Do Investors Care About Corporate Externalities? Experimental Evidence*

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Abstract

We measure how shareholders value a firm's ethical actions via an experiment. Our findings are threefold. First, the "selfish investor hypothesis" is strongly rejected. Participants are willing to pay $.7 more for buying a share in a firm giving one more dollar per share to charities. Symmetrically, a firm that makes profits by exercising a negative externality of $1 on a charity is valued $.9 less than a similar company with no externality. The scaling of non-pecuniary preferences is linear: doubling the size of a social externality doubles its impact on willingness to pay. Second, the data show that whether investors are pivotal or not with regard to the ethical actions of the firm does not affect their willingness to pay. Third, when participants make investment decisions on behalf of a third party (delegation), their generosity level remains similar. Our results appear to be compatible with a utility model where non-pecuniary benefits are conditional on stock holding.

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1 Introduction

This paper uses experiments to measure how investors' moral preferences affect the valuation of socially responsible firms. Our study is motivated by the classic policy debate on Corporate Social Responsibility ("CSR"). Many participants in the policy debate (such as Reich (2014), Warren (2018), Business Roundtable (2019) in recent years) call for firms to integrate social concerns into their objective functions, thereby challenging Friedman's classic statement that "the social responsibility of business is to increase its profits". According to these voices, firms should sometimes accept to make decisions that hurt their *profits* in order to benefit society.[1] As a consequence, CSR advocates demand a shift of managerial focus away from the maximization of shareholder *value*, which is currently the dominant metric of managerial performance. This recommendation is based on the idea that shareholder value is the discounted sum of future profits, and hence fails to take into account the broader impact of the firm on society. However, this argument against shareholder value is not obvious if shareholders put some value on companies' prosocial behavior (Zivin and Small, 2005). If that is the case, market valuations of firms can reflect their CSR characteristics: Two identical streams of future profits could have different values if their ethical features are different, reflecting private benefits of shareholders. Since we know that, in practice, an increasing fraction of professional investors follow socially responsible criteria, it is plausible that ethical corporate behavior is reflected in higher equity valuation.[2]

To illustrate the impact of shareholder moral preferences on value, imagine a one-period setting where a company's profits per share are worth \$1. Now, assume the company is committed to spending 40% of its profits in charity donations and distributing the rest as a dividend. Purely selfish investors would lower the share price to \$0.6. However, if investors are altruistic, the

[1] Bénabou and Tirole (2010) distinguish between profit-enhancing vs. profit-decreasing CSR. Indeed, some CSR initiatives maximize firms' long-term profitability, due to foreseeable changes in regulations, or to expectations about consumers' and employees' preferences (Fink, 2019). In this case, CSR is just an alternative way to improve shareholder welfare. In our paper, we focus on the polar case where CSR actions come at the expense of profits.

[2] According to the *The Forum for Sustainable and Responsible Investment*, as of year-end 2017, about 25% of U.S. professionally managed assets can be categorized as "socially responsible". But many of these investors just exclude a few sectors or a few companies from their investment universe, which leaves quite open the questions of how their moral concerns affect prices and how the whole population of investors values CSR decisions.

price can be at a level such that $P > \$0.6$. In this case, $P - 0.6$ is the valuation of pro-social behavior by shareholders: It reflects their moral preferences. This setting forms the backbone of our experiment. Our key finding is that P is typically closer to \$1, and it is robust to various conditions.

The experimental setting is ideal for separating prosocial behavior from profit-maximizing decisions, a distinction that is hard to make in the field. Social initiatives by firms may simply be a signal of management quality. Also, more often than not, they may just be an investment in consumers and employees' loyalty, hence affecting firm value through another channel than investors' moral preferences. Krueger et al. (2018) provides evidence of such confounding effects: Using a large-scale survey they document that institutional investors believe that screening companies based on environmental information can enhance risk-adjusted returns because equity valuations do not fully reflect climate risks, especially future regulatory risk.

Our experiment consists of directly eliciting investors' moral preferences by auctioning several types of synthetic companies to participants: some companies are ethically neutral, some are generous (they distribute a fraction of profits to charities) and some exercise negative social externalities (they reduce planned transfers to charities). We first make sure participants understand the bidding mechanism and its consequences. We then find that participants strongly integrate social externalities into their pricing bids. The effect is quite symmetric with regard to the sign of the externality: Participants are willing to pay \$.7 more for buying a share in a firm giving one more dollar per share to charities. Symmetrically, a firm that makes profits by exercising a negative externality of \$1 on a charity is valued \$.9 less than a similar company with no externality. We find that the scaling of non-pecuniary preferences is linear: doubling the size of a social externality doubles its impact on willingness to pay. We also find that participants behave similarly whether their bids are pivotal or not for the ethical behavior of companies, which goes against a central assumption in Hart and Zingales (2017). Last, we document that our results are unchanged when each participant's decision is made on behalf of another participant in the

experiment (our "delegation condition"). We also find that the expression of moral preferences through bids does not crowd out more direct charitable behavior. At the end of the experiment, we offer participants an opportunity to give, and the resulting donations are uncorrelated with the pricing of corporate ethical behavior. These results hence document a surprisingly strong effect of shareholders' moral preferences on equity prices. We argue that such evidence is consistent with a simple consequentialist model.

Our paper is related to two different strands of the literature. A first set of papers in behavioral economics explores how moral preferences of agents are expressed in a market context. Using a sample of eBay auctions, Elfenbein and McManus (2010) find that consumers are willing to pay higher prices for products that generate charitable donations. Bartling et al. (2014) uses a lab experiment to show that in a market context consumers refrain from buying goods from firms which have negative social impact. Tasimi and Gross (2020); Tasimi and Wynn (2016); Crockett et al. (2017) also document a similar effect outside a market context, showing that people display an aversion for money earned in a manner that directly or indirectly harmed others. These moral preferences generate a price premium for socially responsible products. Leszczyc and Rothkopf (2010) also find that auctions with proceeds donated to charity lead to significantly higher selling prices, due to higher bidding from participants with charitable motives. However, some papers show that a market context tends to dampen the acuity of moral concerns. Falk and Szech (2013) documents that markets inherently erode socially responsible behavior. They use a lab experiment to measure individuals' willingness to pay for avoiding the death of the mouse, and show that this willingness to pay is lower in a market setting than in comparable non-market contexts. Sandel (2012) develops a philosophical analysis on how markets undermine moral values. We contribute to this literature by providing evidence that moral concerns strongly affect investor's willingness to pay for *financial* claims, and that investors do not take into account whether their decision to buy a stock is pivotal for the course of firms' ethical decisions.

Our results also contribute to the literature in financial economics that is concerned with

socially responsible investors and their effect on stock prices and corporate policies. Ferrell et al. (2016) find that CSR is higher in well-governed firms with lower agency concerns. Cheng et al. (2013) however show that CSR policies are driven by managerial preferences rather than by minority shareholder preferences, suggesting a trade-off between governance and public goods. Riedl and Smeets (2017) find that social preferences are important factors for decisions by responsible investors in survey data; and Bolton et al. (2019) use the trail of proxy votes to infer the distribution of shareholder preferences: They find that a group of investors, including public pension funds, systematically support a more social and environment-friendly orientation of the firm. Heinkel et al. (2001) develop a model where a fraction of investors boycott firms that are not clean. "Dirty" companies trade at a discount compared to their "clean" peers, because in equilibrium, their shareholders (i.e. those that have no moral concerns) are more concentrated in "dirty" companies. In line with this model, Hong and Kacperczyk (2009) documents that "sin stocks" exhibit positive abnormal returns. By contrast, Edmans (2011) documents that firms that treat employees relatively well have positive abnormal returns, which goes against the view that their cost of capital is lower. Margolis et al. (2007) provides a meta-analysis of the empirical literature that shows ambiguous correlations between social responsibility and financial returns. Derwall et al. (2011) finds evidence that reconciles these seemingly opposite results on returns due to the coexistence of values driven and profit-driven SRI investors. Krüger (2015) documents that stock prices react negatively to negative CSR events. Hartzmark and Sussman (2019) documents large outflows when funds are categorized as having a poor sustainability footprint. Our contribution to this literature is to isolate the stock-holder preference channel for the impact of CSR on stock prices. In all these event studies, this channel is confounded with the impact of CSR news on profits (for example via employees, customers or future regulation) and so it is hard to know if CSR is priced because it enhances financial value or because shareholders value ethical behavior beyond cash-flows.

