Who Benefits from Corporate Social Responsibility?

Guglielmo Briscese, Robert L. Slonim and Nicholas Feltovich

December 2019
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December 8, 2019

Abstract

Firms often donate a share of profits to charity as a form of Corporate Social Responsibility (CSR) to attract and retain talent. Previous studies suggest that such initiatives can motivate workers to work harder in lieu of higher wages, generating benefits for both sides of the labor market. We design a novel version of a commonly used experiment to control for self-selection and find that wages remain the most effective incentives to attract and motivate workers, with corporate donations playing a smaller role than previously suggested. We also show that when firms donate a share of profits to charity, they reduce wages to keep their profits constant, negatively affecting workers’ earnings. Our results reveal that CSR initiatives can be at best marginally beneficial for firms, but considerably costly for workers.

JEL Classification Codes: D64, C91, M52

Keywords: Corporate philanthropy, Corporate social responsibility, Gift exchange, Human resources management

∗We thank participants to the seminars and workshops at the University of Technology Sydney, and the Australia New Zealand Workshop in Experimental Economics for valuable comments. We thank the subjects who took part in our study and the School of Economics of the University of Sydney for generous funding for the experiments. This study was approved by the University of Sydney Human Ethics Committee, approval no: 2016/111

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An increasingly common trend for firms around the world is to engage in initiatives of Corporate Social Responsibility (CSR). A common form of CSR is to donate a share of a firm’s profits to charity. Recent studies suggest that these initiatives can be a strategic human resources tool and, in some contexts, substitute for higher wages in the competition for talent. In this study, we argue that these effects might have been overestimated by previous researchers due to methodological limitations, and warn that CSR might not benefit everyone equally in the labor market. We investigate the role of CSR in a gift-exchange game where we introduce a sorting mechanism to improve comparability to a field setting where workers self-select themselves into a job before providing effort. It is reasonable to assume that workers will respond to financial and social incentives depending on the reasons that led them to choose a job in the first place. In other words, an investment banker and a charity worker might have different preferences for wages and CSR. We also pay close attention to the behaviour of firms, since the effectiveness of CSR initiatives depend on the firm’s mission: if a firm’s goal is to maximise donations to charity, they might increase wages to induce higher effort by workers, which increases profits and thus donation amounts; alternatively, they might decrease (or keep constant) wages to maximise donations to charity. Previous studies have focused mostly on the effects of CSR on workers, overlooking the impact that CSR has on a firm’s strategic behavior and the implications for the charity it aims to help.

We find that in competition – that is, when we introduce a sorting mechanism – firms must offer a wage that is higher than a competitor to attract workers, and CSR, in the form of a share of a firm’s profits promised to charity, is only of secondary importance to attract workers. A higher wage is up to five times more effective than higher charity shares to get workers to choose a firm over another. Similarly, we find that wages are still more effective than CSR to motivate workers to work harder. We also see that firms aim to maximise, or at least keep constant, their profits, thus reducing wage offers to compensate for donations to charity. This leads to workers’ earnings being almost half of what they would have been in the absence of CSR. In contrast, firms’ profits remain almost untouched. Whilst a worker’s earnings might not be the only measure of job satisfaction, if workers in our experiment preferred firms that were more generous towards the charity, we would have seen a higher substitution effect at the time of choosing a firm. Instead, we see that CSR is more of a
complement, rather than a substitute, for higher wages. Consequently, any share of profits donated to charity leads to lower earnings for the workers, rather than lower profits for the firm. These results provide a more comprehensive, and perhaps critical, view of the trade-offs of CSR that might have been overlooked by previous studies.

Our contribution is three-fold. First, we complement the literature on the benefits of CSR for firms. Studies have shown that CSR can be effective at increasing sales (Chang, 2008; Gneezy et al., 2010), improving branding and lobbying power (Petrenko et al., 2016; Servaes and Tamayo, 2013; Bertrand et al., 2018), and more generally signal a firm’s trustworthiness (Cassar and Meier, 2018; Fehrler and Przepiorka, 2016; Carpenter and Gong, 2016). However, the evidence on the return on investment of CSR for a firm is more limited and mixed. Hedblom et al. (2019) find that the presence of CSR attracts more productive workers who increase a firm’s profits by exerting higher effort at no extra wage, whilst List and Momeni (2017) warn of unintended moral licensing effects, where CSR can lead to higher cheating by workers, thus harming a firm’s profits. Our results show that CSR can benefit firms, since it helps to attract workers when wages are homogeneous in the labor market. Whilst CSR doesn’t increase effort by workers as much as wages do, it doesn’t reduce profits, hence yielding net benefits as an additional recruitment tool.

Second, we supplement the growing experimental literature on the role of financial and social incentives to motivate workers. In an online real-effort experiment, Tonin and Vlassopoulos (2014) find that social incentives, in the form of a donation to a charity chosen by participants, increase productivity, regardless of whether the donation was a lump-sum amount of money or dependent on their performance. Using a similar approach, Burbano (2016) finds that in the presence of CSR some workers are willing to forgo a significant amount of their wage for the same level of effort, suggesting that CSR might be a substitute for higher wages. Kajackaite and Sliwka (2017) also find that workers work harder when firms donate part of their profits to a charity, with Koppel and Regner (2014) and Cassar and Meier (2018) showing similar results even when the amount donated is conditional on a worker’s own level of effort. However, as explained in more detail in the design section of our paper, we argue that these effects might be partly driven by the experimental design, and a sorting mechanism
can allow to better disentangle the trade-offs between wages and CSR. In our study, we design a novel version of the gift-exchange game by Fehr et al. (1993) and allow employers to choose how to allocate their initial capital between making a wage offer to a worker and donating a share of profits to charity as a form of CSR, rather than pre-specifying a the level or type of CSR. Further, in one of our treatments, workers can choose a preferred firm (between two in every round of the game) before exerting effort, which we compare against a control group that resembles the more traditional design of the game in which worker-firm pairs are randomly assigned each round. This enables us to study how workers choose firms based on financial and social incentives, and how this choice influences the effectiveness of financial and social incentives on their effort at later stage. Introducing these mechanisms also enables us to partially address conflicting findings on gift-exchange between lab and field experiments (Gneezy and List, 2006; Falk, 2007; Fehr and Goette, 2007; Levitt and List, 2007). Our results, in fact, are closer to recent field experiments finding that social incentives are less effective than financial incentives to motivate workers (DellaVigna and Pope, 2017). Third, we demonstrate the importance of estimating the effect of financial and social incentives on all stakeholders in the labor market – workers, firms, and, where present, charities, to provide a comprehensive picture of the trade-offs from CSR. Experimental studies that focus mostly on one stakeholder risk losing the overall impact of CSR on the labour market. We also point to the importance of understanding how charities can better engage with firms to achieve joint social goals. In the next section, we explain the theoretical model and the experimental design we constructed to explore our research questions. We then present the results and discuss implications for future research.

