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**Working Paper**

## Fairness in times of crisis: Negative shocks, relative income and preferences for redistribution

CeDEx Discussion Paper Series, No. 2022-08

**Provided in Cooperation with:**

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*Suggested Citation:* Hochleitner, Anna (2022) : Fairness in times of crisis: Negative shocks, relative income and preferences for redistribution, CeDEx Discussion Paper Series, No. 2022-08, The University of Nottingham, Centre for Decision Research and Experimental Economics (CeDEx), Nottingham

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Discussion Paper No. 2022-08

Anna Hochleitner

March 2022

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CeDEx Discussion Paper Series

ISSN 1749 - 3293



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# Fairness in times of crisis: Negative shocks, relative income and preferences for redistribution

Anna Hochleitner\*

March 25, 2022

## Abstract

While economic crises tend to raise questions about a fair distribution of resources, less is known about whether and how fairness views themselves are affected by negative shocks. To answer this question, I conduct two experimental studies investigating the causal link between income shocks and preferences for redistribution. While Study 1 exogenously manipulates *within* experiment shocks, Study 2 capitalises on the recent Covid-19 crisis and investigates the behaviour of subjects hit by *real world* income shocks. The results from Study 1 show that allocation decisions as well as reactions to shocks depend on participants' relative income. Participants who are relatively poorer exhibit little reaction to shocks and distribute resources in line with an egalitarian fairness view. Participants who are relatively richer, by contrast, distribute resources proportionate to individual contributions and are quite responsive to shocks. They allocate more to themselves if they suffered a shock, but less if the other faced a shock. Study 2 confirms that negative shocks affect redistributive preferences with participants allocating more to individuals who suffered the Covid-19 shock. The results contribute to a growing literature on context-dependent preferences and show that economic shocks can have a substantial impact on the demand and acceptance of redistributive policies.

**JEL classification:** D31, D63, D91, C91

**Keywords:** Redistribution, Inequality, Fairness, Laboratory-Individual Behavior

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# 1 Introduction

Questions about inequality and redistribution regularly give rise to lively public and political debates. While this is already true in economically stable times, they seem to gain even more traction in the presence of economic shocks.<sup>1</sup> Intuitively, if not everyone is affected symmetrically, inequality can increase and thereby enhance the scope for redistribution. In fact, recent studies indicate that vulnerable groups are affected more strongly by the economic shocks caused by Covid-19 (Furceri et al., 2020; Adams-Prassl et al., 2020; Ten et al., 2022), intensifying debates about how to redistribute burdens and support. In addition to the increased visibility, the experience of an economic shock itself might matter for what people perceive as fair. According to Zaki (2020), there are two rivalling views of human behaviour in times of crises. The first one is centred on the assumption that individuals become more selfish. In line with this argument, Fisman et al. (2015) find that during the Great Recession (2007-2009) participants in the lab acted more selfishly and showed more concern for efficiency than equality. Contrasting this finding, times of crises are also associated with mutual aid, compassion, and increased prosocial behaviour (Zaki, 2020).

Given these conflicting findings and the importance of fairness considerations during times of economic crises, it is crucial to develop a better understanding of whether and how notions of fairness change with the experience of economic shocks. To do so, I explore the effect of negative income shocks on fairness views through two experimental studies. In both experiments participants first earn an initial endowment and receive information about shocks, before being given the opportunity to redistribute total earnings between themselves and another player (see e.g. Cappelen et al., 2007, 2013). I thereby vary both who is affected by a shock (self, other, both) and what is known about the experiences of others. While Study 1 exogenously varies the experience of income shocks *within* the experiment and thus allows for a causal inference, Study 2 incorporates real world experiences into the experiment. In particular, I recruit participants who did/ did not lose their employment due to Covid-19. Although the experience of shocks is not exogenous, it allows to explore behaviour in a less abstract and highly relevant environment. The Covid-19 crisis had substantial economic consequences for many people and is thus a very interesting setup to study this research question. Nevertheless, the mechanisms I describe in this work can also be applied to different types of real world shocks such as natural disasters, conflict, or changes in economic and social policies. In addition to the experience of negative shocks, I introduce variation between players along an additional dimension: relative income. Participants either earn a low or a high initial endowment, generating inequality in pre-shock

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<sup>1</sup>This is for instance reflected in an increased awareness and media coverage of these topics since the beginning of the Covid-19 pandemic (see e.g. Butler, 2021; The Economist, 2021).

earnings. This allows to explore whether relative income differences affect redistributive preferences and whether the latter interact with the experience of shocks.

My results show that both relative income differences and the experience of shocks matter for redistributive preferences. In Study 1, players with a higher initial endowment are more likely to distribute total income in line with individual contributions while players with a lower initial endowment are more likely to distribute earnings equally. This is consistent with players adhering to different fairness views, with relatively richer players distributing earnings in line with a contribution-based, and relatively poorer players in line with an egalitarian fairness view. These differences between players lead to separate reactions to shocks. While allocating income in line with an egalitarian fairness view makes participants unresponsive to shocks, individuals who follow a contribution-based fairness view take both own and other's shocks into account. In particular, I find that high endowment players become more selfish after a shock to themselves and more generous after a shock to the other person. Moreover, beliefs about the other's shock seem to play a crucial role in situations with limited information. My results are in line with a conceptual framework, in which fairness views are context-dependent and pre-shock earnings affect final allocation decisions by generating reference points.<sup>2</sup> The importance of shocks for the redistribution stage is confirmed in Study 2. While participants who suffer a real world shock allocate more to themselves, learning that another participant suffered a real world shock reduces allocations to self.