Our results are also related to concurrent and complementary work by Brodback et al. (2019). They use like us an experiment to explore investor valuations of ethical behavior. Their paper

focuses on whether ethical preferences are state dependent, and whether participants care more about some charities than others. They find that investors' willingness to pay for ethical behavior is lower when financial performance is poor. In their experimental setting, all participants are pivotal for the charity outcome; all participants see the same set of charities; and firms are either ethical or neutral. In contrast, our paper focuses on the valuation of ethical, neutral, *and unethical* firms, and we consider both pivotal and *nonpivotal* investors.

In the following, Section 2 describes our experimental design. Section 3 develops a simple analytical framework that can be used to analyze results. Section 4 analyzes in detail our experimental results and elaborates on their economic interpretation. Section 5 concludes.

2 Experimental Design

2.1 Overall structure

We recruit participants through Amazon's Mechanical Turk (MTurk), an online platform which allows requesters–mainly researchers and businesses–to post small-scale tasks to be completed by Mturk "workers". In our experiment, participants submit bids for shares in fictional companies that vary by what dividends they pay to the individual, and by how much money they add or remove from a fund that will be donated to charities. Participants bid on three different company types in random order. The "ethical" company gives away some shareholder profits to charity; the "unethical" company takes money away from the charity and gives it to shareholders; and the "neutral" company neither gives nor takes money from the charity wallet.

To elicit truthful valuations, we use the classical Becker-DeGroot-Marschak (BDM) bidding mechanism where participants bid in a second-price auction against a random machine (Becker et al., 1964). Under some restrictive assumptions, this ensures that participants bid their truthful valuation. The BDM mechanism is the following. Participants first place their bids, and then a share price is drawn from a uniform distribution after bids are submitted. Participants must then

buy the share if their bid is larger than the random price. To emphasize that participants are playing against a random price, we present the random value as the result of a spinning wheel of fortune (see the Appendix for more detail).

We define three variables:

1. "Selfish value" is the cash dividend paid directly to the participant by the firm. Individuals only receive a dividend from the company if they buy the share.

2. "Charity value" is the amount added or subtracted from the charity wallet by the firm. In the case of an unethical company, the participant receives the company profit plus some amount subtracted from the charity wallet, and so the charity value is negative. Otherwise, it is zero or positive.

3. "Excess bid" is the difference between bid and the selfish value. For pure cash-flow maximizing investors, excess bids are zero.

The key parameter of interest is the relationship between "excess bids" and "charity values." This relationship indicates to what extent individuals value the firm's behavior towards the charity. On one extreme, the absence of a relationship would support a selfish investor hypothesis, that share prices do not capture externalities. On the other extreme, a relationship of one would indicate that investors completely internalize what happens to the charity (see Section 3 for a formalized argument).

2.2 Sequence of Events: Baseline Condition

We start the experiment by asking respondents to agree to a consent form that includes a one sentence description of the experiment, a ball park estimate of payments, and the experiment's expected duration. In the first page of the interface per se, participants are given a short description of the game. In the baseline case, participants are told they will begin the experiment with a "virtual wallet" containing $2.00. Separately, $1.00 is placed in a fund that will be donated to a

charity, which we refer to as the "charity wallet." Participants are then told that they will make investment decisions that affect how much money is added or subtracted from both their wallets and the charity wallet. At the end of the experiment, participants receive a base payment of $2.00 and a bonus equal to the amount in their virtual wallet. The charity receives the final content of the charity wallet. In the baseline condition, both successful and failed bids lead to changes in the charity wallet. Of course, the participant's wallet is only affected when the bid succeeds.

At the end of this first page, participants are asked to select the charity that will receive the content of the charity wallet (we also have a condition where they do not select the charity). Participants choose from the following six options: the American Civil Liberties Union, the World Wildlife Fund, Food for the Poor, the American Cancer Society, Save the Children, and the Environmental Defense Fund. The charities are well-respected nationally and span a range of environmental, social, and governance issues.

Participants then proceed to the practice quiz, which is designed to ensure participants fully understand how the bidding game works and the consequences of their choices on their wallet and the charity wallet. Participants are first shown a detailed example of the "neutral" firm that does not modify the charity wallet. They are forced to click line-by-line through the example to ensure slow digestion of information. They do not make any decisions and are not asked any questions during the example. Afterwards, participants are quizzed on both an "ethical" and an "unethical" firm, which respectively add and subtract money from the charity wallet. Participants are given three opportunities to obtain a perfect score on the whole practice quiz. Only those who pass may continue to the main experiment.

The detailed description of the practice quiz follows. Hypothetical bids are set at $1.00, and parameters on firm profits and charity dividends are fixed so that the individual receives $1.1 from all company types. In particular, the ethical company gives $0.4 of its $1.5 profit to charity, and the unethical company earns $0.7 in profits and takes $0.4 from the charity. The quiz then incorporates two scenarios to test whether individuals understand how share purchases influence

the dividends paid out. In one scenario, share prices are set below the bid value (at \$0.50) so that the company share is purchased. In the other scenario, prices are set above the bid value (at \$2.00) so that the company share is not purchased. Participants see both scenarios, and we randomly choose whether the share of the ethical firm is purchased, or whether the share of the unethical firm is purchased. After presenting each firm, we quiz participants on whether the firm's share is purchased, how much they would hypothetically receive in dividends, and how much the charity would hypothetically receive/lose under the given parameters.

Once participants have fully mastered the quiz, they progress to the main experiment. In the main experiment, participants submit bids for a share in each of the three hypothetical companies. Each company randomly draws a profit from $\{0.5, 0.6, 0.7, 0.8, 0.9, 1\}$. The neutral company gives the entirety of this profit to the shareholder. In contrast, the ethical company gives a random portion of this profit to the charity, drawn from $\{0.1, 0.2, 0.3, 0.4, 0.5\}$. The unethical company gives the shareholder the entirety of its profit along with money which it takes away from the charity wallet. The amount subtracted from the charity is also drawn from $\{0.1, 0.2, 0.3, 0.4, 0.5\}$.

The behavioral economics literature indicates the importance of priming effects—the idea that what is presented first can provide a framing that influences how individuals interpret the rest of the experiment. To test the possibility of priming, we randomly vary the order in which the firms are presented in both the practice quiz and the main experiment. We will then test if our results are affected by the order of presentation – and find that they are not.

After bidding on all three companies, participants are shown the amount in both their personal wallet and the charity wallet. In the baseline condition, they are then given an opportunity to donate to the charity from their personal wallet. Participants are told in advance about this possibility, and we vary whether this direct donation option is offered.

Finally, we ask participants to answer a short survey designed to provide data on socio-demographics (education, age, gender, financial literacy).

2.3 Different Experimental Conditions

We started with three pilot sessions to optimize our formulation and make sure participants could pass the quiz. The first one took place on March 20, at the Blab at MIT with 20 participants. The second and third pilots took place on July 3 and 17, each including 30 participants recruited through MTurk. After the second pilot, we found that quite a few participants still failed the quiz, and so we clarified the presentation of the information. Finally, we conducted two separate rounds of the experiment, first on July 22, 2019, and then two weeks later on August 5th, 2019. Workers could only participate in the experiment once and were randomly assigned to different treatment groups. Table 1 shows the different experiment conditions.

There are five different experimental conditions:

1. The *baseline condition* is described in the previous section. It was one of the two conditions tested on July 22.

2. The *pivotal condition* was the other condition tested on July 22. While in the baseline, the charity wallet is affected whether the participant buys the stock or not, in the pivotal condition, the charity wallet is only affected if the participant buys the stock. We include this condition to test whether being pivotal affects the pricing of prosocial behavior, an assumption at the heart of Hart and Zingales (2017).

3. The *no donation condition* only differs from the baseline in that the participants are not allowed to directly donate at the end of the experiment. Comparing this condition with the baseline allows us to test whether or not pricing prosocial behavior crowds out direct generosity. We include this condition in the August 5 batch.