1 Experiment design and research questions

We begin by explaining our modified version of the gift-exchange game (Fehr et al., 1993). In our game, there are two types of players: firms and workers. We use a 3x2 design where we vary (i) whether firms can offer to a worker only a wage, or both a wage and donation of a share of their profits to charity (CSR), and (ii) the way firms and workers are matched. Table 1 summarises the treatments, described below in more detail.
Table 1: Treatments

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of firms per worker</th>
<th>Matching</th>
<th>CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair</td>
<td>1</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Assign</td>
<td>2</td>
<td>Random assignment</td>
<td>No</td>
</tr>
<tr>
<td>Choice</td>
<td>2</td>
<td>Worker’s choice</td>
<td></td>
</tr>
<tr>
<td>Pair-CSR</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assign-CSR</td>
<td>2</td>
<td>Random assignment</td>
<td>Yes</td>
</tr>
<tr>
<td>Choice-CSR</td>
<td>2</td>
<td>Worker’s choice</td>
<td></td>
</tr>
</tbody>
</table>

Each round of the game begins with each firm choosing a wage offer and – in our cells with CSR – a charity-share offer simultaneously\(^1\). The worker is informed of the offer(s) of either one firm (in our Pair treatment) or two firms (in our Assign and Choice treatments). The worker is matched with one of the firms at random in the Assign treatment, or can choose a preferred one out of two randomly matched firms in the Choice treatment. Finally, in all treatments, the worker chooses an effort level, after which the round ends and payoffs of that round are shown to all players. In the experiment, the wage is restricted to integers between 20 and 120 (inclusive), and the effort is restricted to integer multiples of 0.1 between 0 and 1 (inclusive), in line with previous gift-exchange game studies.

Table 2: Worker’s cost of effort

<table>
<thead>
<tr>
<th>Effort level (e)</th>
<th>0</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of effort (c(e))</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>

The worker’s payoff is given by:

\[
\pi_w = w - c(e)
\]

where \(w\) is the wage offered by the (matched or chosen) firm, \(e\) is the worker’s effort, and \(c(e)\) is the cost of effort (shown in Table 2). As per other similar games, the worker’s payoff increases in wage and decreases in effort. The proceeds going to the charity enter directly

\(^1\)We use the term ”CSR” to refer to our treatment in which donations to charity are possible, as well as the concept of corporate social responsibility more broadly. ”Charity share” means the fraction (or percent) of profits an employer offers to donate to charity, and ”charity proceeds” refers to the actual corresponding donation in the lab or in real money (i.e., the charity share multiplied by the employer’s profits).
into the firm’s payoff (but not the worker’s payoff). The firm’s payoff is thus given by:

\[
\pi_f = \begin{cases} 
(120 - w) \cdot (100 - \chi) \cdot e/100 & \text{if matched} \\
0 & \text{if not matched}
\end{cases}
\]  

(2)

where \(w\) is the wage offer, \(\chi\) is the percent share of profits given to the charity (equal to zero when there is no CSR), and \(e\) is the worker’s effort. The firm that is not matched (in the Assign cells) or not chosen (in the Choice cells) by the worker in any round earns nothing on that round. The charity, which does not make any decisions in our game, receives a payoff of:

\[
\pi_c = (120 - w) \cdot \chi \cdot e/100
\]  

(3)

Our baseline condition is thus the Pair cell, which resembles the more commonly used gift-exchange setting, with one firm and one worker randomly matched in each round. The Assign cell is similar to the Pair cell except that (i) each worker sees two offers instead of one before being matched to one, and (ii) half of the firms in each round are randomly chosen to be unmatched (and similarly for the Assign-CSR and Pair-CSR cells). In the Choice cells, instead, with and without CSR, the worker sees two firm’s offers, like in the Assign cells, but can choose the firm to work for. The firm that is not matched or chosen earns nothing in that round. Corresponding CSR cells for each condition differ only in whether donations to charity by firms are possible. The equilibrium predictions – under standard (own-payoff maximising) preferences – are described in the Appendix, but we note two important facts here. First, in all sequential equilibria, the worker’s effort choice \(e\) does not need to exceed 0.1, and it does not need to depend on the wage or charity share. Second, wage offers and CSR offers do not need to vary across treatments, since firms should not need to respond to workers’ own-utility-maximising strategies. Our first research question concerns the effects driven by the introduction of a sorting mechanism. The argument for allowing subjects to choose their partners in experiments is that outside of the lab some individuals may choose to place themselves in situations where they can behave more pro-socially. For example, Lazear et al. (2012) show that in a dictator game giving subjects the choice to participate before allocating a preferred amount to share affects the likelihood and magnitude of sharing. In an
earlier complementary paper, Slonim and Garbarino (2008) show that the sharing behaviour in a dictator game depends on the characteristics of the chosen partner (e.g. gender). In the context of labour markets, sorting is important. For instance, Dohmen and Falk (2011) show the importance of a sorting mechanism in a setting where workers can choose between a fixed and a variable payment scheme. Thus, it is reasonable to expect that sorting plays a major role in determining the effectiveness of financial and social incentives, which is why it is worth exploring.

**Question 1:** What is the effect of firms’ competition on wage offers, CSR, and the earnings of firms, workers and charity?

We expect that in the Choice treatment, workers will choose firms offering higher wages (other things equal), providing an incentive for firms to raise their wages in that treatment. If workers value contributions to charity, then there will be a similar incentive (though not necessarily of equal magnitude) to raise their charity shares as well. However, the effects on the earnings of all stakeholders are less predictable. The direct effect of higher wages (or charity shares) is to decrease in firm profits and increase in worker’s payoffs and charity proceeds. However, gift exchange implies that workers will exert more effort when offered a higher wage (or charity share), possibly offsetting the decrease in firm profits and increase in worker’s payoffs. It is also possible that if firm profits decrease as a result of a sorting mechanism, this will offset the increase in charity proceeds from the higher charity share, leading to unpredictable direction of effects. Our second question is thus about the effect of CSR on the earnings of all players in the game. Whilst previous studies focused mostly on worker’s decisions, here we look at the effects for the labour market as a whole.

