maker

option B: **€ 4** to the advisor **€ 3** to the decision maker

option C: **€ 3** to the advisor **€ 5** to the decision maker.

The advisor moves first by filling in i = A, B, or C to send one of three possible messages:

" With option [i] you earn more money than with the other two options.".

The decision maker receives the message and subsequently makes a choice between the three options.

Motivation of Communication Game Design

The class of "cheap talk" Communication Games is very broad (see, e.g., Farrell and Rabin, 1996; Crawford, 1998). For any particular game within this class, theoretical predictions, as well as the interpretation of behavior may differ substantially. I now clarify and motivate the particular features of this version.

Payoff structure. The game is similar to – and was inspired by – the design in Gneezy (2005). As in Gneezy's game, the payoff structure for the advisor and the decision maker is non-aligned. The truthful message C recommends an option which does not lead to the highest payoff to the advisor. This may give the advisor an incentive to lie in the message. Gneezy showed that the differences in consequences (i.e., how much the advisor can gain from a lie and how much the decision maker may lose) matters for the advisor decision. With the payoff differences between options B and C in this game - where the decision maker stands to lose more (€ 2) than the advisor can gain (€ 1) - a significant fraction of truth-telling can be expected.

Number of options available to the decision maker. An additional third option (A) is added to Gneezy's two-option design. Sutter (2006) demonstrates that with two options and a non-aligned payoff structure, a considerable fraction of advisors send the truthful message and expect the decision maker to deviate from the advice. These advisors tell the truth as a strategic choice for their own benefit. In the design here, an expectation that the decision maker will deviate should result in the choice of message A, and not of the truthful message C.[13] Hence, it serves as a parsimonious modification that potentially rules out strategic considerations for truth-telling.

Degree of asymmetry in information. Two experimental studies have highlighted the possible differences in the degree of information asymmetry: In Blume et al. (1998), both advisors and decision makers know the (finite) set of possible payoff structures (in their words: the set of "types" of advisors), and they know that these types occur with equal probability. The only difference in information is that the advisor alone is told which of the types actually prevails. In contrast, in Gneezy (2005) the decision maker has no information at all (apart from the message). While the former case has the advantage of being

[13] This assumes that the advisor expects the decision maker to deviate to both remaining options with equal probability.

theoretically tractable with standard game-theoretic tools, the latter is probably more representative of ambiguous situations in natural environments. Decision makers in the present game are not informed about the possible payoff structures and probabilities; only advisors know that both players' interests are in fact negatively aligned. However, decision makers know what payoffs are possible for them to obtain (1,3, and 5). This additional information ensures that, first, the decision maker can infer that there is only one truthful message and, second, it is possible to make expected value calculations based on subjective beliefs about whether the advisor will lie or tell the truth. Section 2.3 will provide a detailed analysis of a model for that calculation.

Type of message. The type of message is similar to Gneezy's game. Note that its content is restrictive and that, unlike e.g. in the work by Blume et al. (1998), it assumes the existence of a commonly understood language between the advisor and the decision maker ("rich-language assumption"). However, the content of the message reflects well the information that is typically asked from an advisor.

Behavioral measures

Advisors. The choice of message C is labeled **truth telling**. It is emphasized that the design does not allow to disentangle possible motivations for truthful reporting, especially to what extent altruism, efficiency considerations, or an aversion to the act of lying play a role. In natural settings with asymmetric information all of these motivations may influence the decision to tell the truth or to lie. A recent experimental study by Hurkens and Natik (2006) discusses this issue with respect to Gneezy's (2005) results.

Decision makers. The choice to follow the given advice is labeled **trust**.

Additional elicitations

After the actions (i.e., message and choice) in the Communication Game, specific beliefs are elicited from participants in order to gain insight into the perception and reasoning that underlie actions in the Communication Game.

Advisors. Advisors state how many out of the nine decision makers in the session they expect to follow the advice. Advisors receive € 0.50 for a correct guess (i.e., when guess and actual frequency of following in that session coincide). Their guess is labeled **advisor belief.**

Decision makers. Decision makers state how many out of the nine advisors in the session they expect to tell the truth. Decision makers also receive € 0.50 for a correct guess. Their guess is labeled **decision maker belief.**

In addition, decision makers are asked to indicate on a scale from 0 to 9 how well the following statements fit their expectations of the situation.

(0) "The option that gave the highest gain to the advisor was **not** the option that gave the highest gain to me."

(9) "The option that gave the highest gain to the advisor was also the option that gave the highest gain to me."

The **s**tatement linked to 0 means that the decision maker is sure to face a situation of non-aligned interests; the one linked to 9 means that the decision maker is sure to face a situation of aligned interests. The statement is labeled **expected alignment.**

Experimental procedure

The experimental procedure is illustrated in table 2.1. The experiment consists of six independent parts (participants are told in advance only that it consists of “various” parts). For each part, the 18 participants are matched randomly with a new counterpart to build teams of two. Random (re)matching assures that behavior in the Communication Game is not influenced by reputation effects. In parts 1, 2, 4, and 5, participants perform different sets of exercises and are rewarded for their performance. In part 3, they interact in a simultaneous move game with two-by-two symmetric actions. Participants are informed about their personal gain and the accumulated gain after each part. In part 6, participants play the Communication Game. Subsequently, all participants’ beliefs and the decision makers’ expected alignment are elicited. After this, participants learn their payoff from the

Communication Game. A post-questionnaire is used to collect data on gender, field of studies, verbal explanations of decision in the Communication Game, and the "MachIV" personality test (Christie and Geis, 1970)[14]. Finally, participants are paid their experimental gains.

Table 2.1 -- Summary of the experimental procedure

Basic instructions
Exercise 1 participants have 3 minutes to solve 30 simple calculations (e.g., 8 – 4 + 19 = [ ])
Exercise 2 participants have 3 minutes to answer 15 general knowledge questions
Coordination game (in COOP) / Matching pennies game (in COMP)
Exercise 3 participants have 3 minutes to estimate the distances between 8 pairs of cities (e.g., Paris – Rome [ ])
Exercise 4 participants have 4 minutes to complete 17 sequences of numbers (e.g., 6 7 9 12 [ ])
Communication Game
Elicitation of beliefs from advisors and decision makers Elicitation of expected alignment from decision makers
Post-questionnaire

[14] The test is designed to capture three components of an individual's behavioral dispositions: (1) the extent to which a subject has a cynical view of human nature, and believes that others are not trustworthy; (2) the willingness of a subject to engage in manipulative behavior; and (3) the extent of the subjects' concern (or lack thereof) with conventional morality. A higher test score means a higher degree of "Machiavellianism".

Contextual variation: Cooperative vs. competitive treatment

Participants perform several exercises (parts 1, 2, 4, an 5) and an additional game (part 3) to create a contextual setting. The following variation in the context serves to distinguish a cooperative (COOP) from a competitive treatment (COMP):

Reward-structure in the exercises. The individual performance of both team members is rewarded in a piece-rate fashion and is summed to determine the total team gain. In COOP this total gain is split in equal parts between the two team-members. In COMP, the best performer receives two thirds of the total gain, while the other receives the remaining third. Hence, participants in both treatments have the incentive to perform as well as possible in each exercise. In COMP, however, we add competition, defined as a situation in which the goals of the two parties are negatively linked (cf., van Knippenberg et al., 2001; Schwieren et al., 2006). It becomes profitable to outperform the other team member.[15]

Wording and information. In the exercises (parts 1, 2, 4, and 5) in COMP, participants are explicitly told that they "compete" against the other participant, and they are informed whether they have "won" or "lost" against the other (after each exercise). None of this is said in COOP. (See Appendix for the instructions of the first exercise.)

Game in part 3. In this game, both team members have to choose simultaneously between "square" and "circle". In COOP, both are paid € 2 if they make the same choice and nothing if they choose differently (i.e., a coordination game structure). In COMP, one player gains € 2 if both have chosen the same, the other gains if both have chosen differently (i.e., a matching pennies game structure). This reinforces the positively (COOP) or negatively (COMP) aligned objectives for team members in the different treatments.

[15] In practical terms, these reward structures closely resemble team performance pay with (COMP) or without (COOP) rewarding the team members for their rank in individual contribution. For a discussion of different forms of team performance pay see e.g. Lawler (2000, ch.9).

2.3 Subjective Equilibrium Analysis (SEA)

I expect that both advisors' and decision makers' behavior will be related to the beliefs about what the counterpart does. In addition, beliefs are likely to vary between individuals and the hypothesis is that they can be influenced by the social context, i.e. a competitive vs. a cooperative situation. Bayesian Nash equilibrium analysis (cf., Harsanyi, 1967) - apart from being very complex for situations under uncertainty – usually predicts uniform beliefs across individuals and no sensitivity of beliefs to the context. In accordance with the hypotheses, behavior is compared to a model of expected payoff maximization based on subjective first-order beliefs. Subjective Equilibrium Analysis (Kalai and Lehrer, 1995) – henceforth SEA - aggregates all uncertainty a player may have and describes it by an "environment response function". This function specifies a probability distribution over all outcomes that may result from a particular action. A player is **subjectively rational** if his action is optimal given his subjective environment response function. Importantly, the model explicitly allows for individually subjective assessments of the probabilities. They are neither assumed to be "correct" nor to coincide with those of other players.

Let the advisor's action space be the possible messages $a_{adv} \in A_{adv} = \{A, B, C\}$ and the decision maker's action space the possible choices $a_{dm} \in A_{dm} = \{A, B, C\}$. Denote $o^* \in O^* = \{A^*, B^*, C^*\}$ as the states in which A, B, C, respectively, is the option with the highest gain (€ 5) for the decision maker. Clearly, only the advisor knows that in fact C* is the true state, i.e., the probability $P_{adv}(C^*) = 1$, and $P_{adv}(A^*) = P_{adv}(B^*) = 0$. The **Principle of Insufficient Reasoning (PIR)** (Laplace, 1824) suggests that the decision maker attributes the same probability to all $o^* \in O^*$, i.e., $P_{dm}(A^*) = P_{dm}(B^*) = P_{dm}(C^*) = 1/3$. Consequently, the following assumption is made:

> **Indifference:** Ex ante, the decision maker has no preference for a particular option over the others, and the advisor knows this.

Under this assumption, the decision maker's choice is between the option that is indicated in the advice (follow) or selecting randomly one of the remaining two options (deviate). Hence, one can specify the advisor's environment response function based on the belief about the probability with which the decision maker follows the advice. For the decision maker, an environment response function can be based on his subjective belief about the probability that the message is truthful.