4. The *delegation condition* differs from the *no donation condition* in that each participant manages the wallet of another participant. They are told so explicitly at the beginning of the experiment – the personal wallet is renamed the "other person's wallet," and we verify explictly at the end of the practice quiz that people understand that their own wallet is not

affected by their decision. We include this condition to check whether generosity becomes more pronounced when managing other people's money. We include this condition in the August 5 batch.

5. The *randomized charity condition* differs from the *no donation condition* in that participants do not choose which charity receives the donation. The idea here is to check whether participants only value prosocial behavior when the charity is the one they care about. We include this condition in the August 5 batch.

Importantly, the practice quiz is adjusted to reflect the conditions of each treatment group.

In the first round of experiments (July 22nd, 2019), we recruited 300 workers and randomly allocated each worker to one of the first two conditions (*baseline* and *pivotal*). This round examines the role of pivotality on bidders' valuations by randomly assigning participants to the pivotal case. This relates to the (Hart and Zingales, 2017) conjecture that individuals weight ethical behavior to the extent that they feel responsible for the action in question. All participants in this batch have the option to donate money from their wallet to a charity of their choice at the end of the experiment.

In the second round (August 5th, 2019), we recruit 455 workers. These workers are randomly allocated to one of the last three conditions (*no donation*, *delegation* and *charity randomization*). This round assumes nonpivotality (like the baseline) but removes the option to donate directly (in part because it is complicated). This round examines whether individuals' generosity changes when managing on behalf of others (as in delegated asset management) and when individuals do not choose the charity themselves (as when the company chooses its kind of prosocial behavior).

2.4 Descriptive Statistics

Table 1 shows summary statistics across the different experimental conditions. There are 755 participants in total, with approximately 150 individuals per treatment group. The experiment takes an average of 12 minutes to complete. Across treatment groups, between 77%-88% of respondents

pass the practice quiz. Individuals' bonuses range from \$2.2-\$2.3, and charity dividends are close to \$1. In the donation round, 39 out of 155 participants choose to donate directly to the charity, donating approximately \$0.54 in the baseline case and \$0.64 in the pivotal case.

Overall, we had a roughly even balance across demographic groups in each treatment. Table 2 presents the summary statistics on demographics by treatment condition. Panel A presents statistics on all participants, and Panel B presents statistics on those who passed the practice quiz and made it to the main experiment. About 60% of the participants are male, and roughly 70% report having college or graduate degrees. More than 60% of participants are between the ages of 18-44, with the median age being 34. The majority of participants scored 3/3 on the financial literacy test, and most report not trading stocks directly.

Finally, the quiz passing rate is stable across conditions, at around 80%. This means that about 20% of the participants fail the quiz three times in a row, after which they complete the demographic questionnaire, exit the experiment, and receive the base payment. Since those who fail the practice quiz are not allowed to submit bids, they do not contaminate our sample. Table 3 shows similar passing rates across demographic groups, with the unsurprising exception that those who scored better on the financial literacy questions consistently had higher passing rates. Comparing Panels A and B of Table 2 shows that the final sample for the main experiment is fairly similar to sample in the overall experiment.

3 Model

We provide here a simple framework to consider the bidding behavior of an individual in the experiment. We distinguish between the baseline case in which individuals can donate to charity at the end (July 22 experiment) and the case in which they cannot (Aug 5 experiment). We derive the key regression of interest, and provide intuition for how the parameters can be interpreted.

3.1 Case without ex-post donation

First let us consider the baseline case in which individuals cannot donate money directly to the charity (as in our Aug 5 experiment). Let u_h denote the participant's utility from holding the stock:

$$u_h = s + f(c) + \epsilon$$

where s is the dividend (selfish value) and c the charity value of the stock. ϵ is an idiosyncratic noise that varies across participants.

If the participant does not hold the stock, her utility is:

$$u_r = g(c) + \nu$$

where $g(c)$ reflects the additional utility the individual feels from money going to the charity even when she does not hold the stock.

In the BDM mechanism, the participant obtains the stock if her bid is above the random draw. This price is drawn randomly from a uniform distribution with support $[0, \bar{p}]$. Thus, ex-ante expected utility from bidding b is given by:

$$Eu = \frac{1}{\bar{p}} \left(\int_0^b (u_h - p)dp + \int_b^{\bar{p}} (u_r)dp \right)$$

where $(u_h - p)$ is the utility when the particpant "wins the auction" against the machine, which occurs when $b > p$. Otherwise, the participant just obtains her reservation utility u_r.

Maximizing expected utility with respect to b gives us the optimal bid:

$$b = s + f(c) - g(c) + (\epsilon - \nu), \tag{1}$$

which shows the key insight of the BDM mechanism–that the bid should reflect the private valu-

ation of the participant.

In the paper, we regress $b-s$ (the "excess bid") on c (the "charity value") to identify $f(c)-g(c)$. The algebra makes clear that this running this regression in the baseline case only allows us to identify the difference between the utility of corporate charity when the participant *owns* the stock, and the utility of corporate charity when the participant *does not own* the stock.

However, from the comparison between pivotal and non-pivotal conditions, we can learn more. Let us now consider the pivotal condition, where the charity does not receive/lose any money if the agent does not buy the stock.

We assume the participant is consequentialist. In this case, we know $u_r = g(0)$ so in the pivotal condition we obtain that:

$$b = s + f(c) - g(0) + (\epsilon - \nu) \tag{2}$$

3.2 Donation case

We now consider the case in which individuals can donate money directly to the charity at the end of the experiment (as in our July 22 experiment). Let d the amount donated at the end. Let us assume imperfect substitution between charity values and donations. Then, in the non-pivotal condition (the baseline):

$$u_h = s + F(c, d) - d + \epsilon \tag{3}$$

$$u_r = G(c, d) - d \tag{4}$$

where we replace $G(c, d)$ by $G(0, d)$ in the pivotal condition.

The model now has two periods. First, the participant bids. Second, she donates. Solving recursively, we have:

$$f(c) = \max_d F(c,d) - d \tag{5}$$

$$g(c) = \max_d G(c,d) - d. \tag{6}$$

So donations are given by:

$$1 = \frac{\partial F(c,d)}{\partial d}(c, d^h(c)) \tag{7}$$

$$1 = \frac{\partial G(c,d)}{\partial d}(c, d^r(c)) \tag{8}$$

where the top equation defines the optimal donation as a function of c after a succesful bid. The bottom equation defines the optimal donation after a failed bid.

We can easily estimate these equations by regressing d on c since c is exogenous. If the slope is positive, this means that donation and charity value are complements. If the slope is negative, they are substitutes.

The rest of the model is identical to the no-donation case explored above.

3.3 Empirical Specification

This section summarizes the empirical relationships given by the structural model. We use i to index individuals and j to index firm type (neutral, ethical, and unethical). We denote excess bids as $e_{ij} = b_{ij} - s_{ij}$.

To simplify exposition, we assume linearity: $f(c) = \alpha c$ and $g(c) = \beta c$. The functional forms are identified, but they will turn out to be linear in the data. In this case, Equation (1) yields the empirical relationship:

$$e_{ij} = (\alpha - \beta)c_{ij} + \varepsilon_{ij} \tag{9}$$

which is our main specification.

In the pivotal condition, the above analysis yields the following empirical specification:

$$e_{ij} = \alpha c_{ij} + \varepsilon_{ij}. \tag{10}$$

These equations make clear how identification works. We can compare estimates from the pivotal and nonpivotal conditions and obtain both α and β. In line with Leszczyc and Rothkopf (2010), we can infer different charitable motives based on our estimates of α and β. A result of $\alpha = \beta = 0$ indicates a noncharity selfish model in which bidders do not internalize what happens to the charity at all. If $\alpha = \beta > 0$, bidders obtain utility from money going to charity, but are indifferent about the source of the donation. Alternatively, if $\beta \geq \alpha = 0$, bidders more strongly internalize what happens to the charity when they buy the share.

In line with our discussion on donations, we also run the following specification for the Donation treatment group:

$$d_{ij} = \psi + \phi c_{ij} + \xi_{ij} \tag{11}$$

where d_{ij} refers to how much the individual donated to the charity.

The interpretation of the parameter ϕ is that it identifies the extent to which donations act as a substitute.