**Question 2:** What is the effect of CSR on firms’ profits, wage offers, and workers’ earnings?

We are then interested in understanding how workers choose a firm, and how do they value wages and CSR when the two incentives are offered as a bundle. Here again the
predictions are ambiguous. If a worker does not value contributions to charity, CSR might have no effect at all. The direct effect of offering a share of profits to charity is a lower (net) profit for the firm, but this could be countervailed if charitable contributions induce higher worker effort, which in turn would decrease a worker’s earnings. The expected effect of CSR on wages (which also impacts firm’s profits and worker’s earnings) will therefore depend on whether charity contributions and wages are viewed as substitutes or complements (respectively, tending to decrease or increase wages).

Question 3: When workers can choose a firm, are they more likely to choose firms that offer a higher wage or a higher CSR, and how do they trade-off between the two?

As previously noted, in competition (i.e., in the Choice cells) we expect that a firm is more likely to be chosen the higher are its offered wage and charity share. When the higher wage and higher charity share are offered by different firms, the choice will depend on the worker’s preferences over the two incentives, and possibly the sizes of differences in both between the firms. However, if wage offers and CSR differ between the two firms, the worker will face a trade-off which will also influence the level of effort she will provide in the second stage of each round. Hence, our last question aims to understand these effects.

Question 4: What is more effective between a higher wage offer and a higher CSR to motivate workers to work harder, and does firms’ competition alter these effects?

Gift exchange predicts that effort levels will be increasing in wage offers, and this is likely to extend to the charity share if workers value charity contributions. However, in the Choice treatment, workers have an additional opportunity to reward firms by choosing them over a competitor, so reciprocation via effort may be attenuated in that treatment. In sum, when allowing firms to choose between wage offers and CSR, and when allowing workers to choose a preferred firm based on these two types of incentives, the effects on selection and effort of workers are unclear and worth studying more closely.
2 Experiment procedures

The experimental sessions were conducted at the University of Sydney Behavioural Computer Lab, with a total of 312 subjects took part (see Table 3 for session information). Subjects were recruited using ORSEE (Greiner, 2015) and could not participate more than once in the experiment; there were no other exclusion criteria. The validity of some lab experiments has been questioned partly due to participants being mostly students. In our case, University students represent the ideal subject pool since they are the human capital that companies will compete more aggressively to attract, retain and motivate. Furthermore, business surveys have shown that CSR is of greater importance to millennial workers than other age cohorts. Hence, studying the role of self-selection and the right mix of incentives on this cohort of the population makes our findings more easily generalizable.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of sessions</th>
<th>No. of matching groups</th>
<th>No. of subjects</th>
<th>No. of firms (F) and workers (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair</td>
<td>2</td>
<td>4</td>
<td>48</td>
<td>F=24; W=24</td>
</tr>
<tr>
<td>Assign</td>
<td>3</td>
<td>6</td>
<td>54</td>
<td>F=36; W=18</td>
</tr>
<tr>
<td>Choice</td>
<td>3</td>
<td>6</td>
<td>54</td>
<td>F=36; W=18</td>
</tr>
<tr>
<td>Pair-CSR</td>
<td>2</td>
<td>4</td>
<td>48</td>
<td>F=24; W=24</td>
</tr>
<tr>
<td>Assign-CSR</td>
<td>4</td>
<td>8</td>
<td>54</td>
<td>F=36; W=18</td>
</tr>
<tr>
<td>Choice-CSR</td>
<td>4</td>
<td>8</td>
<td>54</td>
<td>F=36; W=18</td>
</tr>
</tbody>
</table>

The experiment was run on networked personal computers, and was programmed using z-Tree (Fischbacher, 2007). At the beginning of a session, subjects were seated in a single room and given written instructions, which were then read aloud in an attempt to make them common knowledge. In the CSR cells, subjects were also given a one-page description of the charity, and were told that the experimenters would donate the sum of proceeds of the

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2A survey based on 1,000 employees at large US firms found that nearly 40% of millennials have chosen a job because of company sustainability, compared to less than a quarter of gen X respondents, and 17% of baby boomers: https://www.fastcompany.com/90306556/most-millennials-would-take-a-pay-cut-to-work-at-a-sustainable-company

3Screenshots of zTree decision screens are available in the Appendix. The study instructions and additional experimental materials, as well as the raw data from the experiments, are available from the corresponding author upon request.
session on behalf of all participants. After answering a series of comprehension questions to make sure all participants understood the instructions, the first round of play began. At the start of the game, subjects were randomly assigned to roles (firm or worker) and matching groups (which were closed to interaction), which stayed fixed for the entire session. Subjects played 10 rounds, followed by a short questionnaire about themselves and their experience in the experiment. The sequence of events in a round was as follows. First, subjects were matched, under a strangers matching protocol that was explained in the instructions. Next, subjects in the role of firms were prompted to choose their wage offers, and in the CSR cells, their charity-share offers simultaneously. After these choices had been entered, subjects in the role of workers were informed of the wage offers (or in the CSR cells, the wage offers and charity share combination) of each firm in their group, and in the Choice treatment, were prompted to choose one of the two offers. Then, workers were prompted to choose their effort levels.

Importantly, to avoid confusion and simplify the game, after choosing a firm (where this was possible) and a level of effort, workers could click on a button that displayed the payoffs for themselves, the firm and, in the CSR cells, the charity, before confirming their decision. Workers could change their decisions and recalculate payoffs as many times as they wanted before confirming it. Once they confirmed their decision, the round ended. All subjects then received end-of-round feedback comprising the payoffs of firm(s), worker and, in the CSR cells, charity. Once subjects had viewed these results, they could continue to the next round. In the Assign cells, firms had the same probability on every round to be randomly matched to a worker. The firms that were not matched or chosen by the worker earned nothing on that round. Payoffs in the experiment were denominated in Experimental Currency Units (ECU), and were converted to cash at the end of the session, at the rate of AUD 0.05 per ECU, with payments rounded up to the nearest dollar. Subjects also received a show-up fee.

The charity we chose was Cure Brain Cancer Foundation, an Australian charity for research, awareness and advocacy involving brain cancer. Subjects were informed in the instructions that the donation would be made via the Foundation website, and copies of the donation receipt were available to students upon request. We chose a charity with a non-partisan mission that was not well known to participants to avoid influencing their decisions. Across all sessions, 85 percent of subjects reported not having heard of the charity before and 94 percent never donated to the charity before the experiment.

This questionnaire is also available upon request to the corresponding author. We note here that nearly all subjects reported that they found the instructions and experimental interface easy to understand.
of AUD 5. Average earnings were approximately AUD 18.50, and sessions typically lasted about 60 minutes. The sum of all charity proceedings over all CSR sessions was AUD 70.40.

