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Do Markets Erode Social Responsibility?

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Abstract: This paper studies socially responsible behavior in markets. We develop a laboratory product market in which low-cost production creates a negative externality for third parties, but where alternative production with higher costs mitigates the externality. Our data reveal a robust and persistent preference among consumers and firms for avoiding negative social impact in the market, reflected both in the composition of product types and in a price premium for socially responsible products. Socially responsible behavior is generally robust to varying market characteristics, such as increased seller competition and limited consumer information, and it responds to costs and prices in a manner consistent with a model in which positive social impact is a utility-enhancing feature of a consumer product. Consumers in markets exhibit slightly less social concern than subjects in comparable individual choice contexts.

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1. Introduction

Adam Smith's metaphor of the "invisible hand" illustrates the idea that decentralized interaction of independent actors, through market exchange, leads to efficient allocation of societal resources. In fact, there exists widespread evidence that markets often fulfill this function. However, unregulated market exchange is also often blamed as a source of social ills. For example, citing accounts of environmental damage, animal cruelty, unsafe working conditions and persistent inequality, many scholars have raised the question of whether the inherent nature of market exchange has a perverting influence on people's motivations to exhibit concern for the social impact of their actions (Bowles, 1998; Sandel, 2012; Falk and Szech, 2013; Besley 2013).

Indeed, returning to the efficacy of the invisible hand, an important underlying condition is the absence of negative externalities. When the social costs of market activity are not borne by the trading parties in the market—as in many of the examples above—then markets can systematically underappreciate such impacts, absent some other channel through which they are incorporated. Hence, a standard response to the problem of external effects is to call for an active role for government in regulating or taxing activities that impose externalities, as one possible way to internalize their impact. For instance, markets for products with negative environmental impact, such as CO_2 emissions, often highlight the importance of regulatory action in mitigating the negative consequences of unregulated market activity.

However, an alternative remedy occurs if market participants voluntarily take into consideration the social impacts of their actions, thereby resulting in a partial or full internalization of external costs. On one hand, firms may voluntarily incur additional production costs in order to mitigate harm for communities where production occurs or to limit negative environmental impacts. Such concern is potentially reflected, for example, in Apple CEO Tim Cook's statement to shareholders that the firm does "a lot of things for reasons besides profit motive. We want to leave the world better than we found it" (Politi, 2014)—though the extent to which such acts reflect true concern for social impact, rather than for firm reputation and profits, is unclear. On the other hand, consumers may be willing to pay higher prices for products that mitigate potential harm. Indeed, several studies document a willingness by individuals to pay more for socially responsible products (Roe, et al., 2001; Johnston, et al. 2001; Louriero, et al., 2001; De Pelsmacker, et al., 2005), though these estimates are typically obtained by eliciting hypothetical choice or willingness-to-pay measures or by comparing purchasing behavior over

distinct market products that may differ in dimensions beyond social impact, such as actual or perceived quality.

Thus, while the notion of individual and corporate "social responsibility"—the willingness to sacrifice profits or personal wealth in pursuit of broader social interest—has recently come into focus as a means to prevent efficiency losses due to external effects (Bénabou and Tirole, 2010),[1] the extent to which this presents an actual remedy for negative impacts of market activity remains to be better understood. The presence of product labels such as "carbon free," "fair trade" and "cruelty free" in consumer products markets—often associated with higher production costs for firms and prices for consumers—suggests a potential influence of concerns for social impact on market activity. But in real product markets it is difficult to isolate concern for social responsibility from other possible motives underlying such products.

The possibility that market participants voluntarily internalize the external impacts of their actions is also consistent with evidence from research on non-market decision making, which regularly documents a willingness to consider the impact of one's actions on others (Andreoni and Miller, 2002; Fisman, et al., 2007; Cappelen, et al., 2007). The fact that people often show concern for others' welfare in choice contexts such as dictator games (Hoffman, et al., 1994; Engel, 2011) suggests that such concern may exist as well with respect to externalities in market settings. However, there is also considerable evidence, which we review below, indicating that repeated exchange in competitive markets often crowds out or erodes concerns with fairness and equality, at least between the *directly* interacting trading parties in the market (Smith, 1962; Roth, et al., 1991; Franciosi, et al., 1995). The question of whether market exchange and competition similarly eliminate concern with the welfare of externality-bearing third parties, who are uninvolved as buyers or sellers in a market, remains an open question.

To address this important issue, we report a laboratory experiment showing that socially responsible behavior by firms and consumers in markets can, indeed, mitigate the fundamental problem of negative external effects. Our experiment models a competitive product market, in which sellers decide on a price and on which type of product they want to offer for sale—either one that produces a large negative externality for a third party or one that does not, with the latter involving higher production costs. Thus, importantly, our experiment includes a production

[1] This notion is, however, far from new. For example, Arrow (1970) called "attention to a less visible form of social action: norms of social behavior, including ethical and moral codes" and suggested "as one possible interpretation that they are reactions of society to compensate for market failures" (p. 22).

technology that allows market participants to avoid the external harm caused by exchange, as long as they are willing to incur the corresponding costs. In a baseline market case, following firms' supply decisions, consumers observe the set of offered products and prices and then choose which products to buy, or whether to buy a product at all. We allow repetition, in order to obtain a sense of what kind of outcomes arise with experience in the market.

The standard equilibrium prediction for these markets is that only the cheaper good, which produces the externality, is traded. In contrast, we find that the baseline market converges rapidly to a stable outcome in which a significant proportion (roughly 45 percent) of products traded cost more to produce, but yield no externality. The prices for such goods are also regularly higher than prices for the externality-producing products, though to a lesser extent than the full additional production cost. Thus, in our markets, both sellers and buyers share, on average, some of the burden for preventing the negative externality. Both manifestations of social responsibility are stable over time. We interpret these findings as evidence that preferences over considerations such as social impact, fairness and morality can persist in competitive market exchange.

We also conduct additional variants of the market to test the robustness of social responsibility to varying market conditions and production technologies. In particular, we study three factors.

First, we study the effect of increased competition between sellers. Specifically, we add supra-marginal firms to the market, which should theoretically have no effect. However, increased competition is often argued to diminish concerns with fairness (Roth, et al., 1991) and, more broadly, is often highlighted as a potentially corrupting influence in economic and market behavior (Shleifer, 2004; Cai and Liu, 2009; Brandts, et al., 2009). In our market, competition does drive down overall prices, thus yielding greater relative surplus for consumers at the expense of firms. However, there is no detrimental effect of increased competition on the degree of concern exhibited toward externality-bearing parties outside of the market. In fact, the market share of products that yield no externality increases slightly under increased firm competition, relative to our market baseline, as does the price premium for the socially responsible product, meaning that consumers pay a higher fraction of the additional cost of avoiding the externality. Thus, instead of decreasing the expression of social responsibility, increased market competition in this case has, if anything, the opposite effect.

Second, we consider the possibility that consumers may have limited information about the externality produced by available products, but have the ability to learn about such product characteristics. This reflects the fact that many consumers do not know which firms' products are, for example, environmentally or socially harmful, but that such information is often available if a consumer chooses to acquire it. In a setting were consumers are initially uninformed about the types of the offered products, we study both a case in which the information is free to consumers and one in which acquiring it involves the consumer incurring a small cost. In both cases, we find that the need for consumers to actively acquire product information regarding social impact has only a small effect—though slightly larger when acquiring information is costly—on the expression of social responsibility in the market.

Third, we study the effect of an alternative production technology under which the cost of externality-free production is considerably higher. In our baseline condition, the cost of mitigating the negative externality is equivalent to 20 percent of the surplus created for firms and consumers through exchange. We compare this with a condition in which firms and consumers have to forgo 80 percent of the surplus in order to avoid imposing the externality. In this case, the market share of the socially responsible product decreases significantly, by about half. This finding indicates that market participants respond to important features of the market in deciding whether to exert social responsibility. It also highlights the possibility that consumer adoption of socially responsible products—such as renewable energy—will increase with decreasing production costs, or subsidies for such costs, and provides a basis for understanding why the share of socially responsible trade is higher in some markets than others.

We also conduct a condition that allows us to directly compare the strength of the social concern exhibited by participants in our market experiment with social concern expressed in a comparable individual, dictator-like, choice context. We use a design that elicits the choices made by two separate groups of individuals—in market and non-market settings—facing consequentially identical choice sets. To this end, we present a novel group of subjects *exactly* the same choices as those faced by consumers in the baseline market, with identical monetary consequences for the decision maker and for two other participants (reflecting, implicitly, the roles of sellers and externality-bearing third parties from the market condition). We find that the frequency of choices mitigating the negative social impact on third parties in this individual, non-market context is slightly higher than in our market condition, by about 9 percentage points,

but that this difference is not statistically significant. Thus, while, qualitatively, we find that the market yields less socially responsible outcomes than in comparable individual non-market behavior (cf. Falk and Szech, 2013), the effect is not very large.

To better understand the nature of preferences for social responsibility, we estimate simple choice models of consumer and firm behavior from our experimental data. For consumers in the market conditions—and individual decision makers in our non-market condition—we estimate a conditional logit choice model (McFadden, 1974) in which we allow utility to be determined both by a consumer's own material profit (i.e., the value of a product purchase minus the price paid) and by the social impact of a product purchase or choice. This analysis reveals that choices made by consumers in all conditions of our experiment demonstrate a positive concern for both sources of utility, and that this concern is relatively stable across all market and non-market conditions. Thus, the social impact of products in all of our market conditions affects consumer utility in a way that can be modeled as a utility-enhancing product attribute that consumers compare to the product's price. We also study firms' product supply decisions, and find that firms, on average, respond sensibly to the expected relative profitability of the two types of products, but that their behavior also exhibits a persistent concern among some firms for producing socially responsible products.

The remainder of the paper is structured as follows. In the next section, we review some of the related literature. Then, in Section 3, we describe our experimental design. Section 4 presents the results of our market conditions with regard to the market share and price premium of the socially responsible product, while Section 5 presents analyses that use the combined results to estimate models of firm and consumer behavior. Section 6 compares the behavior of consumers in our baseline market to individual allocation choices in a comparable non-market context. Finally, Section 7 concludes and provides a broader interpretation of our results.

2. Relation to Previous Literature

Our findings are surprising in light of an extensive literature showing that experimental markets generally converge toward equilibrium predictions in which considerations such as fairness have minimal impact and one side of the market (firms or consumers) captures most or all of the surplus (Smith, 1962; Plott and Smith, 1978; Roth, et al., 1991; Holt, 1995; Franciosi, et al., 1995). This has even been shown in cases where product purchases create negative externalities

for other market participants (Plott, 1983). It has thus often been argued that fairness and social considerations are minimally important in market settings. A key distinction between this prior work and our experiment, however, is that the kind of social impact we study deals not primarily with fairness or inequality among directly interacting market participants—such as firms and consumers—but, rather, with fairness toward individuals entirely uninvolved with the exchange process in the market that determines the externality. This is often the case, for example, in situations where production and exchange yield widespread negative social impacts, such as environmental pollution or persistent inequality, or harm to those unable to exert agency, as in the case of labor coercion or animal testing. Our experiment creates a simplified version of such settings, in which the behavior of market participants impacts someone uninvolved in the market in which the product is exchanged.[2] We find concerns for the social impact on such individuals to be persistently manifested in market behavior and outcomes.

Our results also contrast with a prominent argument that market exchange crowds out moral values (e.g., Sandel, 2012).[3] Much of the evidence supporting this argument, however, is indirect and does not study the behavior of individuals interacting through markets. For example, experimental findings reveal that the framing of a non-market interaction with market labels and terminology reduces the apparent importance of moral considerations—such as equality and social welfare—among interacting participants (Hoffman, et al., 1994; Ross and Ward, 1996; Cappelen, et al., 2013). Similarly, the act of assigning monetary value to "good" behaviors, through prices, can crowd out intrinsic motivations for such acts (Frey, et al., 1996; Gneezy and Rustichini, 2000; Mellström and Johannesson, 2008). In psychological research, priming people to think of money, in contrast with similar non-monetary primes, leads to more individualistic and less pro-social behavior (Vohs, et al., 2006; see also, Kube, et al., 2012). Thus, while there is considerable *indirect* evidence of the perverting effect of market exchange—i.e., factors associated with markets appear to diminish the importance of moral motivations—there is little direct evidence on whether moral considerations are truly eroded by market interaction.

[2] In this regard, our experiment also creates parallels between the study of social behavior in markets and the vast literature on dictator games, where the social impact of decision makers' actions are felt by passive parties with no decision making power.

[3] A distinct argument is that the properties of markets may not necessarily eliminate moral considerations from the preferences of market participants, but may make them indistinguishable from other motivations under certain conditions governing exchange (Sobel 2010; Dufwenberg, et al., 2011). Another related argument is that "repugnance" to certain kinds of market transactions should be accounted for in the use and design of markets for exchange (Roth, 2007).

One recent study, by Falk and Szech (2013), does study the behavior of participants interacting in bilateral and multi-lateral double-auction markets in a context where, like in our study, market exchange can produce social harm whose impact is not felt by market participants—in their case, the negative social impact is the loss of life of a mouse. They find that repeated market interaction generally yields less socially responsible behavior than one-shot non-market decisions, measured by the proportion of individuals who are willing to accept 10 Euro for the death of a mouse. This stands in apparent contrast to our experiment, where the manifestation of concern for social impact varies less between market and non-market contexts. However, comparing only the extent to which *outcomes that produce negative social impacts* are generated by market and non-market contexts, the results of Falk and Szech are in line with our findings. For example, in Falk and Szech's individual (non-market) condition, 45.9 percent of subjects accept a 10 Euro payment that kills a mouse, while in a bilateral market, 47.7 percent of possible trades that cause the death of a mouse occur.[4]

Moreover, even under Falk and Szech's interpretation of their findings, specific features of their design merit further consideration in understanding better whether markets, in general, erode concerns for social impact. For example, while the extreme nature of the potential externality (the death of a mouse) is a fascinating feature of their design, studying morality in markets with varying and possibly less extreme characteristics is important for understanding many non-laboratory contexts, where tradeoffs are not between money and death, but between different distributions of resources or wealth.[5] In this regard, our approach employs a more standard economic methodology by comparing monetary profits for market participants with monetary harm for those affected by a negative externality. This design, more easily suited for future replication and study, also allows easier evaluations in terms of efficiency and welfare. Furthermore, while double-auction markets, as employed by Falk and Szech, are a workhorse of experimental economic research (e.g., Smith, 1962), they are often more representative of real-

[4] For a more thorough discussion of this interpretation of Falk and Szech's data, see Breyer and Weimann (2014).
[5] Furthermore, an extreme consequence such as death may trigger strong negative emotional reactions in individual choice contexts, which are diminished by market activity (in Falk and Szech's design, market interaction takes more time than non-market choices, perhaps diminishing such emotional influences). While consistent with the idea that markets diminish moral concern, this might not generally be the case in situations where the externality elicits a less extreme emotional reaction, and where moral considerations are weighted more deliberatively (Greene, et al., 2001).

world contexts better described as "bargaining" than many product or labor markets, where one-sided posted offers are a more typical market structure.[6]

Finally, and perhaps most importantly, in Falk and Szech's experiment there is only one production technology, which necessarily requires the imposition of the negative externality if exchange is to occur.[7] However, many real-world markets are characterized by a multiplicity of production technologies, some of which may create fewer negative externalities than others. Indeed, a valuable characteristic of markets is that, where a preference to employ a technology that limits external harm exists, market incentives and competition are likely to lead to its use. Thus, unlike in the study by Falk and Szech, where market exchange is incompatible with acting in a socially responsible manner, our experimental design allows social responsibility to be manifested in market exchange—as long as the trading parties are willing to bear the necessary costs. Indeed, our experiment shows that, as the costs of producing socially responsible products increase, the market yields a substantial decrease in the prevalence of such products. This suggests that Falk and Szech's design can be considered as a limiting case, where the cost of externality-free production is infinite, but that decreasing costs for socially responsible production can yield significant and persistent socially responsible behavior. Thus, an important contribution of our experiment is to highlight the valuable role of markets in producing socially responsible alternatives to harmful products—provided the technology for doing so is feasible.

The conclusions of our study lie closer to research suggesting that markets and social or moral considerations are compatible. For example, an alternative perspective to that described above arises from evidence that exposure of developing societies to market interaction facilitates the adoption of pro-social norms, e.g., of fairness and cooperation (Henrich, et al., 2001; Bowles 2011). For example, Henrich, et al. (2010), find that communities with greater degrees of reliance on and integration into markets for exchange also exhibit the most egalitarian behaviors in experimental games. The interpretation is that successful market exchange requires the development of norms of fairness and cooperation that apply to even impersonal interaction

[6] Smith (1962) contrasted double-auction markets with a posted offer market, which "was intended to simulate approximately an ordinary retail market. In such markets, in the United States, sellers typically take the initiative in advertising their offer prices, with buyers electing to buy or not to buy rather than taking part in a haggling and bargaining process" (p. 124). Our experiment is intended to model such product markets, where discussions of social responsibility are often focused.

[7] This is also the case in the markets with negative externalities among market participants studied by Plott (1983).

between parties. Our study shows, directly, that behavior consistent with such norms can persist as a feature of market exchange.[8]

In this sense, our findings also have some similarity to studies demonstrating that efficiency-enhancing reciprocity between buyers and sellers—as when, for example, contractual incompleteness make trust and trustworthiness necessary for efficient exchange—persists in many kinds of markets (Fehr, et al., 1993; Fehr and Falk, 1999). While the precise nature of these results is very distinct from our work, in which contracts between buyers and sellers are complete and in which market behavior impacts third parties uninvolved with the market, we establish the similar finding that socially responsible behavior can persist in competitive markets.

3. Experimental Design

3.1 The Market Game

We develop a novel experimental market environment that contains important features of real-world product markets. Firms and consumers can exchange two types of products, one of which imposes a negative externality on a third party. For simplicity, we label the product that produces no externality for the third party ($e = 0$), i.e., the socially responsible product, as the "fair" product and the product that generates a negative externality ($e = 1$) as the "unfair" product. Both types of product are worth 50 to the consumer.