Advisors. Let $P_{\text{adv}}(a_{\text{dm}} / a_{\text{adv}})$ be the probability that the advisor attributes to the decision maker's choice of a_{dm} given message a_{adv}. Let s be advisor's subjective belief of the probability that the decision maker follows the advice. In accordance with Indifference, s is independent of the message, so that

$$P_{\text{adv}}(\text{A} / \text{A}) = P_{\text{adv}}(\text{B} / \text{B}) = P_{\text{adv}}(\text{C} / \text{C}) = s .$$

Indifference also ensures that the advisor expects the decision maker to deviate to the two remaining options with equal probability. Since $\sum_{a_{dm} \in A_{dm}} P_{adv}(a_{dm} / a_{adv}) = 1$ must hold for all a_{adv},

$$\begin{aligned} & P_{\text{adv}}(\text{B} / \text{A}) = P_{\text{adv}}(\text{C} / \text{A}) \\ &= P_{\text{adv}}(\text{A} / \text{B}) = P_{\text{adv}}(\text{C} / \text{B}) \\ &= P_{\text{adv}}(\text{A} / \text{C}) = P_{\text{adv}}(\text{B} / \text{C}) \\ &= \frac{(1-s)}{2} \end{aligned}$$

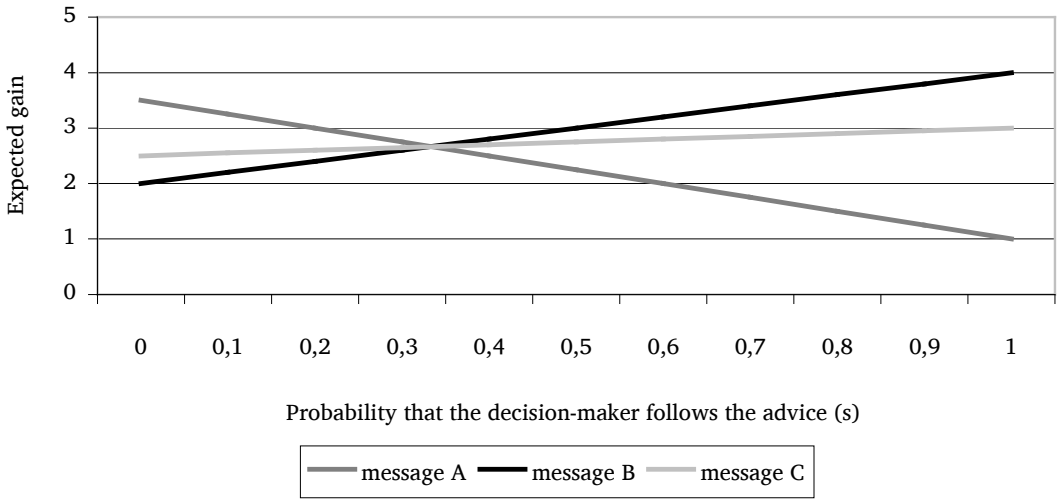
This specifies the advisor's environment response function. Expected gains ($E\pi_{adv}$) from messages A, B and C are

$$E\pi_{adv}[A] = s + 4\frac{(1-s)}{2} + 3\frac{(1-s)}{2} = 3.5 - 2.5s$$
$$E\pi_{adv}[B] = 4s + 1\frac{(1-s)}{2} + 3\frac{(1-s)}{2} = 2 + 2s$$
$$E\pi_{adv}[C] = 3s + 1\frac{(1-s)}{2} + 4\frac{(1-s)}{2} = 2.5 + .5s$$

Figure 2.1 shows graphically $E\pi_{adv}$ for each message a_{adv} as a function of s. For an advisor who maximizes expected gains, it is profitable to choose message A if $s < 1/3$ and

to choose message B if $s > 1/3$. For $s = 1/3$ the advisor is indifferent between all messages, in particular it is the only belief for which the truthful message C is a gains-maximizing response.

Figure 2.1 – Advisors' expected gains as a function of her belief about the probability that the decision-maker follows the advice



Decision makers. Let $P_{dm}(o^*/\ a_{adv})$ be the probability that the decision maker attributes to o^* given that she received message a_{adv}. Let r be the decision maker's subjective belief of the probability that the received message is truthful. PIR (Principle of Insufficient Reasoning) ensures that r is the same for all received messages; i.e.

$$P_{dm}\ (A^*/\ A) = P_{dm}\ (B^*/\ B) = P_{dm}\ (C^*/\ C) = r\ .$$

PIR also ensures that given he received a message a_A, the decision maker attributes equal probability to the two remaining options being the ones with the highest payoffs. Under the condition that $P_{dm}\ (A^*/\ a_{adv}\ ) + P_{dm}\ (B^*/\ a_{adv}\ ) + P_{dm}\ (C^*/\ a_{adv}\ ) = 1$ for all a_{adv},

$$P_{dm}(B^*/\ A) = P_{dm}(C^*/\ A)$$

$$= P_{dm}(A^*/\ B) = P_{dm}(C^*/\ B)$$

$$= P_{dm}(A^*/\ C) = P_{dm}(B^*/\ C)$$

$= \frac{(1-r)}{2}$.

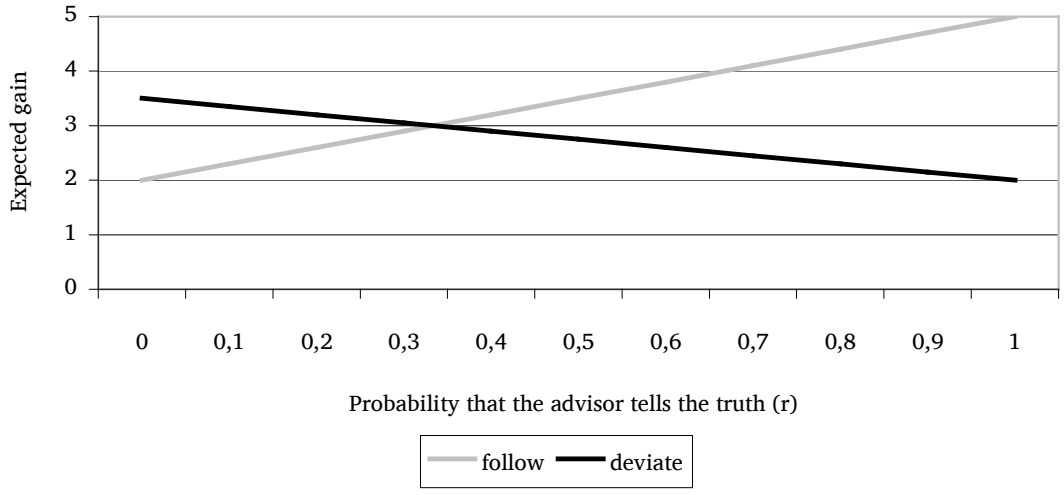
This specifies the decision maker's environment response function. The following expected gains ($E\pi_{dm}$) result:

$$E\pi_{dm}[follow] = 5r + \frac{(1-r)}{2} + 3\frac{(1-r)}{2} = 2 + 3r$$

$$E\pi_{dm}[deviate] = \frac{r}{2} \times (1+3) + \frac{1}{2}\left[\frac{(1-r)}{2} \times (1+5) + \frac{(1-r)}{2}(3+5)\right] = 3.5 - 1.5r$$

Figure 2.2 shows the decision maker's expected monetary gains $E\pi_{dm}$ from following or deviating as a function of r. It is profitable to follow if $r > 1/3$ and to choose deviate if $r < 1/3$. For $r = 1/3$ the decision maker is indifferent between following and deviating.

Figure 2.2 -- Decision-makers' expected gains as a function of his belief about the probability that the advisor tells the truth



2.4 Results

Actions

Table 2.2 shows the joint distribution of messages and choices by the 108 pairs of players in the Communication Game. The marginal distributions summarize advisor and

decision maker behavior separately, i.e., they reflect how often each message and each option are chosen.

Table 2.2 -- Distribution of messages and choices in the communication game (108 pairings)

		Choices made by decision makers			Frequency of messages
		A	B	C	
Messages sent by advisors	A	**10**	1	0	11
	B	12	**49**	4	65
	C	6	4	**22**	32
Frequency of choices		28	54	26	108

Advisors. Messages A, B, and C are chosen 11 (10%), 65 (60%), and 32 times (30%), respectively. Recall that sending message C means telling the truth in the message.

Decision makers. 28 (26%) decision makers opt for A, 54 (50%) for B, and 26 (24%) for C. The diagonal of the joint distribution in Table 2.2 shows the frequencies with which decision makers follow the given advice; all entries off the diagonal reflect deviation from the advice. 81 out of 108 decision makers (75%) follow the given advice. The data suggests a bias towards choosing option A over the other two options.[16]

[16] When message A is sent, 91% of the decision makers follow the advice, compared to 75% and 69% when B and C are sent, respectively. Also, decision makers deviate to A more often – in 75% of the cases when message B is sent and 60% when message C is sent. No explanation for this preference for A will be offered here, but it appears to be a behavioral regularity. The qualitative data do not indicate that advisors anticipate such a bias.

Beliefs

Table 2.3 for the advisors and Table 2.4 for the decision makers depict how individual messages and choices are associated with individual beliefs.

Advisors. Advisor beliefs indicate how many out of the nine receivers in the session they expect to follow the advice. The right column of Table 2.3 shows the total distribution of advisor beliefs between 0 and 9 (mean 4.6, standard deviation 2.3).

Table 2.3 -- Distribution of **advisor beliefs** about how many out of nine decision makers would follow the advice

	message			
belief	A	B	C	total
0	**2**	2	2	6
1	**1**	1	1	3
2	**4**	0	3	7
3	**2**	**13**	**6**	21
4	1	**19**	4	24
5	0	**6**	3	9
6	1	**10**	3	14
7	0	**8**	5	13
8	0	**2**	8	10
9	0	**0**	2	2
total	11	65	32	108
mean belief	2.3	5.0	5.2	4.6

On average, advisors underestimate decision makers' true propensity to follow the advice, since the actually observed 75% following would coincide with a belief of 6.8.[17] In the middle columns, this distribution is separated for advisors that send message A, B, C, respectively. Those advisors that send message A have a mean belief of 2.3, which is significantly lower than the mean of 5.0 for those that sent message B ($t = 4.23$, $p < .01$). Hence, sending message A is correlated with having a low belief ($r = -.35$, $p < .01$), and sending message B is correlated with having a high belief ($r = .19$, $p < .05$). In contrast, there is no correlation between sending the truthful message C and the belief about decision makers' behavior ($r = .02$, not significant). Message-belief combinations that are in line with SEA are indicated in bold.

Decision makers. Decision maker beliefs indicate how many out of nine advisors in the session they expect to have told the truth in the message. The right column in Table 2.4 shows the distribution of decision maker beliefs between 0 and 9 (mean 5.3, standard deviation 2.8).

On average, they overestimate the advisors' true propensity to tell the truth; the actually observed 30% truth telling would coincide with a belief of 2.3.[18] In the middle columns of Table 2.4, the distribution is presented separately for decision makers that followed the advice and for those that deviated. Decision makers who follow the advice have an average belief of 6.7; those that deviate from the advice have an average belief of 2.7 ($t = 6.8$, $p < .01$; correlation between belief and following with $r = .55$, $p < .01$). Action-belief combinations that are in line with SEA are indicated in bold.

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[17] This in line with Camerer et al.'s (1989) finding, that under information asymmetry it is difficult for the informed party to neglect own information (i.e. the non-aligned payoff structure) when building expectations about how the uninformed party will behave.

[18] This is not surprising since decision makers did not know that the payoff-structure was in fact non-aligned. Below it will become clear that many expected it to be aligned, in which case there is no incentive to lie.

Table 2.4 -- Distribution of **decision maker beliefs** about how many out of nine advisors had told the truth in the advice

	(conditional) choice		
belief	follow	deviate	total
0	3	**6**	9
1	0	**2**	2
2	1	**4**	5
3	**9**	**6**	15
4	**3**	4	7
5	**17**	3	20
6	**5**	1	6
7	**17**	0	17
8	**6**	1	7
9	**20**	0	20
total	81	27	108
mean belief	6.7	2.7	5.3

Differences between treatments

Table 2.5 shows the frequencies of messages and choices separately for the cooperative treatment (COOP) and for the competitive treatment (COMP). In addition, it includes the means of beliefs about the counterparts' behavior in both treatments.

Advisors. For advisors there are almost no differences in behavior across treatments; in both treatments 30% of the advisors tell the truth. The mean of beliefs is 4.3 in COMP and 4.9 in COOP (Mann-Whitney rank test: $p = .17$).

Decision makers. In COMP 37 decision makers (69%) follow the advice, 44 (81%) do so in COOP (Fisher Exact test - 1-tailed - for independence between the two treatment: $p = .09$). The mean of beliefs is 4.7 in COMP and 5.9 in COOP (Mann-Whitney rank test: $p = .02$). The mean expectation of alignment is 3.8 in COMP and 5.4 in COOP (Mann-Whitney rank test: $p < .01$).

Table 2.5 -- Comparison of actions and mean beliefs in COOP vs. COMP

	Advisors				Decision makers		
	Messages			Mean of beliefs	Choices		Mean of beliefs
Treatment	A	B	C		follow	deviate	
COOP	6	32	16	4.9	44	10	5.9
COMP	5	33	16	4.3	37	17	4.7

2.5 Analysis and discussion of results

Is communication regarded as meaningless?