4 Results

In this section, we show three sets of results. Our main results show the treatment effects and parameter estimates of the model introduced in Section 3. The second set of results exploit the structure of the experiment to explore the evolution of generosity at the individual level. Finally, we present robustness tests in the third subsection.

4.1 Main Results

4.1.1 How much do participants price charitable behavior?

We first estimate Equation 1 using the entire sample and report the results in Table 4. Bidders with no charitable motives would set bids exactly equal to their selfish values ($\alpha = \beta = 0$). We can reject the hypothesis that $\alpha = \beta$ at the 1% level: participants strongly incorporate the charity externality into their bidding behavior, and more so if they end up owning the stock ($\alpha > \beta$). Column (1) shows that a \$1 increase in charity dividends translates to a \$0.85 increase in bids above selfish values. In the context of the model, this gives us an estimate of $\alpha - \beta \approx 0.85$, which represents the additional utility shareholders feel from money going to the charity if they own the stock.

Column (2) of Table 4 explores the possibility that charitable giving may have asymmetric effects. We can test for asymmetry because each participant faces a prosocial company ($c > 0$) and an antisocial one ($c < 0$). One hypothesis could be that participants discount prices of companies that take money from charities more than they value charitable donations (a form of prospect theory loss aversion). We report our estimates of the regression:

$$e_{ij} = \gamma + \theta^{+} \max\{c_{ij}, 0\} - \theta^{-} \min\{c_{ij}, 0\} \tag{12}$$

where θ^{+} captures the utility people obtain from charitable giving, and θ^{-} captures the disutility

people feel from taking money from the charity. Our estimates show that the results are fairly symmetric. $\theta^+ = 0.9 > \theta^- = 0.7$. So there is some evidence of loss aversion, but it is not significant.

We show additional evidence of linearity in Figure 1, in which we report the average excess bid by value of c across all conditions. The relationship looks strikingly linear. Furthermore, in the second panel in Figure 2, we report the same binscatter plot separately for each condition. Even within condition, linearity still seems to be present. Finally, we formally test linearity in Columns (3)-(5) of Table 4. We include higher-order polynomial terms to the specification in Equation 1 and then test the joint hypothesis that the coefficients on these higher-order terms are all equal to zero. We cannot reject this hypothesis at the 5% level under any specification. In the context of our model, these results imply that $f(c) - g(c)$ is linear in c.

4.1.2 Pivotal Condition

Equation (1) only identifies $\alpha - \beta$, at least in the baseline condition. As discussed in Section 3, in order to separately identify α and β, one can just compare the pivotal and the non-pivotal conditions. In Table 5, we regress excess bids on charity value in both conditions separately, and compare the two. Our baseline estimates in Column (B), assuming non-pivotality, give us $\alpha - \beta \approx 0.797$, which is slightly lower than the estimate in the pivotal condition: $\alpha \approx 0.893$. In the third column, we test equality and find a p-value of .34. This implies that $\beta = 0$. This result lends support to the hypothesis that people obtain utility from owning the charitable stock ($\alpha \approx .8$), but no utility of not owning it ($\beta \approx 0$).

This result goes against the assumptions in Hart and Zingales (2017). In their paper, shareholders tender at the selfish price s because they are not pivotal (they are atomistic – a large shareholder would behave responsibly). This allows a raider to transform a socially responsible firm into one that is not. But in their paper, shareholders genuinely care about firm's prosocial behavior, so if they felt they were pivotal in making the tender offer go through, they would never sell to the raider. In our experiment, whether participants are pivotal or not has no effect on their

valuation of the firm: participants internalize the charity value to the same extent.

4.1.3 Substitution between personal and corporate donation

In Table 6, we explore whether individuals want to undertake charitable giving via firms or whether they would prefer to donate money directly to charity. Columns (D) and (ND) report the estimates of Equation 1 in two conditions: The "baseline" (where donations are allowed) and the "no donation" conditions. All other features of these two conditions are similar, except that the baseline was run on July 22, and the no donation condition was run on Aug 5. If personal and corporate charity giving are to some extent substitutes, we would expect excess bidding to be less sensitive to charity value in the donation condition – since participants can "make up" for the lukewarmness by donating afterwards. Looking at columns (D) and (ND), we find essentially no difference. The p-value of the difference in coefficients is .146. In terms of the model, this indicates that the cross-derivative of $F - G$ is zero. This suggests that participants view the decision to donate and the decision to "reward" pro-social companies as unrelated to one another.

Columns (D1) and (D2) confirm that personal and corporate donations are essentially separate decisions. In columns (D1) and (D2) we run variants of regression (11), where the LHS variable is donation and the RHS is charity value. A negative coefficient would mean corporate and personal donations are to some extent substitutes (the cross derivative of $F - G$ is negative). In column (D1), the LHS variable is an indicator of whether individuals donate at all. Column (D2) uses the amount donated (censored at zero) as LHS variable. From columns (D1) and (D2) we see that $\hat{\phi} \approx 0$. Taken together, the results imply that that the cross-partial derivative of $F - G$ is equal to zero, meaning that direct donations and charity values are not perceived as substitutes.

4.1.4 Delegated management

In addition to the pivotality and donation treatments, we also consider the effect of delegated management. An obvious hypothesis here is that participants are more inclined to overbid when they are not managing their own money. Asset managers may want to "do good" with other

people's money. An alternative could be that such "asset managers" do not feel entitled to make donation decisions–that they are framed into thinking in pure financial terms as trustees.

We implement this test by comparing the Baseline and Delegation conditions, and do not find much difference. In Table 7, comparing Columns (Dg) and (B) we find that people are slightly more generous when managing wallets on behalf of others. The regression coefficients imply that for every \$1 given to charity, excess bids are only \$0.15 higher in the delegation case. But the difference is statistically insignificant (p-value = .17).

4.2 Dynamics of Individual Generosity

In addition to evaluating the treatment effects across experiment conditions, we consider how individual bids evolve throughout the experiment. In particular, each participant who makes it to the main experiment sees two companies that have a non-zero c, allowing us to evaluate whether individual generosity changes in each iteration. One measure of individual generosity is the ratio of excess bids to charity values, what we call pass through.

In Table 8, we test whether there is mean-reversion in generosity by running the following regression:

$$PassThrough_{i,2} = \gamma_0 + \gamma_1 PassThrough_{i,1} + \varepsilon_i \tag{13}$$

and find that γ_1 is significant and negative across treatment groups, indicating significant mean reversion. That is, being very generous in the first round is associated with being stingier in subsequent rounds. To help interpret the coefficient, imagine that the pass through in round 1 is equal to its average across individuals: 66%. The estimates in Table 8 imply that in the second round, the ratio of excess bids to charity values is 29 percentage points lower, at 37%. Comparing across columns, we can see that mean reversion is higher in the Donation case than in the No Donation case, and that this difference is significant at the 1% level. These results are consistent with the idea that we expect more mean reversion if there is no possibility to donate to the charity

and adjust the total quantity "donated" at the end.

One possible interpretation for this reversal in generosity is moral-licensing: After individuals have acted generously, they might feel entitled to behave more selfishly in subsequent periods. This might be because after having recently done good, people feel immunized against negative shocks to their self-image, as suggested by Bénabou and Tirole (2010). Several experimental studies have documented such decrease in altruism after activities where subjects have been acting generously (Mazar and Zhong (2010); Engelmann et al. (2017); List and Momeni (2017)) in line with theories of self-image management (see for example Bénabou and Tirole (2006)).

4.3 Robustness

In this subsection, we investigate the robustness of our results to changes in the experimental setting.

One potential concern is that participants are being generous because the stock they purchase donates to a charity of their own choice, i.e. one they particularly care about. If participants did not get to choose the charity, they might price donations to a lesser extent. Table 9 explores the effect of having the computer randomly choosing the charity which will receive the contents of the charity wallet, instead of allowing participants to choose. We find that excess bids are \$0.31 higher when individuals do not choose the charity, and that this difference is significant at the 1% level. Thus, we can conclude that the treatment effect is robust to removing the choice of charity. Why the result is actually stronger is not entirely obvious to us, and would warrant further investigation.