The production cost of the unfair product is normalized to zero, thus generating a surplus of 50 to firms and consumers when exchanged. However, exchange of this product imposes a negative externality of 60 on a third party, thus making exchange of this product socially harmful and inefficient, with a net welfare impact of $50 - 60 = -10$. In contrast, the fair product has a production cost of $c \in (0, 50)$ that is borne by the firm, but has no impact on the third party. In most of our experimental conditions, $c = 10$. In all cases, exchange of the fair product is efficient, as it generates a net surplus of $50 - c > 0$, which is greater than the net surplus of not trading (0) or of trading the unfair product (-10).

Our *Market Baseline* condition consists of six firms, five consumers and five third parties. All players start with 100 units of wealth. Each firm offers a single product, either $e = 0$

[8] Evidence for the importance of fairness norms in markets also comes from questionnaire survey studies. Kahneman, et al. (1986) report that a price increase by firms that is not justified by a cost increase is considered as unfair by consumers. They argue that such fairness norms imply that markets may not clear if a price increase in response to excess demand (e.g., for snow shovels after a snowstorm) is not justified by an increase in supply costs.

or $e = 1$, in a posted-offer market, at a price, p, determined by that firm. The cost to the firm of producing a fair product is $c = 10$. After all firms select product types and prices, consumers enter the market sequentially (in a randomly determined order), observe the current menu of prices and product types, and either choose a single product offer or reject all available offers. A firm can sell at most one product. Hence, while the consumer who enters the market first can choose among all six product offers, consumers who enter later only see and choose from the remaining offers. Since there are six firms but only five consumers, even the last consumer entering the market can choose among at least two product offers. There is, however, always at least one firm that cannot sell its product. Firms are informed about the product offers—type and price—of all firms in a period, the order in which the offers are accepted by consumers, and thus also the offer(s) that remain unsold.

The payoff of each of the five third parties is determined by one of the five possible exchanges between firms and consumers in the market. The purchase of an unfair product by a consumer reduces a randomly-selected third party's payoff by 60 units, while either the purchase of a fair product or a consumer's decision not to purchase any product yield no impact on the corresponding third party's payoff.

Equations (1) to (3) summarize the payoffs in a period. A firm receives $100 + p - (1 - e) \cdot c$ if it sells its product, and 100 otherwise. A consumer receives $100 + 50 - p$ if she buys a product, and 100 otherwise. The third party's payoff is $100 - 60 \cdot e$, meaning that the third party is only negatively impacted in the case where a consumer and firm exchange an unfair product.[9]

$$\Pi^{firm} = \begin{cases} 100 + p - (1 - e) \cdot c & \text{if he sells his product at price } p \\ 100 & \text{otherwise} \end{cases} \quad (1)$$

$$\Pi^{consumer} = \begin{cases} 100 + 50 - p & \text{if she buys a product at price } p \\ 100 & \text{otherwise} \end{cases} \quad (2)$$

$$\Pi^{thrid\ pary} = \begin{cases} 100 - 60 \cdot e & \text{if the matched consumer buys a product} \\ 100 & \text{otherwise} \end{cases} \quad (3)$$

[9] Notice that the production costs (in case of $e = 0$) and the externality (in case of $e = 1$) arise only if a product is sold, not if a product is just offered. This design feature can be interpreted as a "production on demand" technology. We chose this design feature—rather than, perhaps, one in which the externality is created at the time of the product type choice by firms—in order to create a situation in which *exchange* between buyers and sellers creates the externality.

Subjects play 24 rounds of the market game in fixed groups (16-person markets) and roles. We eliminate the possibility of cross-period reputation by not showing subjects the ID numbers of other market participants and by randomly ordering the display of product offers in each period. One round is randomly chosen for payment at the end of the experiment. Each third party is randomly matched to the purchasing decision realized by a particular consumer.

We introduce an explicit market context in the instructions. Players A are described as "sellers" and Players B as "buyers" and they are told they can "trade" different "types of products" at the offered "prices." Player C is neutrally described as "Player C," and the two types of products are called "product without impact on player C" (in case of $e = 0$) and "product with loss for player C" (in case of $e = 1$). An English translation of the original German instructions for the Market Baseline condition is included in the Appendix.

3.2 Varying Market and Technological Characteristics

To study the robustness of the behavior in the Market Baseline condition, we implement additional market variants, each of which changes one characteristic of the market. Specifically, we vary (*i*) the degree of competition between firms in the market, (*ii*) the information that consumers have about the types of available products, and (*iii*) the cost of becoming informed about the characteristics of products. Moreover, we also implement a variation in the production technology by (*iv*) increasing the production cost of the fair product.

First, in a *High Firm Competition* condition, we increase the number of firms from six to eight. There are thus always at least three firms in this condition—rather than one in the Market Baseline—that are unable to sell their product offers in each period. Apart from this difference in the number of firms, this condition is otherwise identical to the Market Baseline. We expect this increased competition between firms will lead to prices closer to the competitive equilibrium—posted-offer markets typically produce prices above the competitive equilibrium (Plott and Smith, 1978; Ketcham, et al., 1984)—than in the Market Baseline. Our primary focus, however, is on how this increased competition affects the manifestation of social responsibility, e.g., the market share of the fair product.

Second, we conduct two *Limited Information* conditions, in which consumers initially have no information regarding the types of different products. In these conditions, consumers initially only observe the price of each available product, though they are aware that the products

might vary based on their social impact on the third party. In both cases, we give consumers the opportunity, in each period, to become informed—i.e., to learn the social impact of all available products—after observing the prices of the available products. If they decide not to learn the social impact of the products on offer and purchase a product without awareness of product types, they never become informed about the product types in that period, not even about the impact of any product they might purchase. This corresponds to situations in which consuming a product provides no information about the social impacts of its production. The two conditions vary how costly it is for consumers to acquire such information.

In the *Limited Information (Free)* condition, a consumer can reveal the types of products at no monetary cost, simply by clicking a button. Apart from the fact that consumers do not learn the types of products by default when entering the market, this condition is identical to the Market Baseline. However, it allows us to identify whether an alternative, more natural, informational default affects socially responsible behavior and market outcomes.

The *Limited Information (Costly)* condition is identical, apart from the fact that a consumer has to pay a small cost, of 1 unit, if she chooses to reveal the types of the available products before making a purchasing decision in a period. This condition adds the realistic feature that it is (minimally) costly for consumers to become informed about the social impact of their products, perhaps discouraging some of them from doing so, or providing a rationalization for possible harm inflicted on the third party.

Finally, in the *High Production Cost* condition, we increase the production cost of the fair product to $c = 40$. Recall that the production cost of the fair product is $c = 10$ in the Market Baseline. The High Cost condition thus implements a technological change from the Baseline, in terms of the cost of mitigating the externality. Apart from the higher cost of the fair product, this condition is identical to the Market Baseline. This condition allows us to understand the role that technological differences may play in the prevalence of social responsibility in market settings, and potentially helps to explain variation in socially responsible behavior in market settings.

3.3 The No Market Condition

The above experimental conditions all study the prevalence of socially responsible behavior under varying market and technological conditions. In order to provide a non-market benchmark against which to compare the behavior and outcomes in our market conditions, we conducted a

No Market condition. This condition mimics the standard distributional decision tasks (i.e., dictator games) typically used to measure fairness and concerns for social impact in individual choice experiments.

Our novel design creates a precise parallel between the monetary consequences of the product choices made by consumers in a given round in the Market Baseline and the allocation choices made by decision makers in our No Market condition. To achieve this, we present each decision maker in the No Market condition with the *exact* sequence of choices faced by a paired consumer in the Market Baseline. That is, for each consumer in the Market Baseline, who faced a sequence of 24 menus of product offers, we have a decision maker in the No Market condition, who faces a sequence of 24 identical, in monetary terms, neutrally framed allocation choices.

We implement three-person groups (Players "A," "B," and "C"), in which Players B (corresponding to consumers in our market conditions) choose between different allocations of payoffs among all three players, as in a three-person dictator game. Players A and C are thus inactive in this condition.[10] The assignment of subjects to roles is fixed for the 24 rounds. As in the Market Baseline, one of the 24 rounds is randomly chosen to determine payoffs at the end of a session.

Our design is intended to compare the behavior of *individuals*—in the roles of "consumers" or as neutrally framed decision makers—between market and non-market settings. Specifically, we aim to study the tradeoffs people are willing to make between personal benefits and the welfare of others in two very distinct and important settings: neutrally framed individual choice contexts, similar to the widely studied dictator game, and in a context designed to simulate consumer choice in product markets. For this purpose, we employ a design that allows us to identify possible changes in individuals' preferences between the two contexts, measured by choices among consequentially identical sets of alternatives. By holding the monetary consequences of these choices exactly constant, while also keeping the choice procedures and

[10] For example, suppose a consumer in Market Baseline can choose between three different products: one fair product at price, $p = 30$, one fair product at price, $p = 25$, and one unfair product at price, $p = 15$. There is also always the option not to buy a product at all. Then the corresponding choice options for a Player B in the No Market condition in the respective round are the following four allocations: either 120 for Player A $(100 + 30 - 10)$, 120 for Player B $(100 + 50 - 30)$, and 100 for Player C $(100 - 0)$; 115 for Player A $(100 + 25 - 10)$, 125 for Player B $(100 + 50 - 25)$, and 100 for Player C $(100 - 0)$; 115 for player A $(100 + 15 - 0)$, 135 for player B $(100 + 50 - 15)$, and 40 for player C $(100 - 60)$; or 100 for each player (corresponding to no trade).

interface very similar, our design creates a clear basis for this comparison, relative to one in which we change more features of the choice environments.[11]

3.4 Predictions

The standard economic assumptions of self-interest and rationality yield the same prediction for all the market conditions: consumers purchase only the unfair product, which is traded at a price of zero. The resulting outcomes are maximally inefficient, since each unit of the unfair good traded results in a net social loss.

Our experiment also allows the possibility of socially responsible behavior, reflected in market share and prices. If concern for social impact is a persistent characteristic of market participants' preferences, and such concern is sufficiently strong, then we expect a positive and constant market share for the fair product. Moreover, we expect such concern to respond to the costs of mitigating the externality, such that fewer fair products should be traded when they cost more to produce, relative to the unfair product. Finally, to the extent that competition among firms brings prices close the respective production cost, it is reasonable to expect that the burden of the additional production cost of the fair product will be borne by socially conscious consumers, reflected in a price premium for such products.[12]

3.5 Session Overview and Number of Observations

A total of 613 subjects participated in our experiment. We conducted 7 markets of the Market Baseline condition, across 5 sessions.[13] Of the 112 subjects who participated in the Market

[11] For example, an alternative approach would be to compare our Market Baseline to a non-market condition in which a single subject plays the role of firm and consumer and can choose among all payoff combinations (price and product type) available in our market setting. Such an experiment, by taking a decision that is collectively produced by multiple subjects (firms and consumers) and making it the responsibility of a single subject, would essentially test the effect of diffusion of responsibility. There exists extensive evidence (from within and outside economics) documenting how diffused responsibility significantly decreases concern for social impact, even in contexts that have nothing to do with markets (Darley and Latane, 1968; Dana, et al., 2007; Hamman, et al., 2010). Thus, rather than conducting another study on diffusion of responsibility, our market versus non-market comparison focuses on understanding how individual preferences change between market and non-market settings, while substantively changing the choice context as little as possible.

[12] We do not propose a formal model of social responsibility in this paper. However, as we show in the Appendix, a straightforward application of a standard model of social preferences (Fehr and Schmidt, 1999) to our setting reveals that consumers and firms concerned with fairness and inequality are willing to bear additional costs for socially responsible products that do not harm the third party. The model also predicts a decreased market share for the fair product as the cost of mitigating the externality, c, increases.

[13] In some sessions of our market conditions we had a sufficient number of subjects to run two independent markets in parallel; in others we conducted a single market only.

Baseline, 42 subjects were in the role of a firm, 35 in the role of a consumer, and 35 in the role of a third party. We conducted 6 markets, each, of the High Firm Competition, Limited Information (Free), Limited Information (Costly), and High Production Cost conditions; this was done in 4 separate sessions for first three conditions, and in 3 separate sessions in the last condition. 108 subjects participated in the High Firm Competition condition and 96 subjects participated in each of the two Limited Information conditions and in the High Production Cost condition. We also conducted 3 sessions of the No Market condition, with 105 subjects in total. Table 1 gives an overview of our treatment conditions and the number of observations.

3.6 General Procedures

All sessions took place at the computer laboratory of the Department of Economics at the University of Zurich. The study was conducted through computer terminals, using the software z-Tree (Fischbacher, 2007). Subjects were mainly students from the University of Zurich and the Swiss Federal Institute of Technology (ETH) in Zurich. Students majoring in economics or psychology were not eligible to participate. We conducted a between-subjects design; that is, each subject participated in only one condition.

Before subjects entered the lab, each subject randomly drew a place card that specified at which computer terminal to sit. The terminal number determined a subject's role as either firm (participant A), consumer (participant B), or third party (participant C). Subjects received written instructions, including comprehension questions that had to be answered correctly before a session could begin. A summary of the instructions was read aloud by the experimenter to ensure common information about payoff functions, choice options, informational conditions, etc. in each of the treatments.

Sessions lasted about 1.5 hours. Payoffs from the experiment, denominated in "points," were converted into money at the rate of 10 points to CHF 2.50 (CHF 1 ≈ $ 1 at the time of the experiment) at the end of a session. On average, subjects earned about CHF 42, which includes a show-up fee of CHF 15.

4. Market Shares and Prices

In discussing the results, we proceed as follows. In this section, we first present the results of our Market Baseline condition, to identify the extent to which concerns for the welfare of third

parties are reflected in market outcomes, i.e., market shares and relative prices for the two kinds of products. Then, we study how varying market and technological conditions—increased firm competition, limited consumer information, and varying production costs—influence socially responsible market behavior.

In Section 5, we shift our attention from aggregate outcomes to the individual behavior of consumers and firms. Finally in Section 6, we address the issue of whether concerns for social impact are diminished by markets, relative to the concern observed in non-market individual choice contexts, by comparing consumers' choices in our Market Baseline condition to individual allocation choices in our No Market condition.

4.1 Market Baseline

In 99 percent of cases (831 of 840 consumer choices), consumers purchased a product. Therefore, our analysis will primarily focus on the realized purchases by consumers; unless otherwise noted, we ignore cases in which a consumer made no product purchase.

The solid line in Figure 1 displays the proportion of fair products purchased by consumers across time in the Market Baseline condition. This statistic identifies how often the externality on third parties was mitigated and, therefore, corresponds to the efficiency of the market. To smooth random variation across periods, we report data aggregated across three-period blocks.

The figure reveals a large and stable share of fair products in the Market Baseline. The share of fair products is 50 percent in the first three periods, then decreases slightly, but remains between 42 and 46 percent in all remaining three-period blocks. The overall proportion of fair products purchased by consumers in the Market Baseline is 44.3 percent.[14] Thus, as measured by market share, we observe a persistent manifestation of socially responsible behavior in market exchange, with almost half of the realized trades demonstrating an apparent concern for avoiding the imposition of the externality.

[14] When a consumer's choice set included at least one product of each type, the frequency of fair product purchases is slightly higher (48.1 percent). We can also study consumers' purchases depending on whether they were randomly selected to choose earlier (when there were more options available) or later in a period. When a consumer observed all 6 product offers fair products were purchased by 45.3 of those consumers who could select from at least one product of each type. When a consumer observed only 2 product offers—i.e., the consumer was last to act in a period—the corresponding frequency is 42.5 percent. The small differences suggest that consumers did not strategically alter their purchasing behavior to influence choice sets of later-acting consumers.

To provide a statistical basis for the claim that the proportion of fair products does not decrease over time, Table 2 reports probit regressions, with subject random effects, of consumers' product choices. All models include period as an explanatory variable, and the coefficient for this variable is never statistically significant. Model 2 introduces an explanatory variable measuring the size of the choice set available to the consumer, which has no effect on the frequency of fair product choices.[15] Models 3 and 4 restrict the data to those cases in which a consumer saw both kinds of products (remember that consumers acting later saw subsets of the original set of products offered). Again, there is no significant time trend in this data. Model 4 reveals that consumers respond sensibly to market prices: they are less likely to purchase the fair product as the lowest price at which one is available increases and, conversely, they are more likely to buy a fair product as the lowest price at which an unfair product is available increases. In Section 5 we conduct a more thorough analysis of consumer's choices and of the importance that consumers place on prices, i.e. on their own material payoff, versus the social impact of a product, i.e. the material payoff of the third party.

Consumers' concern for social impact is also reflected in a persistent price difference for the two types of products. Figure 2 shows the average purchase prices for the fair and unfair products over time in the Market Baseline (it also shows the High Firm Competition condition, which we discuss later). Two trends are clear from the figure. First, there is a general slight decreasing trend in prices over time. This is consistent with the competitive advantage held by buyers in this market, which is increasingly manifested in overall prices over time.[16] Second, however, there is a persistent price difference for the two types of products. Products that produce no social harm cost more than socially harmful products throughout the experiment. This price premium increases over time, from 2.7 in the first six periods to 4.8 in the final six periods. By the end of the experiment, when the price premium is approximately 5 price units, the 10-unit cost of mitigating the externality is borne roughly equally by sellers and buyers. This is also illustrated by the solid line in Figure 3, which shows the price premium for the fair

[15] Alternatively, if we construct binary variables for whether a consumer saw 2, 3, 4, 5 or 6 product offers, and use these variables instead, none of the coefficients is statistically significant.

[16] Our market experiment reproduces the common finding that offer prices tend to be above equilibrium in posted-offer markets. Note, however, that the trade volume corresponds, almost perfectly, to the equilibrium prediction—i.e., there are very few missed trading opportunities. Our High Firm Competition condition, which we analyze later, obtains prices closer to the competitive equilibrium prediction. A comparison between this condition and the Market Baseline provides a test how social responsibility is affected as prices converge further toward equilibrium.

product—i.e., the mean price of the fair product minus the mean price of the unfair product—in the Market Baseline condition.

The observation that the average price premium is below the additional cost of producing the socially responsible product reflects firms' concern for social impact. Offering the fair product led to lower expected profits for firms—the average profit for firms offering fair products was 114.2, while it was 119.1 for firms offering unfair products—but a significant proportion of firms' product offers (44.1 percent) were nevertheless fair, and this proportion did not decrease over the course of the experiment.[17]

As a complement to the above qualitative description of the price pattern, Table 3 reports regressions that study how prices vary over time and by product type. Model 1 reports estimates using data from the Market Baseline condition and reveals that the general price decrease across time is significant, that the fair product sells at a significantly higher price, and that the gap between the two prices increases over time.