3 Results

We begin our analysis by answering our first research question on whether introducing a sorting mechanism influences the decision-making of firms and workers. Table 4 shows treatment-level aggregates, and Table 5 shows p-values from non-parametric tests of differences across treatments ⁶. Note that throughout the paper CSR is reported in percentage, in the same way firms chose it in the game (i.e. a percentage of profits to donate to charity). We pool data from the Pair and Assigned treatments, as we found no significant differences between these treatments, and we will sometimes refer to them together as the "no-Choice" treatment ⁷. The similarities between the Assign and Pair conditions further confirm that the introduction of a second firm in the game does not alter participants’ behaviour per se, but it is rather the sorting mechanism (in the Choice conditions) and the presence of CSR that influence decisions. In sum, the baseline values in the Assign and Pair allows us to compare these conditions to other studies that use a traditional design of the gift-exchange game.

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⁶Unless mentioned otherwise, our non-parametric tests use matching-group-level data, and two-tailed rejection regions. See Siegel and Castellan (1988) for descriptions of the tests we use, and Feltovich (2005) for critical values of the robust rank-order test.

⁷The only significant difference we observe between our Assign and Pair treatments is in unconditional firm payoff, and this is driven entirely by our experimental design (all firms are matched in the Pair treatment, while a randomly chosen half of firms are unmatched in the Assign treatment).
Table 4: Treatment aggregate

<table>
<thead>
<tr>
<th></th>
<th>noCSR Choice</th>
<th>noCSR no-Choice</th>
<th>CSR Choice</th>
<th>CSR no-Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage offer (ECU)</td>
<td>84.8</td>
<td>56.5</td>
<td>65.5</td>
<td>50.4</td>
</tr>
<tr>
<td>... given match</td>
<td>91.1</td>
<td>56.0</td>
<td>73.1</td>
<td>50.8</td>
</tr>
<tr>
<td>CSR (%)</td>
<td>13.5</td>
<td>14.9</td>
<td>13.9</td>
<td>15.0</td>
</tr>
<tr>
<td>... given match</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effort (unconditional)</td>
<td>0.58</td>
<td>0.38</td>
<td>0.36</td>
<td>0.36</td>
</tr>
<tr>
<td>Worker earnings (ECU)</td>
<td>82.5</td>
<td>50.9</td>
<td>68.8</td>
<td>46.2</td>
</tr>
<tr>
<td>Firm profit (given match, ECU)</td>
<td>14.5</td>
<td>21.3</td>
<td>13.8</td>
<td>17.7</td>
</tr>
<tr>
<td>Charity proceeds (ECU)</td>
<td></td>
<td></td>
<td>2.8</td>
<td>5.0</td>
</tr>
</tbody>
</table>

The starkest result from Table 4 is the effect of worker choice. In the cells without CSR, worker choice leads to significantly higher wage offers overall, and an even larger difference in realised wages (i.e. conditional on acceptance by the worker). Worker payoffs are also higher in the Choice cell, and firm payoffs are lower, both of these despite an increase in workers’ efforts. In the CSR treatment, wages are also significantly higher in the Choice cells compared to the other cells, but this increase is only about half what it is in the treatments without CSR. We also see no difference in average efforts, making worker payoff significantly higher in the Choice-CSR cell than in the other CSR cells. Donations to charity (CSR %) and firm payoffs are lower in the Choice cell, though these differences are not significant.

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8 Average worker efforts are included in these tables, as these averages are useful in explaining differences in firm profits and worker payoffs across treatments. However, to the extent that efforts depend on wages (as the gift-exchange hypothesis implies), these unconditional averages cannot distinguish between a treatment effect on efforts due to a treatment effect on wages, versus an effect due to other factors such as a change in the gift-exchange relationship. We will discuss workers’ effort choices in more detail in the relevant section.
Table 5: Pairwise comparisons

<table>
<thead>
<tr>
<th></th>
<th>Effect of worker choice</th>
<th>Effect of introducing CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSR</td>
<td>no-CSR</td>
</tr>
<tr>
<td>Wage offer (ECU)</td>
<td>p ≈ 0.001</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>... given match</td>
<td>p &lt; 0.001</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>CSR (%)</td>
<td>n.s.</td>
<td>p ≈ 0.001</td>
</tr>
<tr>
<td>... given match</td>
<td>n.s.</td>
<td>p ≈ 0.001</td>
</tr>
<tr>
<td>Effort (unconditional)</td>
<td>n.s.</td>
<td>p ≈ 0.001</td>
</tr>
<tr>
<td>Worker earnings (ECU)</td>
<td>p &lt; 0.001</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Firm profit (given match, ECU)</td>
<td>n.s.</td>
<td>p ≈ 0.017</td>
</tr>
<tr>
<td>Charity proceeds (ECU)</td>
<td>p ≈ 0.086</td>
<td></td>
</tr>
</tbody>
</table>

Notes. The significance tests are based on a two-tailed robust rank-order tests at the matching-group level. Non-significant results (n.s.) refer to value of p < 0.2

Another set of notable results from Table 5 concerns the effect of allowing firms to allocate a share of profits to charity (i.e., CSR). Introducing CSR lowers both workers’ effort and workers’ payoffs (though both not significantly in the no-Choice treatments). Figure 1 shows wage offers and CSR levels for each treatment cell over the ten rounds of the game. The left panel shows upward time trends for wage offers in the Choice cells, suggesting that the treatment effects get larger over time. The right panel shows weak upward trends for charity offers in both CSR cells, but we see no evidence that the effect of worker choice in those cells changes over time.

Figure 1: Time series of firms’ decisions

Further evidence of these treatment effects is shown in Table 6, which reports results from
panel linear regressions on the dis-aggregated data. The dependent variables are listed in the table; the regressions for wage offers, firm profits and worker profits use data from all cells, while those for charity offers and charity proceeds use data from the CSR cells only. The right-hand-side variables are an indicator for the Choice treatment (with no-Choice as baseline), the round number, and when applicable, an indicator for the CSR treatment. Also included are all two- and three-way interactions of these variables, a constant term, and subject random effects.