By investigating how income differences and shocks affect redistributive preferences, this study contributes to a large literature exploring heterogeneities in individual fairness views (see e.g. [Konow, 2000, 2003](#); [Cappelen et al., 2007](#); [Konow and Schwettmann, 2016](#), among others). Developing a better understanding of what drives fairness views is a crucial question, as previous research has shown that the latter can explain differences in the acceptance of inequality within a society and ultimately in redistributive policies across countries ([Alesina et al., 2012](#); [Almås et al., 2020a](#)). A common finding is that fairness views seem to be context-dependent and formed in a self-serving manner ([Ubeda, 2014](#); [Neuber, 2021](#)). Studies have shown repeatedly that the relative position within society matters for different aspects of fairness such as support for redistribution and social policies ([Alesina and La Ferrara, 2005](#); [Cappelen et al., 2013](#); [Durante et al., 2014](#)) or the acknowledgement of earned entitlement [Barr et al. \(2015\)](#). In line with recent work by [Gallenstein \(2021\)](#), my paper contributes to this literature by establishing a causal link between income inequality and fairness views by randomly assigning individuals to a high or low initial endowment.

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<sup>2</sup>The theoretical framework relates to the literature on reference-dependence and loss aversion ([Kahneman and Tversky, 1979](#); [Kőszegi and Rabin, 2006](#)). More recently, studies have shown that these concepts also matter for distributional preferences ([Roth and Wohlfart, 2016](#); [Charité et al., 2019](#)).

The project also contributes to a growing literature that explores how *changes* in personal circumstances affect preferences for redistribution (see [Margalit, 2019](#), for an overview). Psychological research suggests that the experience of own hardship might change the receptiveness and empathy for the suffering of others ([Eklund et al., 2009](#); [Lim and DeSteno, 2016](#)). In line with that argument, [Cassar and Klein \(2019\)](#) show that the experience of own failure induces subjects to favour higher levels of redistribution as an unaffected observer in a lab experiment. To investigate the effect of shocks, people have both focused on macro shocks such as a general economic crisis ([Giuliano and Spilimbergo, 2014](#); [Fisman et al., 2015](#); [Cappelen et al., 2021](#)), as well as individual level shocks such as becoming unemployed ([Barr et al., 2016](#); [Naumann et al., 2016](#); [Martén, 2019](#)) or winning the lottery ([Doherty et al., 2006](#); [Powdthavee and Oswald, 2014](#)).<sup>3</sup> While results with respect to general crises are mixed, several studies show that a negative (positive) individual shock increases (reduces) support for redistribution.<sup>4</sup> Similar results have been found in studies manipulating the exposure to inequality ([Sands and de Kadt, 2020](#)) or utilising a mismatch between individuals' beliefs and actual position within the income distribution ([Cruces et al., 2013](#); [Karadja et al., 2017](#); [Hvidberg et al., 2020](#)). In line with these findings, [Mérola and Helgason \(2016\)](#) show in an experimental setting that a positive relative income shift decreases demand for redistribution, while a negative change in relative income increases redistribution. Overall it thus seems, that if people change their distributive preferences after an individual shock their reactions are in line with their own self-interest ([Margalit, 2019](#)). This however makes it difficult to disentangle whether a shock has changed perceptions of what is fair or whether people simply show a best response to a new environment. My study avoids such confounds, as independent of the experience of shocks, players with a lower initial endowment always benefit from redistribution while players with a higher initial endowment benefit from the status quo. Consequently, it allows to test whether negative shocks affect fairness views and allocation decisions themselves, independent of self-interest concerns. This has important consequences for the demand and acceptance of social policies and helps to understand the enhanced focus on topics around inequality and redistribution in the presence of economic shocks. A similar approach is used in recent work by [Gagnon et al. \(2021\)](#), who explore the effect of decreasing wages on the demand for redistribution. They find that both absolute and relative wage decreases reduce allocations to other players. I confirm their finding that own shocks lead to more selfish behaviour both for shocks experienced *within* the lab as well as *real world shocks*. I further add to their work by showing that individuals do not only take

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<sup>3</sup>While economic shocks seem to have a significant effect on attitudes, there is evidence that these shifts are temporal and have less consistent effects on voting outcomes (see [Margalit, 2019](#)).

<sup>4</sup>[Barr et al. \(2016\)](#) also show that negative shocks are associated with other dimensions of fairness. More precisely, people who became unemployed stopped acknowledging earned entitlement in their study.

own shocks into account, but also react to the experience of others which has important implications for economic crises that go beyond individual income shocks. In fact, this finding can provide an explanation for conflicting results on increased selfishness and compassion. Depending on how severely an individual is affected relative to others, one of the effects might dominate the other, leading to separate perceptions of fairness. My study further provides an explanation for a secondary finding in [Gagnon et al. \(2021\)](#). The authors note that the reaction to own shocks seems to be more pronounced for high income than for low income players. By exploring the interaction between fairness views and negative shocks, I show that low income players benefit from an egalitarian fairness view which prescribes an equal share of the total endowment independent of the experience of shocks. High income players, by contrast, tend to act in line with a contribution-based fairness view that in turn makes them compensate own and other's shocks by changing allocation decisions.

Overall, this paper contributes to the literature on heterogeneity and context-dependence of fairness views, underlining the importance of taking an individual's environment into account. Contrasting observational research, it allows to assess the causal impact of negative shocks on distributional preferences while abstracting from self-interest motives related to a personal change in the income distribution. In addition, the two experiments directly complement each other. While Study 1 provides a clean identification, I extend the laboratory approach to real world shocks in Study 2, providing more context and showing that the key mechanisms detected in Study 1 also hold in a less abstract environment. The remainder of this paper is structured as follows. Section 2 describes the design for Study 1, while Section 3 outlines a theoretical framework that conceptualises how income differences and shocks affect fairness views in this context. The results for Study 1 are reported in Section 4. Similarly, Section 5 and 6 outline the design and results for Study 2, before Section 7 provides a discussion of both studies and concludes.