Furthermore, in light of the extensive results on priming and framing in the behavioral economics literature, we consider how the order in which the companies are presented may affect bidding behavior. For example, it could be the case that individuals who see the unethical company first may bid lower throughout the experiment, or perhaps that individuals who see the ethical company first are induced to be consistently more generous. Besides the experiment itslef, in the practice quiz, one may be concerned that individuals who are first exposed to a situation

where they managed to *buy* the share could prime them towards bidding higher to buy shares in the subsequent experiment.

To test for the possibility of priming, we varied the order in which companies are presented to the individual in both the practice quiz and the main experiment. We then run the specification in Equation 1 for each subsample, and test for equality of coefficients. Figure 9 shows that the coefficients of the regressions are very similar across practice quiz scenarios, ranging from 0.78 to 0.89. Our F-test of joint significance does not allow us to reject the hypothesis that the coefficients are all the same. In Figure 1, we see that the range of coefficients for the main experiment is a bit wider, ranging from 0.68 in the case where the ethical company is seen first, to 1.01 in the case where the neutral company is first. However, we still cannot reject the hypothesis that all the coefficients are equal. We repeat this regression within each treatment group and also find that we cannot reject the equality across coefficients (not shown here). Taken together, the robustness checks imply that our treatment effects cannot be explained by priming.

5 Conclusion

To what extent do shareholders value ethical behavior? In this paper, we develop a theoretical framework and an experimental design to investigate this question. We present a lab experiment that allows participants to submit bids for companies that vary by how much money they add or subtract from a fund that will be donated to charity. This design allows us to isolate the impact of a firm's externalities on investor bids, a feature that is difficult to achieve outside an experimental setting. We find strong evidence that individuals incorporate the charity externality in their bids and that this relationship is symmetric almost linear. This result persists across treatment conditions, including when shareholders are pivotal for what happens to the charity, and when participants make decisions on behalf of other participants. Taken together, our results indicate that charity externalities are reflected in share prices.

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6 Tables and Figures

6.1 Tables

Table 1: Description of Experiment Conditions and Overall Outcomes

Treatment group:	No Donation			Donation	
	Baseline	Delegation	Randomize Charity	Baseline	Pivotal
Date	8/5/2019	8/5/2019	8/5/2019	7/22/2019	7/22/2019
Experiment condition:					
Pivotal	N	N	N	N	Y
Delegation	N	Y	N	N	N
Randomized Charity	N	N	Y	N	N
Experiment statistics:					
Num. of Participants	148	155	152	148	152
Average Duration	11.95	12.86	12.24	11.81	11.51
Num. who passed the practice quiz	114	112	121	131	124
Base payment	2.00	2.00	2.00	2.00	2.00
Average Bonus	2.26	2.23	2.20	2.28	2.23
Average charity payment	1.01	1.02	1.01	1.05	1.06
Num. who donated to charity	n/a	n/a	n/a	22	17
Average amount donated	n/a	n/a	n/a	0.54	0.64

Table 2: Summary Statistics

		No Donation						Donation			
		Baseline		Delegation		Randomize Charity		Baseline		Pivotal	
		Obs.	%	Obs.	%	Obs.	%	Obs.	%	Obs.	%
Panel A: All											
Gender	Female	60	40.5	66	42.6	62	40.8	60	40.5	60	39.5
	Male	88	59.5	89	57.4	90	59.2	88	59.5	92	60.5
Education	High school	43	29.1	52	33.5	44	28.9	54	36.5	71	46.7
	College	81	54.7	89	57.4	86	56.6	81	54.7	66	43.4
	Post-grad	24	16.2	14	9.0	22	14.5	13	8.8	15	9.9
Age	18-24	12	8.1	15	9.7	12	7.9	16	10.8	15	9.9
	25-34	64	43.2	61	39.4	51	33.6	68	45.9	77	50.7
	35-44	37	25.0	52	33.5	48	31.6	41	27.7	38	25.0
	45-54	15	10.1	16	10.3	15	9.9	10	6.8	16	10.5
	55-64	9	6.1	6	3.9	11	7.2	8	5.4	6	3.9
	65+	11	7.4	5	3.2	15	9.9	5	3.4	0	0.0
Score	0/3	9	6.1	8	5.2	6	3.9	8	5.4	2	1.3
(financial	1/3	19	12.8	18	11.6	19	12.5	6	4.1	13	8.6
literacy)	2/3	20	13.5	27	17.4	26	17.1	22	14.9	24	15.8
	3/3	100	67.6	102	65.8	101	66.4	112	75.7	113	74.3
Trades stocks	No	100	67.6	106	68.4	107	70.4	111	75.0	120	78.9
	Yes	48	32.4	49	31.6	45	29.6	37	25.0	32	21.1
Panel B: Main Experiment											
Gender	Female	45	39.5	50	44.6	51	42.1	56	42.7	47	37.9
	Male	69	60.5	62	55.4	70	57.9	75	57.3	77	62.1
Education	High school	36	31.6	43	38.4	34	28.1	48	36.6	61	49.2
	College	64	56.1	59	52.7	68	56.2	72	55.0	53	42.7
	PostGrad	14	12.3	10	8.9	19	15.7	11	8.4	10	8.1
Age	18-24	12	10.5	12	10.7	11	9.1	14	10.7	12	9.7
	25-34	43	37.7	40	35.7	36	29.8	60	45.8	58	46.8
	35-44	30	26.3	43	38.4	38	31.4	36	27.5	34	27.4
	45-54	11	9.6	10	8.9	14	11.6	10	7.6	15	12.1
	55-64	8	7.0	5	4.5	9	7.4	7	5.3	5	4.0
	65+	10	8.8	2	1.8	13	10.7	4	3.1	0	0.0
Score	0/3	5	4.4	2	1.8	2	1.7	4	3.1	1	0.8
(financial	1/3	7	6.1	7	6.3	8	6.6	6	4.6	6	4.8
literacy)	2/3	15	13.2	21	18.8	21	17.4	19	14.5	17	13.7
	3/3	87	76.3	82	73.2	90	74.4	102	77.9	100	80.6
Trade stocks	No	81	71.1	81	72.3	86	71.1	98	74.8	100	80.6
	Yes	33	28.9	31	27.7	35	28.9	33	25.2	24	19.4

Table 3: Practice Quiz Passing Rates: By Demographic Group

		No Donation			Donation	
		Baseline	Delegation	Randomize Charity	Baseline	Pivotal
Gender	Female	75.0%	75.8%	82.3%	93.3%	78.3%
	Male	78.4%	69.7%	77.8%	85.2%	83.7%
Education	High school	83.7%	82.7%	77.3%	88.9%	85.9%
	College	79.0%	66.3%	79.1%	88.9%	80.3%
	PostGrad	58.3%	71.4%	86.4%	84.6%	66.7%
Age	18-24	100.0%	80.0%	91.7%	87.5%	80.0%
	25-34	67.2%	65.6%	70.6%	88.2%	75.3%
	35-44	81.1%	82.7%	79.2%	87.8%	89.5%
	45-54	73.3%	62.5%	93.3%	100.0%	93.8%
	55-64	88.9%	83.3%	81.8%	87.5%	83.3%
	65+	90.9%	40.0%	86.7%	80.0%	n/a
Score (financial literacy)	0/3	55.6%	25.0%	33.3%	50.0%	50.0%
	1/3	36.8%	38.9%	42.1%	100.0%	46.2%
	2/3	75.0%	77.8%	80.8%	86.4%	70.8%
	3/3	87.0%	80.4%	89.1%	91.1%	88.5%
Trade stocks	No	81.0%	76.4%	80.4%	88.3%	83.3%
	Yes	68.8%	63.3%	77.8%	89.2%	75.0%

Table 4: The sensitivity of Excess Bids to Charity Values, Full Sample

	Overall	Asymmetry	Testing Linearity		
	(1)	(2)	(3)	(4)	(5)
	Excess Bids	Excess Bids	Excess Bids	Excess Bids	Excess Bids
Charity Value	0.827***		0.829***	0.787***	0.788***
	(0.0343)		(0.0343)	(0.0845)	(0.0839)
Charity Value > 0 (P)		0.745***			
		(0.0627)			
Charity Value < 0 (N)		0.913***			
		(0.0617)			
CharityValue^2			-0.162	-0.165	-0.880**
			(0.131)	(0.131)	(0.362)
CharityValue^3				0.276	0.236
				(0.536)	(0.530)
CharityValue^4					3.424*
					(1.804)
Constant	-0.0185	-0.00308	-0.00850	-0.00843	0.00325
	(0.0127)	(0.0156)	(0.0149)	(0.0149)	(0.0155)
P-value for joint test that:					
P = N	.	0.106			
Higher-order terms = 0			0.219	0.388	0.064
adj. R-sq	0.208	0.209	0.209	0.208	0.210
N	1806	1806	1806	1806	1806

Standard errors in parentheses, clustered at the worker level.