Let us first compare observed behavior to what would be obtained if communication were meaningless. Such a benchmark behavior can be justified from standard Bayesian Nash equilibrium analysis, which shows that a "babbling equilibrium" always exists (see Farell and Rabin, 1996, p.108). Also, if communication were ignored, the Principle of Insufficient Reasoning (Laplace, 1824) would suggest choosing messages and options randomly, i.e. with equal probability. In this case, messages and options should be distributed equally, with an expected frequency of 36 out of 108 for A, B and C. The marginal distributions in Table 2.2 reveal that the hypothesis of equal proportions can be rejected both for the messages sent by

the advisors (Chi-squared = 13.56; dof = 2; $p < 0.01$) and for the decision makers' choices (Chi-squared = 41.17; dof = 2; $p < 0.01$). Hence, messages are not regarded as meaningless.

Is behavior consistent with SEA?

In accordance with the analysis introduced in section 3, advisors may choose based on their subjective belief of how likely it is that decision makers follow the advice. Decision makers may choose an option based on their subjective belief of how likely it is that advisers tell the truth in the message. The significant correlations between actions and beliefs for lying senders and for decision makers suggest that such a relationship exists. Tables 2.3 and 2.4 indicate in bold those combinations that are in line with the predictions from SEA. Table 2.6 shows in detail how advisor and decision maker actions correspond with the model. For those advisors that choose to lie in the message, the maximization of expected gains based on the subjective belief describes behavior correctly in 72 out of 76 cases (95%). However, the majority of truth-tellers (81%; with belief ≠ 3) is not in line with the model. Decision maker behavior is largely in line with the model (88%). Many of the 13 decision makers that do not behave in line deviate with a belief of little above the critical value of $r = 1/3$.

Table 2.6 -- Frequencies of actions in accordance with SEA

	Messages			Choices	
In accordance?	A	B	C	Follow	Deviate
Yes	9	63	6	77	18
No	2	2	26	4	9

From this comparison, it is evident that behavior of lying advisors and of decision makers is related to the belief about what the other side does. SEA describes behavior well for this population, whereas a model that predicts uniform beliefs would clearly fail to do so. Yet, there is an important difference between the advisor and receiver population. Advisors face an ethical dilemma in their decision, i.e. they have to trade off between maximizing their own gains and telling the truth. Decision makers have no ethical component to consider. Hence, while most decision makers are indeed subjectively rational with respect to their gains, truth-tellers in the advisor population deviate from the model predictions. This shows that a descriptively adequate model should also allow for non-self-interested motivations. The extent to which truth telling in this situation reflects altruism, an aversion towards the act of lying, or even others, is the topic of research on deception. Hurkens and Nartik (2006) show that what looks like behavior motivated by lying aversion may be explained also by (social) preferences over outcomes. For modeling purposes, several authors have suggested a behavioral type approach in which certain types of players act upon preferences or action tendencies that deviate from self-interest and economic rationality (Crawford, 2003; Chen, 2004; Cai and Wang, 2006).

Does a competitive context influence behavior?

Advisors. The data show no influence of the induced contextual change on advisor behavior. One may conjecture that the propensity to tell the truth is generally insensitive to a competitive context. This paper does not go so far. Possibly, the contextual variation in this experiment is just too small to create an effect, i.e., it is dominated by the more general context of a laboratory experiment with a student population. This should be addressed in further research.

Decision makers. The data suggest a mild effect of competition on the decision makers' side (difference in following: p-value $< .1$; difference in decision maker beliefs: p-value $< .05$). It is important to note that the decision maker's uncertainty consists of two

components – uncertainty about the underlying situation – measured by expected alignment - and uncertainty about advisor behavior for any given situation. The significant difference in the expected alignment suggests that the context influences how decision makers perceive the uncertain situation. In a competitive situation they are less likely to believe that interests are aligned. Additional information from the post-questionnaire gives further insight into what motivated decision makers' choices. As will be discussed shortly, an important finding is that the difference in following understates the true size of the context effect on trust. The below classification scheme shows that in COMP several decision makers follow for strategic reasons.

Classification of decision maker strategies. In the post-questionnaire, decision makers are asked to explain their decision in the communication game. Decision makers are classified according to their actions in the game: **follower** or **deviator**. Their explanations are then sorted into categories. Two colleagues volunteered as independent judges. The categories are:

Naïve: The decision maker gives an explanation which describes that he/she simply "believed" / "trusted" / "followed" /... or "disbelieved" / "distrusted" / "deviated" /....

Positive alignment: The decision maker explains the action by stating explicitly that his/her expectation of the payoff-alignment was positive.

Negative alignment: The decision maker explains the action by stating explicitly that his/her expectation of the payoff-alignment was negative.

Random: The decision maker states that he/she chose randomly, i.e., independently of the message.

No classification possible: The judge cannot make sense of the explanation.

For followers, one additional category is included:

Strategic: The decision maker states explicitly that he/she followed the advice because he/she thought that the advisor would be strategic in telling the truth, i.e. expecting him/her to deviate.

Observations are counted for a particular category when both judges coincide. When their judgments differ, the observation is entered in the column **"judges do not coincide".** The results are shown in Table 2.7.

Table 2.7 -- Classifications based on actions and verbal explanations

	Classification	COOP	COMP
Follower	naïve	24	17
	positive alignment	14	9
	negative alignment	-	-
	random choice	2	1
	no classification possible	-	1
	judges did not coincide	3	3
	strategic	1	6
	Total	**44**	**37**
Deviator	naïve	2	6
	positive alignment	-	-
	negative alignment	7	10
	random choice	1	1
	no classification possible	-	-
	judges did not coincide	-	-
	Total	**10**	**17**

In COMP there are fewer naïve trusters (17 vs. 24) and more naïve distrusters (6 vs. 2) than in COOP. Furthermore, in COMP there are fewer trusters that mention their expectation of a positively aligned payoff structure (9 vs. 14) and more distrusters that mention their expectation of a negatively aligned payoff structure (10 vs. 7). Hence, the frequencies in all four categories support less trust and more distrust under a competitive

context. In general, the large fraction of "naïve" responders suggests that many decision makers do not rationally consider the payoff alignment. Nevertheless, the context has an effect on their decision.

Table 2.8 -- Comparison of decision maker choices in COOP vs. COMP with modified definition of trust

	Trust		Distrust			
Treatment	Follow not strategically	Total trust	Follow strategically	Deviate	Total distrust	Total
COOP	43	**43**	1	10	**11**	54
COMP	31	**31**	6	17	**23**	54

An insight gained from this analysis is that the action to follow taken by some decision makers is strategic with second-level reasoning. Recall that the payoff structure in the game was selected to rule out strategic truth telling by advisors. However, the uninformed decision maker may have different expectations. Multi-level reasoning has been reported for many economic games (Wilson and Stahl, 1994; Nagel, 1995; Camerer et al, 2004). It is important to recognize that in the present game, this way of reasoning implies, first, a belief in a negative alignment, and second, a belief in a strategic, self-interested advisor. Consequently, for these decision makers the choice to follow reflects considerations that are contrary to the rest of the followers. In fact, they show distrust rather than trust, and reveal a weakness of "following" as a behavioral measure of trust. Strategic following occurs in seven out of 108 cases overall, six of which are in the COMP treatment. As a result, the difference in following understates the effect of the competitive context on trust. With a modified definition of trust as **"following not strategically"** a Chi-square test clearly rejects

independence with respect to the treatments (see Table 2.8) (Chi-square = 6.18, dof = 1, p = .02).[19]

What explains individual differences?

The decision to tell a "costly" truth and to trust under information asymmetry is marked by large individual differences. A regression analysis is used to relate individual characteristics elicited in the post-questionnaire with differences in truth telling and trust. More specifically, the explanatory variables are a dummy for the field of studies being Economics / Business (Econ / Business student = 1), a dummy for gender (Male = 1), the accumulated gains prior to the communication game (Wealth), and the individual's score on "Machiavellianism" (see footnote 5) (MachIV score). In addition, a dummy is included for the treatment (COMP = 1) as test for context effects, and advisor belief (Belief) for the advisor regressions. For each analysis, a first regression is run with all these explanatory variables. Subsequently, a second ("reduced") regression excludes all those variables that turn out to be insignificant with a p-value greater than .5 in the first regression.

Advisors. We report regressions on all advisors and on subsets according to beliefs.

All advisors. Truth telling (advisor sends message C = 1) is first explained with a probit regression on all 108 advisor observations. The results are reported in the left column of Table 2.9. Only the field of studies can be shown to have a significant impact on truth telling, i.e., students of economics and business tell the truth less. The overall fit of these regressions is poor (Pseudo R-squared = .04).

"Low-belief" vs. "high-belief" advisors. In Gneezy's (2005) version of the communication game, the assumption is made that all advisors believe that "most" decision makers follow their advice. Sutter (2006) challenges this assumption successfully by complementing experimental behavior with the elicitation of advisor beliefs. Equivalently, belief elicitation

[19] Analogously, for advisors in a two-option version of a Communication Game, Sutter (2006) proposes to include strategic truth telling in the category of "deception".

for the present game shows that expectations vary, and that they can be related to the choice of action. Even with the third option included, one may suspect that different subgroups of advisors have different motivations for their choice of the message.[20] Therefore, probit regressions are performed separately on "low-belief" advisors - who believe that few (≤ 3/9) decision makers will follow their advice, and on "high-belief" advisors - who believe that most (≥ 6/9) decision makers will follow their advice. In particular, for the latter group truth telling is unambiguously "costly". The right side of Table 2.9 shows that regressing the data of the subgroups leads to a better fit (Pseudo R-squared ≥ .09 and ≥ .22), and that the results differ.

Results on the population of low-belief advisors are inconclusive. The only significant variable is the experimental gain prior to the Communication Game; those low-belief advisors that gain more are less likely to tell the truth. For the population of high-belief advisors, several coefficients turn out to be significant. Here, participants with a high score on "Machiavellianism" tell the truth less. This is what one might expect, since the MachIV score captures variations in personal predispositions toward engaging in manipulative or exploitative behavior. Other experimental studies show similar effects, e.g., high Machs have been shown to accept lower offers in the Ultimatum Game (Meyer, 1992).

The second finding is that men are significantly more likely to tell a costly truth than women. Gender effects have been reported in many studies on other-regarding behavior (e.g., Eckel and Grossman, 2000). In most studies, however, men show equal or more selfish behavior than women; e.g., they reciprocate less in the Trust Game (Croson and Buchan, 1999) and they give less in Dictator Games (Eckel and Grossman, 1998; Andreoni and Vesterlund, 2001). The present study tests gender differences in communication under

[20] It may be that some low-belief advisors told the truth for strategic reasons, even though our design intended to rule this out.

information asymmetry. Note further that the result suggests that truth-telling in the Communication Game cannot be equated with altruistic giving.

Table 2.9 -- (Reduced) probit regression results for advisor behavior

Dependent variable: truth telling

Independent variable	All	Low belief	High belief
COMP	x	x	x
Belief	x	x	x
Econ/Business Student	-.52 (-1.99)*	x	-1.25 (-2.22)*
Male	.24 (.86)	x	1.15 (2.02)*
Wealth	-.09 (-.88)	-.30 (-1.70)+	.18 (0.82)
MachIV score	x	.02 (.94)	-.04 (-1.72)+
Constant	-.01 (-.02)	-.91 (-.46)	1.37 (.60)
Observations	108	35	39
Pseudo R-squared	.04	.09	.22

- x where the variable was dropped after being clearly insignificant in a first regression ($p > .5$)
- value of z statistics in parentheses
- + significant at 10%; * significant at 5%; ** significant at 1%

As final finding, economics and business students tell the truth less. Differences in behavior between economic students and students from other fields have been reported for other experimental games, where economic students act more in line with the economically rational prediction (Marwell & Ames, 1981; Carter and Irons, 1991; Frank, 1993). In a recent study, Rode, Hogarth & Le Menestrel (in press – see also Chapter 1) show that students of Economics and Business at UPF are less prepared to pay an ethical premium for labelled goods than students from other fields. The results indicate that such behavioral differences also hold for Communication Games. However, the usual question applies, that is whether these differences are due to self-selection into studying Economics or to learning and conforming to "economic rationality".

Decision makers. We report regressions that use two different definitions of trust.

"Trust = follow advice". Probit regressions are run with the 108 decision maker observations to explain trusting behavior. In a first analysis (see left column of Table 2.10), a dummy for "following" is used as dependent variable. The overall fit is poor and no variable can be shown to be significant on a reasonable level.