## 2 Study 1: Design

The pre-registered design builds on the structure of previous allocation experiments (see e.g. [Cappelen et al., 2007, 2013](#)) and consists of two stages: A *production* and a *redistribution* stage.<sup>5</sup> In the production stage, participants individually generate earnings that depend on i) the difficulty level of a real effort task and ii) whether a negative income shock occurs. In the redistribution stage participants are then matched in pairs and are given the opportunity to freely redistribute the total earnings both players brought into this stage between each other. Each player is thereby matched with three different players who differ in their

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<sup>5</sup>AEA RCT Registry. July 06. <https://doi.org/10.1257/rct.7913-1.0>.



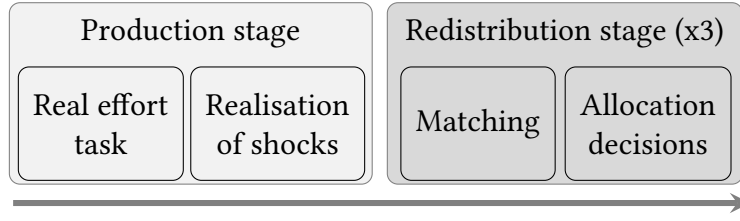


Figure 1: Session structure

experience of shocks. Figure 1 gives an overview of the experiment’s structure.

## 2.1 Player types and realisation of shocks

As mentioned above, participants have to perform a real effort task and receive a flat fee upon completion. While earnings thus do not depend on effort, income differences between participants are introduced by randomly either assigning them to a *more difficult* or an *easier* version of the task, for which they receive a higher or a lower flat fee ( $x_{H1}, x_{L1}$ ).<sup>6</sup> In the following, I refer to participants who receive the high initial endowment as H and to those who receive the low initial endowment as L players. I deliberately chose to generate the difference in pre-shock earnings in a way that leaves sufficient wiggle room for participants to either see it as deserved or a consequence of luck. On the one hand, who is assigned to which version of the task is random. On the other hand, knowing that one did a more difficult task could generate a sense of entitlement.<sup>7</sup> The presence of both deserved and arbitrary elements that is also reflected in real world income differences is crucial, as it ultimately allows individuals to justify different fairness views. After participants have completed the real-effort task, a negative income shock may occur.<sup>8</sup> Half of the participants randomly suffer a shock, while the other half does not. Players are immediately informed whether they have been hit by a shock as well as about their new post-shock earnings ( $x_{H2}, x_{L2}$ ).<sup>9</sup> The realisation of a shock is independent of player type and performance in the real effort task.

A key feature of the design is that the post-shock earnings and thus the allocation decision is always identical, independent of own and other’s shocks ( $x_{H2} = 300, x_{L2} = 100$ ). A rational agent should thus not be affected by shocks and always choose exactly the same allocation in the redistribution stage. In other words, any observed differences in allocation decisions can be attributed to the experience of shocks. These constant post-shock earnings

<sup>6</sup>In the task, participants have to correctly reverse 10 strings consisting of 6 letters each (see e.g. Zhu et al., 2018). In the easy version of the task, typed letters are visible, in the difficult version they are replaced by asterisks.

<sup>7</sup>In an additional treatment, I explicitly introduce uncertainty about entitlement. Appendix D presents the design and results of this variation.

<sup>8</sup>Participants know from the beginning that their earnings depend on external factors that will be revealed to them later on. See Appendix E.1 for experimental instructions.

<sup>9</sup>See Appendix E.2 for how this information was presented to participants.

	<i>H players</i>		<i>L players</i>	
	No shock	Shock	No shock	Shock
<b>Pre-shock</b> ( $x_{H1}, x_{L1}$ )	300	400	100	200
<b>Post-shock</b> ( $x_{H2}, x_{L2}$ )	300	300	100	100

Table 1: Pre- and post-shock earnings

are achieved by varying pre-shock earnings as illustrated by Table 1. If H players have been assigned to the shock condition they start with pre-shock earnings of 400. They then learn that they suffered a negative shock of -100 and are left with post-shock earnings of 300. If, by contrast, they are assigned to the no shock condition they directly start with 300. The same is true for L players. In the shock condition they start with 200 tokens and are left with 100 after the shock, while they already start with 100 tokens in the no shock condition.

Note that in case of a shock, both H and L players receive the same *absolute* reduction in earnings (-100). This implies at the same time that L players are affected more by shocks in relative terms. While the instructions make absolute losses salient, this does not rule out the possibility that people think in relative terms.<sup>10</sup> I therefore include control questions about the perception of absolute and relative differences in an ex-post survey and discuss how a focus on relative shocks could affect the interpretation of the findings where necessary.

## 2.2 Matching and allocation decisions

In order to investigate how people react to different shocks, I employ a 2x3 design and vary both *own* experience of shocks and what is known about the *other's* shock. Participants learn whether they suffered an income shock at the end of the production stage. In the redistribution stage they are subsequently matched with three other players. In a random order, they are matched with i) a player who has suffered a shock, ii) a player who has not suffered a shock and iii) a player for whom they have no information (while knowing that half of all participants suffered a shock). What is known about the other's shock thus varies within subjects, while the own experience of shocks only varies between subjects. As it is possible that earlier allocation decisions have an impact on later ones, the decision order is randomised. For the incomplete information condition, I also elicit incentivised beliefs about the shock to the other player.<sup>11</sup>

After being matched with another player, participants can freely redistribute the total

<sup>10</sup>I decided to keep absolute shocks constant across players, as it seems more intuitive to tell participants that they lost x tokens due to a negative shock instead of x% of their pre-shock income.