Table 6: Panel linear MEs

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage offer</td>
<td>21.730***</td>
<td>-1.462</td>
<td>-2.634***</td>
<td>27.106***</td>
<td>-2.279**</td>
</tr>
<tr>
<td>CSR</td>
<td>(2.225)</td>
<td>(2.779)</td>
<td>(0.857)</td>
<td>(1.920)</td>
<td>(1.087)</td>
</tr>
<tr>
<td>Worker earnings</td>
<td>(2.147)</td>
<td>(1.224)</td>
<td>(2.733)</td>
<td>(2.732)</td>
<td>(1.087)</td>
</tr>
<tr>
<td>Charity proceeds</td>
<td>-11.080***</td>
<td>-1.545</td>
<td>-7.422***</td>
<td>1.276***</td>
<td>0.173</td>
</tr>
<tr>
<td>(2.116)</td>
<td>(0.985)</td>
<td>(1.707)</td>
<td>(2.19)</td>
<td>(0.114)</td>
<td></td>
</tr>
<tr>
<td>Round</td>
<td>1.690***</td>
<td>0.404</td>
<td>-0.038</td>
<td>1.276***</td>
<td>0.173</td>
</tr>
<tr>
<td>(0.191)</td>
<td>(0.265)</td>
<td>(0.065)</td>
<td>(0.219)</td>
<td>(0.114)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample</th>
<th>All firms</th>
<th>Firms in CSR cells</th>
<th>All firms</th>
<th>All workers</th>
<th>All firm/worker pairs in CSR cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1920</td>
<td>960</td>
<td>1920</td>
<td>1200</td>
<td>600</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.314</td>
<td>0.006</td>
<td>0.019</td>
<td>0.37</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Notes. Panel linear marginal effects, based on random effects regression with standard errors (in parenthesis) are clustered at the matching group level.*** p < 0.01; ** p < 0.05; * p < 0.1

Table 6 shows the average marginal effect for each right-hand-side variable, along with conditional marginal effects for the Choice indicator (given a value for the CSR indicator of either 0 or 1) and for the CSR indicator (given a value for the Choice indicator of either 0 or

Tobit regressions yielded similar results to those reported here, as did a simultaneous-equation model of wage offer and charity offer for the CSR treatment (details from the corresponding author upon request).
1). Introducing worker choice increases wages and worker payoffs, both when CSR is present and when it is not. Worker choice also reduces firms’ profits significantly when CSR is not present and insignificantly when it is.

**Result 1:** Firms’ competition (i.e., introducing a sorting mechanism) significantly increases wage offers but decreases CSR. Competition also increases workers’ earnings but decreases firms’ profits and charity proceeds.

Observing the behaviour of firms, we can see that firms seek to maximise profits. For some starting proportions of wage offers and charity shares, firms seemed to learn that workers are relatively more responsive to wages than charity shares, so they adjusted on the margin the relative amounts of both. Introducing CSR obviously increases charity proceeds, since they are zero without CSR, but at the cost of reducing significantly wages and workers payoffs, whether or not workers can choose firms (and with reduced earnings not driven by higher effort). Firm profits also decrease, though not significantly.

**Result 2:** When firms have the option to donate a share of profits to charity, this reduces wage offers and workers’ payoffs but has no significant effect on firms’ profits.

After analysing and comparing treatment aggregate effects, we now turn the analysis on worker’s and firm’s behaviour.

### 3.1 Worker’s preferences for wages vs CSR

In the Choice treatment, with and without CSR, workers make two decisions in each round: which firm’s offer to accept and what level of effort to exert. In the treatments without CSR, firms can only offer wages to workers, and when the offers of the two firms differ, it is reasonable to expect that workers will choose the higher wage. Indeed, they choose the higher wage offer 97.7 percent of the time when the offers differ, significantly more often than
the 50 percent implied by random choice (Wilcoxon signed-ranks test, \( p = 0.008 \)). In the Choice-CSR treatment cells, in order to be chosen and exert effort by workers, firms can make a wage offer and charity share (i.e. a percentage of potential profits to donate to charity). This makes the worker’s decision more complex to disentangle compared to traditional game settings. To begin the analysis, we first plot this relationship visually. In 2, we show the workers’ decisions for the Choice-CSR cell in a scatter-plot, with the foregone wage (i.e., the wage of the unchosen firm minus that of the chosen firm) on the horizontal axis and the foregone CSR (i.e. charity share) on the vertical axis.

Figure 2: Forgone wages and CSR

Notes. The individual points are jittered by adding uniform [-2,2] random noise to each component. This reduces the chance that multiple observations with the same coordinates obscure each other. On the horizontal axis we report the (logarithmic) ratio of magnitudes of the difference in wages and the difference in charity shares between the two firms that were paired on each round. We then group them based on approximate quintiles for easier reference. On the vertical axis, we report the frequency with which workers chose a higher wage offer over a higher CSR.

In cases where one firm offered both a wage and a charity share that were higher than the other firm, that firm was chosen by the worker 100 percent of the time (52/52). Firms were also very likely to be chosen when they offered a higher wage and an equal charity share (96.9 percent of the time, 31/32) or a higher charity share and an equal wage (93.8 percent, 15/16). In cases where one firm offered a higher wage and the other firm offered a higher
charity share – so that the worker had to choose one or the other – the higher wage was chosen over the higher charity share 74.3 percent of the time (55/74). This suggests that wage offers remain the most important incentive to attract workers. To further disentangle this effect, in 3 we map the cases where the higher wage and the higher charity share are offered by different firms. We can see that not only workers choose firms with higher wage offers, but that they are also sensitive to the relative difference between wage offers and CSR. When only a small amount of wage must be foregone to gain a large CSR, workers are roughly equally likely to choose either the higher wage firm or the higher CSR firm; but when the wage difference is much more than the difference in charity shares, workers always choose the firm offering the higher wage.\footnote{We also estimated a probit with a dummy for the higher-wage firm chosen by the worker as the dependent variable, and the log-ratio of wage difference and charity-share difference as the independent variable. The marginal effect of the log-ratio was significantly positive (+0.131, $p$-values of 0.019 using clustering by matching group, pseudo-R2 0.133), confirming the positive association between these variables.}

Figure 3: Worker choice between firm offering a higher wage and firm offering a higher CSR

Notes. The figure shows the choice of workers between higher-wage and higher-CSR firms using Choice-CSR cell only. We do not use a constant term. Recall that charity shares range from 0 to 100 percent. We scale them by adding 20 when computing this ratio for two reasons: (1) to avoid dividing by zero, and (2) for comparability with wages, which range from 20 to 120.

The positive association between these variables is confirmed by a probit regression using the worker-level data from the Choice-CSR cell. The dependent variable is an indicator for the firm labelled as Firm 1 being chosen by the worker. The independent variables are the log
of the wage ratio $\ln(w_1/w_2)$ and the log of a scaled charity-share ratio $\ln[(20 + \chi_1)/(20 + \chi_2)]$. The results are shown in 7.