"Trust = follow advice not strategically". In a second regression, decision makers that follow strategically are counted as not trusting. The results on the right side of Table 2.10 show that, with this definition of trust, the overall fit of the regression is slightly better (Pseudo R-squared = .08), and the variables COMP and Econ/Business Student seem to have a significantly negative impact on trust. The result indicates that there is no influence of the MachIV test score on decision makers' propensity to trust. Related findings in the experimental Trust Game show equally ambiguous results with regards to trust and Machiavellianism. For example, Burks et al (2003) find that people high in Machiavellianism invest significantly less, while Gunnthorsdottir et al (2002) find no effect for Machiavellianism on investment.

Table 2.10 -- (Reduced) probit regression results for decision maker behavior

Dependent variable: trust

Independent variable	Trust = followed advice	Trust = followed advice not strategically
COMP	-.37 (-1.33)	-.60 (-2.29)*
Econ/Business Student	-.45 (-1.51)	-.57 (-2.15)*
Male	x	x
Wealth	x	x
MachIV score	.01 (1.04)	x
Constant	.03 (.03)	1.11 (.4.62)**
Observations	103	108
Pseudo R-squared	.04	.08

- x where the variable was dropped after being clearly insignificant in a first regression ($p > .5$)
- value of z statistics in parentheses
- + significant at 10%; * significant at 5%; ** significant at 1%

2.6 Concluding remarks

As mentioned in the outline, trust is an important ingredient of "social capital". In Rotter's (1967) words, "one of the most salient factors in the effectiveness of our present complex social organization is the willingness of one or more individuals in a social unit to

trust others." The most interesting result of this study is that trust in advice from others can be inhibited when the surrounding context is a competitive one. While the difference in the initial measure of trust ("following") between the treatments is only 12%, further analysis suggests that it may be as much as 23%. In either case the study shows that trust is indeed affected by a competitive context. The particular size of this difference should not be overemphasized for two reasons. First, I agree with Levitt and List (2006) that laboratory experiments are better suited for qualitative rather than precise quantitative predictions.

Second, as pointed out in the motivation of the experimental design, behavior depends on the features of the situation and on the degree of information asymmetry. For instance, I conducted an additional experiment with equal design, but where decision makers had five options to choose from and where they were not informed about possible payoffs. In that game, in COOP 11 out of 16 (69%) decision makers followed the advice, and only 3 out of 16 (19%) followed in COMP (Fisher exact test, 1-tailed: $p < .01$). This finding suggests that decision makers are even more affected by contextual changes when they have no information on which to base calculations. This is probably the case for many naturally occurring situations. The conditions under which contextual effects have more or less impact is a question left to further research.

The results of the current study suggest that the principal reason for the effect of context on trust is that under competition, uninformed decision makers are more likely to perceive the situation as one of conflicting interests. It has been pointed out to me that the one-shot characteristic of this experiment may not give appropriate predictions for interactions in which repetition would allow for learning about the environment. I agree that repetition may moderate the effect, and emphasize that the study does not allow for predictions for that case. However, at least two reasons can be postulated as to why people in natural environments may be less receptive to (rational) learning than economic theory predicts. First, natural interaction is seldom characterized by repetition as studied in

economic experiments. Rather, situations of information asymmetry occur sporadically (cf., Babcock and Loewenstein, 1997) over time, and any particular one may be perceived as more or less unique. Second, in psychological terms the context in the experiment acts as a "prime" for perceptions which lead to observed behavior. Bargh and Chartrand (1999) review experimental evidence related to many domains of human activity, showing that the role of conscious thought for judgment, decision, and action is quite limited. They conclude that "automatic evaluation of the environment is a pervasive continuous activity that individuals do not intend to engage in and of which they are largely unaware (p. 475)." This finding suggests that perceptions of the environment are not necessarily due to cognitive evaluation. Yet, this would be necessary for rational learning to take place.

Practical implications of the finding depend on the social unit in question. As an example, firms should consider this effect of competition when evaluating the efficiency of different corporate reward system. Overly competitive schemes may have the side effect of decreasing trust in communication among employees. This, in turn, has a negative impact on cooperation and overall efficiency (La Porta et al., 1997).

An additional finding is the influence of higher-level strategic reasoning by some participants on study outcomes. In the case of the current study it is demonstrated that even a minority of participants (7 out of 108) can potentially bias the results.

Finally, the paper emphasises Subjective Equilibrium Analysis as a model for decisions under uncertainty. It is increasingly recognized that the strong predictive power of Bayesian Nash equilibrium analysis is of little practical use for many complex games (cf., Aumann and Dreze, 2005). This study indicates that SEA may be a promising tool to maintain some consistency requirements for descriptive and predictive purposes in games where more complex models would fail.

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Chapter 3

What is a fair wage and who should decide it?

An experimental study

(with Marc Le Menestrel)

Abstract: In an experimental laboratory setting two types of actors are involved in the generation of economic gain – Actives and Inactives. Only Actives work in a real-effort task; payments to them reflect the wage for their work. In three treatments, the decision power to allocate payments from the economic gain is assigned (1) to Inactives, (2) both to Inactives and Actives equally, and (3) to Actives. We observe actual distributions of payments and we elicit fairness judgments from all participants. Payments show that people trade-off fairness and self-interest (cf., Konow, 2000). Wage payments increase with the power that is assigned to the Active. Different fairness notions are applicable in this setting. Judgments give little evidence of libertarian fairness, but vary between an egalitarian and a meritocratic prediction. In all treatments, people tend to judge fairness in a self-serving manner. Having absolute power to decide in one's self-interest increases this tendency significantly. Overall, shared decision power enhances aggregate perceived fairness of allocations. We discuss implications for corporate governance.

3.1 Introduction

How should economic gain be divided between different actors that are involved in its generation? The division of economic gain has certainly been among the central and most controversial issues in economic history. In particular, the (proper) remuneration of labor is still the subject of considerable debate.

Most people will agree that wages should be fair. But then, what is a *fair* wage? Maitland (1997) represents a common business argument according to which "the appropriate test [for fair wages] is not whether the wage reaches some predetermined standard, but whether it is freely accepted by (reasonably) informed workers." Companies are typically interested in lowering wages and increasing profits for shareholders. In international business they do so for example by moving their production to developing countries in which workers accept very low wages compared to the companies' country of origin. In Maitland´s sense, those wages are fair. Meyers (2004) argues for an opposing view, saying that such wages may be exploitative in the sense that "the exploiter benefits from his use of the exploited in a way that is unfair, for example, by benefiting disproportionately to the contribution of the exploited." Many critics of globalization promote "Fair Trade" which divides profit in a way that pays higher wages to workers. Similarly, within developed countries labor unions try to negotiate fair minimum wage standards for workers or, in general, fair wages that are above what would barely be accepted.

Philosophical theories may provide guidance as to what characterizes fair wages (see Konow, 2003). Theories of distributive justice consider the total economic gain and then propose a fair division. A simple version of an **egalitarian** theory divides economic gain equally between the involved parties. In contrast, a **meritocratic** (i.e., desert-based) theory

splits economic gain proportional to the contributions to its creation.[21] In a different approach, Nozick (1974) formulates the principle of "justice in transfer", according to which "all allocations resulting from freely chosen transfers are fair" (Konow, 2003). For transfers of wage for labor, this **libertarian** fairness reflects Maitland's view which is often taken by business. We define wages are fair in the libertarian sense when the employment relationship is mutually beneficial, respects freedom of choice, and does not involve deception (cf., Meyers, 2004).

Hence, fairness in wage setting is an ambiguous notion. The first goal of our study was to test experimentally three types of fairness in wage setting: egalitarian, meritocratic, and libertarian fairness. Previous experimental results on allocation decisions support meritocracy. Hoffman and Spitzer (1985) summarize their results stating that participants usually apply meritocratic reasoning, and that they use egalitarian norms only when there is "no obvious morally relevant distinction" between the parties. To our knowledge, no attempts have been made so far to test libertarian reasoning.

While it may be desirable for many reasons, fairness is certainly not the only determinant of wage payments. In fact, according to the standard economic prediction people would not consider fairness at all. Rather, from the point of view of economic rationality, those that have the power to decide about the division of economic gain are expected to maximize their own payments. Yet, many empirical studies stress the importance of fairness (see e.g., Kahneman, Knetsch & Thaler, 1986), and social preferences including fairness considerations are well-documented in the behavioral economic literature (Camerer, 2003). For example, in Dictator Game experiments (Hoffman et al., 1996) people

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[21] Hoffman and Spitzer (1985) refer to this as fairness based on "earned desert"; Konow (2000) calls it the "accountability principle". In a recent experimental study, Cappelen et al (2005) discriminate between fairness principles based on talent and effort. Our study does not distinguish between these two distinct determinants of merit.

Considerations of need are also frequent in arguments on fairness and social justice. However, in this experimental study we will not be able to discriminate between neediness, and therefore leave it aside.

use their power to decide in their monetary interest, but also many of them share with their counterpart. In the standard Dictator Game, fairness is assumed to demand an equal split. In an important paper on allocation decisions, Konow (2000) suggests a model in which people maximize their utility by trading off their personal gains and costly deviations from what they judge as the fair outcome. Recall, however, that fairness in wage setting is ambiguous. Which of the different notions of fairness should be applied? Babcock and Loewenstein (1997) summarize an impressive body of empirical evidence showing that under ambiguity people tend to rely on the fairness notion which favors what is in their self-interest. Konow incorporates this finding by modeling a cognitively costly option of biasing the personal fairness judgment away from the objectively fair outcome. But then, it is not clear which one of different fairness concepts should be regarded as the objective one. Those that have the power to make allocation decisions could simply reconcile the payoff-maximizing choice with a suitable fairness notion. Could this be the reason why business promotes libertarian fairness? In any case, we argue that power may pull allocation decisions towards self-interest in two ways: directly via payoff-maximization and indirectly via a self-serving selection of fairness. Thus, the second goal of this study was to test the impact of decision power on fairness in wage setting.

In the experiment, two actors were asymmetrically involved in the generation of economic gain. Only one actor contributed actively by completing a task, the other actor was present but **Inactive**. Payments to the **Active** resembled the wage. The experiment was designed to capture important features of natural labor relations in which egalitarian, meritocratic, and libertarian reasoning are potentially applicable but give distinct solutions. In three treatments we varied who has the power to decide about how the gain is divided: (1) Inactives, (2) both Inactives and Actives, or (3) Actives. We tested how actual divisions of gain, and also how perceived fairness was affected by changes in the assignment of decision power.

What is a fair wage? We find that people judge fairness according to both meritocracy and egalitarianism, but our results give little empirical support to the libertarian argument. Apparently, people's intuition about what is a fair allocation does not entail libertarian reasoning, not even when it would permit them an interpretation of fairness that is favorable for them.

Who should decide wages? Fairness perceptions in the experiment vary substantially depending on the personal role (i.e., on being Inactive or Active) and on the assignment of decision power. Absolute power significantly alters judgments towards a self-interested interpretation of fairness. Our results indicate that fairness can be promoted by giving decision rights over the division of economic gain to all parties that are involved in its generation, but in particular to active ones.

In the following section 3.2 we describe in detail the experimental design. Section 3.3 presents the experimental results from the three treatments; Section 3.4 provides an interpretation of the results. In Section 3.5 we clarify what our findings imply for practical issues on fairness in corporations. Section 3.6 concludes.

3.2. Experimental design

In the experiment, two types of actors were involved in the generation of economic gain, but only one contributed actively by completing a real-effort task. The other was inactive. In case of successful completion of the task, both actors – the Active and the Inactive - received a fixed minimum compensation of the gain. In addition, an excess gain had to be divided between the two actors. The change in design across the three treatments consisted in the assignment of decision power about how to divide the excess gain. In the first treatment, Inactives decided the payments that went to the Inactive and to the Active. In the second treatment, both decided the payments; more specifically, Inactives and Actives shared equal decision power and had to agree in a simultaneous-offer bargaining process. In

the third treatment, Actives decided the payments. In all three treatments we observed the distribution of actual payments to the Active, and we also elicited participants' statements of what they considered fair payments.