<sup>11</sup>Participants receive 50 token if their guess about the other's shock is correct and 0 otherwise. See Appendix E.2 for the exact phrasing of the belief question. To control for order effects, I randomise whether a participant first takes the allocation decision in iii) or is first asked to state their beliefs about the other player.

post-shock earnings between themselves and the other person in an unbounded dictator game.<sup>12</sup> At the end of the experiment, first one of the three situations is selected at random, then the allocation of one of the two players is chosen to be relevant for the bonus.

### 3 Conceptual framework

#### 3.1 Basic set-up

Before presenting the experimental procedure and results, I outline a theoretical framework that conceptualises the effect of inequality between player types and the experience of negative income shocks on allocation decisions. First, I describe the general set-up and for this purpose abstract from shocks. I thereby draw on previous work by Cappelen et al. (2007), who describe an individual  $i$ 's allocation decision at time  $t$  as a trade-off between own material payoff ( $y_{it}$ ) and what they consider as a fair allocation to themselves ( $m_{it}$ ). An individual's utility is then given by:

$$U_{it} = y_{it} - \beta_i \frac{(y_{it} - m_{it})^2}{X_t}, \beta_i \geq 0, \quad (1)$$

where  $X_t = x_{it} + x_{jt}$  is the sum of individual earnings that has been brought into the redistribution stage by individual  $i$  and  $j$  and  $\beta_i$  is a sensitivity parameter that describes how relevant it is for an individual to behave in line with their own notion of fairness. When solving (1) for the optimal allocation this results in:

$$y_{it}^* = m_{it} + \frac{X_t}{\beta_i} \quad (2)$$

If individuals do not care about adhering to their own fairness ideals ( $\beta_i \rightarrow 0$ ), the optimal solution is to allocate all earnings to themselves. The higher  $\beta_i$ , by contrast, the closer the allocation should be to what the individual considers as fair. A natural question is then by which principles individuals are guided when making their fairness judgement. One way previous literature has classified existing theories of justice is along the categories of "*equality and need*" and "*equity and desert*". While the first stresses the concern for the well-being of those who are the least advantaged, the latter focuses on individual responsibility and proportionality (Konow, 2003). In the following, I focus on two notions of fairness that embody these respective categories: the contribution-based and the egalitarian view. Under contribution-based, I understand the notion that each individual should receive exactly what

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<sup>12</sup>See Appendix E.2 for how the allocation screen looked like for participants.

they contributed to the overall endowment  $(x_{it}, x_{jt})$ .<sup>13</sup> This can be seen as a variation of Konow’s accountability principle, stating that a fair distribution should be proportionate to a person’s discretionary inputs (Konow, 2000, 2003).<sup>14</sup> The egalitarian view, by contrast, abstracts from individual contributions and favours an equal split of the total pie  $X_t$ . The two fairness views can thus be summarised as follows:

**Egalitarian fairness view:** *Fairness means equality of outcomes. It is fair to redistribute total earnings such that each individual receives the same amount independent of individual contributions.*

**Contribution-based fairness view:** *Fairness means that each individual receives a share of total earnings that is equal to their individual contributions. This is independent of whether such an allocation causes inequalities between individuals.*

Following the egalitarian fairness view thus implies that people dislike unequal outcomes, while the contribution-based view does not assign any value to equality (see Cappelen et al., 2007). Following previous literature, an individual’s fairness view can then be thought of a weighted average between these two notions (see e.g. Barr et al., 2015):

$$m_{it} = \alpha_i x_{it} + (1 - \alpha_i) \bar{x}_t, \quad (3)$$

where  $\alpha_i$  determines where on the continuum between the egalitarian and contribution-based fairness view an individual falls. If  $m_{it}$  is the fair allocation to self, the fair allocation to the other player from the point of view of individual  $i$  is consequently:

$$m_{jt} = X_t - m_{it} = X_t - (\alpha_i x_{it} + (1 - \alpha_i) \bar{x}_t) \quad (4)$$

While this conceptualisation represents a formal restriction on what can be considered as fair, it captures the most important ideas discussed by previous literature and thus provides a useful way to think about the possible range of fairness ideals (see e.g. Cappelen et al., 2007, 2013; Barr et al., 2015; Almås et al., 2020b).

<sup>13</sup>Cappelen et al. (2007) refer to this as a *libertarian* fairness view in line with the libertarian principle of non-interference.

<sup>14</sup>While Konow (2000, 2003) argues that a fair allocation will be a function of inputs and endowments, he also states that only discretionary factors should matter for allocation decisions. Subjects should not be held accountable for exogenous variables. As discussed in the design section, there exists some wiggle room as whether income differences between H and L players can be seen as deserved/ discretionary (different difficulty levels) or as exogenous factors (random assignment). The label contribution-based abstracts from this discussion.