> **Result 1:** *Outcomes in the Market Baseline condition reveal a significant and stable concern for the welfare of the third party, reflected both in market share and in relative prices for the two kinds of products.*

4.2 Increased Firm Competition

We next consider how the concern for social impact that we observe in the Market Baseline condition is affected by varying market characteristics. Our second market condition increases the number of firms, from 6 to 8, thereby increasing competition and likely putting downward pressure on prices. We use this condition to study how such increased competition and closer approximation to competitive equilibrium price levels affect the concern for social impact reflected in market outcomes.

Returning to Figure 1, the dotted line shows that the High Firm Competition condition yields a slightly *higher* frequency of fair products, relative to the Market Baseline. Specifically, the overall frequency of fair products traded increases from 44 percent to 54 percent. Models 1 and 2 in Table 4 report the results of random-effects probit regressions of the type of product purchased, comparing the Baseline Market and High Firm Competition conditions. Model 1

[17] The proportion of fair product offers by firms differs little between the first (43.1 percent) and second (45.2 percent) halves of the experiment. The probability of having an offer accepted was similar for both fair (83 percent) and unfair (82 percent) product offers.

shows there to be no significant differences between the Market Baseline (omitted category) and High Firm Competition conditions, in terms of overall fair product market shares over the course of the experiment. Model 2 additionally tests for differences in condition-specific time trends, again revealing no significant treatment effects, neither in levels nor in time trends. Therefore, under increased firm competition, we observe persistent socially responsible behavior reflected in the market share of the fair product, which is slightly, but statistically insignificantly, higher than in the Market Baseline.

We also observe the price premium for the fair product that we found in the Market Baseline condition. Figure 4 presents prices for the fair and unfair products, in both the Market Baseline and High Firm Competition conditions. Reflecting basic economic forces, increased firm competition clearly has an effect on prices, with lower prices for both types of products than in the Market Baseline.

More importantly, for our purposes, the figure reveals that the price difference for the two types of products persists under High Firm Competition and, if anything, is slightly greater; this is also apparent in the dotted line in Figure 3. With prices converging toward the competitive equilibrium, the price premium of the fair product must eventually reflect the cost difference, in order for a firm to cover its production cost. Importantly, however, many consumers are willing to pay the greater price premium for the fair product, which is revealed by the slightly increased market share for this product. Thus, despite market prices being closer to the competitive equilibrium prediction in the High Firm Competition condition, socially responsible behavior is not crowded out by increased competition.

Returning to Table 3, in Model 2, we see that the lower prices with high competition are reflected in the smaller coefficient for the constant term, relative to the Market Baseline. We also observe the persistent price premium for fair products, reflected in the positive and significant coefficient for that variable and for the interaction term with Period, both of which are higher under High Firm Competition than for the Market Baseline condition.

> **Result 2:** *Increased firm competition lowers prices relative to the Market Baseline, i.e. prices are closer to the competitive equilibrium prediction. Nevertheless, outcomes in the High Firm Competition condition reveal a significant and stable concern for the welfare of the third party, reflected both in market share and in relative prices for the two kinds of products. Socially responsible behavior is even slightly, but statistically insignificantly, higher under High Firm Competition, relative to the Market Baseline.*

4.3 Limited Consumer Information

We next analyze the case in which consumers initially possess limited information about the types of the different available products in a period. However, they always have the opportunity to acquire such information. Our two Limited Information conditions vary whether such information is Free or Costly, in which case consumers must pay a small cost to become informed.

The lines of varying dash length in Figure 1 present the frequencies of fair product purchases in the two Limited Information conditions. Introducing Limited Information decreases the proportion of fair products traded, but only slightly. In particular, under Limited Information, the overall frequency of fair products traded across all periods decreases to about 40 percent, relative to 44 percent in the Market Baseline; this proportion, when considering all periods, is the same regardless of whether information is free or costly. Looking only at the second half of the experiment, where time trends are fairly flat, the frequencies of fair products are ordered in the manner one would expect—highest in the Market Baseline, lower with Free Limited Information and lowest under Costly Limited Information—but with differences that are not very large in magnitude.

To statistically test the effect of limited consumer information on product market shares, we return to the treatment-effect comparisons in Table 4. Models 3 to 6 provide separate comparisons of the Market Baseline (omitted category) with the two Limited Information conditions. Models 3 and 5 show that there are no significant differences between fair product market shares in the Market Baseline and either of the two Limited Information conditions. Models 4 and 6 additionally show that there are also no significant differences in time trends. These results confirm that the proportions of fair products are stable and quite similar between the Baseline Market and the two Limited Information conditions.

The persistent concern for the welfare of the third party is again also reflected in the relative prices of the two types of products. The two varying-length dashed lines in Figure 3 show an increasing price premium for the fair product in both Limited Information conditions.[18] Returning to Table 3, Models 3 and 4 present coefficient estimates for random-effects regressions of price on product type and across time for the two Limited Information conditions.

[18] Figure A1 in the Appendix shows price levels, separately, for the two types of products in the two Limited Information conditions. We omit this figure here for space considerations.

The price premium for the fair product is statistically significant throughout the experiment and significantly increasing for Free Limited Information, reflecting a similar pattern to that in the Market Baseline. Under Costly Limited Information, the price premium increases significantly over time, but the overall difference only becomes statistically significant after a few periods.[19] Thus, both limited consumer information conditions, yield persistent and statistically significant differences in the prices of the two types of products after the initial periods of the experiment.

> **Result 3:** *Outcomes in both Limited Information conditions reveal a significant and stable concern for the welfare of the third party, reflected both in market shares and in relative prices for the two kinds of products. Relative to the Market Baseline, the concern for the welfare of the third party, manifested in purchasing behavior, is slightly, but not significantly, reduced when acquiring product information is costly.*

We also study information acquisition decisions by consumers. Across the entire experiment, consumers in the Limited Information (Free) condition acquired product information 73 percent of the time. Consistent with basic economic intuition, consumers in the Limited Information (Costly) condition acquired this information less frequently, 42 percent of the time. The frequencies of information acquisition are also fairly stable across time.[20]

Information acquisition appears instrumental, as reflected in Figure 5, which shows the type of product purchased, conditional on consumers' information acquisition decisions. In both Limited Information conditions, consumers who do not acquire information typically end up purchasing unfair products, particularly after the first few periods.[21] Meanwhile, a large majority of consumers who pay for information purchase fair products (see the line labeled, "LI Costly – Info").[22] Not surprisingly, the proportion of consumers who acquire fair products following the

[19] Specifically, statistical rejection of the condition that, *Fair Product + t * Period X Fair Product = 0*, based on the estimates in Model 3, reaches a level of significance of $p = 0.05$ ($\chi^2(1) = 3.77$) in period $t = 3$. The weaker effect in the Limited Information (Costly) condition is consistent with the intuitive notion that prices are less likely to reflect product attributes when consumers are less well informed about such attributes.

[20] If we consider all 8 three-period blocks, the frequencies vary between 66 percent and 79 percent in the Limited Information (Free) condition and between 36 and 47 percent in the Limited Information (Costly) condition. Random-effects probit regressions of information acquisition reveal no significant time trend in either condition.

[21] While such consumers do not know (and are not informed, *ex post*) which type of product they are purchasing, they almost always purchase the product available with the lowest price, which is typically an unfair product. If we consider only cases in which a consumer's choice set includes both product types, then across both Limited Information conditions the lowest-priced product is an unfair product 94 percent of the time; in the second half of the experiment (Periods 13-24), this proportion rises to 99 percent. The information about the type of product contained in the offer prices might be a reason why consumers' limited information has a relatively little effect on market outcomes.

[22] The fact that only 75 percent of buyers who paid for product information purchased fair products is driven both by limited product choices and by price sensitivity. For example, among those who acquire product information and

acquisition of free information is lower—likely reflecting indifference between having and not having the information or curiosity without the intent to act on the obtained information.

> **Result 4:** *The frequency of information acquisition by consumers is generally stable over time and higher for free information than when information is costly. Consumers' information acquisition appears instrumental; most consumers who acquire information purchase fair products (especially when information acquisition is costly), while those who do not acquire it almost always purchase unfair products.*

4.4 High Production Cost

Finally, we consider the market with high production costs for the socially responsible product. Recall that, in all prior conditions, the marginal cost of producing the socially responsible product equals 10 units, or 20 percent of the surplus from exchange. In this alternative condition, the cost increases to 40, or 80 percent of the surplus.

The dashed line in Figure 1 shows that this increase in the cost of producing the socially responsible product leads to a considerably lower market share: 24 percent across all periods, close to half of that in the Market Baseline. Thus, while previous changes to the market—i.e., increased competition, limited information—had little effect on the fair product market share, making the fair product more costly to produce has a much larger impact. It is also noteworthy, however, that the market share of fair products remains relatively constant throughout the experiment, indicating that the concern for social responsibility manifested under high production costs is no less stable than that in the Market Baseline.[23]

Models 7 and 8 in Table 4 provide statistical comparisons of fair product market shares in the Market Baseline and High Production Cost conditions. Consistent with Figure 1, the latter yields significantly lower frequencies of fair products, with no time trend in either condition.

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saw both types of products, a higher proportion (81 percent) purchased fair products. Breaking down these cases by the price difference between the cheapest fair and unfair products available, we see that the frequency of fair product purchases decreases in the price difference—e.g., 97 purchase fair products when the price difference is 0 or 1, 72 percent do so when it is from 2 to 5, 67 percent do so when it is 6 or greater, and the proportion is also 67 percent when it is 10 or more (in which case the consumer is paying the entire production cost of the fair product).

[23] Interestingly, the high production cost increases, slightly, the frequency with which consumers opt not to buy a product, but this behavior remains rare. In the Market Baseline, the frequency of no-purchase choices is 1 percent, while with High Production Cost, the percentage is 4.7 across all periods, and 3.9 percent in the second half of the experiment. A random-effects probit regression of no-purchase choices on High Production Cost condition, period, and the interaction of these two variables reveals no significant difference between the High Production Cost and Market Baseline conditions. The frequency of no-purchase choices is low (3.5 percent or below) also in all remaining conditions.

As is evident in Figure 3, there is again a persistent and increasing price premium for the fair product.[24] Not surprisingly, the price premium is higher with High Production Costs—close to 14 units over the entire experiment—than in other market conditions. Thus, higher production costs lead to a greater price premium for the fair product in cases where consumers purchase such products. As with our other market conditions, however, the average price premium remains below the full cost of socially responsible production, meaning that firms and consumers share the burden of implementing socially responsible outcomes.[25]

> **Result 5:** *Outcomes in the High Production Cost condition reveal a significant and stable concern for the welfare of the third party, reflected both in market shares and in relative prices for the two kinds of products. With High Production Cost, the price premium for the fair product is higher. The market share for the fair product is significantly lower with High Production Cost than in the Market Baseline.*

5. Individual Consumer and Firm Behavior

Our analysis thus far has focused on aggregate market outcomes—product shares and prices—as a way of studying concern for the welfare of non-participants in the market who are nevertheless potentially affected by market activity. We next shift our attention from aggregate market outcomes to the individual behavior of consumers and firms. If market outcomes truly reflect socially responsible behavior, then such concerns should show up as part of a "sensible" dimension of the decision making of market participants. Moreover, average *preferences* for social responsibility should be relatively similar across market environments, even when behavior changes in response to market factors like prices and costs.

We first study the behavior of consumers across our experimental conditions, to observe whether they appear to value concern for the well being of the third party in a reasonable manner. Specifically, we ask whether the social impact of products can be described as a utility-enhancing product attribute and accounted for by a simple econometric model of consumer

[24] Figure A2 in the Appendix shows the prices for both product types in the High Production Cost condition across periods.

[25] The theoretical analysis in the appendix predicts both the lower market share of fair products in the High Production Cost condition and the smaller relative price premium in this condition. While the premium generally approaches or exceeds the threshold at which costs are divided evenly in our other conditions, it remains well below 20 with higher production costs. The model predicts that the price premium equals 10 for c = 10, but for c = 40 the predicted premium is 20. The higher demand for the unfair product when $c = 40$ necessitates that some "fair" firms offer the unfair product for supply to meet demand. However, since such firms have to be compensated for imposing the externality by offering the unfair product, the market price of such products increases.

choice, and whether the apparent concern held by consumers for this attribute is similarly strong across different market conditions. We also explore the behavior of individual firms, to determine whether they respond to market conditions in a reasonable manner. Aside from providing insights into the preferences and decisions of consumers and firms, this analysis also helps us address the possible concern that the non-trivial market shares for the socially responsible product that we document earlier arise primarily from confusion or random behavior.

5.1 Consumer behavior

To study consumer behavior, we assume that individuals potentially care both about their own material payoff and about the social impact of their product choice—i.e., whether or not it produces an externality for the third party. A simple way to capture such preferences is with a linear utility function of the form, $u = \theta\, x + \gamma\, y$, where $\theta > 0$ represents the weight that consumers place on their own monetary payoff (value of the product purchased minus the price paid), indicated by *x*, and γ captures their concern for their social responsibility toward the third party, whose payoff is indicated by *y*. Thus, for example, consumers with $\gamma = 0$ care only about buying the product at the lowest price, while consumers for whom $0 < \alpha\, \theta = \gamma$ are willing to sacrifice up to α units of own wealth for a one unit increase in the third party's wealth.[26]

We estimate the weights in the above utility specification, using the conditional logit choice model specified by McFadden (1974). Specifically, Table 5 reports coefficient estimates for utility functions of the form,

$$u_{itj} = \theta\, x_{itj} + \gamma\, y_{itj} + \left(\sum_{k=1}^{K} \alpha_{jk}\, z_{itk}\right) + \epsilon_{itj},$$

which describe the utility to a consumer, i, in period t, from product alternative, $j \in \{0, 1, 2, \cdots, J\}$, where J^{it} is the number of product alternatives available to consumer i in period t. The option not to purchase a product, which is always available, corresponds to $j = 0$, and the actual number of product offers observed by the consumer is indicated by $2 \leq J^{it} \leq 6$, except for High Firm Competition, where $4 \leq J^{it} \leq 8$. The variables, z_{itk}, correspond to K variables

[26] For simplicity, we assume that consumers do not care about the firm's wealth. Prior experimental evidence suggests that fairness between market participants is often extinguished in repeated market exchange (Kachelmeier, et al., 1991; Roth, et al., 1991; Francoisi, et al., 1995). Indeed, we confirm this to be the case in our data: when we conduct the estimation in this section and include firm profits in any model (see Table 5), the result is a statistically insignificant coefficient for the firm's profit, but no substantive change to any of the other results.

that vary between cases (i.e., between subjects and periods), but not across alternatives in a case. Specifically, in our estimated models, $K = 3$, corresponding to period, female and (the natural logarithm of) age. Because the labeling of the different product options is irrelevant in our experiment (product choice options were unlabeled and were presented in random order), except for the option not to purchase a product in a period (which was always available and uniquely identifiable), we impose the restriction that $\alpha_{jk} = \alpha_{j'k}$, for all $j, j' \neq 0$. Finally, ϵ_{itj} corresponds to an idiosyncratic extreme-value (logit) random utility error.

Model 1 in Table 5 reports the coefficient estimates for θ and γ, for the Market Baseline condition.[27] Consumers care both about their own monetary payoff ($\theta > 0$) and about the welfare of the third party ($\gamma > 0$). Thus, the apparent social concern that we observe in aggregate market outcomes in the Market Baseline is also apparent in the purchasing behavior of individual consumers. Moreover, the ratio of the two coefficients can be interpreted as the relative concern that the average consumer places on her own payoff versus the payoff of the third party. In the case of the Market Baseline, this ratio is approximately 11 to 1, suggesting that, on average, consumers are willing to sacrifice one unit of wealth to benefit the third party by 11 units.

The remaining models all introduce condition-specific intercept terms to measure the extent to which concern for social impact differs in each condition, relative to the Market Baseline. Specifically, Models 2 through 5 use data from the Market Baseline and one additional market condition, and introduce an interaction term between condition and third-party earnings, to measure differential concern for the welfare of the third party between the Market Baseline and that specific treatment condition. Model 6 includes data from all market conditions and simultaneously estimates all the condition-specific interaction terms.

The estimates reveal fairly stable concern for social impact across most market conditions, with interaction coefficient estimates that are typically small, positive (indicating, if anything, increased concern for social impact), but generally statistically insignificant. The lone exception is the Limited Information (Costly) condition. When consumers have limited information about the social impact of their purchases and have to pay for such information, their

[27] The table omits the case-specific intercept terms (α_{jk}). Selecting not to make a product purchase is generally infrequent. However, the coefficient estimates suggest that consumers tended to make the no-purchase option more frequently later in the experiment and as they reported an older age, though these are not always statistically significant. Omitting these intercept terms from the estimated models do not substantively change the results.

purchasing behavior reflects decreased concern for the welfare of the third party.[28] However, if we estimate the model separately for this condition alone, the coefficients for both Consumer Earnings and Third Party Earnings are positive and highly statistically significant ($\beta = 0.575$ (0.010); $\gamma = 0.024$ (0.005); both $p < 0.001$). Thus, while apparent concern for social impact is lower in this condition, it is nevertheless present.

The overall pattern is striking, and observable quite clearly in Model 6. The same model—in which all the interaction terms in Model 6 equal zero—does a good job of describing behavior across all five market conditions. Indeed, we fail to reject a test of the restriction that all four interaction terms in Model 6 equal zero ($\chi^2(4) = 6.06$, $p = 0.195$).

> **Result 6:** *Consumer's purchasing behavior reflects concern for both the price and the social impact of the product; this concern is fairly stable across all market conditions. Social concern among consumers, relative to self-interest, is lower in the Limited Information (Costly) condition than in the Market Baseline condition.*

5.2 Firm behavior

We also study the decisions made by individual firms regarding which type of product to produce in a period. Table 6 reports the results of random-effects probit regressions, using as the dependent variable whether a firm chose to offer a fair (1) or unfair (0) product in a period. The regressions include data from all five market conditions.[29]

Model 1 shows that there are no differences between conditions in the tendency of firms to offer fair products, with the exception of the High Production Cost condition, where firms are significantly less likely to offer fair products. This concords with the general pattern in Figure 1.