Treatment 1 – "Inactives decide" and Treatment 3 – "Actives decide" represent variants of the Dictator Game. The Dictator Game is widely recognized as an "interesting vehicle for studying the meaning and interpretation of fairness" (Hoffman et al., 1996). However, it has been criticized for not representing a genuine social situation, in particular that money comes as "manna from heaven" (see e.g., Bardsley, 2005). Here, we embedded the game into a particular experimental frame, in which economic gain was generated by productive activity, and in which payments represented remuneration for the participants' involvement.

Experimental procedure

Participants entered the laboratory and were seated at a computer. The instructions (see Appendix) were read out aloud, explaining in detail the following experimental procedure: In a sequential manner, participants were randomly assigned the roles of actor A1 or actor A2; random pairs of A1-A2 were determined. A2 works on a task that consists of counting letters from a text. The task took approx. 15 minutes to finish. A1 had nothing special to do, but could relax, read (we provided newspapers), do homework, etc.[22] If A2 finished the task within a maximum of 20 minutes, an experimental gain of € 16 was generated, no gain was generated otherwise. Of the € 16, the same fixed amount of € 3 was given both to A1 and to A2. The additional amount of € 10 was divided between A1 and A2 in the following way:

Treatment 1 - "Inactives decide". A1 decided how to divide the € 10.

Treatment 2 - "Both decide". A1 and A2 had to agree how to divide the € 10.

Treatment 3 - "Actives decide". A2 decided how to divide the € 10.

[22] Participants in the role of A1 saw the text with the counting exercise so that they could infer the difficulty of the task.

Upon knowing the exact procedure - including the assignment of decision rights - and knowing their personal role, each participant marked on a sheet of paper whether she agreed to stay in the experiment or preferred to leave with a show-up fee of € 2. Participants who preferred to leave were substituted.

In Treatment 2 – "Both decide", A1 and A2 determined the allocations in a repeated simultaneous-offers bargaining procedure. If they agreed (i.e., their proposals coincided), then the division was implemented. If they disagreed, they were informed about the proposal of the other party and they were asked to make new proposals. This procedure was repeated until they reached agreement. We chose this bargaining procedure because it is easy to understand and gives participants an entirely symmetric starting position (i.e., no first-mover advantage, no informational asymmetry, etc.). Those pairs of participants that agreed quickly left the experiment earlier, but we assured that they could not infer who had been their counterpart.

The experiment was computerized with z-tree software and conducted in the experimental laboratory (LEEX) at Pompeu Fabra University. Participants were 168 students from various fields of study who were recruited using the ORSEE online recruitment system. They participated in nine sessions (16 to 20 participants per session) between October 2006 and May 2007.

Experimental measures

Payments. We observed the divisions of the € 10 excess gain. Throughout the paper, results are reported in terms of the payments that are given to the Actives.

Fairness judgments. After the actual division was made we asked participants the following question: "What do you think would be the fair division?" Fairness judgments are

reported in terms of "fair payment to the Active". [23]

Theoretical predictions

Payments. Economic theory typically assumes that people act in their material self-interest. In accordance with the economic paradigm, participants should make use of their decision power to maximize their own earnings. Table 3.1 shows the predictions for the three treatments. When Inactives have absolute power, they should pay € 0 to the Active; when Actives have absolute power, they should keep € 10 for themselves. When both share decision power and have to agree in a bargaining process, prominent solution concepts of cooperative game theory suggest a payment of € 5 to the Actives, e.g., the Nash (1950) and the Kalai and Smorodinsky (1975) bargaining solutions.

As mentioned, Konow (2000) provides a theoretical modification of the standard economic model to incorporate both a preference for fairness and a tendency to bias fairness perceptions in a self-serving manner. Any payment between a subjective fairness judgment and the payoff-maximizing outcome may result. In the present setting, the ambiguity of fairness would even allow each party to reconcile the payoff-maximizing choice with a suitable notion of fairness.

Fairness judgments. Egalitarian fairness demanded paying half of the excess gain to the Active (€ 5); meritocratic fairness justified paying more, or even the entire excess gain to the Active (€ 6 - € 10). The experimental design allowed for the application of libertarian fairness since 1) participation and provision of effort by the Active was mutually beneficial (this was assured by the fixed remuneration of € 3), 2) the situation respected freedom of

[23] The question varied slightly depending on the role and the treatment. It was phrased "Independently [of your decision how much to give / of what you think you will receive/ of the final division], what would be the fair division?". In the treatments in which one party had absolute decision power, the other party was asked before receiving information about the actual payment. Note that the party with decision power answered the question after having made its decision. It would be interesting to see if eliciting fairness judgments prior to the payment decision would change results. However, in this study we do not address this.

choice (actors were explicitly given the option to leave), and 3) there was no deception (roles, rules, and power structure were communicated in the beginning; those with no decision power knew they would only receive € 3 for sure from the economic gain).[24] Hence, according to libertarian fairness all divisions could be judged as fair, including no additional payment to the Active (€ 0).

Table 3.1 -- Theoretical prediction for payments and for fairness judgments

	Treatment 1 – "Inactives decide"	Treatment 2 – "Both decide"	Treatment 3 - "Actives decide"
Prediction for payments according to economic self-interest	**0**	**5**	**10**
Alternative predictions according to fairness			
Egalitarianism	**5**	**5**	**5**
Meritocracy	**6 - 10**	**6 - 10**	**6 - 10**
Libertarianism	**0-10**	**0-10**	**0-10**

- All values are the payments from the excess gain that go to the Active (in € out of € 10)

Note that the whole range of payments to the Active could be justified as fair with the suitable notion of fairness. Treatment 1 – "Inactives decide" is of particular interest for the objective of testing libertarian reasoning. When Inactives had absolute power to decide, payments to the Active between € 0 and € 4 could be justified as fair exclusively by libertarian reasoning. Any fairness judgments within this range would be evidence for

[24] It is true that those in the role without decision-power do not freely accept a particular ex-post payment but rather that they have no influence on receiving more that the sure gain of € 3. Yet, many of them (36% of Actives in Treatment 1 and 50% of Inactives in Treatment 3) also explicitly expected to receive 0 additional payment from their counterpart, and they still participated.

libertarian reasoning. Moreover, such fairness judgments should have been convenient for Inactives with absolute power, since it permitted them to give little or nothing to the Active and to justify this behavior as fair.

3.3 Results

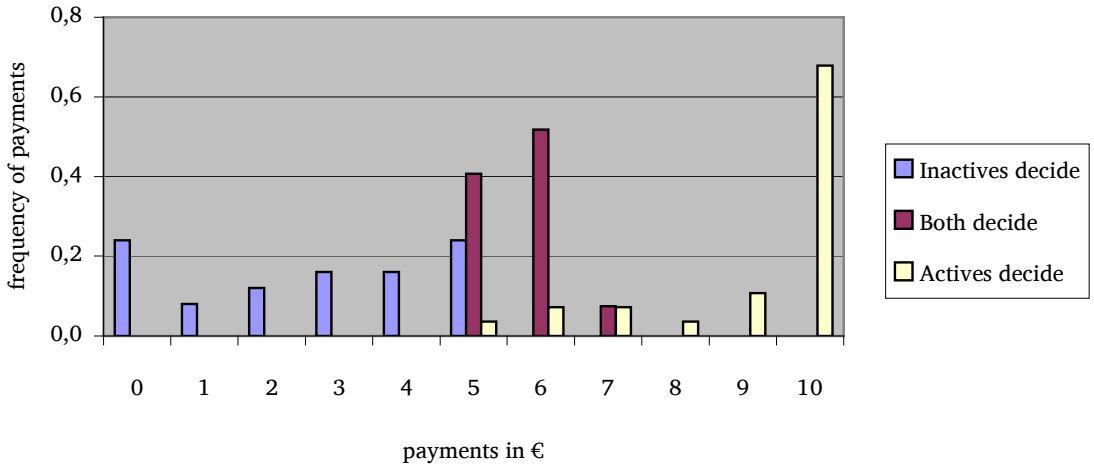
Two out of 168 participants decided to leave the experiment after learning the rules and their personal role; one Inactive in Treatment 2 and one Inactive in Treatment 3.

80 of 83 Actives managed to complete the task in 20 minutes to generate the gain.

Treatment 1 – "Inactives decide" (N = 2 x 25)

Payments. Frequencies of payments to the Active in all treatments are depicted in Figure 3.1. The distribution of payments to the Active in Treatment 1 ranged from € 0 to € 5, with two modes at € 0 and at the equal split of € 5 (6 out of 25, respectively). The mean was € 2.6.

Figure 3.1 -- Relative frequency of payments to the Active in the three treatments



Fairness judgments. Fairness judgments for Inactives and Actives are shown in Figure 3.2. The majority of Inactives (17 out of 25) stated that the equal split is fair. The mean

judgment of Inactives was € 5.3. Actives' judgments were more evenly distributed between € 5 and € 10, their mean judgment was € 7.2. The difference in the distributions is statistically significant (Mann Whitney rank test - MWR: $p < .01$).

Figure 3.2 -- Distribution of fairness judgments in Treatment 1 - "Inactives decide"

Treatment 2 – "Both decide" (N = 2 x 27)

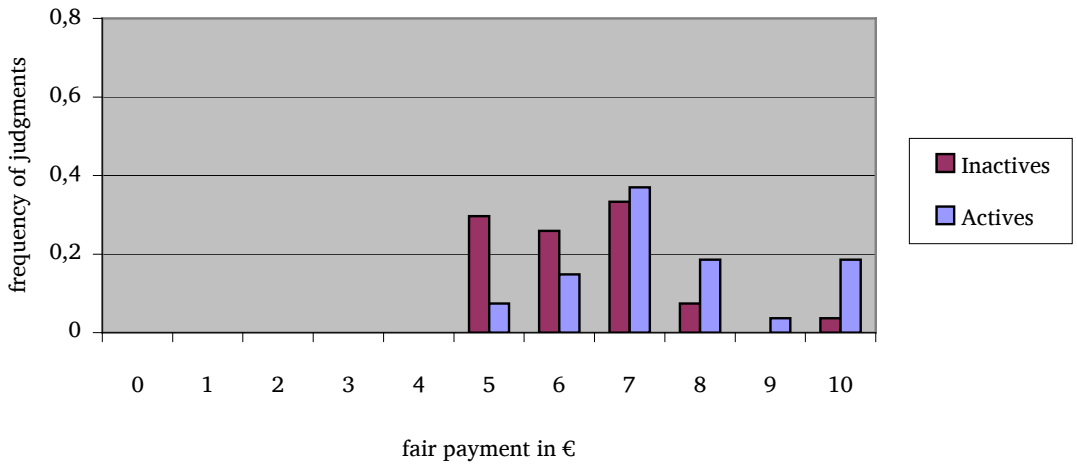
Payments. The distribution of payments to the Active ranged from € 5 to € 7 (see Figure 3.1). The modal payment was € 6 (14 of 27) and the mean payment was € 5.7.

Fairness judgments. Fairness judgments for Inactives and Actives are shown in Figure 3.3. The modal fairness judgment of both Inactives and Actives was € 7. While many Inactives judged € 5 or € 6 as fair, many Actives stated € 8 or € 10 as the fair payment. Means were at € 6.3 for Inactives and at € 7.5 for Actives; the difference is statistically significant (MWR: $p < .01$).

Bargaining procedure. The number of bargaining periods until an agreement was reached ranged from 2 periods (lasting approximately 1 minute) to 66 (approximately 20 minutes) with a median of 5 (approximately three minutes). Mean proposals of Inactives in the first

bargaining period were 3.5, those of Actives were 7.9. Hence, the average difference between first proposals and final divisions (5.7) were similar for Inactives and Actives (2.15 vs. 2.26; difference not significant).[25] It is interesting to note that on average both roles' first proposals are more self-interested compared to what they consider fair, but that this is considerably more so for Inactives (Inactives propose on average 2.8 less to the Active; Actives propose .4 more). Apparently the (symmetric) power structure is already reflected in first proposals, pulling allocations away from more meritocratic to more egalitarian outcomes.