<table>
<thead>
<tr>
<th></th>
<th>ME of ln(wage ratio)</th>
<th>ME of ln(CSR ratio)</th>
<th>Wald test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1 chosen</td>
<td>1.113***</td>
<td>0.239***</td>
<td>$p &lt; 0.001$</td>
</tr>
<tr>
<td>(N= 180)</td>
<td>(0.130)</td>
<td>(0.072)</td>
<td></td>
</tr>
</tbody>
</table>

Notes. Probit MEs and cluster standard errors. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Both marginal effects are positive and significant, indicating that both higher wages and higher charity shares make a firm more likely to be chosen by the worker. However, the marginal effect of the log wage ratio is significantly higher than that of the log charity share ratio, reflecting more importance placed by workers on wages than charity shares.

The model estimated in Table 7 has a straightforward structural interpretation. Consider the Cobb-Douglas utility function

$$U(w, \chi) = \alpha \cdot \ln(w) + \beta \cdot \chi$$

(4)

where $w$ and $\chi$ denote the wage and (re-scaled) charity share (CSR) respectively, and $\alpha$ and $\beta$ are non-negative constants. Suppose that the likelihood of the worker choosing Firm 1 is a function of the difference in utilities between Firm 1’s (wage, charity share) offer and Firm 2’s:

$$\text{Prob}(\text{ChooseFirm 1}) = g[U(w_1, \chi_1) - U(w_2, \chi_2)]$$

(5)

Finally, estimate $\alpha$ and $\beta$ assuming $g$ is the probit function, and adding an error term. Note that (1) and (2) imply:

$$\text{Prob}(\text{ChooseFirm 1}) = g \cdot [\alpha \cdot \ln(w_1/w_2) + \beta \cdot \ln(\chi_1/\chi_2)] + \varepsilon$$

(6)

where $\varepsilon$ is the error term. This is exactly the probit model estimated in Table 6, and the coefficients corresponding to the reported marginal effects reported there are $\alpha = 5.433$ (s.e. 0.787) and $\beta = 1.166$ (s.e. 0.283). Thus workers are sensitive to both higher wage offers and
CSR (i.e., charity shares), but the former is up to five times as large as the latter.

Result 3: Workers nearly always choose the higher-wage firm and the higher-charity-share firm when there is no trade-off between the two. When there is a trade-off, they are more likely to choose the higher-wage firm than the higher-charity-share firm, but the likelihood of choosing the latter increases with the difference in charity shares, and decreases as the difference in wages increases.

We then turn the analysis on worker’s choice of effort to better understand whether wage offers or CSR have a higher effect in motivating workers.

3.2 Worker’s effort

In other studies employing the gift exchange game, the gift exchange measure is a simple measure of the relationship between the firm’s wage offer and the worker’s effort. Any deviation from a worker’s utility maximisation strategy can be inferred to a sense of reciprocity driven by a high wage offer. In our sample, we see that, across conditions, effort levels of 0 or 0.1 (i.e. effort levels that do not lead to reciprocal benefits to the matched or chosen firm) account for about 37% of workers’ efforts (ranging from 15 percent in the Choice cell to 44% in the Pair-CSR cell). While this is clearly a substantial fraction of worker choices, the fact that most observations involve higher effort – and are therefore not consistent with equilibrium play – suggests that non-pecuniary considerations will be important in understanding behaviour in the experiment. However, the measure of gift exchange in our experiment is more complex. First, firms in our CSR treatment can offer charity shares as well as wages; if workers value charitable donations, their effort levels should depend on both wages and charity shares, raising the question of how to aggregate them. Second, workers in our Choice treatment can reciprocate attractive offers not only through higher effort, but also by choosing a firm over its rival, potentially attenuating a worker’s sense of reciprocity when providing effort. Third, since wages are substantially higher in the Choice treatment (Table 4), and the difference grows over time (Figure 1), it is important to ensure that comparisons of gift exchange
between Choice and ‘no-Choice’ are not reliant on extrapolation outside the samples, as would happen if there were little or no overlap in the two distributions. Regarding the first complication, we consider two ways of aggregating wages and charity shares. One leverage on the equation in the previous section, where we essentially estimate a utility function for workers. We define the worker utility index as:

\[
\text{worker utility index} = w \cdot 0.166/5.433 - 20 \cdot 0.166/5.433
\]

which is the gain in utility (after taking a monotonic transformation of (4)) for the worker over the minimum possible utility – based on a wage of 20 and charity share of 0 (and hence an adjusted charity share of 20, as noted in the previous section). Then the associated gift exchange is the relationship between the worker’s effort and the worker’s utility (which depends on the wage and charity share). Then the ”gift” to the worker is measured in the worker’s utility, while the ”gift” to the firm is, as usual, the worker’s effort. Our second way of aggregating wages and charity shares utilises equation (2) in section 2: the firm’s profit function. In that equation, profit divided by the worker’s effort is a weakly decreasing function of both the wage and charity share. So, a measure of how much profit the firm sacrifices by offering a given wage \( w \) and charity share \( \chi \) for a given worker effort is:

\[
\text{forgone firm profits} = [(100) \cdot (100) - (120 - w) \cdot (100 - \chi)]/100
\]

which is proportional to the difference between the profit associated with the offered wage and charity share, and that from the minimum wage and charity share (0 and 20, respectively). The corresponding gift exchange is the relationship between the worker’s effort (the ”gift” to the firm) and this measure of foregone profit (the ”gift” to the worker). The two resulting gift exchange relationships are displayed in Figure 4. Both panels have one of the gift-to-worker indices on the horizontal axis and worker effort on the vertical axis, and the relationships are shown separately for each of the four treatment cells. To reduce cumbersome wording, we

\footnote{A third way of aggregating wage and charity share would be to simply ignore the charity share and use the wage alone as the ”gift” to the worker. Such an approach has the advantages of comparability to previous work and conformity to standard theory (as noted in (1), this is the actual monetary earning a subject would receive as worker). It turns out that results using this method are nearly identical to those using the foregone firm profit index; hence to save space, we omit them from the paper.}

\footnote{To make the relationships easier to observe, we combine observations with similar horizontal coordinates.}
refer to the two indices on the horizontal axis as “firm generosity”, though clearly firms may choose high levels of wage and CSR for reasons other than generosity.