### 3.2 Relative differences in income

As mentioned in the introduction, individuals often tend to follow the notion of fairness that is most beneficial for themselves (Konow, 2000; Cappelen et al., 2013; Ubeda, 2014; Barr et al., 2015; Gallenstein, 2021). In this context, this would imply that individuals assign a larger weight to the fairness view that allows a larger allocation to self ( $y_{it}$ ). Such a strategic choice of  $\alpha_i$  is closely related to the literature on motivated beliefs and reasoning (Bénabou and Tirole, 2016). Typically, motivated beliefs are modelled by an interpersonal game over several time periods (see e.g. Bénabou, 2015). In this context, one can think of the allocation decision as a two-period process ( $t \in \{0, 1\}$ ), as illustrated by Figure 2. At  $t = 0$ , an individual decides which fairness ideal (which  $\alpha_i$ ) they should apply in a specific situation. At  $t = 1$  this  $\alpha_i$  is then taken as given and  $i$  decides on what they consider as fair ( $m_{it}, m_{jt}$ ) given the individual earnings  $x_{it}, x_{jt}$ , and ultimately how they want to distribute  $X_t$ . The  $t = 1$  self can thus see themselves as a fair person, adhering to their chosen fairness view while ignoring the fact that the latter might have been chosen strategically. The  $t = 0$  self then faces the following maximisation problem:

$$\max y_{it} = \underbrace{\alpha_i x_{it} + (1 - \alpha_i) \bar{x}_t}_{m_{it}} + \frac{X_t}{\beta_i} \text{ w.r.t } \alpha_i \quad (5)$$

Solving (5) results in  $\frac{\partial y_{it}}{\partial \alpha_i} = x_{it} - \bar{x}_t$ , implying the following corner solutions:

$$\alpha_i^* = \begin{cases} 1, & \text{if } x_{it} > \bar{x}_t. \\ 0, & \text{if } x_{it} < \bar{x}_t. \end{cases} \quad (6)$$

The initial inequality in earnings implies that for H players, the individual contribution to total earnings is always larger than an equal split ( $x_{it} > \bar{x}_t$ ), while the opposite is true for L players. To maximise their own material benefit while still complying with their fairness views, H players should thus tend towards a contribution-based and L players towards an egalitarian notion of fairness. Note that my experiment is deliberately designed in a way

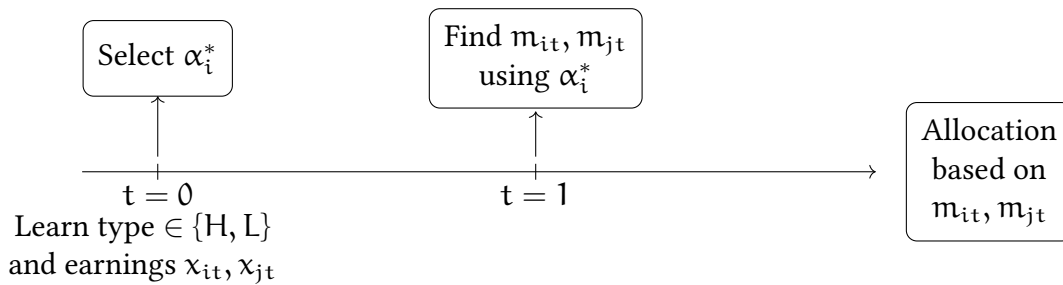


Figure 2: Formation of fairness ideals and allocation decisions

that allows participants to justify a contribution-based as well as an egalitarian fairness view. H players can focus on the differences in difficulty levels, giving them a feeling of entitlement to higher earnings than L players. L players, by contrast, can focus on the random assignment to the different tasks and that earnings are independent of effort which in turn provides an argument in favour of an equal split. The different fairness views predicted for H and L players are in line with recent work by [Gallenstein \(2021\)](#) who shows theoretically and empirically that income inequality induces individuals to hold different notions of fairness.

**Proposition 1:** *Income inequality makes it optimal for different player types to adhere to different notions of fairness. Relatively richer individuals are more likely to adhere to contribution-based fairness views, while relatively poorer individuals are more likely to hold egalitarian views.*

### 3.3 Experience of shocks

While so far I have considered the endowment that can be redistributed to be fixed, the introduction of negative shocks, confronts individuals with a *dynamic* situation. Individuals thus have to determine twice what they consider as fair: once before and once after learning about income shocks. While the fairness judgement is likely to change with the new situation, it might be difficult for individuals to completely discard their initially held beliefs. Previous research has shown that distributional preferences in fact show a certain degree of stickiness and are affected by reference points ([Roth and Wohlfart, 2016](#); [Charité et al., 2019](#)). In this setup, the reference point is the fairness judgement in the initial situation which then affects how much each individual should receive in the following way:

- $t=1$ : Participants see pre-shock endowments and decide what would be a fair allocation in this situation  $(m_{i1}, m_{j1})$ . Then a shock happens, implying that individuals are confronted with a new situation.
- $t=2$ : When deciding what is fair now  $(m_{i2}^*, m_{j2}^*)$ , individuals are both influenced by what they would consider as fair in the new situation  $(m_{i2}, m_{j2})$ , but also by what they regarded as fair before the shock (see Figure 3).<sup>15</sup>

$$\begin{aligned} m_{i2}^* &= (1 - \rho_i)m_{i2} + \rho_i m_{i1} \\ m_{j2}^* &= (1 - \rho_j)m_{j2} + \rho_j m_{j1}, \end{aligned} \tag{7}$$

where  $\rho_i \in \{0, 1\}$  can be seen a measure for the stickiness of the initial judgement and is exogenously given.  $m_{i2,j2}$  describes what an individual would have considered as fair in

<sup>15</sup>The reference dependence of fairness views is formalised in line with [Kőszegi and Rabin \(2006\)](#).