Figure 3.3 -- Distribution of fairness judgments in Treatment 2 - "Both decide"



Treatment 3 – "Actives decide" (N = 2 x 28)

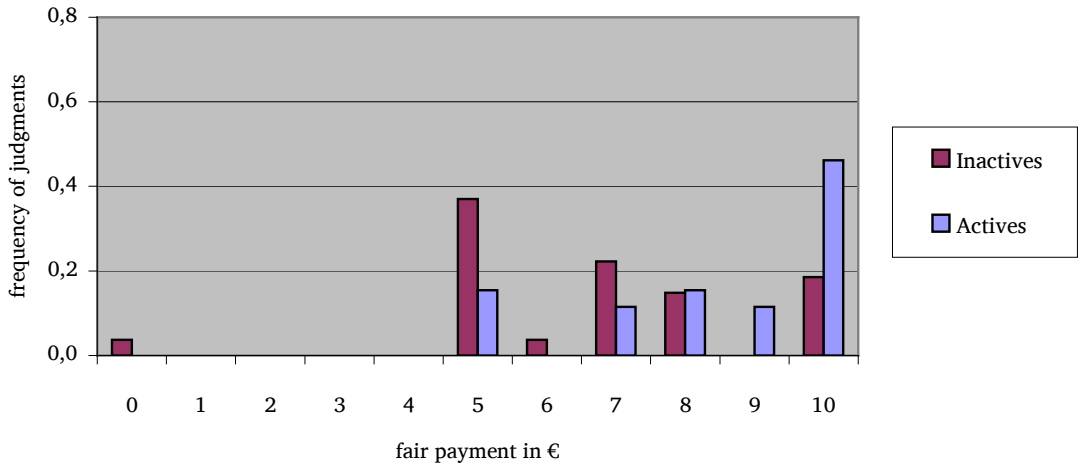
Payments. The distribution of payments to the Active ranged from € 5 to € 10 (see Figure 3.1). The modal payment was € 10 (19 out of 28) and the mean payment was € 9.1.

Fairness judgments. Fairness judgments for Inactives and Actives are shown in Figure 3.4.

[25] We do not provide a detailed analysis of the bargaining dynamics which are not studied in this paper.

The modal judgment of Inactives was the equal split; their mean judgment € 6.7. The modal judgment of Actives was € 10; their mean judgment € 8.5. The difference in the distributions is statistically significant ($p < .01$, MWR).

Figure 3.4 -- Distribution of fairness judgments in Treatment 3 - "Actives decide"



Payments and fairness judgments across treatments

Table 3.2 summarizes mean payments and mean judgments from all three treatments. Inactives in Treatment 1 paid on average 2.6 to the Actives; Actives in Treatment 3 paid on average 9.1 to themselves.[26] Mean payments to Actives from the agreed upon divisions in Treatment 2 were 5.7, which is close to the middle between what was paid to Actives in the other two treatments.

Average fairness judgments ranged from 5.3 (Inactives in Treatment 1) to 8.5 (Actives in Treatment 3). Note that these extreme values were reached when the respective party had

[26] We also elicited expectations from the receiving party. They were close to actual payments, with mean 2.7 in Treatment 1 (compared to 2.6 in actual payments) and mean 1.6 in Treatment 3 (exclusive of two outliers that stated 10; compared to 0.9 in actual payments).

full power to decide the payments. Apart from individual differences, average fairness judgments show considerable variation depending on the role, i.e., whether participants were Inactives or Actives, but also for the same role depending on the experimental treatment. Table 3.2 reports results of the Mann-Whitney rank test on differences of the respective distributions (p-values in parentheses between the means).

Table 3.2 -- Mean payments (row 1) and mean judgments (rows 2 and 3) in all treatments

	Treatment 1 – "Inactives decide" (25 pairs)		Treatment 2 – "Both decide" (28 pairs)		Treatment 3 - "Actives decide" (27 pairs)
Actual payments	**2.6**	(p<.01)	**5.7**	(p<.01)	**9.1**
Inactives judge as fair payments	**5.3**	(p<.01)	**6.3**	(n.s.)	**6.7**
	(p<.01)		(p<.01)		(p < .01)
Actives judge as fair payments	**7.2**	(n.s.)	**7.5**	(p< .1)	**8.5**

- P-values in parentheses indicate whether the respective distributions payments or of fairness judgment are statistically different according to the Mann-Whitney rank test (n.s. = not significant).
- P-values for tests between Treatments 1 and 3 are not reported; distributions are clearly distinct.

As mentioned before, the distributions of fairness judgments between Inactives and Actives are statistically significant in all three treatments ($p < .001$, $p = .003$, $p = .004$). For Inactives, more decision power meant lower fairness judgements: 5.3 for absolute power, 6.3 for shared power, 6.7 for no power. Differences are statistically significant between full power and shared power ($p < .01$), but not between shared power and no power ($p = 514$). In particular, the share of Inactives that opted for the equal split as the

fair outcome decreased from 68% in the case of absolute power to 37% (shared power) and 30% (no power). For Actives, more decision power meant higher fairness judgments: 8.5 for absolute power, 7.5 for shared power, and 7.2 for no power. Again, differences are statistically significant between absolute power and shared power ($p = .03$), but not between shared power and no power ($p = .459$).

Arguments to justify allocations

In the questionnaire following the allocation decision we asked participants to "please give [up to three] arguments in favor of allocating money to A1" (the Inactive) and to "please give [up to three] arguments in favor of allocating money to A2" (the Active). We wanted to elicit reasons for allocation decisions, and to what extent these reasons were in line with the three fairness notions.

We compared arguments and classified them into comparable categories. The most frequent argument was based on meritocratic reasoning which we categorized as "amount of work / effort / time spent". Two types of arguments were in line with an egalitarian division: "roles were determined by chance" and "both players were needed and are part of the team". These arguments were typically given to justify the allocation of money to the Inactive. There was one type of argument that could be interpreted to represent the "mutual beneficence" part of libertarian reasoning, namely that "the other gains already € 3". However, this argument did not occur frequently and it was given only as a justification to give to the Active, never to the Inactive. As such, it rather reinforced meritocratic reasoning in the sense that this is all the Inactive deserves for her (lack of) contribution. Table 3.3 reports the frequencies with which participants wrote down arguments from a category. For example, the two far left columns show the arguments which were given for allocating money to Actives in Treatment 1; the very left column presents the number of times that Actives gave the arguments, the second left column presents the number of times that Inactives did so.

Table 3.3 -- Frequencies with which participants stated types of arguments

	Treatment 1 – "Inactive divides"				**Treatment 2 – "Both divide"**				**Treatment 3 – "Active divides"**			
Allocating money to (...)	Actives		Inactives		Actives		Inactives		Actives		Inactives	
was justified by (…) with an argument based on…	Actives	Inactives	Actives	Inactives	Actives	Inactives	Actives	Inactives	Actives	Inactives	Actives	Inactives
amount of work / effort / time spent	**24**	**24**	**2**	**4**	**27**	**27**	**9**	**13**	**22**	**18**	**6**	**11**
roles were determined by chance	0	0	**3**	**5**	0	0	**7**	**11**	1	1	**12**	**5**
egoism / maximization of gains	x	x	**12**	**10**	0	0	0	1	**5**	**6**	x	x
both are needed / team of two	0	0	0	1	1	1	**4**	**6**	0	0	**4**	**2**
having power / decision rights	x	x	0	3	0	1	**6**	**4**	0	0	x	x
solidarity / altruism	1	0	x	x	0	0	0	0	x	x	**1**	**7**
the other gains already € 3	x	x	0	0	2	1	0	0	4	0	x	x
other	0	0	3	3	0	1	0	1	0	1	0	0
Sum of all arguments	**25**	**24**	**20**	**26**	**30**	**31**	**26**	**36**	**32**	**26**	**23**	**25**

- Numbers are absolute frequencies
- x means "not applicable"

The majority of participants stated the amount of work or effort as a reason for giving money to Actives. In addition, this argument was used by some to justify allocating money to Inactives. In these cases, participants usually stated that "A1 had to spend time in the experiment". In all three treatments, Inactives and Actives recognized this argument almost equally often as justification for giving to Actives (24 vs. 24; 27 vs. 27; 22 vs. 18), while as a justification for giving to Inactives it was used more often by Inactives (4 vs. 2; 13 vs. 9; 11 vs. 6). The second most frequent argument was that "roles were determined by chance", which typically served as a reason to allocate money to Inactives. In Treatment 1 and Treatment 3 "Egoism and maximization of personal gain" was stated as a reason for the party with absolute power to keep money for themselves. It was stated twice as often, however, as an argument for Inactives to keep money (12 and 10 vs. 5 and 6). Several people emphasized that the team consists of two people, so that the Inactive should get part of the allocation. "Solidarity" was stated almost exclusively by Inactives in Treatment 3 as a reason to give money to them.

3.4 Interpretation of the results

Fairness in the division of economic gain

We compared three different notions of fairness: libertarianism, egalitarianism, and meritocracy. We were particularly interested in whether libertarian reasoning would be applied – for that reason the experimental design ensured mutually beneficial participation, freedom of choice, and absence of deception. In Treatment 1 – "Inactives decide", libertarian reasoning allowed Inactives to judge any payment to the Actives as fair, even very low or zero payments. However, while 19 Inactives in Treatment 1 paid less than € 5 to the Actives, only 3 of them (16%) claimed that their payments were fair. Moreover, the majority of Inactives (18 of 25) admitted with their fairness judgments that they acted

unfairly. This suggests that their intuition about what is a fair allocation does not entail libertarian reasoning. Rather, fairness judgments were almost exclusively in the range between payments of € 5 and € 10 to the Active. Our interpretation of this result is that fairness in this experimental setting is composed of two main components: a value for payment according to merit and a value for payments according to egalitarian treatment of both parties. Arguments from the post-questionnaire support this interpretation. The most frequent argument ("amount of work / effort / time spent") supports meritocratic values. "Roles determined by chance" and "both needed / team of two" supports an egalitarian perspective. Note also that arguments do not support libertarian reasoning.

Hoffman and Spitzer (1985) argue that whenever the context suggests asymmetric attribution of entitlement, then meritocracy will be applied. Our results do not confirm this claim. Rather, we observe that within an identical context, people who contributed actively to wealth creation judged fairness more in accordance to meritocracy, but those who did not contribute actively often judged fairness in accordance to egalitarianism (see figures 3.2 to 3.4). In fact, Messick and Sentis (1979) also found such role-dependent application of fairness notions in statements about hypothetical labor scenarios. In their study, people who worked more on a joint task generally believed that they should earn more, while those who worked less stated often that both parties should be paid equally. Such differences are in line with a so-called "self-serving bias" in fairness judgments, which has been reported for many situations characterized by "moral ambiguity" (see Babcock and Loewenstein, 1997). Note that the two values conflict for the determination of what are fair payments; egalitarian values justify an equal split, meritocratic values justify higher payments to the Active. Apparently people are more likely to select or at least they emphasize more the fairness value that is in line with their monetary self-interest. But again, they do not intuit a justification based on libertarian reasoning.

The impact of decision power on payments and fairness judgments

Our results link the issue of fair payments to the issue of who decides about them. Decision power about the division of the excess gain was varied in the three experimental treatments, and the assignment of decision power influenced both actual payments and participants' fairness judgments.

First, people used their decision power to satisfy self-interest with respect to personal monetary gains. Inactives paid more to themselves in Treatment 1, Actives paid more to themselves in Treatment 3, and payments under equal decision power in Treatment 2 were in between those in the other two treatments. However, we did observe sharing of the excess gain when absolute power was assigned to one party. This finding is in line with results from other experimental studies (e.g., Dictator Game) and not with the standard economic prediction. Apparently the use of power for determining payments is also influenced by peoples' perception of what is a fair division. In contrast to usual Dictator Games, fairness judgments in our setting were asymmetric - on average fairness judgments implied higher payments to the Active than to the Inactive. Consequently, sharing by Inactives was higher than sharing by Actives.