Model 2 studies the effect of a variable that identifies whether a firm offered a fair product in the previous period. The positive and statistically significant coefficient suggests a tendency to repeat the product choice from the prior period. Thus, some firms tend to repeatedly

[28] The estimated model ignores the information-acquisition stage and the cost of acquiring information. Thus, we implicitly assume that such costs are zero, and that consumers know the product characteristics at the time of purchase. In principle, it is possible to estimate a model that includes the endogenous information acquisition decision, incorporating the relevant cost. However, estimating such a model with our data requires making assumptions about the beliefs held by consumers regarding the characteristics of different products, based on observed prices. Given the necessarily *ad hoc* nature of such assumptions, we limit our analysis to a comparison of product purchases based on the known (to the experimenter) characteristics of products and ignore the (small) utility implications of information acquisition in the Limited Information (Costly) condition.

[29] We also estimated the models with controls for gender, age and period. None of these is significant at $p < 0.05$ in any model, nor do they substantively change any of the results. We report models without these controls, to facilitate interpretation of the coefficients.

offer the same product type across periods; we document such firm-level heterogeneity more precisely in the next section.

In Model 3, the variable *Expected Fair Product Profit Premium* uses a very simple measure of the relative expected profitability of the two types of products. Specifically, we calculate, for each period in a market, the average realized profit in the prior period for firms that offered the fair product minus the average realized profit for firms that offered the unfair product. This measure identifies how much more (or less) firms earned by offering the fair product than the unfair one, and serves as a crude measure of relative expected profitability.[30] The positive and significant coefficient for this variable indicates that firms respond to the prior relative profitability of the two kinds of products, becoming more likely to offer a fair product as such products become more profitable.

Finally, Model 4 jointly incorporates all the above variables. The type of product offered by the firm in the prior period and the expected profitability of the fair product retain their statistical significance, and the magnitude of the coefficients remains similar to that in Models 2 and 3. However, the treatment effect for High Production Cost decreases substantially in magnitude and is no longer statistically significant. Thus, while Model 1 suggests a treatment effect of High Production Costs on firm decision making, Model 4 reveals that these can be largely accounted for by the impact of the higher production costs on expected firm profits.

> **Result 7:** *Firms offer more fair products when such products are more profitable. This difference in expected profitability accounts for differences in the frequencies of fair product offers by firms across market conditions. Firms, on average, show a tendency to repeat prior product type choices.*

5.3 Consumer and Firm Heterogeneity

The above results indicate a considerable influence of concerns for social responsibility in average individual market behavior by consumers and firms. Of course, these results hide potentially significant individual differences in concerns for social impact. Indeed, individual choice experiments—e.g., using dictator games—usually reveal heterogeneous concerns for fairness by individuals (Camerer, 2003; Engel, 2011).

[30] Recall that firms in our design observe all prices and product types offered by other firms, as well as which products sold and which were unsold. The measure includes firms that did not sell their product offer, earning profits of 100.

Figure 6 presents histograms showing, separately, how often each consumer purchased or each firm offered a fair product, pooling the individual's decisions across periods. We present here only the data for the Market Baseline condition, though graphs for all conditions are in the Appendix. The top two panels, A and B, show the individual behavior of buyers and sellers, respectively, over the entire experiment; the bottom two panels, C and D, do so for only the second half of the experiment (periods 13-24). For consumers, we consider only those periods in which the consumer had a choice between at least one fair and one unfair product.

Looking first at the entire experiment, in Panels A and B, we see considerable heterogeneity in the behavior of both consumers and firms. For example, while some consumers (6 percent) never purchase a fair product, a larger proportion (14 percent) does so in every period. A similar pattern obtains for firms: a smaller proportion (12 percent) never offers a fair product than those who always do so (19 percent). Moreover, while in both graphs there is mass at the extremes, the majority of subjects lie in between—purchasing or offering both types of products over the course of the experiment.

In the second half of the experiment, in Panels C and D, there is greater differentiation in the behavior of both firms and consumers. Among consumers, the proportion that never purchase the fair product increases to 23 percent, while the proportion who always do so is even higher (29 percent). For firms, the proportions are similar: 24 percent never offer the fair product, while 26 percent always do so. Thus, for both consumers and firms, behavior in the second half of the experiment reflects both high degrees of heterogeneity and fairly strong invariance in individual behavior. Roughly half of firms and consumers either always offer or purchase the fair product or never do so. This finding is similar across all market conditions—in every case behavior of both firms and consumers is bimodal, though the proportions of the two extremes changes across conditions in a manner consistent with Figure 1 (see Appendix).

> **Result 8:** *Individual consumer and firm behavior in the market reflect heterogeneous concerns for the third party. A large proportion of individual behavior is highly stable across the second half of the experiment.*

6. Market Consumer Behavior versus Individual Non-Market Choices

The analysis so far shows that socially responsible behavior is not eliminated by repeated market interaction. Instead, we document a stable concern for social impact across multiple market

conditions, reflected in persistent and non-trivial fair product market shares and in consumers' willingness to pay higher prices for such products. While social responsibility decreases significantly in one of our market conditions, analysis of individual behavior indicates this to be a sensible response to varying costs of production technology, and can be accounted for by the same preference for socially responsible products that describes consumer behavior in other market conditions.

To study whether the level of social concern exhibited in our markets is comparable to that in non-market individual choice contexts, we compare the choices of consumers in our Market Baseline condition with consequentially identical choice options faced by individuals in our No Market condition. This latter condition mimics typical distributional decision tasks, such as the dictator game.

Our design allows a direct comparison between the choices made by individual consumers in the Market Baseline condition and by a comparable group of subjects in the No Market condition. Recall, from the experimental design in Section 3, that we created the No Market condition by taking the 24 product choice sets facing each of the consumers in the Market Baseline condition, and presenting these *exact* 24 choices—with identical monetary consequences for a set of three subjects—to another set of decision makers in the No Market condition. Thus, from a purely monetary point of view, the 24 choice sets faced by one subject in the No Market condition are identical to the 24 choices sets faced by a consumer in the Market Baseline.

Before describing the results, we highlight an important aspect of our design. We explicitly chose not to compare decisions made by multiple individuals in a market—e.g., sellers and buyers interacting to produce market outcomes—with the behavior of a single individual who determines all relevant outcomes in a non-market setting. Such a design immediately creates the likely possibility that diffusion of responsibility—which decreases social concern even in the absence of markets (e.g., Darley & Latane, 1968; Dana, et al., 2007; Hamman, et al., 2010)—is the causal reason for differences between market and non-market behavior. Indeed, diffusion of responsibility provides a straightforward interpretation of previous results that show large behavioral changes between market and non-market settings (Falk & Szech, 2013). Our design, instead, employs a novel approach in which we hold the comparison fixed at the level of decisions by individuals, facing given choice sets created by someone else—another subject or

the experimenter—to see if the behavioral manifestation of preferences using such directly comparable choices differs between individuals in a market setting and similar individuals facing consequentially identical choice sets in non-market settings. While it is unlikely that there is any definitive, single way to compare market and non-market behavior, our study introduces a novel approach that is complementary to other comparisons.

The dashed line in Figure 7 shows the proportion of fair choices—i.e., choices that imposed no "externality" on the "third party"—made by consumers in the No Market condition. The solid line shows the comparable proportion in the Market Baseline (as in Figure 1).[31] Consistent with the idea that markets diminish socially responsible or moral behavior, the proportion of fair choices is higher in the No Market condition relative to the Market Baseline. However, the difference is not very large: 44.3 percent vs. 53.8 percent. Moreover, as the random-effects probit regressions reported in Models 1 and 2 in Table 7 reveal, the differences in proportions do not differ significantly, neither in levels, as indicated by the coefficient for No Market, nor in trends across time.

We can also compare the distributions of the individual behavior of subjects in the No Market condition and of consumers in the Market Baseline, across the experiment. For this purpose, we return to the individual-specific frequencies of fair choices, reported in Figure 6. Figure 8 shows the analogous cumulative frequencies of subject behavior for consumers in the Market Baseline (the same data as in Figure 6, Panel A, transformed into a cumulative density) and for decision makers in the No Market condition. Comparing individual behavior leads to a similar conclusion as the one we draw above. The cumulative frequency for the Market Baseline is almost always higher than for the No Market condition, reflecting a tendency toward less frequent fair behavior by market consumers. Moreover, there are roughly twice as many subjects in the No Market condition who always chose fairly than in the Market Baseline (14.3 vs. 28.5 percent). However, as with the analysis in Table 7, statistical comparisons of the distributions

[31] For comparability with the Market Baseline condition, where we omitted cases in which a consumer did not purchase a product, we omit cases in the No Market condition in which a subject made the analogous choice. While such choices could be interpreted as exhibiting a high concern for equality (since they yield payoffs of 100 for all parties), they are often inefficient and also infrequent in the No Market condition (3 percent of cases). Including such choices in both lines in Figure 7 and in other analyses has no substantive effect on the results.

yield insignificant differences (Kolmogorov-Smirnov: $D_{35,35} = 0.26$, $p = 0.20$; Wilcoxon rank-sum: $z = 1.10$, $p = 0.27$).[32]

Returning to the utility specification in Section 5.1, we can repeat the type of analysis reported in Models 2 through 5 of Table 5 to perform a comparison of behavior of consumers in the Market Baseline and decision makers in the No Market condition. The analysis yields a statistically insignificant interaction between concern for the third party and the No Market condition.[33]

Result 9: *Socially responsible behavior is slightly—though not statistically significantly—more prevalent in the No Market than in the Market Baseline condition.*

7. Conclusion

This paper provides experimental evidence addressing the question of whether concerns for social responsibility persist in repeated market interaction. To this end, we develop and experimentally study a laboratory product market, in which socially responsible behavior involves incurring additional production costs to mitigate a potential negative externality imposed on an individual otherwise uninvolved with the market

Our data show, first, that there is a non-trivial and constant share of socially responsible products supplied and demanded in all our market conditions. Second, the socially responsible product, which avoids imposing a negative externality on a third party but costs more to produce, sells at a price premium that does not decrease with market experience. In most cases, this price premium even increases over time, suggesting that consumers' willingness to pay in order to behave in a socially responsible way is not eliminated over the course of the repeated market interaction. Third, we show that individual-level market behavior is consistent with a preference for acting socially responsibly, though such concerns are heterogeneous. We also document the

[32] These statistical comparisons treat the observations as independent between conditions. However, the nature of the data is such that the choices presented to subjects are paired—each subject in the No Market condition is presented with the same choices as a buyer in the Market Baseline. This allows us to conduct a paired comparison of how behavior changes between conditions, when holding constant the choice set. This analysis similarly finds no statistically significant difference between conditions ($t_{34} = 1.12$, $p = 0.27$; sign test: $p = 0.38$).

[33] Specifically, the estimated coefficients (robust standard errors) are 0.337 (0.040) Consumer Earnings + 0.029 (0.006) Third Party Earnings + 0.012 (0.009) Third Party X No Market. Interestingly, if one introduces "seller" profits into this model, the coefficient is positive and statistically significant (0.209 (0.098))—the other coefficients are qualitatively similar to those in the model without seller profits—indicating that concern for the welfare of "sellers," which is absent in all of the market conditions, is important in the non-market context.

robustness of social responsibility in markets to varying market conditions, such as increased seller competition and limited consumer information.

Additionally, we identify a feature of markets for socially responsible products—the technology costs of production—that strongly affects the market share of such products. Specifically, the proportion of socially responsible products exchanged changes inversely to the relative cost of their production. This suggests a critical role for production subsidies as a mechanism for facilitating the adoption of socially responsible products in markets and improving market efficiency. We also show that this fairly dramatic change in market behavior—the market share of the socially responsible product almost doubles as the production cost decreases—occurs without substantive changes in the estimated underlying preferences of market participants.

A critical feature of our market experiment is that we allow the presence of a technology that can mitigate the externality, at a cost to market participants. In this sense, our design allows social responsibility to be consistent with market exchange, rather than entirely orthogonal.[34] The prevalence of such technologies is widespread in many existing markets. For example, "green," "fair trade," "ethical sourcing," and "cruelty-free" production are features of many products, which often involve higher costs that must be borne in some combination by firms and consumers. It is natural, therefore, to study social responsibility in the presence of such technologies, and to understand the role that they play in facilitating socially responsible market behavior. Indeed, our experiment produces clear evidence of the importance of such production technologies, and of their costs, for socially responsible market behavior.

Finally, we also employ a novel design that allows us to conduct a direct comparison between the behavior of *individuals* in market and non-market contexts, holding much else about the choices they face constant. Specifically, our design limits the number of features of the choice environment that change between market and non-market settings—such as the monetary consequences of the choice options, the choice procedures and the number of repetitions—in order not to introduce differences that are not inherent to a market versus non-market comparison. Using this design, we find that market behavior *does* indicate less concern for social

[34] For related evidence that the feasibility of pro-social outcomes matters for their adoption in principal agent relationships, see Charness and Dufwenberg (2011).

impact than comparable individual choice settings, but the difference is small and statistically insignificant in our data.[35]

Our findings thus complement and counterbalance recent propositions and empirical findings that markets erode moral values. We provide a clear example of where, in different variants of a market, social concerns are prevalent and stable over time and only slightly lower than in highly comparable non-market decisions. We also find that other features of the environment—specifically, the availability of a low-cost technology that can mitigate the externality—can have a much more significant impact on socially responsible behavior than market versus non-market comparisons. Our results, therefore, draw attention to the important challenge of understanding better the conditions under which markets erode moral values—or even maybe the conditions under which they increase them—rather than making claims that they generally do or do not.[36]

One appealing feature of our design is that it easily lends itself to further study. Thus, one of our contributions is what we believe to be a valuable experimental paradigm for studying the varying conditions under which socially responsible behavior occurs in markets. Our design is easily modified to incorporate additional varying, and possibly heterogeneous, production technologies or market characteristics. It is also straightforward to incorporate additional realistic features like firm reputation, products with greater heterogeneity in social impact, and market regulations. While we intentionally omit such rich features from our current experiment, with the goal of simplicity, all of these possibilities raise interesting questions and topics for future research.

[35] Furthermore, an interesting property of the pro-social behavior in our market setting is that it seems resistant to a contextual feature that strongly decreases pro-social behavior in individual choice settings. Specifically, in dictator games, limited information greatly diminishes pro-social behavior (Dana, et al., 2007; Larson and Capra, 2009). The fact that limited information has a much smaller effect in our market context, raises the possibility that socially responsible market behavior is more robust to such contextual features than individual behavior.

[36] Evidence that socially responsible market behavior is robust to alternative market characteristics and production technologies can be seen in a recent working paper by Danz, et al. (2012), that studies whether consumers with monopsony power in a duopoly market setting are willing to pay more for products produced by firms that pay higher wages to their workers. They find that a substantial proportion of consumers buy a higher-priced product if it also yields a higher wage for the worker. The specific focus of their paper is on how such concern by consumers is affected by variation in minimum wage policies.

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Table 1. Session Overview and Number of Observations

Treatment	Markets	Firms (Participant A)	Consumers (Participant B)	Third Parties (Participant C)
Market Baseline	7	42	35	35
High Firm Competition	6	48	30	30
Limited Information – Free	6	36	30	30
Limited Information – Costly	6	36	30	30
High Production Cost	6	36	30	30
No Market	-	35	35	35

Table 2. Random-effects Probit Regressions of Fair Consumer Product Choice in Market Baseline Condition

	All periods		Consumer saw both kinds of products	
	(1)	(2)	(3)	(4)
Period	-0.007 (0.008)	-0.007 (0.008)	-0.013 (0.010)	0.014 (0.022)
Number of Product Offers		0.054 (0.047)		
Lowest price of fair product				-0.403*** (0.074)
Lowest price of unfair product				0.385*** (0.063)
Constant	-0.009 (0.211)	-0.225 (0.252)	0.180 (0.248)	2.275 (1.826)
Observations	831	831	621	621
Number of subjects	35	35	35	35

Omits the nine cases in which a consumer made no product purchase
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Random-effects Regressions of Prices by Product Type

	Market Baseline (1)	High Firm Competition (2)	Limited Info. (Free) (3)	Limited Info. (Costly) (4)	High Prod. Cost (5)
Period	-0.283***	-0.474***	-0.574***	-0.342***	-0.154***
	(0.037)	(0.066)	(0.051)	(0.055)	(0.048)
Fair Product	2.401***	3.328***	3.121***	1.202	8.993***
	(0.651)	(0.846)	(1.153)	(0.934)	(1.448)
Period X Fair Product	0.108**	0.190**	0.192**	0.103*	0.115*
	(0.050)	(0.079)	(0.078)	(0.062)	(0.066)
Constant	26.881***	21.812***	28.771***	30.240***	31.974***
	(0.574)	(0.754)	(0.791)	(0.989)	(0.836)
Observations	831	711	695	702	686
Num. of subjs.	35	30	30	30	30

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Random-effects Probit Regressions of Fair Consumer Product Choice in Market Baseline and Alternative Market Conditions

	Baseline vs. High Firm Competition		Baseline vs. Limited Info (Free)		Baseline vs. Limited Info (Costly)		Baseline vs. High Production Cost	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.373	0.494	-0.314	-0.471	-0.135	0.167	-0-896**	-0867**
	(0.359)	(0.333)	(0.374)	(0.378)	(0.307)	(0.308)	(0.387)	(0.401)
Period		-0.007		-0.007		-0.007		-0.007
		(0.008)		(0.008)		(0.008)		(0.008)
Period X Treatment		-0.010		0.013		-0.025		-0.002
		(0.013)		(0.016)		(0.017)		(0.017)
Constant	-0.085	-0.001	-0.083	0.002	-0.098	-0.014		0.005
	(0.230)	(0.209)	(0.232)	(0.211)	(0.225)	(0.204)		(0.213)
Observations	1,542	1,542	1,526	1,526	1,533	1,533	1,517	1,517
Num. of subjs.	65	65	65	65	65	65	65	65

Omits cases in which consumers made no product purchase
Robust standard errors (clustered by subject) in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Estimated Weights for Consumer Utility Model

	Baseline Market	Baseline & HF Comp.	Baseline & LI (Free)	Baseline & LI (Costly)	Baseline & High Cost	All Market Conditions
	(1)	(2)	(3)	(4)	(5)	(6)
Consumer Earnings (θ)	0.372*** (0.062)	0.370*** (0.054)	0.395*** (0.044)	0.439*** (0.054)	0.214*** (0.069)	0.282*** (0.041)
Third Party Earnings (γ)	0.033*** (0.006)	0.032*** (0.007)	0.034*** (0.006)	0.038*** (0.006)	0.020*** (0.008)	0.025*** (0.006)
Third Party X HF Competition		0.008 (0.009)				0.005 (0.008)
Third Party X Lim. Info. (Free)			0.000 (0.009)			0.001 (0.008)
Third Party X Lim. Info. (Costly)				-0.018** (0.009)		-0.012 (0.008)
Third Party X High Prod. Cost					0.006 (0.009)	0.006 (0.011)
Observations	4,205	9,247	7,835	7,821	7,848	20,136
Cases	840	1560	1560	1560	1560	3,720

Robust standard errors (clustered by subject) in parentheses
*** p<0.01, ** p<0.05, * p<0.1
The model includes period, gender and ln(age) as case-specific (intercept) terms (coefficients omitted).