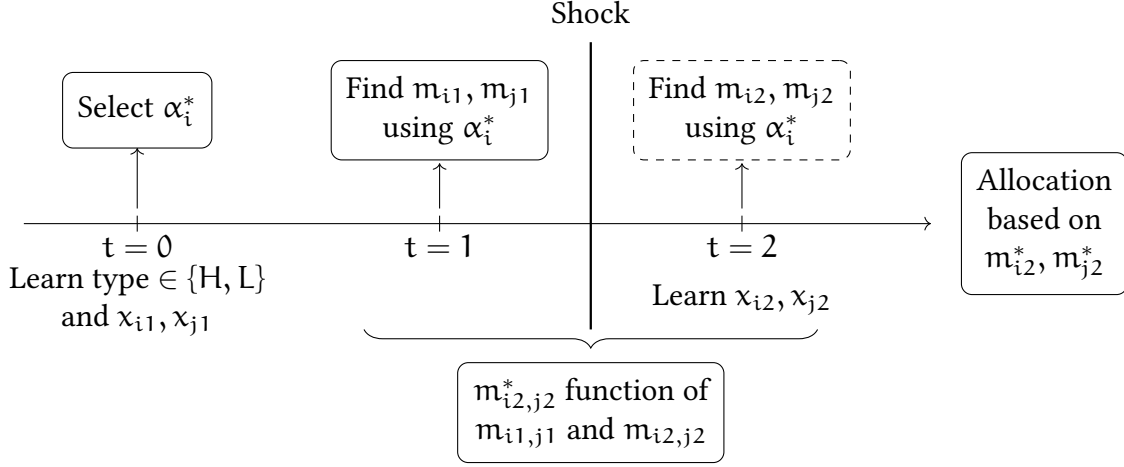


Figure 3: The effect of shocks on allocation decisions

the final situation, had they been presented with it from the start. However, as the initial fairness judgement is sticky and I consider individuals to have a desire to be consistent with themselves, the final fairness judgement  $m_{i2,j2}^*$  will be different from the hypothetical judgement  $m_{i2,j2}$ . If  $\rho_i > 0$  the pre-shock situation will thus influence an individual's fairness judgement.

So far, the model has only been concerned with the ideal allocation that individuals consider as fair. However, this allocation also needs to be feasible. One issue caused by negative shocks is that the total amount that can be distributed ( $X_t$ ) is shrinking. This means that it will not be possible to fulfil  $m_{i1}$  and  $m_{j1}$  at the same time. As an example assume that an H player thought at the beginning that a fair allocation of a total  $X_1 = 500$  would be 400 for themselves and 100 for the L player. However, after a shock the available pie  $X_2$  is only 400. It thus becomes impossible to stick to the allocation that was originally considered as fair. The individual needs to weigh off the fair reference allocation for themselves against the one for the other player. Let  $\gamma_i$  measure how much individual  $i$  cares for the fair reference allocation to self relative to the fair reference allocation to the other player. Equation (7) can then be adjusted such that  $X_2 = m_{i1} + m_{j1}$  is satisfied:

$$\begin{aligned}
 m_{i2}^* &= (1 - \rho_i)m_{i2} + \rho_i \underbrace{[\gamma_i m_{i1} + (1 - \gamma_i)(X_2 - m_{j1})]}_{\text{feasible } m_{i1} \text{ satisfying } X_2 = m_{i1} + m_{j1}} \\
 m_{j2}^* &= (1 - \rho_i)m_{j2} + \rho_i \underbrace{[\gamma_j m_{j1} + (1 - \gamma_j)(X_2 - m_{i1})]}_{\text{feasible } m_{j1}}
 \end{aligned} \tag{8}$$

Using equation (8), one can now explore how different types react to negative shocks. If H players suffer a shock, then the higher fair reference allocation to self ( $m_{i1}$ ) leads to an increase in  $m_{i2}^*$ , implying that they will justify a larger allocation to themselves after a shock



than had they been faced with the same situation from the beginning. Similarly, if H players observe others suffering a shock,  $m_{j1}$  will drive the perceived fair allocation to the other player ( $m_{j2}^*$ ) upwards. For instance, assume an H player follows the contribution-based fairness view and thinks before the shock that a fair allocation would be 400 to self and 100 to the other player, justified by differences in difficulty levels. After the shock reduces the H player's earnings to 300, they still feel to a certain degree that they deserve 400, driving allocations to self upwards. The opposite holds true if the other player suffers a shock. Pre-shock earnings thus constitute a reference point that is affecting how individuals perceive a fair allocation in a new environment. If both players suffer a shock, the weight individuals give to their own versus the other's reference point ( $\gamma_i$ ) determines which of the two effects prevails.<sup>16</sup>

**Proposition 2:** *Under a contribution-based fairness view, negative shocks to self imply that individuals consider a larger allocation to self as fair. Likewise, if they observe another person suffering a negative shock they take this into account and perceive a higher allocation to the other as fair.*

When looking at L players, by contrast, the egalitarian view implies that both before and after the shock the amount they consider as fair for themselves and the other player is half of the total pie. Assuming that  $\gamma_i$  is exogenously given for each individual, this means it does not matter whether the players themselves, the players they are matched with or both are hit by a shock. Intuitively, if L players focus on the random allocation of the real effort tasks and thus see differences in initial earnings as undeserved, a fair distribution would be an equal split and it does not matter whether individual earnings change due to a negative shock.<sup>17</sup> The fairness judgement will be identical in all situations.

**Proposition 3:** *Under an egalitarian fairness view, negative shocks to self, the other or both have no effect on what an individual judges as a fair allocation for self and other.*

### 3.4 Hypotheses

The theoretical framework allows me to derive precise hypotheses for the experimental design with respect to income differences and reactions to shocks.

When first considering general differences between H and L players, *Proposition 1* shows that it is optimal for different player types to hold distinct fairness ideals. In particular,

<sup>16</sup>Appendix A derives in more detail how the amount that is considered as fair changes for both player types conditional on the experience of shocks.