Our results suggest that people have values both for meritocratic and egalitarian fairness. Moreover, they indicate that the strength with which the two values influence fairness judgments is sensitive to 1) what is in a participant's monetary self-interest, and 2) who has the power to decide. Inactives tended to favor egalitarian values, but significantly more so when they were assigned absolute power to decide in their monetary self-interest (in Treatment 1 68% judged € 5 as fair vs. 37% and 30% in the other two treatments). Actives, on the other hand, tended to favor meritocratic values, but in a significantly more pronounced manner when they were assigned absolute power to decide (in Treatment 3, 46% judged € 10 as fair vs. 24% and 19% in the other two treatments). Hence, for participants in both roles the assignment of absolute decision power lead to significantly

more self-serving fairness judgments, while the difference between partial power and no power was insignificant.

Aggregated perceived fairness

It is illuminating to attempt to quantify the fairness of outcomes when decision power is assigned differently. Since there is no unique objectively fair division, we compared across treatments how participants from both roles perceived fairness in the resulting divisions. We measure Aggregate Perceived Fairness (APF) by averaging the differences between what the N participants in the treatment actually got paid and what they judged as fair.

(1) $$- \frac{1}{N}\sum_{i=1}^{N} \left|\text{fairness judgment - payment}\right|$$

The following values of this measure resulted for the three experimental treatments:

Treatment 1 – "Inactives decide": **-7.28**

Treatment 2 – "Both decide": **-2.89**

Treatment 3 – "Actives decide": **-4.93**

According to this measure, when only inactive participants decided about the division of economic gain, outcomes were perceived as least fair. Divisions were perceived as more fair when absolute decision power was in the hands of those who were active in its generation, and they were perceived as most fair when decision power was shared by all parties that were involved.[27]

[27] Note that this measure is limited to the perception of fairness in outcomes. Different assignments of decision power may be perceived as more or less fair also due to the process per se, e.g., a democratic system may be perceived as more fair.

3.5 Implications for fairness in wage setting

What is a fair wage? As a first main conclusion, the data from our study provides little evidence that people judge fairness according to the libertarian conception of fairness. Rather, fairness judgments reflect considerations that support meritocratic and egalitarian outcomes.[28] It is interesting to ask then why libertarian reasoning has become so prominent in the debate on wage determination in business practice? One may speculate that its popularity stems from the influential history of libertarian thinking within (neo)classical economic theory. According to this theory, wages in a free market system depend on the supply and demand of labor, and they may be as low as "subsistence level" (Ricardo, 1817). The underlying assumption of self-interest, i.e. of profit maximizing companies, predicts that the rational outcome is the minimum wage for which workers still accept to work. In the theory, this outcome is also desirable since it leads to an efficient equilibrium state in which no unemployment can persist. Though descriptive in its origins, one may presume that the dominance of neoclassical theory has granted its prediction a quasi-normative status. More provocatively, one may argue that the libertarian conception of fairness may be more a justification for a self-interested allocation of economic wealth by those who possess the decision power than a genuine basis for fairness judgments. [29] [30]

Who should decide wages? The results of our experimental study show that when there is a trade-off between personal monetary interest and fairness, people use their power to decide in their monetary interest, but they do so also under consideration of egalitarian and meritocratic fairness values. Fairness values tend to be emphasized selectively according to

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[28] Egalitarian fairness in this case can be attributed partly to the fact that roles were determined randomly. In natural labor settings, the assignment of roles and power may be due to chance (e.g., to be born to an influential or rich family or country), but they may also be earned (e.g., by hard work or skills). Hofmann and Spitzer (1985) show that when power is earned, people find it more legitimate to use it in one's own interest.

[29] Note that the experimental setting isolates basic features of natural labor relations (asymmetric contribution to the generation of economic gain, decision power etc.) to address fairness in judgment and behavior while it bars the potential influence of contextual cues which may be due to custom or ideology.

what is in people's own monetary interest, and significantly more so for those that have absolute power to decide. Allocations that result from decisions under shared power are more balanced between the interests of all actors. In addition, shared decision power limits self-serving selection of fairness judgments. Consequently, Aggregate Perceived Fairness (APF) in the experiment was lowest when inactive participants had absolute power to decide. APF was higher when instead active participants have absolute power, but it was highest when all involved parties share decision power. So who should decide about wages? Our study suggests that in order to enhance fairness in the division of economic gain all parties that are involved in the creation of economic wealth should be assigned decision power. In particular those actors that contribute actively should participate in the decision process.

From a fairness perspective our findings support participative structures in corporate decision-making processes, in particular for the division of economic gain. Fairness considerations may enter corporate decision making through different channels. On the one hand, companies may accept fairness as a goal of managerial action per se. In recent years, companies attribute increasing attention to issues of Business Ethics or Corporate Social Responsibility (CSR). While "shareholder primacy" remains the dominant dogma governing decisions within publicly traded enterprises (Kelly, 2000), many acknowledge that other groups, e.g. employees, have legitimate interests "at stake". The Brazilian company Semco, where workers decide about their own wages within a fully democratic decision system, provides a seminal example of a structural change in corporate governance. It is noteworthy that the drastic changes at Semco have evolved from within the company as opposed to legal or public pressure (see e.g., http://semco.locaweb.com.br/).

[30] Another interesting issue is how monetary interests and actual decision power in firms is distributed between managers and shareholders.

Fairness considerations can enter corporate decision-making also through the legislative power of a social planner. Governments may wish to promote fairness (or social justice) in the economic realm, and they can shape legislation for corporate design accordingly. Germany is one prominent example of a capitalist system in which corporate law incorporates principles of balance for the division of economic gain between capital and labor. It contains strict rules for employee participation (co-determination, in German: *Mitbestimmung*) which aim at balancing the – possibly opposing - interests of employers (e.g., shareholders) and employees. For example, it is obligatory for companies with over 20 employees to allow for worker councils (*Betriebsrat*). Corporations are legally forced to have one third or even half of supervisory board (*Aufsichtsrat*) members representing workers' interests (see e.g., Page, 2006). In a recent empirical study Gorton and Smith (2004) compare German firms in which half of supervisory board members represent workers and firms with only one-third worker representation. Their results show that more worker representation is related to higher payrolls[31] and lower capital returns, i.e., to an income shift from shareholders to workers. While the German system is special in this regard among Western capitalist systems, most countries' legislations foster worker participation to a certain extent, often through the industry-wide influence of labor unions. Our study may be seen as supportive evidence that measures of codetermination enhance perceived fairness in the division of economic gain.

Parenthetically, in most capitalist countries it is possible to opt for more participative corporate governance by organizing companies in the form of cooperatives. In worker cooperatives, workers are at the same time owners of the company, and all share decision power about the division of economic gain. There is disagreement on the merits and possible problems of cooperatives. Critics often refer to a possible lack of efficiency. However,

[31] Since wages are determined mainly on (unionized) industry level, it is the number of workers that is larger in these companies.

Pencavel (2002) demonstrates in an empirical study of the 20-year performance of worker cooperatives in the Northwestern US plywood industry that cooperatives were in fact more efficient than conventional capital-owned companies. He relates these findings to higher motivation and better peer-monitoring in cooperatives. In any case, from the perspective of fairness cooperatives seem a promising model of corporate design.

3.6 Conclusion

We have studied fairness in the division of economic gain in an experimental laboratory setting. Our results show that participants did not perceive libertarian reasoning as fair, but that meritocratic and egalitarian values influenced fairness judgments and allocation decisions. This finding may cast doubts on the frequent use of libertarian arguments in business discourse. In addition, our results suggest that equality of decision power between different parties that are involved in the generation of economic gain enhances perceived fairness of allocations. This is not only because power can thus be used more evenly to serve the interest of the different parties, but also because absolute power significantly increases a self-serving interpretation of fairness. We relate our findings to systems of corporate governance, claiming that more participative decision structures would enhance fairness in the division of economic gain. As mentioned before, fairness may be only one among different criteria for the design of corporate structures. Efficiency consideration, for example, have been excluded in this study by construction of the experimental design, i.e. a fixed amount of economic gain for task completion.[32] Also, it is important to note that our experiment does not deal with the question how risk associated with different inputs is - or should be - fairly compensated. There are many different ways in which risks can be

[32] In their study of German companies, however, Gorton and Smith (2004) do no find evidence that different degrees of codetermination have an effect on efficiency.

allocated and remunerated between labor and capital, but this is beyond the scope of this paper.

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Appendix

Chapter 1 - Experimental instructions

General Information

Thank you for participating in this experiment on market decision making, which is part of a research project. Your earnings will depend on your decisions and those of the other participants. As a minimum you will earn a show-up fee of 5 Euros. From now on, we ask you not to talk to each other till the end of the experiment. If you have any question, please raise your hand so that the experimenter can help you. Thank you very much!

You will participate in a market. The market consists of **three producers** and **six consumers**. You will be randomly assigned to one of these roles at the beginning of the experiment. You will remain in that role throughout the entire trading sequence, which consists of **15 periods**. You will stay in the same market group with the same participants, but you will never know who they are.

Market Characteristics

This is a market for one product. Three international firms are competing in this market. It is publicly known that the production of this good is primarily done in India and Pakistan. Although legal regulations against the use of child labor officially exist, the use of various forms of child labor is expected to prevail both in the supply chain and in some final production sites. An internationally recognized NGO named MARK is fighting child labor practices. It offers a label for the product as "child labor free," which on the market will be indicated by a Star-Symbol (*). In the European market, only licensed MARK producers are legally permitted to sell products carrying the MARK label.

To be certified by MARK, producers have to sign a legally binding contract to:

- Abandon any use of child labor in their production sites.
- Hire adult personnel to fair working conditions and standardized wages.
- Allow access to their production sites for unannounced inspections.

MARK provides the following:

- Regular monitoring of production sites by local control committees.
- Organization of schooling projects for previously employed children.
- Education for parents as well as organizational and financial aid to secure the basic needs for directly affected families.

All three producers in the market have been asked to participate in this initiative. However, fulfilling the requirements for the certificate implies an increase in production costs.

Experimental Procedure

On the first screen you will see your personal role for the entire experiment. It can be that you have to sell the product as **Producer A, Producer B**, or **Producer C**, or to purchase the product as **Consumer 1,2,3,4,5 or 6**.

Producers

In each period each producer will fix a price for his product simultaneously with the other two producers.

Producer A and Producer B do **not** participate in the MARK initiative to fight child labor. Their p**roduction costs are 20 ECUs** per unit. For each period, Producers A and B must post a **price between 20 ECUs and 100 ECUs per unit**.

Producer C **is offering the exact same product, but** has agreed to the MARK conditions**. Therefore he incurs** higher production costs of 25 ECUs per unit**. For each period, Producer C must post a** price between 25 ECUs and 100 ECUs per unit**. As mentioned, Consumer C's product will show a star (*) symbolizing the MARK label in order for the consumer to distinguish it from producers A and B's products.**

The extra production costs of 5 ECUs (of the 25 ECUs) for each (*) unit sold by Producer C will be donated to a project against child labor. More specifically, the donated money will be paid to the (…)MARK Foundation, which is fighting child labour in a specific industry. For more information you can consult the official website which is shown at the end of the instructions. For legal questions we will hide the name of the product. The transfer for the donation will be made online and visible for all participants at the end of the experiment.

Producers' profits (per period):

[Unit Profit] = [Price offered – Production Cost]*[number of sold units]

Only units that are actually sold create costs.

Information for each producer after each period:

The prices of all producers in that period,

The quantities sold by each producer in that period,

Each producer's profits in that period,

The sum of own profits.

Consumers

In each period, every one of the six consumers **must buy three units** of the product.

Each consumer has a **budget of 300 ECUs** to spend per period. The three units can be purchased from one, two, or all of the firms. Thus, you will be asked to indicate on the screen how many units you wish to buy from producer A, how many units from Producer B, and how many (*) units from producer C (has to add up to three). Purchasing decisions remain private information.

Calculation for Consumers' earnings (per period):
[Earnings] = [300] – [amount paid to producer A] - [amount paid to producer B] - [amount paid to producer C]
Remember that the amount paid to each producer is the price of the product that this producer has posted times the units bought from that producer.

As said, the amount corresponding to Producer C's extra production costs will be donated.