Table 6. Random-effects Probit Regressions of Firm Product Decisions

	(1)	(2)	(3)	(4)
High Firm Competition	0.359			0.337
	(0.415)			(0.388)
Limited Information (Free)	-0.413			-0.346
	(0.474)			(0.448)
Limited Information (Costly)	-0.112			-0.067
	(0.459)			(0.434)
High Production Cost	-1.323**			-0.565
	(0.554)			(0.522)
Firm Offered Fair Product Last Period		0.298**		0.357***
		(0.119)		(0.126)
Expected Fair Product Profit Premium			0.028***	0.030***
			(0.004)	(0.004)
Constant	-0.123	-0.504	-0.209	-0.250
	(0.324)	(0.153)	(0.164)	(0.308)
Observations	4,752	4,554	4,396	4,396
Number of subjects	198	198	198	198

Robust standard errors (clustered by subject) in parentheses
Models 2 through 4 exclude the first period; Models 3 and 4 additionally exclude cases in which either a fair or unfair product was not offered in the prior period.

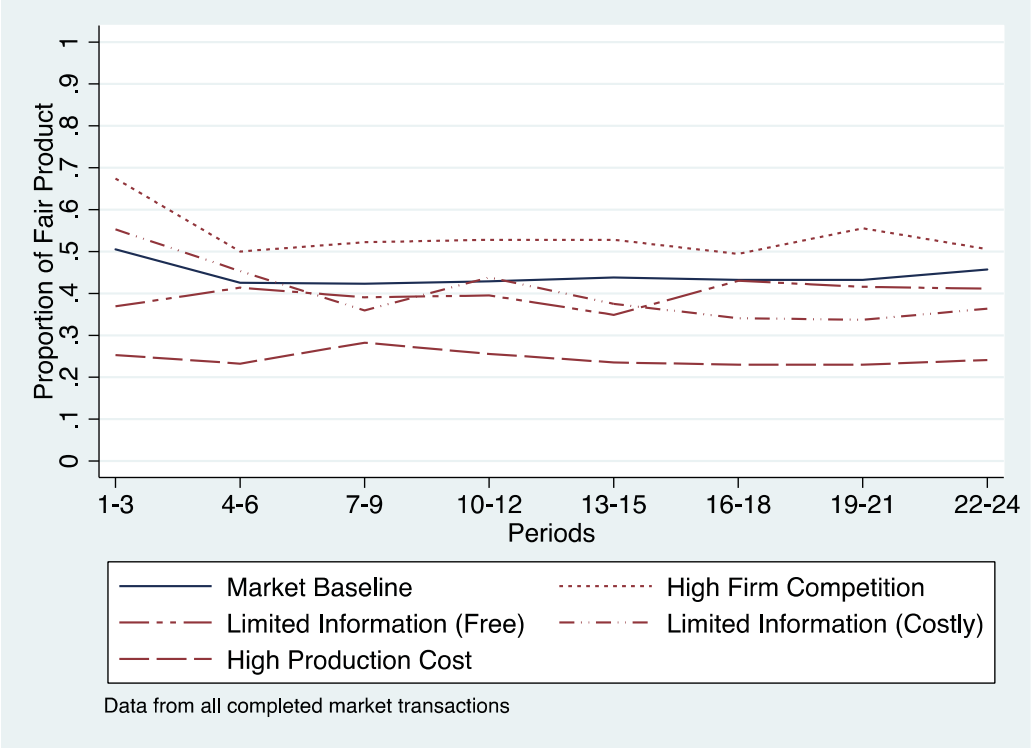
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Random-effects Probit Regressions of Fair Choices in the No Market Condition and Fair Product Purchases in the Market Baseline

	(1)	(2)
No Market	0.330	0.314
	(0.321)	(0.302)
Period		-0.007
		(0.008)
Period X No Market		0.001
		(0.012)
Constant	-0.091	-0.008
	(0.227)	(0.206)
Observations	1,643	1,643
Number of subjects	70	70

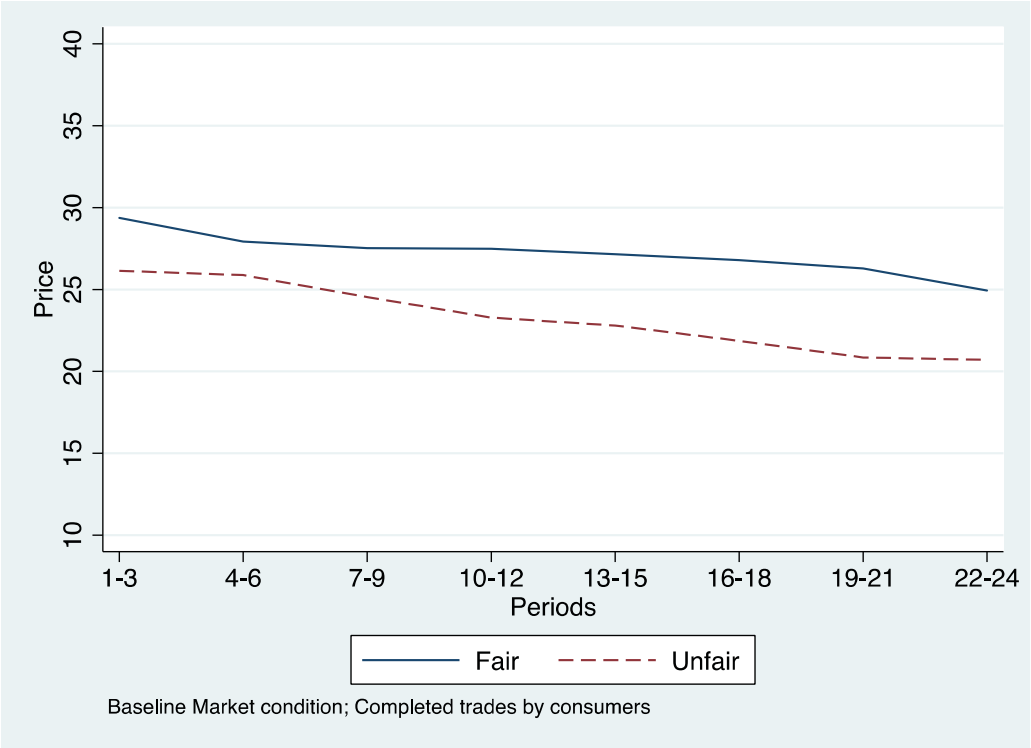
Omits cases in which consumer made no product purchase and the respective choices in No Market condition
Robust standard errors (clustered by subject) in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Fair Product Purchases across Varying Market Conditions



Data from all completed market transactions

Figure 2. Prices by Product Type in Baseline Market Condition



Baseline Market condition; Completed trades by consumers

Figure 3. Price Premium for the Fair Product across Varying Market Conditions

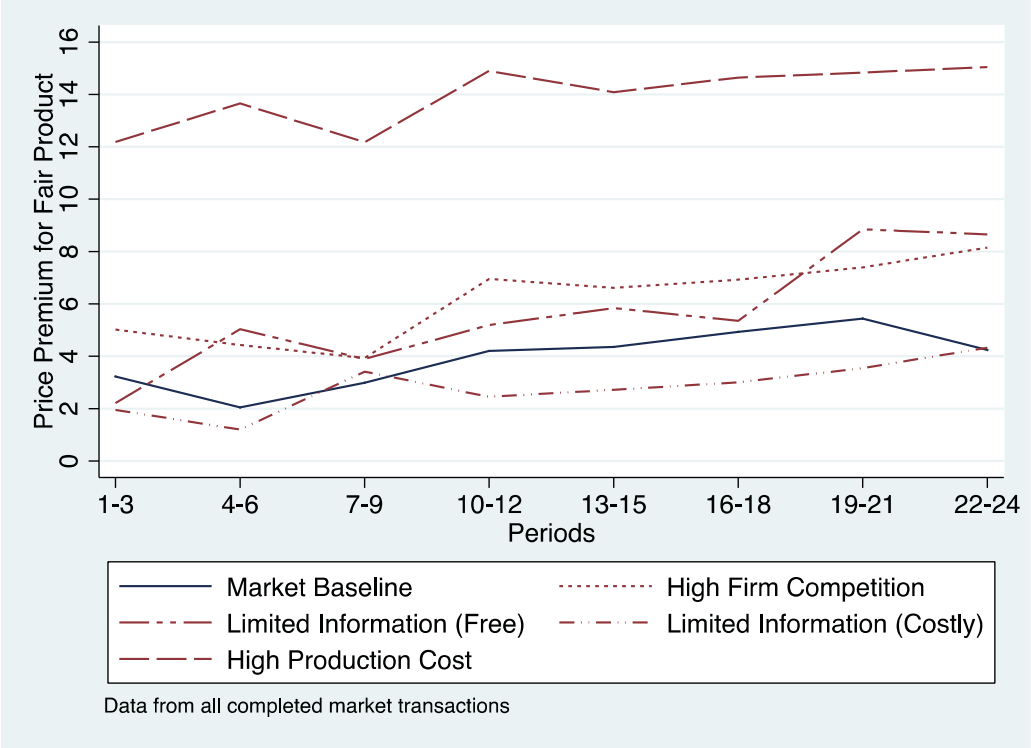


Figure 4. Prices by Product Type in Market Baseline and High Competition Conditions

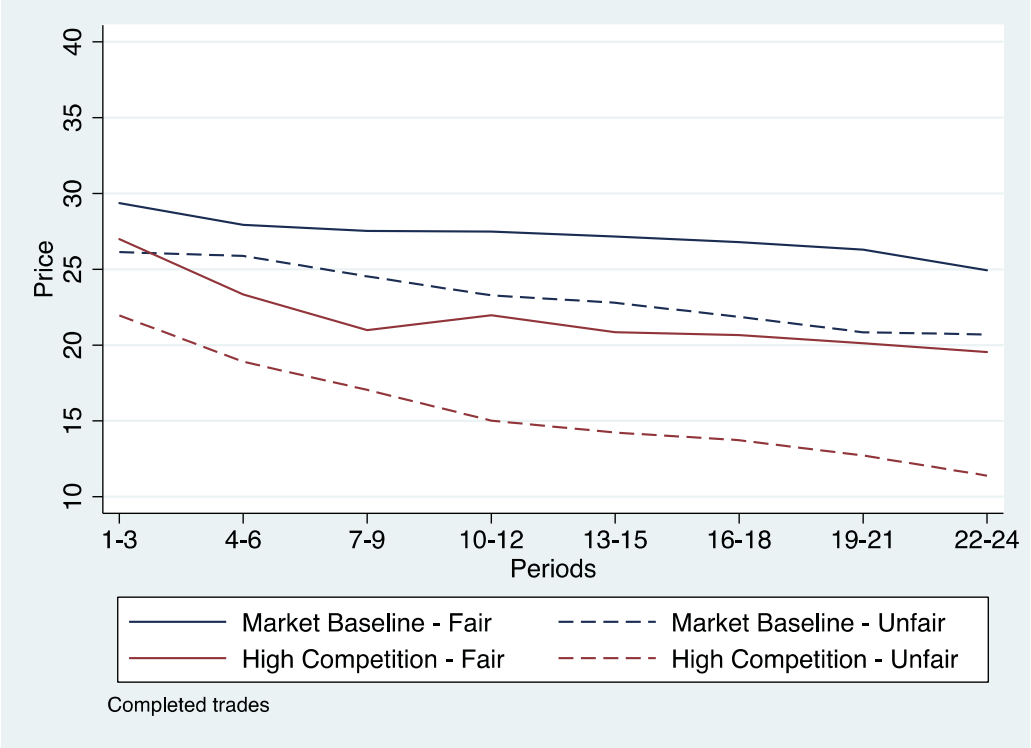


Figure 5. Product Purchases Conditional on Consumer Information Acquisition

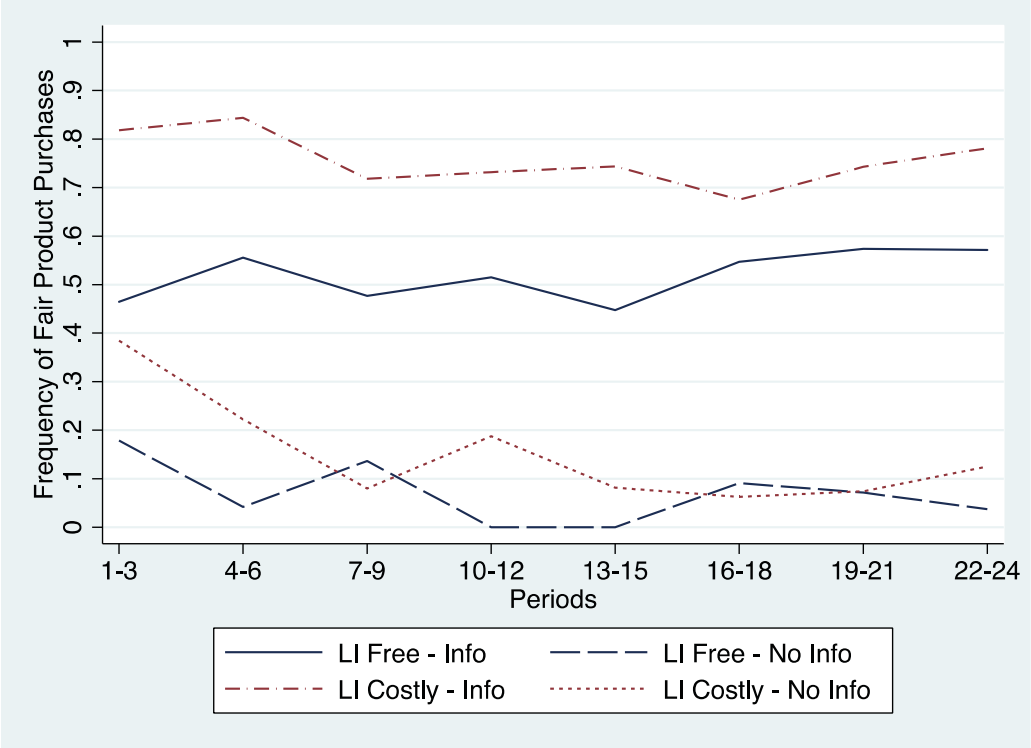


Figure 6. Distributions of Individual Behavior (Market Baseline)