Figure 4: Gift exchange

In all of the graphs, we see evidence of the usual gift-exchange relationship, with higher firm generosity associated with higher worker efforts. However, the relationship appears to break down at the highest levels of firm generosity, with efforts levelling off or even decreasing. This is not paradoxical: as firm generosity increases, the benefit of effort on firm profit decreases (note from (2) that for a firm that is matched, its profit is $(120-w) \times (100-\chi) \times e$, which is decreasing in both $w$ and $\chi$), while the cost of effort is unchanged. In the extreme case where $w = 120$ or $\chi = 100$, worker effort does not benefit the firm at all, while it is still costly. Therefore, a rational worker with other-regarding preferences may reduce effort when firm generosity is very high\textsuperscript{13}. At first glance, we do not see systematic differences in the gift-exchange relationship across the cells, though a closer examination suggests that at intermediate levels of firm generosity (corresponding roughly to wages between 60 and 80 without donations to charity), effort may be lower in the Choice cells than in the ‘no-Choice’ cells. To examine the potential treatment effects more rigorously, we estimate panel linear

\textsuperscript{13}See Appendix for additional details.
regressions with effort choice as the dependent variable. The main explanatory variable is the measure of firm generosity: worker utility index in one model and foregone firm profit index in another. We use a quadratic in each of these variables, to allow for non-linear effects. Additional explanatory variables are dummies for the Choice and CSR treatments, the round number, all two- and multi-way products of these variables, a constant term, and subject random effects.

Figure 5: Marginal effects of Choice and CSR (on selected values of firm generosity

Notes. The figure shows the marginal effects of Choice and CSR treatments (light and dark circles, respectively) on worker effort, and 95-percent confidence intervals (vertical lines), for selected values of firm-generosity indices. These models are estimated on the sample of all worker choices, and as always, standard errors are clustered by matching group. The lowest levels of firm generosity are not displayed in the figure because those levels are almost never observed in our Choice treatment. A similar result obtains if we simply use the wage as the measure of firm generosity, ignoring charity donations completely.

We omit the usual table of average marginal effects, since these are of little importance here. Instead, we focus on the marginal effects of our Choice- and CSR-treatment dummies at particular values of our firm-generosity indices shown in Fig. 5. At intermediate levels of firm generosity, we see a positive marginal effect for the CSR dummy and a negative marginal effect for the Choice dummy. These effects shrink as firm generosity increases, and at high levels (corresponding roughly to a wage of 80 to 90 with zero charity share), both effects become small and statistically insignificant.

The results for the Choice dummy warrant some additional discussion. As noted in Section 2, workers in the Choice treatment have two ways to reward a generous firm – through high
effort and through choosing the firm over its rival – while in the other treatments, they have only the former of these options. The negative marginal effect of the Choice dummy is consistent with this logic, but it is important to point out that the effect is only substantial over a range where there are relatively few observations in the Choice treatment. In all rounds, 75 percent of observations involve a worker utility index of 104 or higher, or a firm foregone profit index of 55 or higher. In the last three rounds, 75 percent of observations involve a worker utility index of 126 or higher, or a firm foregone profit index of 64 or higher. So the negative effect seen in the figure, while interesting, concerns levels of firm generosity not commonly seen in the Choice treatment; for the typical worker’s decision in that treatment, efforts are not substantially different from what they would have been in the no-Choice treatment.\[14\]

Result 4: We find evidence of gift-exchange, with workers providing higher effort as the firm’s offer (wages and CSR) becomes more generous. Efforts are higher in the presence of CSR and lower in the presence of competition (i.e. Choice). All these relationships become weaker for the most generous firm offers.

4 Conclusions

We studied the implications of using CSR (as a percentage of a firm’s profits donated to charity) to attract and motivate workers. Previous studies indicate that in some contexts CSR could be a substitute for higher wages in competition for talent. We developed a novel version of the gift-exchange game to disentangle how these two incentives – financial and social - have joint effects on worker’s behaviour, and to what extent they might complement or substitute each other. We also looked at the implications of CSR on all stakeholders in the

\[14\] The relationships in 5 between the marginal effects and the indices of firm generosity suggest that the slope of the gift-exchange relationship also varies across treatments. Indeed, this is the case. For all but the highest level of the generosity indices in the figure, the marginal effect of the generosity index itself is significantly higher in the Choice treatment compared to noChoice, and significantly lower in the CSR treatment compared on noCSR (for the highest level, the direction is the same, but not significant.) So, the gift-exchange relationship is steeper when workers can choose which firm they match with, and flatter when firms can donate to charity.
labor market: workers, firms, and the CSR intended recipient charity. To improve the validity of our results, we introduced a sorting mechanism to account for a worker’s preference for choosing a firm that offers higher wages or higher CSR before exerting effort. Our results show that wages are significantly more effective than CSR to attract and motivate workers. We see that CSR has no significant effect on firms’ profits, since firms substitute CSR with lower wage offers; on the other hand, CSR has a negative effect on workers, almost halving their earnings. Whilst it is possible that workers are willing to forgo earnings for a higher level of job satisfaction that is beyond just earnings (Cassar and Meier, 2018; Jones et al., 2018), in our experiment we do not see a significant portion of workers choosing firms with higher CSR over higher wages. Thus, by improving realism of the gift-exchange game with a sorting mechanism and studying the effects of financial and social incentives within the same (controlled) environment, we provide a more comprehensive picture of the trade-offs of CSR. Surveys of millennial workers in developed countries indicate that a firm’s CSR matters when choosing a job. Whilst these prospective workers report preferring jobs with a social purpose, in cases where firms donate a portion of profits to charity as CSR strategy, this can come at a cost to their earnings. Future studies could look at whether the adoption of CSR by large firms in a labor market suppresses wages, as well as shed a light on what extent firms’ CSR initiatives do in fact achieve the intended social objectives, or if they are mostly a marketing tool. Lastly, our study focused on the impact of CSR on all market stakeholders, but more work is needed to understand the benefits of CSR for charities, and whether partnering with a firm provides net benefits or if it crowds out other type of donations, or if it has implications for the charity operations.
References


Appendix

A Model

A.1 Equilibrium under standard preferences

Under standard (own-payoff-maximising) preferences, equilibrium behaviour in all three treatments involves the worker choosing either of the zero-cost efforts \( (e = 0 \text{ or } e = 0.1) \), and in the Choice treatment, selecting the higher-wage firm. (The charity shares offered by the firms do not affect the utility of such a worker, so cannot affect the worker’s choice of firm unless both offer the same wage; in that case, any choice by the worker is sequentially rational.) Thus in the noCSR treatment, equilibrium effort-choice behaviour can be characterised by \( W^* = \{ w : e(w) = 0.1 \} \) the set of wages that results in an effort choice of 0.1 rather than 0, allowing the firm to earn a positive payoff rather than a zero payoff. There is no restriction on which wages are in \( W^* \), since workers are always indifferent between effort choices of 0 and 0.1, but since the latter is always weakly better for the firm, intuition and the previous literature on gift exchange suggest \( W^* \) may have the ”threshold” form \( \{ w, w + 1, \ldots, 120 \} \) for some integer \( w \). We can also include the case where \( W^* \) is empty by allowing \( w \) to be 121.