<sup>17</sup>The reduction in the overall stake size implies that there is some wiggle room of how to allocate total earnings depending on  $\gamma_i$ , the weight individuals put on their own reference point. However, as  $\gamma_i$  is exogenous, this is identical across different shock scenarios.



H players should be more likely to hold contribution-based ( $\alpha_i^* \rightarrow 1$ ) and L players to hold egalitarian views ( $\alpha_i^* \rightarrow 0$ ). This means ultimately that H and L players will take different allocation decisions.<sup>18</sup> H players are expected to focus on individual contributions, allocating 300 to themselves and 100 to the other player, while L players are expected to focus on an egalitarian split (200 - 200). Given the earnings structure where  $x_{Ht} > \bar{x}_t > x_{Lt}$ , L players should moreover allocate less to themselves than H players independent of shocks.<sup>19</sup>

**Hypothesis 1 - The importance of relative income differences:** *L players allocate significantly less to themselves than H players. In line with an egalitarian view, L players' allocations will be closer to an egalitarian split (200-200), while H players' allocations will be closer to individual contributions (300-100).*

When it comes to the effect of shocks, the framework predicts further differences between H and L players due to the adherence to different fairness views. In particular, H players should allocate more to themselves after suffering a negative shock and less to themselves after they observe the other player suffering a negative shock (see *Proposition 2*). When looking at L players, by contrast, *Proposition 3* shows that shocks should not cause any changes in what is considered as fair under an egalitarian fairness view. Consequently, the final allocation decision is expected to be independent of the experience of shocks.

**Hypothesis 2 - Effect of different shock experiences:** *For H players, a negative shock to own earnings results in higher allocations to self and lower allocations to the other player. A negative shock to the other player results in lower allocations to self and higher allocations to the other player. For L players, allocations are not affected by the experience of shocks.*

As the predicted effects of a shock to self and a shock to other go in opposite directions, an interesting question is what happens if both players suffer a shock. The answer depends on how much weight individuals assign to their own reference point relative to the other's ( $\gamma_i$ ). Likewise, people could react differently to others' shocks depending on their own experience.<sup>20</sup> Both questions can be analysed empirically within the experiment.

Finally, after exploring differences between player types and experience of shocks, my design also addresses the question of what happens under incomplete information. For

<sup>18</sup>Note that for both player types there is always wiggle room to allocate more to oneself than one considers fair (depending on  $\beta_i$ ).

<sup>19</sup>In the pre-registration, I hypothesised that H and L players could behave differently in the experiment. After further developing the theoretical framework it is possible to make more specific predictions about these differences.

<sup>20</sup>Previous research suggests that the reaction to another person's shock might indeed depend on own prior experiences (Cassar and Klein, 2019).

instance, people could convince themselves that they are the only ones who have suffered a shock in the absence of explicit information. Such biased beliefs would be in line with their own material interest if a shock to the other person implies higher allocations to the other and lower to self. Pretending that the other did not suffer a shock, would justify a similar allocation as in the situation where it is known that the other did *not* suffer a shock.

**Hypothesis 3 - The role of incomplete information:** *Participants might form beliefs in a self-serving way if information is incomplete. Allocations under incomplete information will then be closer to a situation where it is known that the other did not suffer a shock.*

## 4 Study 1: Results

### 4.1 Sample and data collection

The experiment was programmed using LIONESS Lab ([Giamattei et al., 2020](#)) and participants were recruited online via Prolific in July 2021. The median completion time was 15.5 minutes and participants earned on average £7.35/h. In total, I recruited 536 participants that were equally distributed across player type and shock experience (see table 2).<sup>21</sup> Participants in Study 1 were stratified with respect to real world shocks to ensure balance across treatment cells and to increase the comparability between Study 1 and 2. Using data provided by Prolific, I distinguished between three different sub-samples: 1) participants who became unemployed due to Covid-19 (large shock), 2) participants who were full-time employed and now work part-time (medium shock) and 3) participants who still work full-time (no shock).<sup>22</sup>

After participants completed the experiment, they were asked to fill out a short ques-

	H players	L players
Shock self	134	134
No shock self	134	134
Total N	536	

Table 2: Sample size across player types and experience of shocks

<sup>21</sup>The sample size was informed by a power analysis based on comparisons of means and allows to detect an effect at a significance level of 5% with 90% power. I used an average effect size of 0.36 standard deviations that was informed by previous research on redistributive preferences ([Fisman et al., 2015](#); [Barr et al., 2015](#); [Cassar and Klein, 2019](#)).

<sup>22</sup>Table B.1 in Appendix B provides an overview of the sample and confirms that participants who do/do not suffer a shock within the experiment are balanced across demographic characteristics. The same holds true for H and L players (see Table B.2).

tionnaire that collected demographic information,<sup>23</sup> affect reactions, perceived closeness between participants,<sup>24</sup> attitudes towards redistribution and solidarity during a crisis, as well as perceptions of inequality and shocks within the experiment.<sup>25</sup>

## 4.2 The importance of relative income differences

Before diving into the effect of shocks, I first explore whether the relative income of a player matters. Independent of shocks, H players are predicted to distribute total earnings more in line with a contribution-based fairness view and L players more in line with an egalitarian fairness view. This should also translate into lower overall allocations to self for L players (see Hypothesis 1). The left graph in Figure 4 shows the average allocation to self for each player type and confirms that L players in fact allocate significantly less to themselves ( $p < 0.01$ ). This is in line with previous research showing that initial earnings generate a feeling of entitlement (see e.g. Barr et al., 2015; Jakiela, 2015).