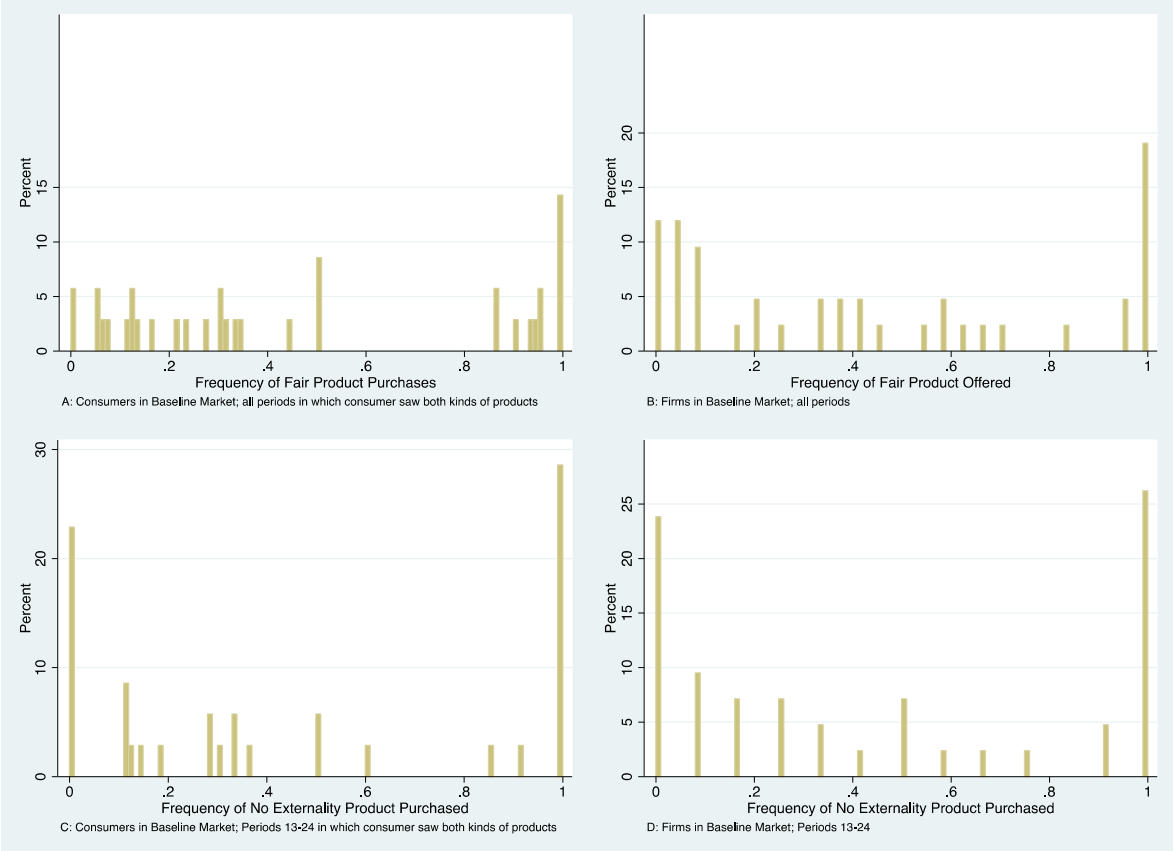


Figure 7. Fair Product Purchases in Baseline Market and No Market Conditions

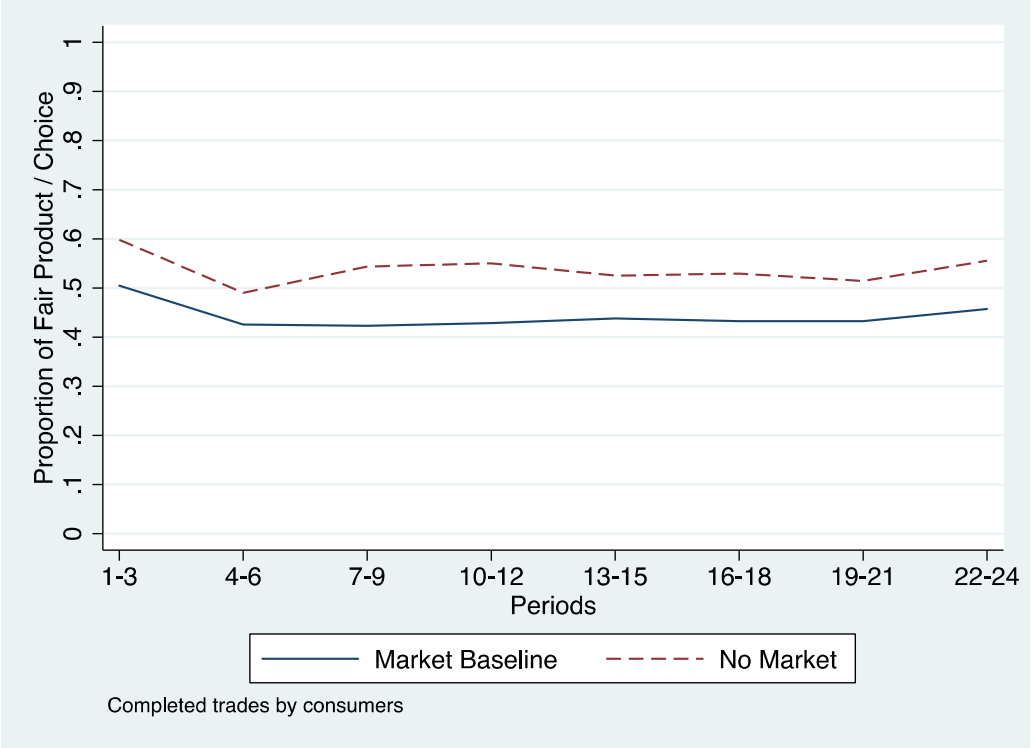
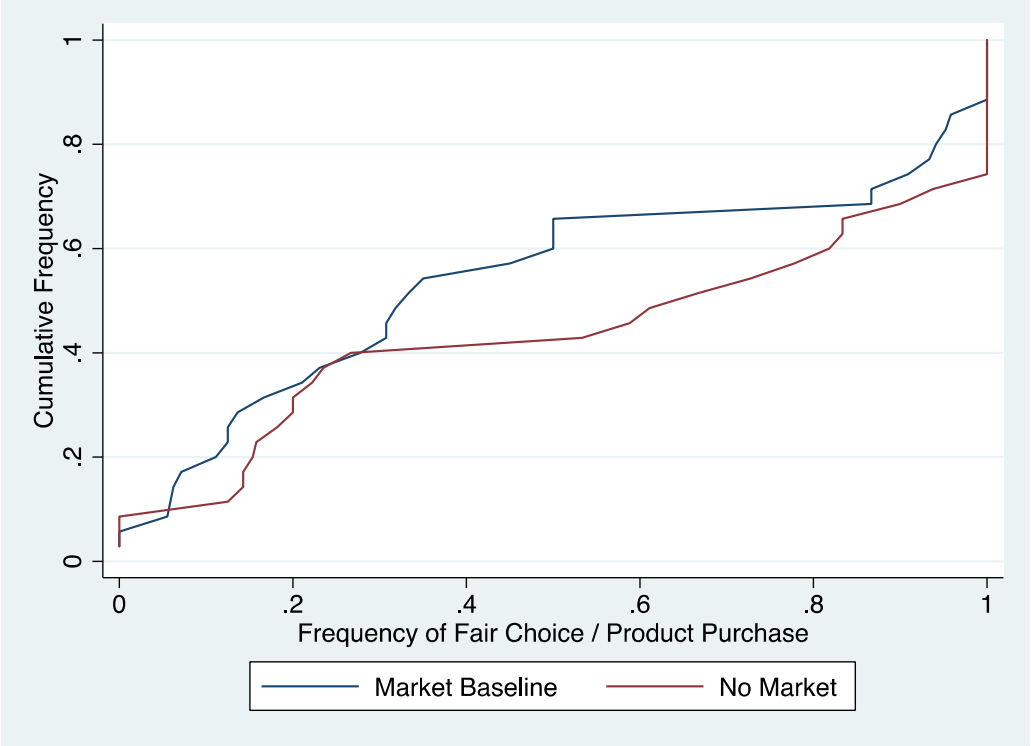


Figure 8. Cumulative Frequencies of Individual Socially Responsible Behavior



Appendix A: Social Responsibility Modeled as Inequity Aversion

In this appendix we provide an illustrative example of how a simple model of social preferences can be applied to our experimental markets. Specifically, we analyze firm and consumer decisions using the model of inequity aversion introduced by Fehr and Schmidt (1999). We selected this model because of its simplicity and widespread use in many other applications.

We assume that some consumers and some firms are socially responsible, which we model as inequity aversion with regard to the third party. Since consumers and firms are both free to choose what to trade and at which price, we do not apply the concept of social responsibility to their mutual relationship. We thus maintain the assumption of the pure self-interest model that consumers and firms do not care about each other's payoffs. As we note in the paper, this model fairly accurately describes convergence to equilibrium predictions in markets that only involve payoff implications for buyers and sellers.

We first derive the price premiums that (i) a consumer is willing to pay for the fair product on top of the price of the unfair product and that (ii) a firm demands for offering the fair product, which is more costly to produce. We show that for sufficiently high degrees of social responsibility (i.e., aversion to advantageous inequality with regard to the third party) trade of the fair product becomes feasible. We then derive the equilibrium predictions for prices and product shares in our baseline and high cost conditions, taking price competition among firms and social preference type heterogeneity into account.

A1. Price premium that a consumer is willing to pay for the fair product

Consider a socially responsible consumer who experiences a disutility equal to $\beta < 1$ times the positive difference between her own payoff and that of the third party, in addition to the utility produced by her own payoff. Denote the consumer's and third party's endowment, respectively, as m^c and m^t, the value of the product as v, the size of the externality as e, and the prices of the fair and unfair product as p^{fair} and p^{unfair}, respectively. A consumer prefers buying the fair product over buying the unfair product if

$$\begin{aligned} U(\text{fair}) &= m^c + v - p^{fair} - \beta \cdot \max\{m^c + v - p^{fair} - m^t; 0\} \\ &\geq m^c + v - p^{unfair} - \beta \cdot \max\{m^c + v - p^{unfair} - (m^t - e); 0\} = U(\text{unfair}) \end{aligned}$$

With $p^{fair} \leq v$ and $p^{unfair} \leq v$, this simplifies to

$$\Delta p = p^{fair} - p^{unfair} \leq \frac{\beta e}{1-\beta} \qquad (1)$$

Hence, a socially responsible consumer buys the fair product instead of the unfair product if Δp, the price premium for the fair product, does not exceed the r.h.s. of (1). The important observation is that a socially responsible consumer is willing to pay a higher price for the fair than for the unfair product even though the material value, v, to the consumer is identical for both types of products. The increasing curve in Figure A1 illustrates the price premium the consumer is willing to pay as a function of β. The size of the externality in Figure A is set to $e = 60$ as in our experiment.

A2. Price premium that a firm demands for offering the fair product

Consider next a socially responsible firm that experiences a "disutility" equal to $\beta < 1$ times the positive difference between its own payoff and that of the third party, in addition to the utility from its own monetary payoff. A socially responsible firm requires the following price premium in order to be willing to sell the fair instead of the unfair product.

$$\begin{aligned}\Pi(\text{fair}) &= m^f + p^{fair} - c - \beta \cdot \max\{m^f + p^{fair} - c - m^t; 0\} \\ &\geq m^f + p^{unfair} - \beta \cdot \max\{m^f + p^{unfair} - (m^t - e); 0\} = \Pi(\text{unfair})\end{aligned}$$

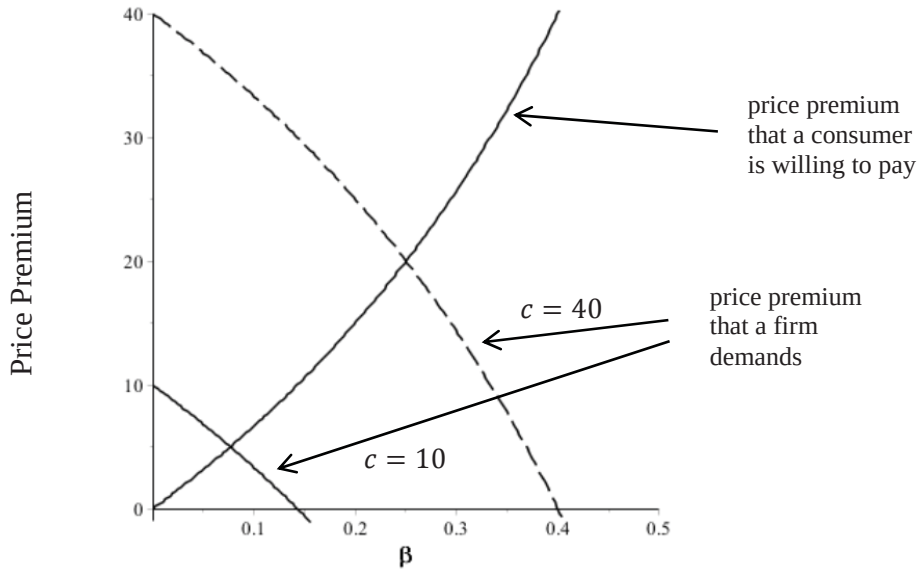
With $p^{fair} \geq c$ and $p^{unfair} \geq 0$, this simplifies to

$$\Delta p = p^{fair} - p^{unfair} \geq c - \frac{\beta e}{1-\beta} \qquad (2)$$

A socially responsible firm is thus willing to offer the fair product at a price premium that does not fully cover the higher cost, c, of production. Put differently, in order to be willing to offer the unfair product, a socially responsible firm demands a markup of at least $\beta e/(1-\beta)$ on top of the cost of production of the unfair product (normalized to zero in our setting) as a compensation for imposing the externality on the third party. The decreasing curves in Figure A1, illustrate the required price premium for $c = 10$ (solid line) and $c = 40$ (dashed line), which correspond to

the cost of production of the fair product type in the baseline and the high cost conditions, respectively.

Figure A1. Price Premium as Functions of the Inequity Aversion Parameter β



Notes: The figure shows the price premium Δp that a consumer is willing to pay for the fair product on top of the price of the unfair product (increasing line) and the price premium that a firm demands for offering the fair product instead of the unfair product (decreasing lines; solid for $c = 10$, dashed for $c = 40$) as a function of β. The externality is set to $e = 60$.

A3. Conditions under which trade of the fair product is feasible

Assume, for simplicity, that both firm and consumer have the same degree β of concern about the third party. It then follows from equations (1) and (2) that if $\beta \geq c/(c + 2e)$, a consumer's willingness to pay for the fair product is as least as high as a firm's required price premium. In such cases, there will always be a price premium such that trading the fair product becomes feasible.[37] However, the higher the relative cost of production of the fair product, the higher the necessary level of β such that trade of the fair product becomes feasible: with $c = 10$ this level is

[37] In general, without assuming that consumer and firm have the same β, trade of the fair product becomes feasible if $\beta^c e/(1-\beta^c) \geq c - \beta^f e/(1-\beta^f)$, where β^c and β^f denote the consumer's and firm's individual and potentially different concern for the third party.

$\beta = 1/13$, and with $c = 40$ it is $\beta = 1/4$, given $e = 60$. If $\beta = c/(c + 2e)$, the price premium is $c/2$, i.e., firm and consumer each bear exactly half of the higher cost of production of the fair product. This corresponds to the intersection of the curves shown in Figure A1.

If $\beta \geq c/(c + e)$, which is $\beta \geq 1/7$ with $c = 10$ and $\beta \geq 4/10$ with $c = 40$, it is possible for either the firm or the consumer to bear the entire additional production cost, i.e. all price premiums between 0 and c are possible. In Figure A1 this corresponds to the values of β that are given by the intersection of the respective decreasing curve with the β-axis (firm's required price premium is zero) or where the increasing curve reaches the value of 10 or 40, respectively (consumers are willing to pay for the entire additional cost of producing the fair product).

A4. The market equilibrium with purely self-interested preferences

Given that there are more firms than consumers in our experiment and that each firm and consumer can trade at most one product, the pure self-interest theory predicts that price competition among firms leads to prices equal to cost in equilibrium. That is, the price of the fair product will be $p^{fair} = c$ and the price of the unfair product will be $p^{unfair} = 0$. Purely self-interested consumers would, however, not buy the fair product at price $p^{fair} = c$ but always the unfair product at price $p^{unfair} = 0$. Given that a firm's monetary profit equals zero for both types of product, purely self-interested firms are indifferent between offering a fair or an unfair product, and they also do not care whether they can sell or not (recall that the cost of production is incurred only if a product offer is sold). The pure self-interest model thus predicts that only the unfair product is traded at price $p^{unfair} = 0$ in equilibrium.

A5. Heterogeneous inequity-averse preferences

To study a prediction for the competitive market with socially responsible behavior and for preference type heterogeneity, we use the distribution of preference types suggested by Fehr and Schmidt (1999) in Table III (p. 844). According to this distribution, 30 percent of subjects (i.e., of consumers and of firms) are purely self-interested with $\beta = 0$, 30 percent of subjects have $\beta = 0.25$, and 40 percent have $\beta = 0.6$.[38] In the following, we derive the market equilibria

[38] Note that $\beta < 1$ implies that buying a fair product offer is always better than not buying at all.

predicted under such preferences, for $c = 10$ and $c = 40$, respectively. Since we are interested in qualitative predictions, we ignore, for simplicity, the integer problem in our markets with 5 consumers and 6 firms.

A5.1. The market equilibrium with $c = 10$

The predictions of the Fehr-Schmidt model in our baseline condition with $c = 10$ and $e = 60$ are given as follows:

- The market share of the fair product is 70 percent.
- The fair product trades at $p^{fair} = 10$ and the unfair product trades at $p^{unfair} = 0$.

In particular, the following actions form the market equilibrium: The 30 percent of firms with $\beta = 0$ each offer the unfair product at $p^{unfair} = 0$, and the 30 percent of consumers with $\beta = 0$ each accept an unfair product offer. The 70 percent of firms with $\beta = 0.25$ or $\beta = 0.6$ each offer the fair product at $p^{fair} = 10$, and the 70 percent of consumers with $\beta = 0.25$ or $\beta = 0.6$ each accept a fair product offer. Since there are more firms than consumers (for each preference type), supply meets demand for both types of product, i.e. all consumers can buy their preferred product but some firms cannot sell their product offer.

To see that the above actions form an equilibrium, consider possible deviations by the market participants.

Consider first the consumers. Neither the selfish consumers with $\beta = 0$ nor the socially responsible consumers with $\beta = 0.25$ or $\beta = 0.6$ have an incentive to deviate to not buying because at the given prices they realize payoffs from buying of, respectively, 50 and $(1 - \beta)40$. Moreover, none of the consumers has an incentive to deviate and buy the respective other product type. This follows from equation (1), showing that a consumer's willingness to pay for the fair product on top of the price of the unfair product is given by $\Delta p = 60\beta/(1 - \beta)$. Purely self-interested consumers with $\beta = 0$ thus strictly prefer buying the unfair product at the given prices. The 30 percent of consumers with $\beta = 0.25$ are however willing to pay a price premium of $\Delta p = 20$ and thus strictly prefer buying the fair product at the given prices. The 40 percent of consumers with $\beta = 0.6$ never buy the unfair product as they would even give money to the third party in order to equalize payoffs.

Would any of the firms deviate? Consider first purely self-interested firms. Irrespective of whether such a firm can sell its unfair product offer at price $p^{unfair} = 0$, it does not realize a positive profit on top of its endowment. Deviating and offering the fair product at $p^{fair} = 10$ would not lead to positive profits, irrespective of whether the offer will be sold or not, because the price just covers the cost of production. Offering a product at a price lower or higher than $p^{fair} = 10$ or $p^{unfair} = 0$, respectively, would lead to zero profits at best. A firm realizes losses for lower prices because the price does not cover the cost and it would not be able to sell at higher prices due to price competition.

Consider now socially responsible firms with $\beta = 0.25$ or $\beta = 0.6$. Irrespective of whether such a firm sells its fair product offer at $p^{fair} = 10$, it does not realize a positive profit on top of its endowment. Deviating and offering the unfair product at $p^{unfair} = 0$ would lead to a loss in case the offer is sold (and to zero profits otherwise). The reason is that equation (2) shows that such a firm requires a markup of $60\beta/(1-\beta)$ on top of the cost of production of the unfair product as a compensation for the disutility created by the externality imposed on the third party. As with purely self-interested firms, there is no incentive to deviate and offer a product at a price lower or higher than $p^{fair} = 10$ or $p^{unfair} = 0$, respectively, because this would lead to zero profits at best.

A5.2. The market equilibrium with $c = 40$

The predictions of the Fehr-Schmidt model in our high production cost condition with $c = 40$ and $e = 60$ are given as follows:

- The market share of the fair product is 40 percent.
- The fair product trades at $p^{fair} = 40$ and the unfair product trades at $p^{unfair} = 20$.