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 5: The effect of being pivotal

subsample:	Baseline (B)	Pivotal (P)	P-value for test that: B=P
dependent variable:	Excess Bids	Excess Bids	
CharityValue	0.797***	0.893***	0.347
	(0.072)	(0.073)	
Constant	-0.070***	-0.036	
	(0.026)	(0.025)	
adj. R-sq	0.210	0.279	
N	393	372	

Standard errors in parentheses, clustered at the worker level.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 6: Substitution with donation

subsample:	Baseline				
	No Donation (ND)	Donation (D)	P-Value for test that ND=D	Donation (D1)	Donation (D2)
dependent variable:	PrivateValue	PrivateValue		Indicator of Donation	Amount Donated
CharityValue	0.645***	0.797***	0.146	-0.003	0.002
	(0.076)	(0.072)		(0.031)	(0.016)
Constant	0.004	-0.070***		0.168***	0.091***
	(0.027)	(0.026)		(0.033)	(0.023)
adj. R-sq	0.136	0.210		-0.003	-0.003
N	342	393		393	393

Standard errors in parentheses, clustered at the worker level.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 7: The effect of delegation

subsample:	Baseline (B)	Delegation (Dg)	P-value for test that: B=Dg
dependent variable:	Excess Bids	Excess Bids	
CharityValue	0.645***	0.797***	0.171
	(0.076)	(0.081)	
Constant	0.004	0.032	
	(0.027)	(0.030)	
adj. R-sq	0.136	0.184	
N	342	336	

Standard errors in parentheses, clustered at the worker level.
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 8: Evidence of Mean Reversion in Generosity

subsample:	Full Sample (F)	No Donation (ND)	Donation (D)	P-value for test that: ND=D
dependent variable:	Passthrough	Passthrough	Passthrough	
Lagged Passthrough	-0.289***	-0.211***	-0.489***	0.010
	(0.057)	(0.068)	(0.083)	
Constant	1.117***	1.055***	1.281***	
	(0.110)	(0.149)	(0.155)	
adj. R-sq	0.074	0.045	0.152	
N	602	347	255	

Standard errors in parentheses, clustered at the worker level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Robustness 1: The effect of charity randomization

subsample:	Baseline (B)	Randomize Charity (R)	P-value for test that: B=R
dependent variable:	Excess Bids	Excess Bids	
CharityValue	0.645***	0.953***	0.005
	(0.076)	(0.079)	
Constant	0.004	-0.014	
	(0.027)	(0.033)	
adj. R-sq	0.136	0.222	
N	342	363	

Standard errors in parentheses, clustered at the worker level.
* p < 0.10, ** p < 0.05, *** p < 0.01