Calculation for Donations (per period):
[Donation] = [number of (*) units sold] * [5]

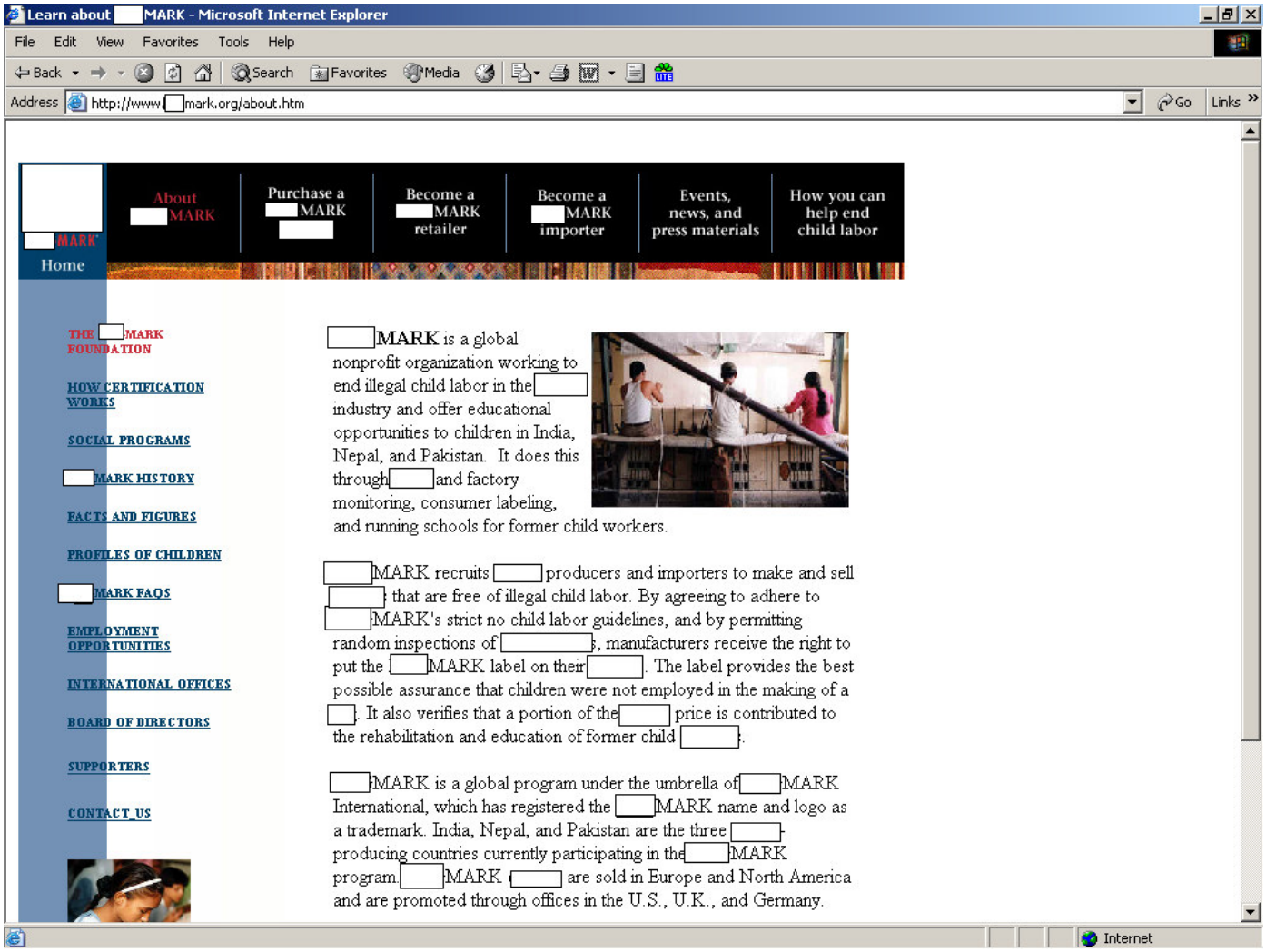
Information for each consumer after each period:

Own earnings in that period,
Own total earnings,
The sum of donations in that period,
The total sum of donations.

All earnings and donations in the experiment involve real money. Three ECUs of earnings will be converted into one Euro cent at the end of the experiment, so that 300 ECUs will be converted into one Euro. Additionally you will be paid the fixed show-up fee of five Euros.

If you have any questions please feel free to ask the experimenter any time!

Thank you very much for your participation!



(...)MARKs official webpage (12-02-2004).

Basic instructions

Thanks for participating in this experiment, which is part of a research project. The money that you can gain depends on your results in the exercises and on your decisions, and the results and decisions of the other participants. From now on until the end of the experiment you are not allowed to talk. Thank you!

The experiment consists in several consecutive parts. At the beginning of each part of the experiment you will receive detailed instructions about what you have to do and how zou can gain money. Please read the instructions carefully. Press “OK” to continue only when you have fully understood the instructions. If you have any questions, raise your hand and one of the instructors will answer you. Please do not ask aloud!

In each part of the experiment you will be randomly assigned another participant. It will be someone different in each part, but you will never know who it is.

In each part, you and the other participant will encounter either an exercise in which your results will be rewarded, or an interaction, in which you have to make a decision. As said, you will receive further instructions at the beginning of each part.

After each part, you will be told how much you have gained, and how much money you have accumulated in total.

No one will know your results or your decisions in the experiment!

If you have a question, please ask the instructor at any time!

Thank you for your participation!

Instructions for first exercise

Part 1

This part consists of an exercise for you and another participant *[COMP: This part consists in an exercise in which you compete against another participant]*. Remember that the participant you get assigned to will change in the following parts.
The exercise consists in solving easy calculations. You have to solve 30 calculation exercises. Fill in the correct solution behind each one of them. You have 3 minutes to solve as many calculations as possible.

Example: A calculation could be 7 + 3 = [10].

To determine the money that you and the other participant will receive, the numbers of correct solutions of each one of you are summed up. Then this sum is multiplied by 0.05 Euros. This will be the money accumulated for your gains in this part of the experiment.

Example: You have 25 correct solutions and the other has 20.
In this case you would have accumulated (25 + 20) x 0.05 € = 2.25 €.

You and the other participant each receive half of the accumulated gains.
Example: You receive both ½ x 2.25 € = 1.13 €.

[COMP: If you have more correct solutions than the other participant, then you win and receive two thirds of the accumulated money. If you have fewer correct solutions than the other, then you loose and receive one third of the accumulated money. If you have both the same number of correct solutions, then you both receive half of the money.

Example:
You win and receive 2/3 x 2.25 € = 1.50 €; the other looses and receives 1/3 x 2.25 € = 0.75 €.]

Please press "OK" when you are ready. The calculations will appear when you have pressed "OK" and the time (3 minutes) will begin to count.

Instructions for Communication Game

Advisor

Part 6
This part consists in an interaction between you and the other participant. You have to take a decision.

In this part you and the other participant have three possible options with different gains.

Option	for you	for the other
A:	1 €	1 €
B:	4 €	3 €
C:	3 €	5 €

You know these payments from the options while the other participant only knows that there are three options A, B, and C, and that with one of the options she gains 1, with another 3, and with another 5 Euros. SHE DOES NOT KNOW WHICH OF THE GAINS 1, 3, 5 BELONGS TO WHICH OPTION AND SHE DOES NOT KNOW ANYTHING ABOUT THE GAINS FOR YOU!

This means that the other knows the following:

Option	for you	for her
A:	?	1, 3 o 5 €
B:	?	1, 3 o 5 €
C:	?	1, 3 o 5 €

The other participant has to choose one of the options! To make her decision, the only additional information that she has will be a message that you send her before she decides.

Your possible messages are:
Message A: "With option A you receive more money than with the other options".
Message B: "With option B you receive more money than with the other options".
Message C: "With option C you receive more money than with the other options".

The other participant will receive your message and then has to choose one of the three options. To repeat, the choice of the other determines the gains in this part. However, she will never know which gains belong to the options that were not chosen and she will never know the value of the gains for you.

Decision maker

Part 6
This part consists in an interaction between you and the other participant. You have to take a decision.
In this part you and the other participant have three possible options with different gains. YOU HAVE TO MAKE A CHOICE BETWEEN THE THREE OPTIONS. OPTION A, B, or C. That means that the gains in this part depend on your choice. However, you only know the following:

ONE OF THE OPTIONS GIVES YOU A GAIN OF 1 €, ANOTHER A GAIN OF 3 €, ANOTHER OF 5 € (this means that you do not know the order).

The other participant knows the gains from each option for both of you. THIS MEANS THAT THE OTHER PARTICIPANT KNOWS EXACTLY WHICH GAINS FOR YOU (1, 3, and 5) BELONG TO WHICH OPTION!!! The only additional information that you have is a message that the other participant sends you.

The possible messages are:
Message A: "With option A you receive more money than with the other options".
Message B: "With option B you receive more money than with the other options".
Message C: "With option C you receive more money than with the other options".

After receiving the message, you will have to choose between the three options. You will never know which gains belong to the options that you have not chosen.

Chapter 3 - Experimental instructions

(Differences between Treatments 1, 2 and 3 are indicated in italics.)

Instructions

Thank you for participating in this experiment which is part of a research project. You will have to make decisions. The money that can win depends on your decisions and on the decisions of the other participants. From now please do not talk until the end of the experiments. Thank your very much!

You have aready gained € 2 for coming to the experiment. Now we tell you how the experiment works and how you can gain more money.

The experiment

Actors
The experiment consists in an interaction between **two actors: A1 and A2**. Each of you will be randomly assigned a role (A1 or A2). You will be matched randomly to build pairs "A1 – A2". You know that you will be assigned a counterpart of the other role, but you will never know who he/she is.

Payments
A2 has to do an exercise. If he/she completes the exercise successfully, a **total gain of € 16** is generated. From these € 16 both are paid €3 for sure. *The rest will be paid provisionally to A1. / The rest will be paid provisionally to A2. / A1 and A2 have to agree how to divide the rest (€ 10) between them.*

Actions

A2 has a maximum of 20 minutes to complete the exercise in order to generate the € 16. If A2 does not complete the exercise within 20 minutes the gain of € 16 will not be generated.

The exercise consists in several parts of a text. The entire exercise takes between 10 and 15 minutes if A2 works calmly but with full concentration. As said, A2 has a maximum of 20 minutes.
While A2 is working A1 has nothing special to do, but waits until A2 has finished. He/she can read (we have today's newspaper), relax, etc.
When A2 has finished the exercise, ***A1 decides how to divide the € 10*** *between him/herself and A2. / ...,* ***A2 decides how to divide the € 10*** *between him/herself and A1. / ...,* ***both decide about the division of the € 10*** *by making proposals simultaneously until they agree.*

Important: Participation by all actors is voluntary!
When you know your role and the rules you can decide whether you want to continue with the experiment (that you accept your role and the rules) or you can leave (with the € 2).

We repeat the process of the experiment

1) Distribution of the roles and decision whether to participate or not

It will be randomly decided how is A1 and A1. The distribution of the roles will be sequential so that it can take a few minutes until you have your role. When you are given your role, you have to decide if you want to continue with the experiment or leave. The distribution is finished when everyone has a role.
Remember that you have gained € 2 for sure for coming to the experiment. If you continue with the experiment and if A2 completes the exercise correctly then you receive at least € 3 more.

2) Exercise

A2 counts letters of a text. The information which letter to count will appear on the computer screen. The exercise will take approximately 15 minutes. All A2 have to complete the task before the experiment proceeds.
A1 can relax, read, etc.
If A2 completes the exercise in 20 minutes then a total gain of € 16 is generated.

3) Division

A1 divides the additional gain of € 10 between him/herself and A2. / A2 divides the additional gain of € 10 between him/herself and A1. / A1 and A2 divide the additional gain of € 10 between themselves.
That means *he/she / they* can decide between 11 different divisions:

1)	€ 10 for A1	€ 0 for A2
2)	€ 9 for A1	€ 1 for A2
...	...	...
10)	€ 1 for A1	€ 9 for A2
11)	€ 0 for A1	€ 10 for A2

If the proposals from A1 and A2 coincide, then the division is implemented. If the proposals do not coincide, A1 and A2 will have to make new proposals. That process is repeated until the proposals coincide. You will see the proposals of the other on the screen.

4) Questionnaire
5) Payments

Remember that the payments involve real money for the participants.
No one will know your results or your decisions in the experiment.
If you have a question please ask the experimenter at any time.
Thank you very much for your participation!