In particular, the following actions form the market equilibrium: The 60 percent of firms with $\beta = 0$ or $\beta = 0.25$ each offer the unfair product at $p^{unfair} = 20$, and the 60 percent of consumers with $\beta = 0$ or $\beta = 0.25$ each accept an unfair product offer. There are more firms than consumers so that supply meets demand. While all firms with $\beta = 0$ can sell their product offer, some firms with $\beta = 0.25$ cannot. The 40 percent of firms with $\beta = 0.6$ each offer the fair product at $p^{fair} = 40$, and the 40 percent of consumers with $\beta = 0.6$ each accept a fair product

offer. Since there are more firms than consumers, supply meets the demand, but some firms with $\beta = 0.6$ cannot sell their product offer.

To see that the above actions form an equilibrium, consider first possible deviations by the consumers. No consumer has an incentive to deviate to not buying because they all receive strictly positive payoffs from buying—though smaller ones than in case of $c = 10$. Moreover, neither purely self-interested consumers with $\beta = 0$ nor socially responsible consumers with $\beta = 0.6$ would deviate to buying the respective other product type as they strictly prefer to buy the unfair or fair product, respectively. Consumers with $\beta = 0.25$, however, who are willing to pay a price premium of $\Delta p = 20$, are now indifferent between buying the fair product at $p^{fair} = 40$ or the unfair product at $p^{unfair} = 20$. Hence, they do not have an incentive to deviate to buying the fair product.

Consider now the firms. All purely self-interested firms with $\beta = 0$ sell their unfair product offer at $p^{unfair} = 20$. In our markets there are more firms than consumers but less than twice as many. Given the demand of 60 percent of the consumers, it is thus possible that each of the overall 30 percent of purely self-interested firms can sell their offer. These firms do not have an incentive to deviate to offering the fair product because they strictly prefer selling the unfair product at $p^{unfair} = 20$, where they make positive profits, over selling the fair product at $p^{fair} = 40$. Importantly, since all firms with $\beta = 0$ can sell at $p^{unfair} = 20$, none of them has an incentive to bid prices down as this would only lower their profits.[39] Asking for a lower price for the fair product will even lead to losses. Asking for higher prices for either product type leads to zero profits as the product offer could not be sold.

Consider now socially responsible firms with $\beta = 0.25$. Irrespective of whether such a firm sells its unfair product offer at $p^{unfair} = 20$, it does not realize a positive payoff. The reason is that equation (2) reveals that the markup of 20 on top of the cost of production of the unfair product just compensates them for the loss of imposing the externality on the third party. Importantly, this is the reason why firms with $\beta = 0.25$ that cannot sell at $p^{unfair} = 20$ would not bid down prices and sell the unfair product at a price below 20. At any price $p^{unfair} < 20$

[39] If there were more purely self-interested firms than demand for the unfair product at $p^{unfair} = 20$, such firms would bid prices down to cost, i.e. to $p^{unfair} = 0$. Consumers with $\beta = 0.25$ would then strictly prefer buying the unfair product and firms with $\beta = 0.25$ would strictly prefer offering the fair product at $p^{fair} = 40$. The demand for the fair product from consumers with $\beta = 0.6$ would then be served by firms with $\beta = 0.25$ or $\beta = 0.6$. Hence, the price of the unfair product would decline, but the market share of the product types would remain unchanged.

firms with $\beta = 0.25$ would strictly prefer to not sell any product. Equation (2) also reveals that firms with $\beta = 0.25$ are indifferent between selling the fair product at $p^{fair} = 40$ or the unfair product at $p^{unfair} = 20$, as they require a price premium of $\Delta p \geq 20$ in order to sell the unfair product. Hence, they have no incentive to deviate and offer the fair product. Socially responsible firms with $\beta = 0.6$ would never offer the unfair product; they just break even at $p^{fair} = 40$. Note, finally, that offering either product type at higher or lower prices would, at best, lead to zero profits for socially responsible firms, i.e., there is no incentive to ask for different prices.

Appendix B: Additional Figures

Figure A1: Prices by Product Type in the Limited Information Conditions

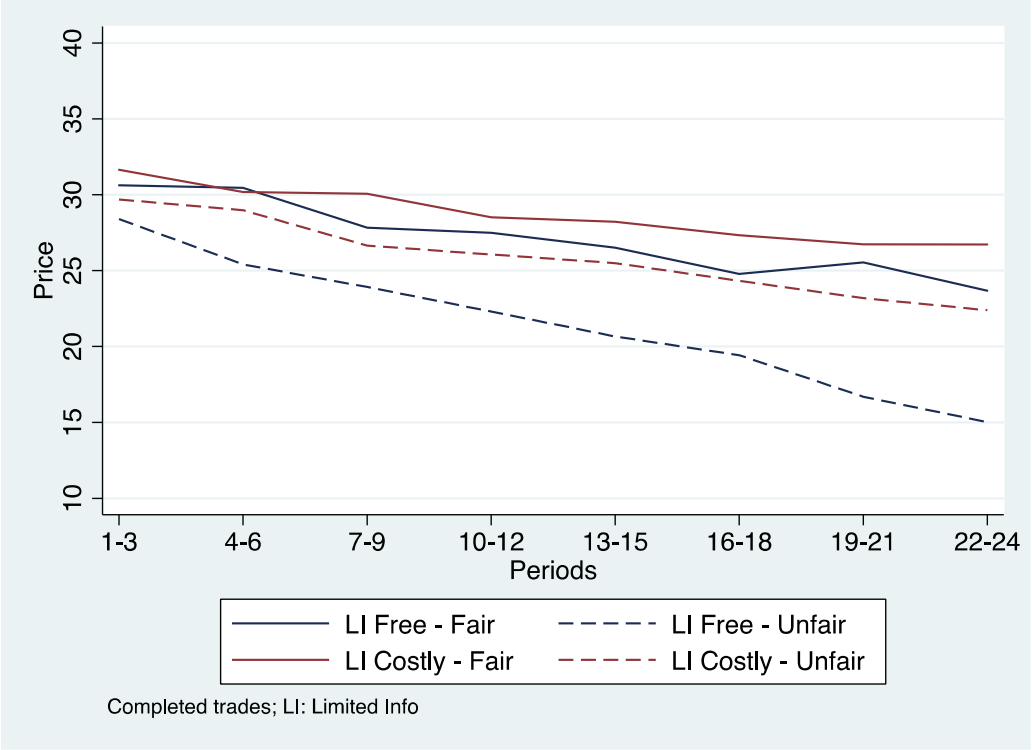


Figure A2: Prices by Product Type in the High Production Cost Condition

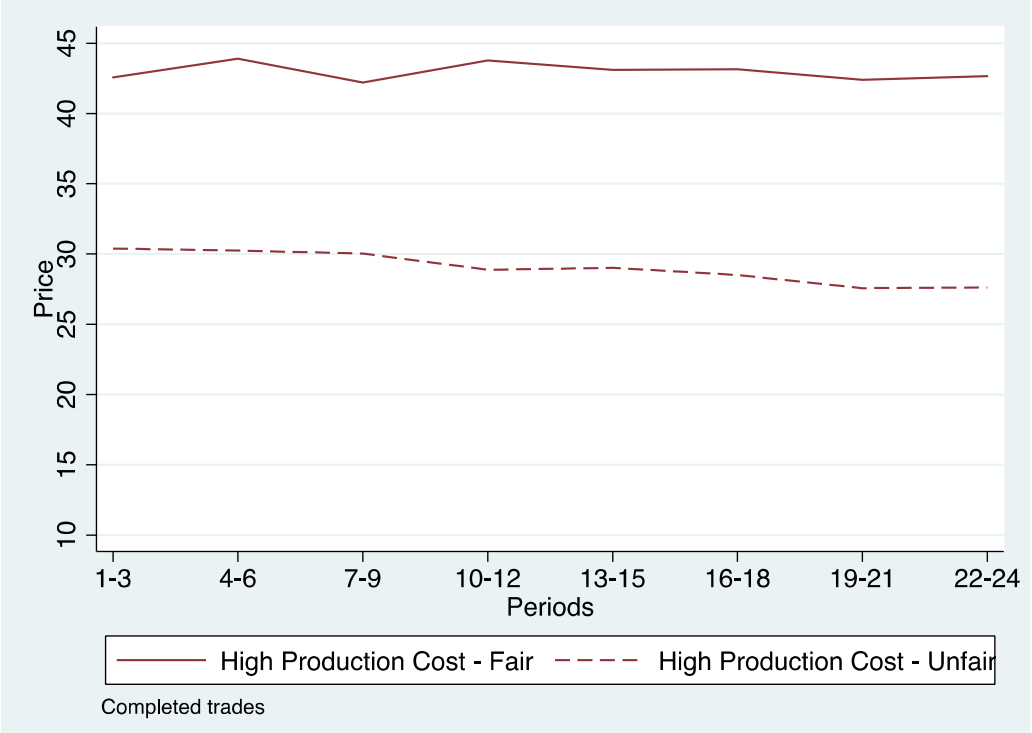


Figure A3: Distributions of Individual Behavior (High Firm Competition)

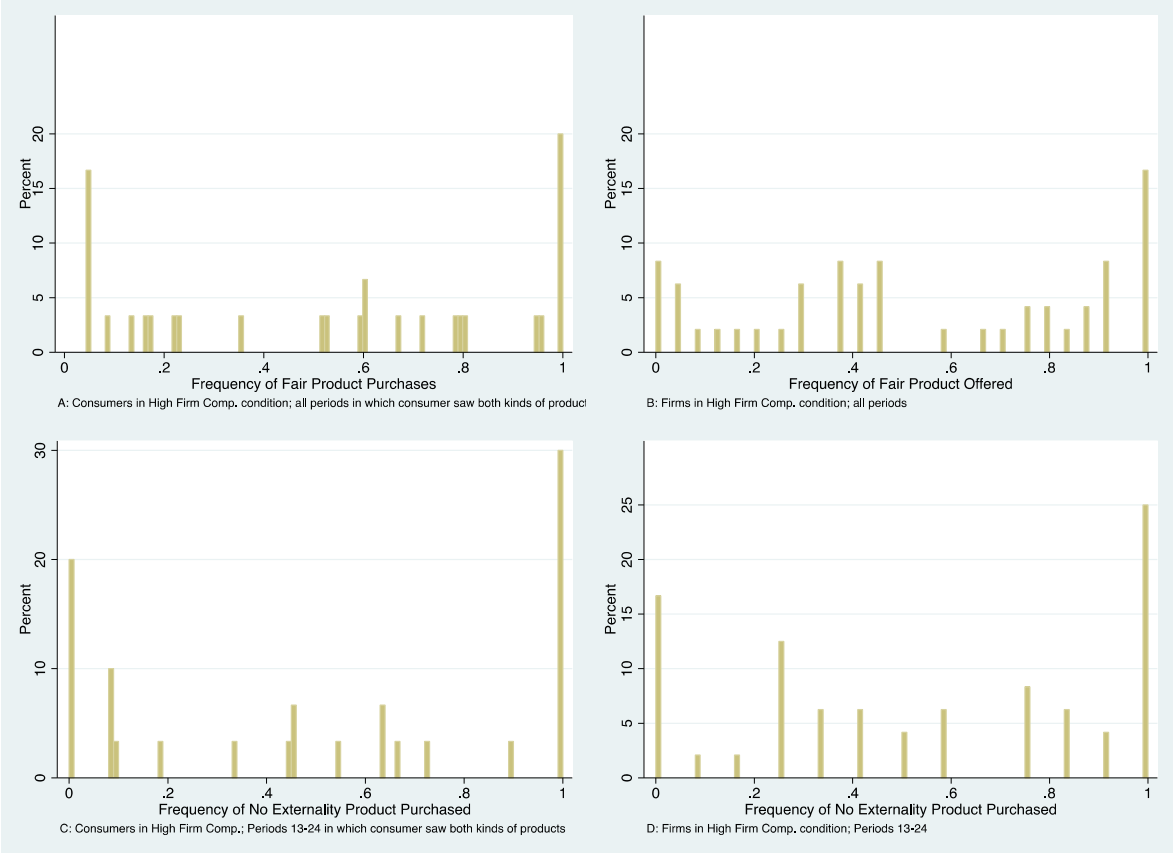


Figure A4: Distributions of Individual Behavior (Limited Consumer Information (Free))

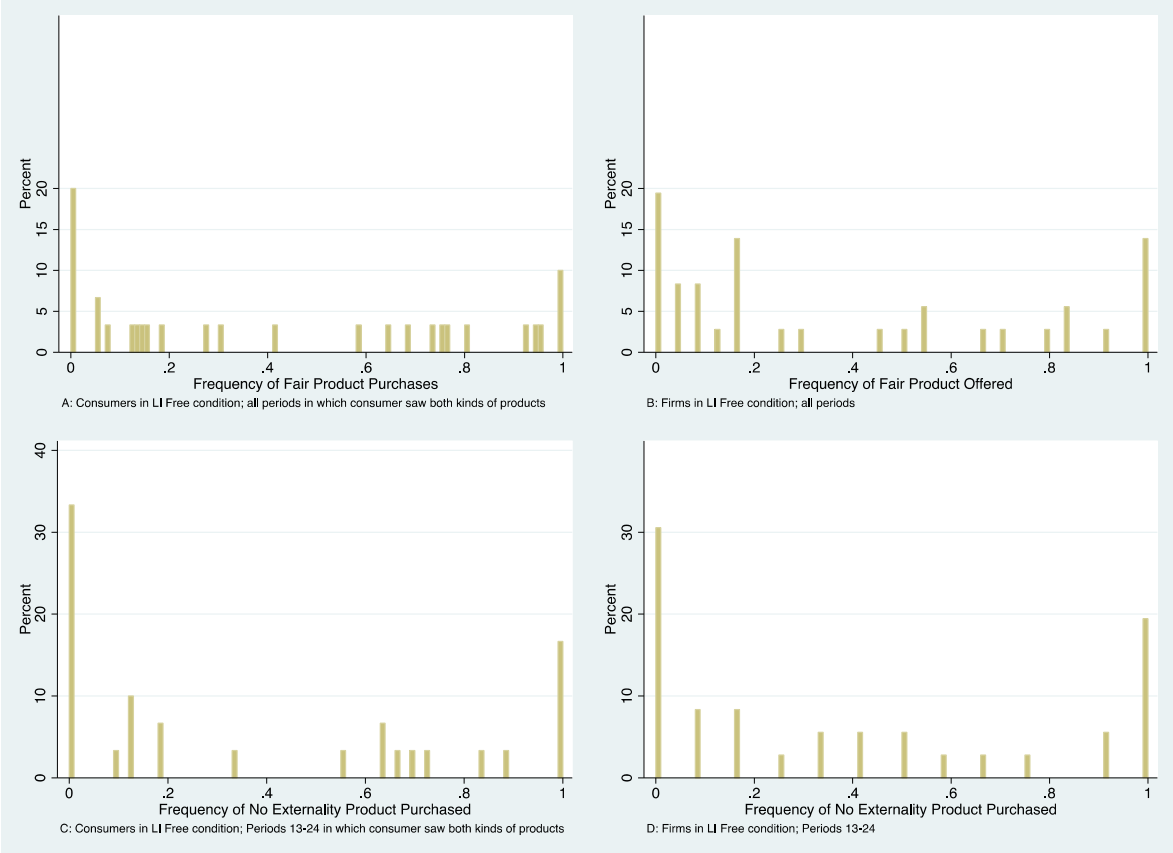


Figure A5: Distributions of Individual Behavior (Limited Consumer Information (Costly))