6.2 Figures

Figure 1: Linearity of the Relationship between Excess Bids and Charity Values

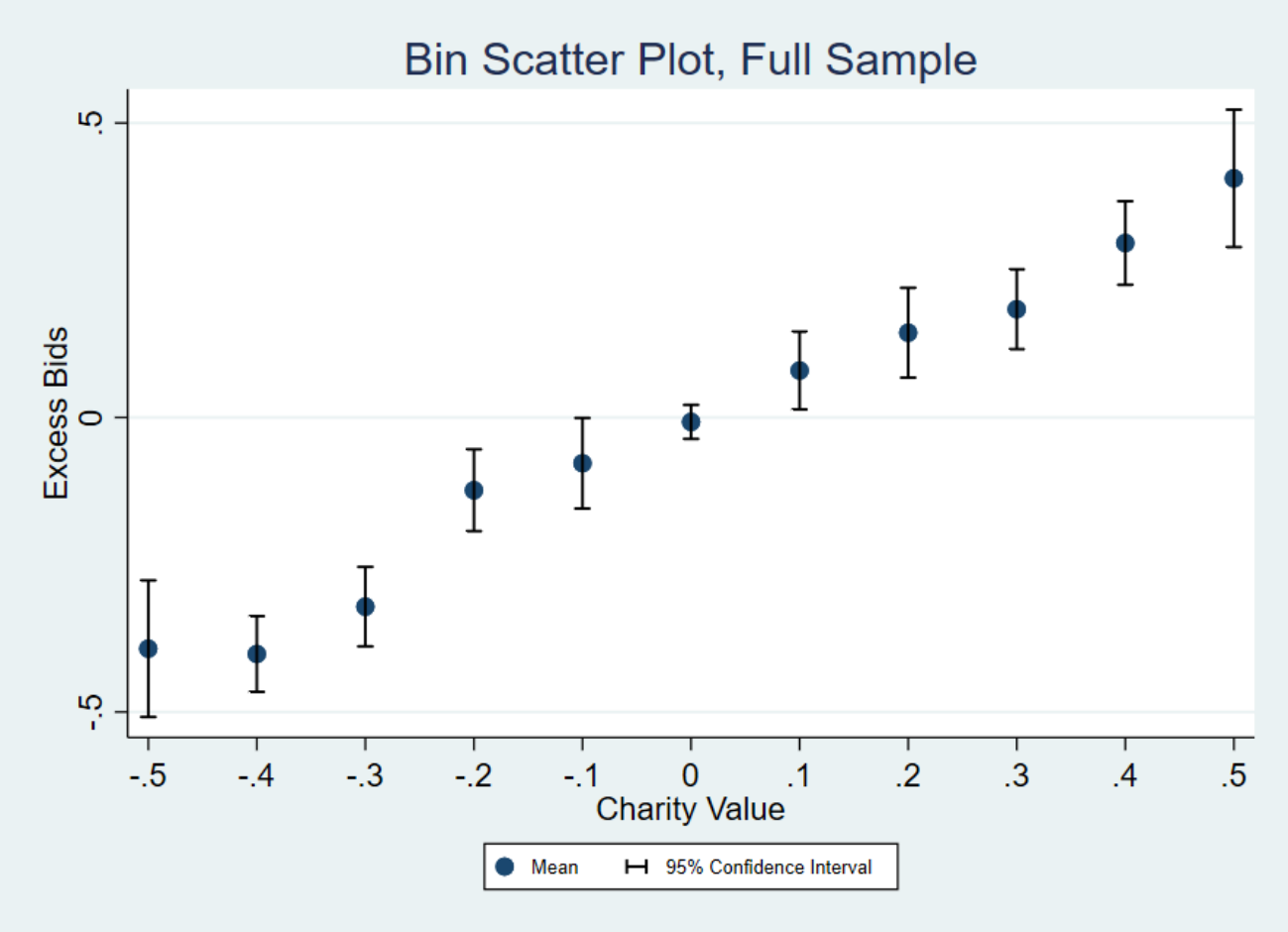


Figure 2: Deviation from Dividend

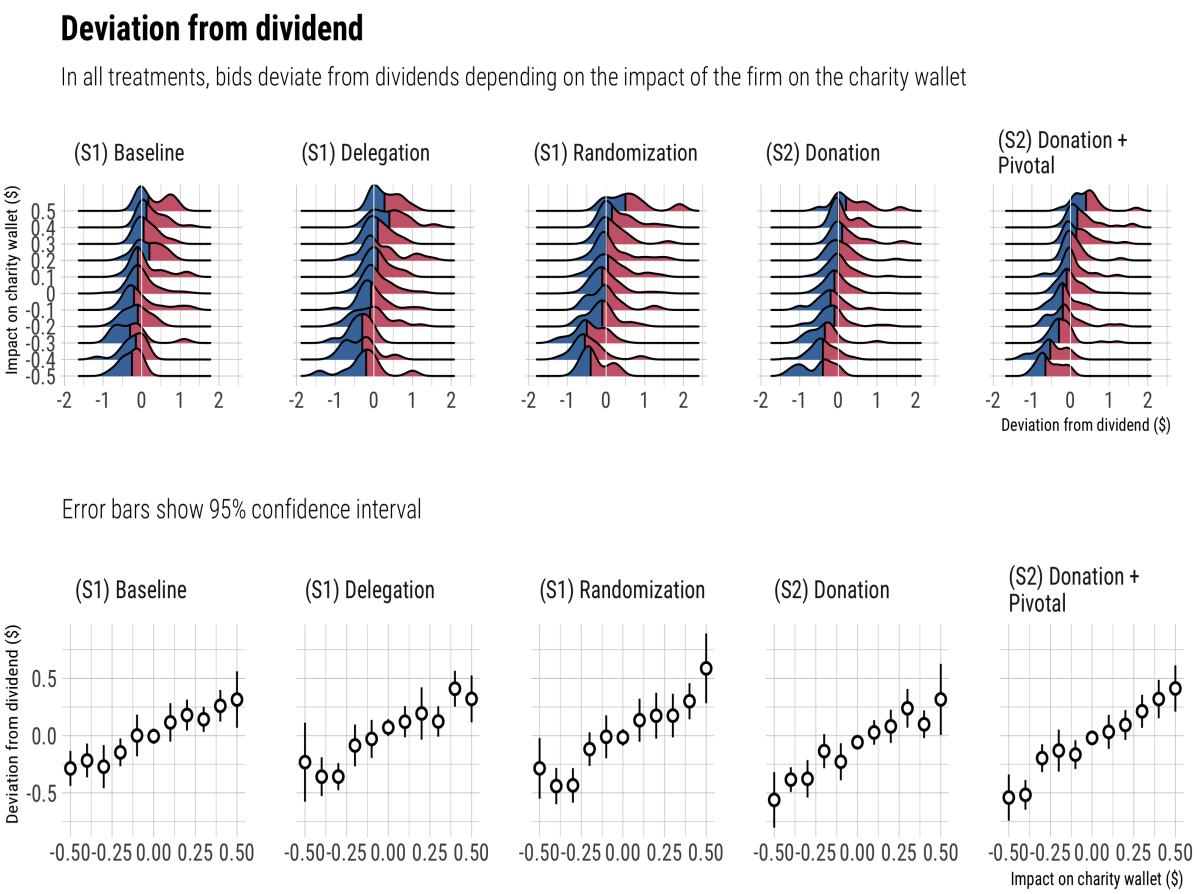


Figure 3: Robustness 2: Practice Quiz

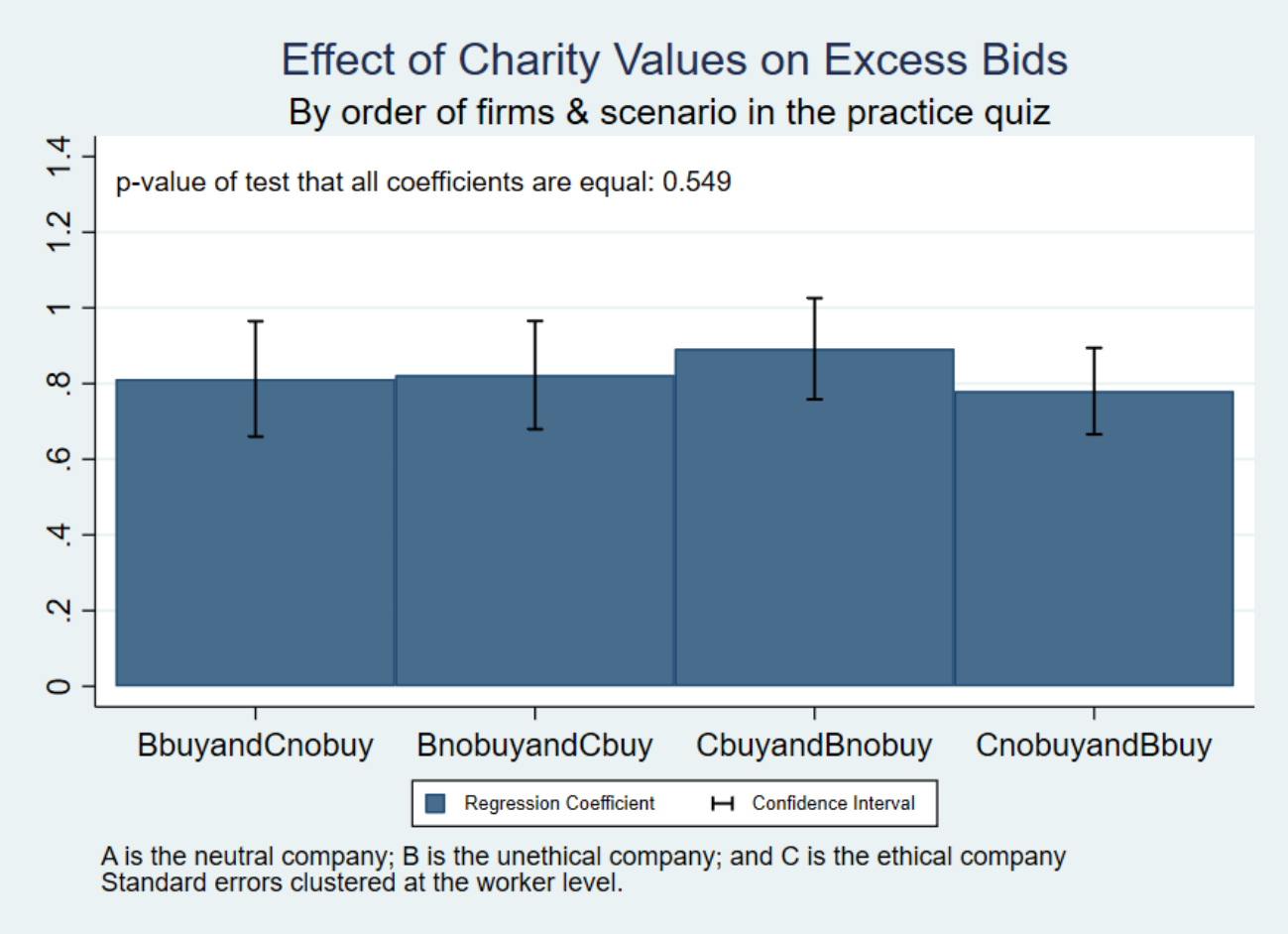
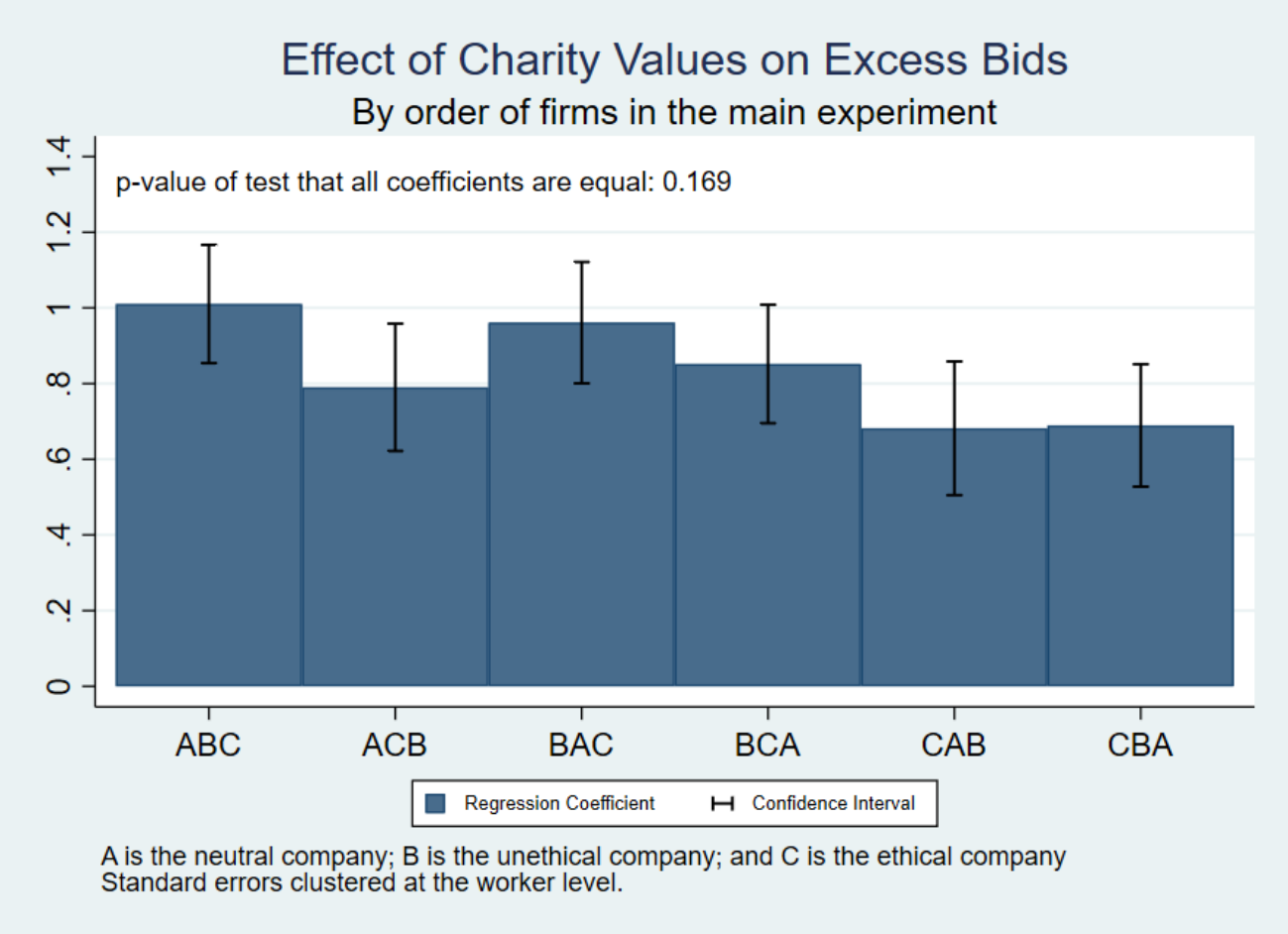