In the CSR treatment, equilibrium effort-choice behaviour can similarly be characterised by \( X^* = \{ (w, \chi) : e(w, \chi) = 0.1 \} \): the set of wage-charity-share pairs that result in an effort choice of 0.1. As in the noCSR treatment, there is no restriction on this set, though it is probably reasonable to assume a threshold form, such that if \( \{ (w, \chi) \in X^* \} \), then \( \{ (\hat{w}, \chi) \in X^* \} \) for \( \hat{w} > w \) and \( \hat{\chi} > \chi \).

Equilibrium firm behaviour will thus depend on the worker’s strategy. In the noCSR treatment, if \( W^* \) has the threshold form described above, firms will be indifferent over all wage choices if \( w \geq 120 \), as they cannot earn a positive profit. If \( w \leq 120 \), firms will choose \( w \) in the Pair and Assign treatments, while in the Choice treatment, competition for the worker will entail that both firms choose either 119 or 120.

Similarly, assuming a threshold form for \( X^* \) in the CSR treatment, if \( X^* \) contains no wage-charity-share pairs that allow a positive profit (either \( w \geq 120 \) or \( \chi \geq 120 \) for all
members of $X^*$), then firms will be indifferent over all pairs. If $X^*$ does allow a positive profit, then in the Pair and Assign treatments, firms will choose the profit-maximising pair in $X^*$ (i.e. $(w, \chi)$ that maximizes $(120 - w) \cdot (100 - \chi)$). In the Choice treatment, if we make an additional assumption that workers’ choice of firm is monotonic in charity share (i.e., if both firms offer the same wage but one offers a higher charity share, that one will be chosen), then in equilibrium firms will choose one of (i) $w = 120$, with $\chi$ indeterminate; (ii) $\chi = 100$, with $w$ indeterminate; or (iii) $w = 119$ and $\chi = 99$.

There are therefore a large number of equilibria in this setting, but some of the important properties of the set of equilibria are as follows.

First, the worker’s effort choice $e$ is never larger than 0.1 in any equilibrium. Second, predicted treatment effects depend on what assumptions are made about equilibrium selection. If we assume that $W^*$ and $X^*$ is fixed across Pair, Assign and Choice cells within the noCSR and CSR treatments respectively, then equilibrium wages (and in the CSR treatment, charity shares) weakly increase as we move to the Choice cell from one of the other cells. However, the increase need not be strict (e.g., if $w = 119$ in the noCSR treatment, then $w$ will be 119 in all three cells of that treatment).

A.2 Optimal worker’s effort under other-regarding preferences

In this section, we demonstrate that optimal effort by workers is typically non-monotonic when they are other-regarding. For simplicity, we focus on the noCSR treatment, but similar results obtain for the CSR treatment. We suppose that workers have utility functions as described by Fehr and Schmidt (1997). The general form is:

$$v_i(\pi_w, \pi_f) = \pi_w - \alpha \cdot \max \{\pi_f - \pi_w, 0\} - \beta \cdot \max \{\pi_w - \pi_f, 0\}$$

(9)

where $\pi_f$ and $\pi_w$ are the monetary payoffs to the firm and worker respectively, $\alpha$ is the worker’s aversion to disadvantageous payoff inequity (i.e., the firm earning more than the worker), and $\beta$ is his aversion to advantageous payoff inequity. Using (1), (2) and (9), we have the worker’s optimisation problem:
\[ \max_{\pi_w, \pi_f} [\pi_w - \alpha \cdot \max \{ \pi_f - \pi_w, 0 \} - \beta \cdot \max \{ \pi_w - \pi_f, 0 \}] \]

subject to: \( \pi_w = w - c \left( \frac{\pi_f}{120 - w} \right) \)  \hspace{1cm} (10)

For a given combination of \( \alpha \) and \( \beta \), the optimal effort \( e \) depends on the wage \( w \); thus, the set of combinations of \( w \) and optimised \( e \) can be shown as a graph. 6 shows such a graph, for four particular combinations of \( \alpha \) and \( \beta \).

Figure 6: Utility-maximising effort levels for selected \((\alpha,\beta)\)

Notes. The figure shows utility-maximising effort levels under Fehr-Schmidt preferences for selected levels of \((\alpha,\beta)\).

The selected \((\alpha,\beta)\) pairs were chosen to span the range of possible graphs, but those from other \((\alpha,\beta)\) pairs yield similar results. As the figure shows, quantitatively there are large differences in the gift-exchange relationship depending on how inequity-averse the worker is. However, qualitatively the graphs are very similar. In each case, effort initially increases with the wage, but reaches a maximum and then decreases, eventually all the way to 0.1.

29
B Appendix B. z-Tree decision screens

You have an initial capital of 120 ECU available to you.
You can pay the worker any wage between 20 and 120 ECU.

Your payoffs = \((100\times \text{percentage of profits going to charity}) \times \text{(120 ECU - wage)} \times \text{worker's effort}\)

- Please insert any wage between 20 and 120 ECU that you would like to offer to the worker.
- Please enter the percentage of profits you want to donate to charity (0-100).

Once you have entered your decisions, please click OK to continue.
You are a Worker

Employer 1's offer to you: 45 ECU
Percentage of Employer 1's profits donated to charity: 20%

Employer 2's offer to you: 100 ECU
Percentage of Employer 2's profit donated to charity: 20%

Choose an offer to accept: ⬜ Employer 1
⬜ Employer 2

Please choose a level of work effort that you would like to provide to the employer that was randomly allocated to you. Each level of effort has a cost according to the table below.

Please enter your preferred level of work effort among the options below:

<table>
<thead>
<tr>
<th>Work effort</th>
<th>0</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs in ECU</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>

Press the Confirm button when you are happy with your decisions and you are ready to move on to the next stage.

Your earnings: 0 ECU
Employer 1's earnings: 0 ECU
Employer 2's earnings: 0 ECU
Donation to charity: 0 ECU

Check

CONFIRM
You are a Worker

Employer 1's offer to you: 70 ECU
Employer 2's offer to you: 20 ECU

The Employer you have been randomly allocated to is: Employer 1

Please choose a level of work effort that you would like to provide to the employer that was randomly allocated to you. Each level of effort has a cost according to the table below.

Please enter your preferred level of work effort among the options below.

<table>
<thead>
<tr>
<th>Work effort</th>
<th>0</th>
<th>0.1</th>
<th>0.2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.8</th>
<th>0.9</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs in ECU</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

Press the Confirm button when you are happy with your decisions and you are ready to move on to the next stage.

Your earnings: 68 ECU
Employer 1's earnings: 15 ECU
Employer 2's earnings: 0 ECU

Check