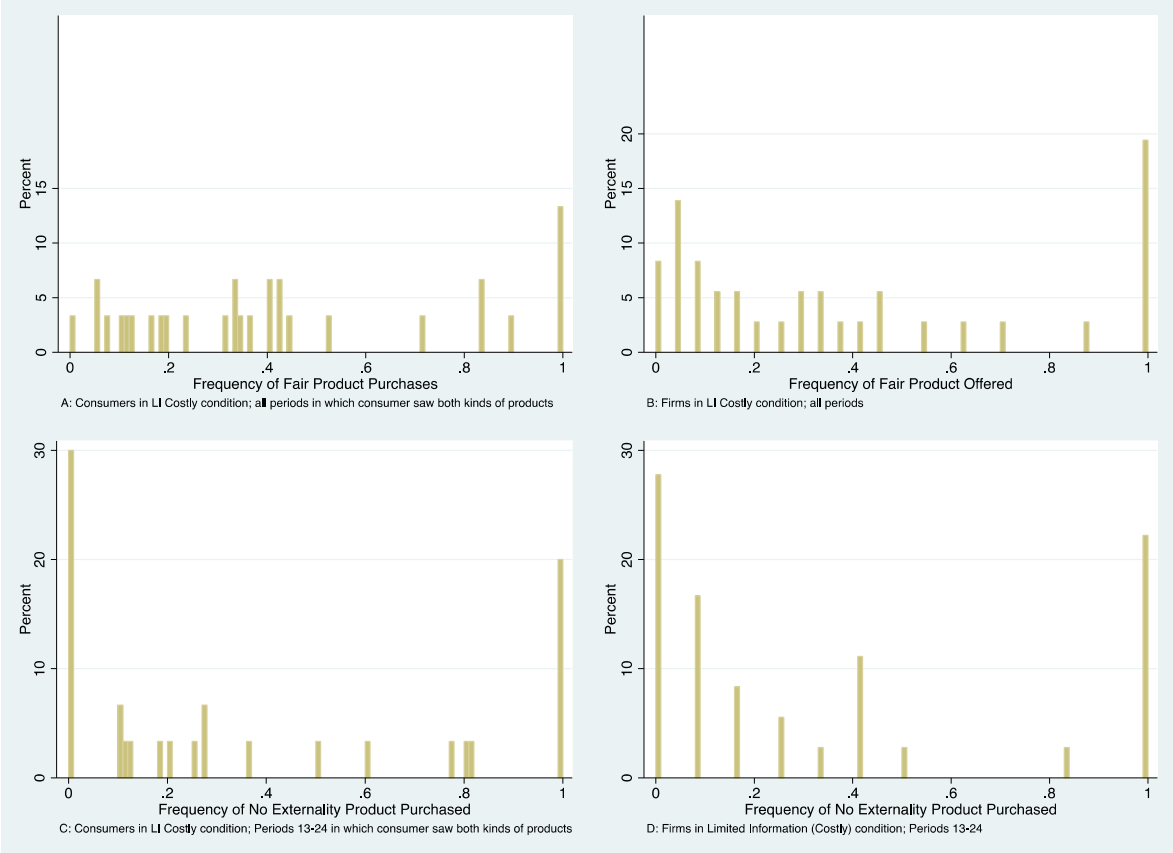
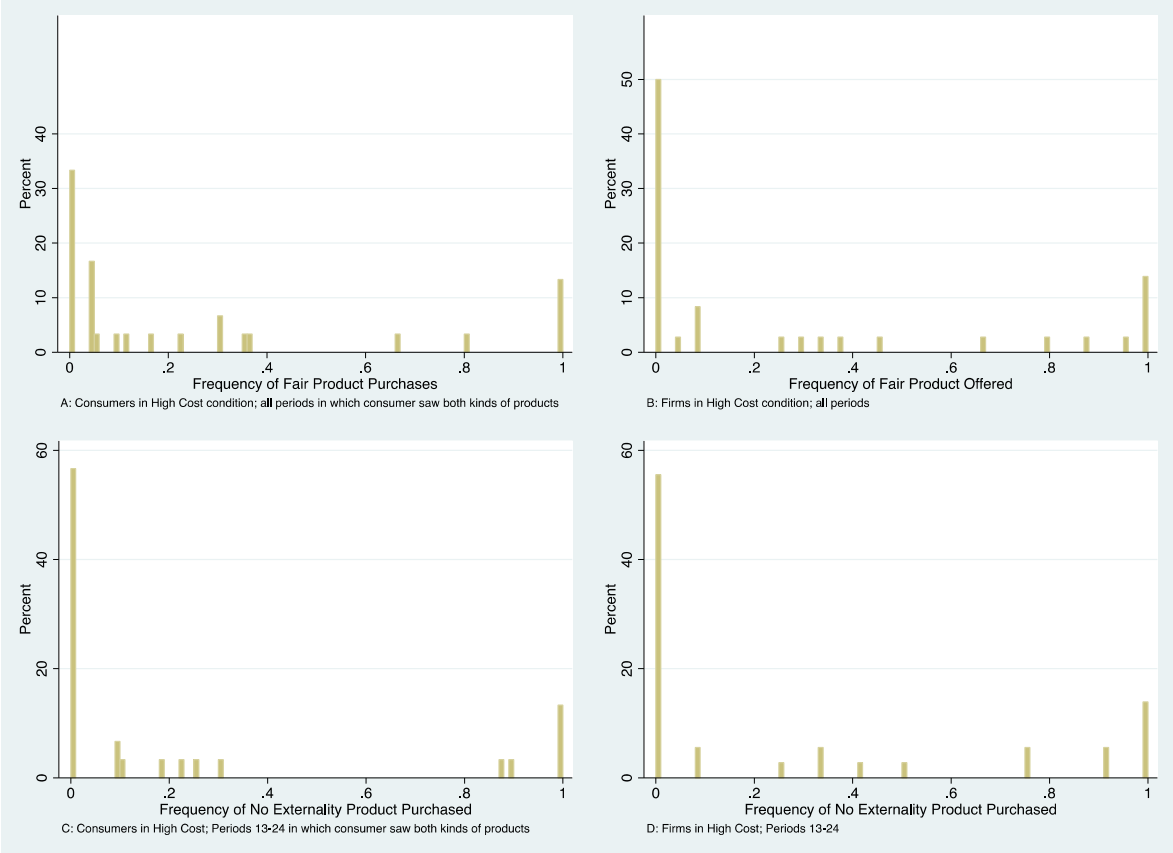


Figure A6: Distributions of Individual Behavior (High Production Cost)



Appendix C: Experimental Instructions

A) Market Baseline

General instructions

We are pleased to welcome you to this economic study.

If you read the following instructions carefully, you can – depending on your decisions and/or those of the other participants – earn money in addition to the **15 Swiss francs** that you receive as an initial endowment for participating. It is thus very important that you read the instructions carefully. If you have any questions, please contact us.

Communication with the other participants is strictly forbidden during the study. Violation of this rule will lead to exclusion from the study and loss of all of the associated payments.

During the study, we will not speak of francs, but of points. Your entire income will thus first be calculated in points. The points you earn during the study will be converted to Swiss francs at the end of the study. The following conversion rate applies:

10 points = 2.50 Swiss francs.

At the end of today's study, you will receive the number of points earned during the study plus the initial endowment of 15 Swiss francs for appearing **in cash**.

We will explain the exact procedure of the study on the next pages. For the sake of simplicity, we will always use male forms for participants; the instructions also obviously refer to female participants.

The study

There are three types of participants in this study: participants A, B, and C. The participants in this study are divided into groups of 16 people. There are **6** participants A, **5** participants B, and **5** participants C in each group.

Participants A are sellers, participants B are buyers. Participants C can neither sell nor buy, but they can incur losses due to the transactions between the participants A and B.

The study last for 24 periods. In each period, each participant A makes exactly one sales offer for a product. Participant A thereby determines the **type of product** and the **price** for the product.

- There are two types of products:
    1. **"Products with no effect on participant C"** and
    2. **"Products with a loss for participant C".**
- Every value from 0 up to and including 50 can be selected as a price.

The production costs for participants A for a "product with no effect on participant C" amount to **10 points**. Participant A bears no costs (**0 points**) for the production of a "product with a loss for participant C".

The value of a product for a participant B is always **50 points**, regardless of what type of product it is.

The five participants B see the sales offers made by the six participants A (the price and the type of product) and can accept one offer each. The participants B can decide one after the other in a random order. Each participant B can only accept one offer. This means that a maximum of five of the six participants A can sell a product.

In each period, each of the five participants B will be randomly assigned to one of the five participants C. If a participant B purchases a "product with a loss for participant C", the assigned participant C incurs a loss of **60 points**. If a participant B purchases a "product with no effect on participant C" or no product at all, the assigned participant C incurs no loss.

You will see whether you are participant A, B, or C on your screen at the beginning of the study. Your role as participant A, B, or C remains the same during the entire study.

In each period, each participant A, B, and C first receives an endowment of 100 points. The payment in points of participant A (seller), participant B (buyer), and participant C in a period are thus determined as follows:

Participant A's payment

- If a participant B accepts his sales offer

  100 – costs of production + price of the product

  where the production cost amounting to 10 points are incurred only with a "product without effect on participant C". The production costs for a "product with a loss for participant C amount to 0.
- If no participant B accepts his sales offer: ***100***

Participant B's payment:

- If participant B accepts a sales offer

  100 + 50 – price of the product
- If participant B does not accept a sales offer: ***100***

Participant C's payment:

- If the randomly assigned participant B chooses a "Product with loss for participant C"

  100 - 60 = 40
- If the randomly assigned participant B chooses a "Product without effect on participant C" or does not purchase a product: ***100***

Procedures on the computer:

In each period, participants A enter their sales offers on the following screen:

Participant A must indicate whether he wants to offer a "product without effect on participant C" or a "product with a loss for participant C." to do this, the corresponding type of product must be clicked on.

Furthermore, participant A must indicate the price he wants to request for the product. The corresponding number must be entered in the box. All integers from 0 up to and including 50 are possible.

Once a participant A has made his decisions, he must click on the OK button at the lower right-hand side. The type of product and the price can be changed until the OK button is clicked.

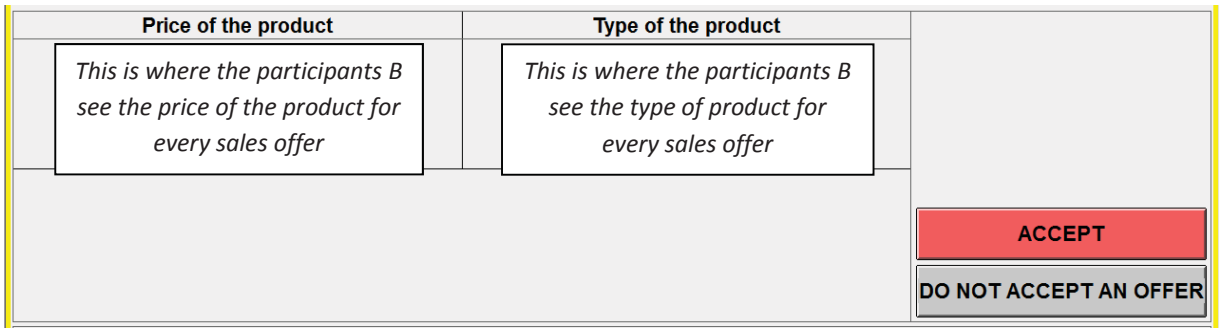
Once all six participants A have made their sales offers, the participants A will see the sales offers (the price and the type of product) of all of the other participants A in a table. Here is an example:

Price of the product	Type of the product	Order of acceptance
This is where the participants A see the price of the product for every sales offer	*This is where the participants A see the type of product for every sales offer*	accepted SECOND - accepted FIRST -

The participant's own sales offer is always marked in blue. Participants A can always see in the column on the right whether and in which order the participants B accept the offers.

Once all participants B have made their decisions, each participant A will learn of his own payment. If his offer is accepted, participant A will also learn participant B's payment and the payment of the corresponding participant C.

The **participants B** can see the sales offers on the screen below in each period:



Participants B see the screen above in a random order and can accept an offer one after the other. Thus only one participant B sees the screen above at any one point in time. Only when the current participant B has made his decisions will the next participant B see the screen above, where he can then accept an offer.

The participant B who is first shown the screen can select from all offers. The participant B who is shown the screen second can only choose from the remaining offers, as each offer can only be accepted by one participant B.

If the five participants B have each accepted an offer, one offer will always remain that can no longer be accepted. The participant A who made this offer cannot conclude a sale in this period.

The order in which the five participants B decide on accepting the six offers will be randomly determined anew in each period.

The prices appear in the left column of the table, and the type of product appears in the right column. Each offer is always in a separate row. In order to accept an offer, the corresponding row must be clicked on with the mouse. The marked row will then appear with a blue background.

- In order to accept the offer marked in blue, you must click on the ACCEPT button.

The choice of offer can be changed until the ACCEPT button is clicked on.

If a participant B does not want to accept an offer, he must click on the DO NOT ACCEPT AN OFFER button. Even if a row had already been marked, all offers will be declined if the DO NOT ACCEPT AN OFFER is clicked on.

When all participants B have made their decisions, each participant B will learn of his own payment and that of his assigned participant C.

Participants C cannot make any decisions during this study. We ask the participants C, however, to indicate in each period their expectations about the behaviors of participants A and B.

When all participants A and B have made their decisions, the participants C will learn of their own earnings, which are entirely dependent on the decisions of participants A and B.

After all participants have been informed about their payments in a period, the next period will begin.

Your earnings in this study are the payment out of <u>one</u> randomly selected period.

Because you do not know which period the computer will randomly select, you must consider your decisions in each of the 24 periods very carefully.

At the end of the study, the corresponding point amount will be converted to Swiss francs and paid in cash to you together with the initial endowment.

Do you have any further questions? If yes, please raise your hand. We will come to you at your workplace. Otherwise, we ask you to answer the control questions on the next pages.

Control questions

1. Assume that participant A offers a "product without effect on participant C" at the price of 40 and participant B accepts the offer.
   How high are the payments to participants A and B and the corresponding participant C?

2. Assume that participant A offers a "product with a loss for participant C" at the price of 40 and participant B accepts the offer.
   How high are the payments to participants A and B and the corresponding participant C?

3. Assume that participant A offers a "product without effect on participant C" at the price of 15 and participant B accepts the offer.
   How high are the payments to participants A and B and the corresponding participant C?

4. Assume that participant A offers a "product with a loss for participant C" at the price of 15 and **no** participant B accepts the offer.
   How high is the payment for participant A? How high is the payment for a participant B who does not accept an offer? How high is the payment for the corresponding participant C?

Please raise your hand when you have completed the control questions. We will then come to you at your workplace.

B) No Market Condition

[General instructions as in Market Baseline]

The study

There are three types of participants in this study: participants A, B, and C. The participants in this study are divided into groups of 3 people. There is one participant A, one participant B, and one participant C in each group.

The study last for 24 periods. In each period, one participant A, one participant B, and one participant C are randomly assigned to one another.

In each period, the participants A, B, and C first receive an endowment of 100 points.

The Participant B in a group can select a different distribution of points. In case of a new distribution, the sum of the payments that participants A and B receive is 40 or 50 points greater than the initial endowment of 100 points each.

There are two types of distributions:

3. **"Distribution with no effect on participant C"** and
4. **"Distribution with a loss for participant C".**

If a participant B selects a "distribution with a loss for participant C," the assigned participant C incurs a **loss of 60 points**. If a participant B selects a "distribution with no effect on participant C" or does not opt for a new distribution, the assigned participant C will not incur any loss.

You will see whether you are participant A, B, or C on your screen at the beginning of the study. Your role as participant A, B, or C remains the same during the entire study.

In each period, each participant A, B, and C first receives an endowment of 100 points. The payment in points of participant A, B, and C in a period depend on the participant B's decisions and are determined as follows:

Participant A's payment

- If the randomly assigned participant B selects a new distribution

Payment in the new distribution

- If the participant B does not select a new distribution: ***100***

Participant B's payment:

- If he selects a new distribution

Payment in the new distribution

- If he does not select a new distribution: ***100***

Participant C's payment:

- If the randomly assigned participant B chooses a "Distribution with loss for participant C"

100 - 60 = 40

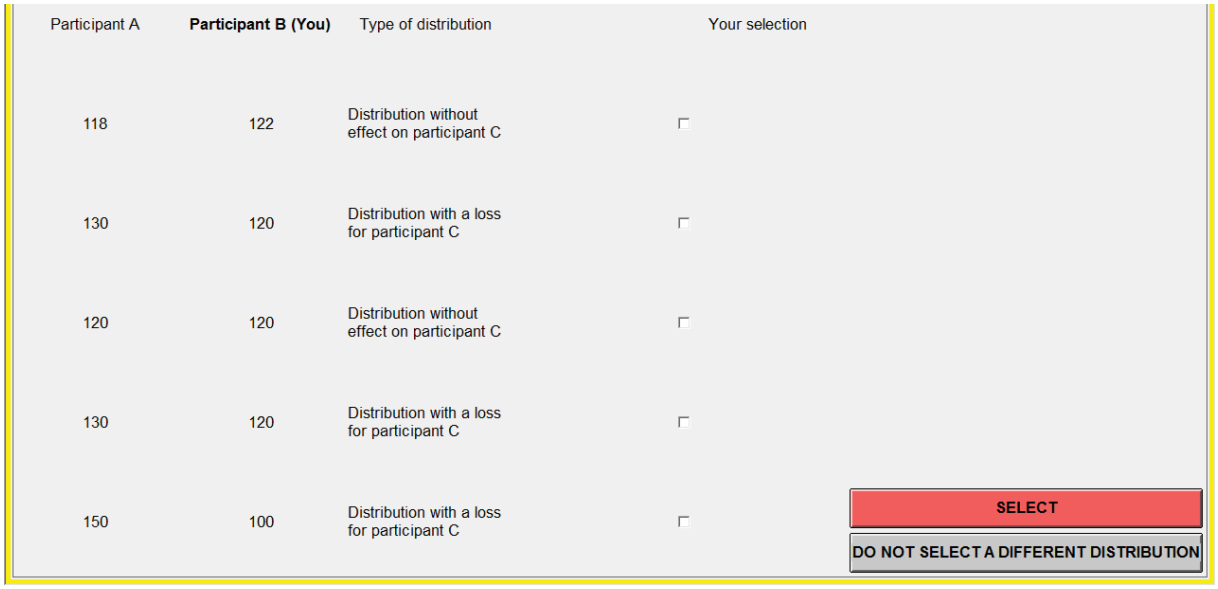
- If the randomly assigned participant B chooses a "Distribution without effect on participant C" or does not select a new distribution: ***100***

In case of a "distribution without effect on Participant C," the sum of the payments for participant A and participant B is 40 points higher than if no new distribution is chosen, for example 125 points for participant A and 115 points for participant B (and 100 points for participant C).

In case of a "distribution with a loss for Participant C," the sum of the payments for participant A and participant B is 50 points higher than if no new distribution is chosen, for example 120 points for participant A and 130 points for participant B (and 100 – 60 = 40 points for participant C).

Procedures on the computer:

In each period, **participants B** can select from possible new distributions on the following screen:



Participants B can choose from two to six different distributions in each period. In this case, for example, participant B can choose between five new, different distributions.

The left column of the table shows the possible payments for participant A, the middle column shows the possible payments for participant B, and the type of distribution is shown in the right column. Each new distribution always appears in a separate row. In order to select a new distribution, the box at the far right must be clicked on with the mouse.

- The SELECT button must be clicked on in order to select the chosen distribution.

The type of distribution can be changed until the SELECT button is clicked.

If a participant B does not want to select a new distribution, he must press the DO NOT SELECT A DIFFERENT DISTRIBUTION button. Even if new distribution had already been marked, no new distribution will be selected if the DO NOT SELECT A DIFFERENT DISTRIBUTION button is chosen.

When all participants B have made their decisions, the assigned participants A and C will be informed of the decision.

Participants A and C cannot make any decisions during this study. We ask the participants A and C, however, to indicate their expectations about the participant B's behavior in each period.

After all participants have been informed about their payments in a period, the next period will begin.

Your earnings in this study are the payment out of <u>one</u> randomly selected period.

Because you do not know which period the computer will randomly select, you must consider your decisions – if you are a participant B – in each of the 24 periods very carefully.

At the end of the study, the corresponding point amount will be converted to Swiss francs and paid in cash to you together with the initial endowment.

Do you have any further questions? If yes, please raise your hand. We will come to you at your workplace. Otherwise, we ask you to answer the control questions on the next pages.

Control questions

1. Assume that participant B chooses a new distribution and this is a "distribution without effect on participant C."
   How high are the payments to the participants A, B, and C randomly assigned to each other in this period?

2. Assume that participant B chooses a new distribution and this is a "distribution with a loss for participant C."
   How high are the payments to the participants A, B, and C randomly assigned to each other in this period?

3. Assume that participant B chooses no new distribution.
   How high are the payments to the participants A, B, and C randomly assigned to each other in this period?

Please raise your hand when you have completed the control questions. We will then come to you at your workplace.