Figure 4: Robustness 3: Main experiment



7 Appendix: Screenshots of the Experiment

Figure 5: Game Description

Game Description

At the beginning of the experiment, we will give you a virtual wallet containing $2 *("your wallet")*. At the same time, we will put an initial $1 in a separate wallet (the *"charity wallet"*).

You are going to make investment decisions (buying shares of various companies using the money in your wallet), and these decisions will affect two things:

1. how much money is added to, or subtracted from, your wallet
2. how much is added to, or subtracted from, the charity wallet

At the end of the experiment, you will receive the content of your wallet, and we will wire to the charity the final content of the charity wallet. You will also have the opportunity to donate directly to the charity.

Please select a charity that will receive the content of the charity wallet:

- American Civil Liberties Union
- World Wildlife Fund
- Food for the Poor
- American Cancer Society
- Save the Children
- Environmental Defense Fund

Next →

Figure 6: Practice Quiz: Example Company

Example

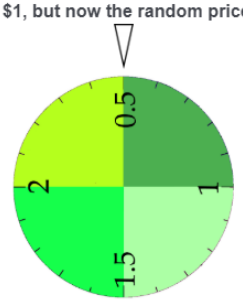
A bid indicates the highest amount you would be willing to pay for a share in the following company. We then draw a random price between $0 and $2.

- If the random price is greater than your bid, you do not buy the share and your wallet stays unchanged.
- If the random price is less than or equal to your bid, you must buy the share for this random price.
  - The corresponding amount is subtracted from your wallet.
  - Then, the company makes $1.1 of profit.
  - After this, it puts $1.1 into your wallet.
- Let's assume for now that the Food for the Poor charity wallet stays unchanged.

Assume your wallet starts with $2, and the Food for the Poor charity wallet starts with $1.

Continue

Imagine that your bid is still $1, but now the random price is: $ 0.5



- You buy the share at price $0.5
- The amount in your wallet right after you pay for it is $1.5.
- The company then gives you $1.1.
- The final amount in your wallet, once you have paid for the share and received the company money, is $2.6.
- The final amount in the charity wallet is $1.

Continue

Figure 7: Practice Quiz: Unethical Company

Practice Quiz: Scenario 1

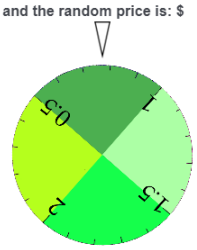
You will now be quizzed on the following company.

As earlier, in order to buy a share in this company, you must indicate a bid, which is the highest amount you would be willing to pay for the share. We then draw a random price between $0 and $2.

- If the random price is greater than your bid, you do not buy the share and your wallet stays unchanged. Then, the company subtracts $0.4 from the Food for the Poor charity wallet.
- If the random price is less than or equal to your bid, you must buy the share for this random price.
  - The corresponding amount is subtracted from your wallet.
  - Then, the company makes $0.7 of profit.
  - After this, it puts $0.7 into your wallet. Then, it subtracts $0.4 from the Food for the Poor wallet, and adds this additional $0.4 into your wallet.

  Assume again that your wallet starts with $2, and the Food for the Poor charity wallet starts with $1.

Imagine that your bid is $1 , and the random price is: $



Does that mean you buy the share or not?

Yes

No

Does that mean you buy the share or not?

Yes

No

If yes, at what price would you buy? If no, just input 0 here.

If you buy the share, what is the amount in your wallet right after you pay for it? If you do not buy the share, what is the amount in your wallet?

How much does the company add to the American Cancer Society charity wallet?

What is the final amount in the American Cancer Society charity wallet?

How much money does the company give you in total?

What is the final amount in your wallet, once you have paid for the share and received the company money?

Continue

Figure 8: Main Experiment: Bid on Unethical Company

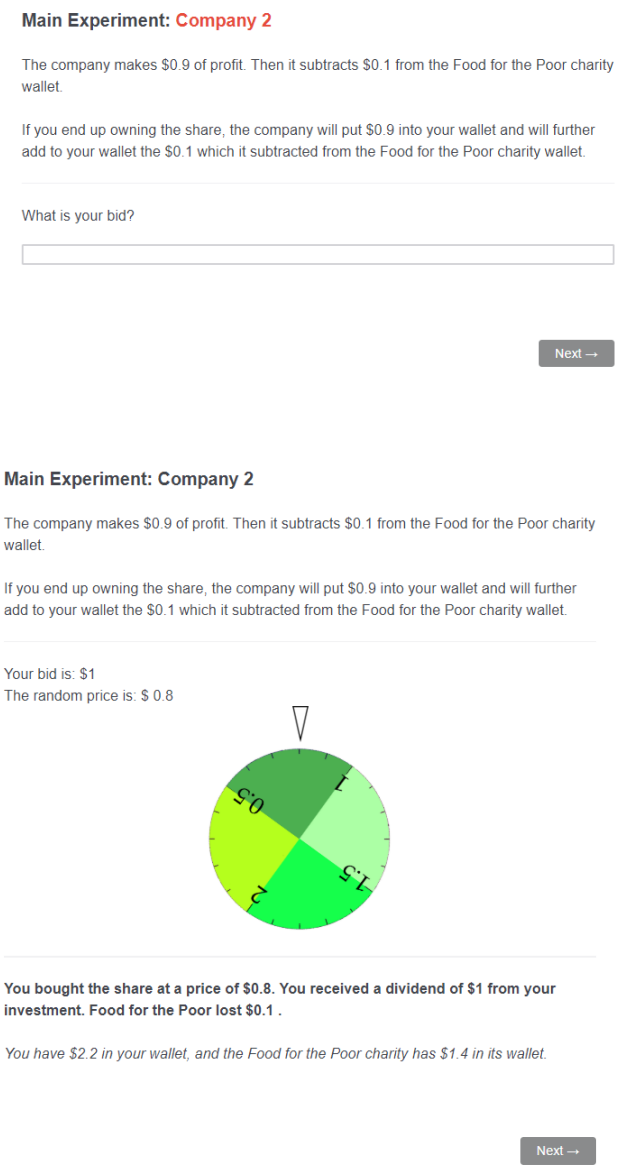


Figure 9: Main Experiment: Direct Donation