The right graph in Figure 4 shows the distribution of allocations for both H and L players. The distribution for H players is not only shifted to the right, but also differs with respect to modal allocations.<sup>26</sup> While the most common allocation to self for H players is 300 in line

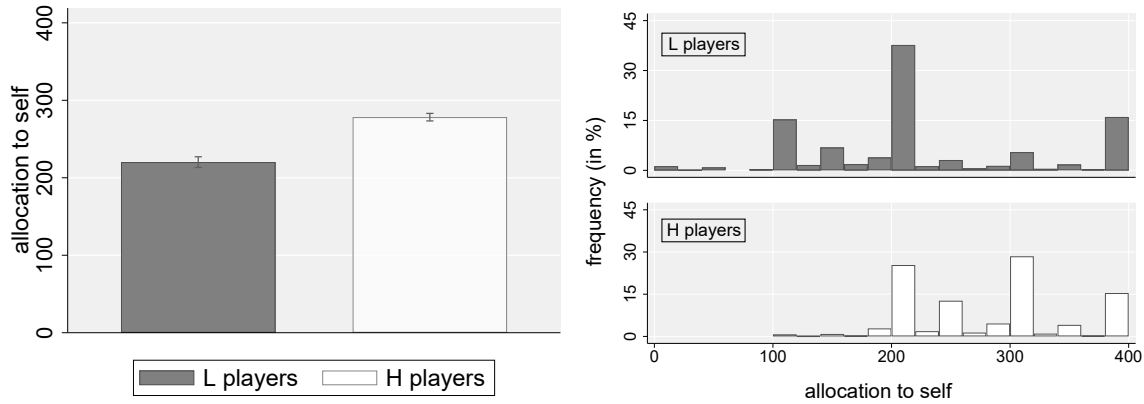


Figure 4: Average allocation to self (LHS) and distribution (RHS) by player type

<sup>23</sup>In particular, I collected information on participants' gender, age, country of origin, household income and size, political orientation, subjective social status (Adler et al., 2000), highest educational attainment as well as attitudes towards redistribution and solidarity, effects of Covid-19 crisis on financial situation, as well as changes in employment status due to Covid-19.

<sup>24</sup>See Appendix B.4 for an analysis of closeness and affect.

<sup>25</sup>Attitudes towards solidarity and behaviour during a crisis affect allocations in the experiment. People who state that compassion is a crucial virtue ( $p < 0.05$ ), that in a crisis people become more compassionate ( $p < 0.05$ ) and that one should give priority to society's instead of individual problems allocate significantly less to themselves ( $p < 0.01$ ). These correlations are also confirmed in Study 2.

<sup>26</sup>A Kolmogorov-Smirnov test confirms that the distributions are statistically different from each other ( $p < 0.01$ ).

with a contribution-based fairness view, the modal choice for L players is the egalitarian 200-200 split. While there is a second mode for H players at 200, indicating some heterogeneity in fairness views, the results confirm that there are substantial differences in both mean and modal allocations between player types. This supports Hypothesis 1 that relative differences in income cause a focus on different fairness ideals, with relatively richer individuals being more likely to follow a contribution-based notion of fairness and relatively poorer individuals being more likely to act as egalitarians.

**Result 1:** *Relative income differences matter for redistribution decisions. L players are more likely to favour an egalitarian allocation, while H players are more likely to follow a contribution-based fairness view.*

### 4.3 Effect of different shock experiences

Next, I turn to how different player types react to negative shocks.<sup>27</sup> Figure 5 depicts how allocations to self change for H players after they themselves (left graph) or the other player (right graph) suffered a shock. As can be seen, there is a clear reaction to shocks with the cumulative distribution of allocations shifting to the right (left) after a shock to self (other). H players thus become on average more selfish after a shock to themselves ( $p < 0.05$ ) and more generous after a shock to the other person ( $p < 0.05$ ). L players, by contrast, do not adjust their behaviour with shocks. As Figure 6 shows, they neither react to own nor other's shocks.<sup>28</sup> Both results are in line with Hypothesis 2 and are confirmed by a regression analysis. Table 3 reports results from regressing the number of tokens individuals allocate

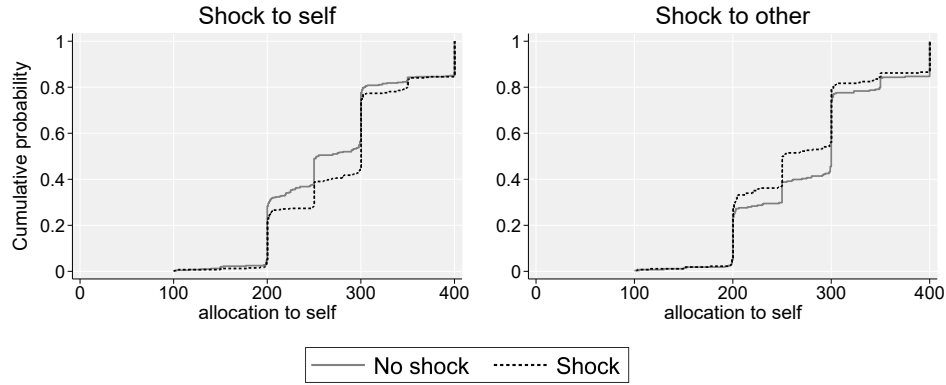


Figure 5: H players' reaction to different shocks

<sup>27</sup>When comparing affect measures between participants who did or did not suffer a shock, I find that people report significantly more negative feelings after suffering a shock (see Appendix B, Figure B.1). This underlines that a shock within the experiment really is felt as a negative event.

<sup>28</sup>While for H players, distributions are statistically different from each other (Kolmogorov-Smirnov tests,  $p < 0.05$ ), they are statistically not distinguishable for L players.

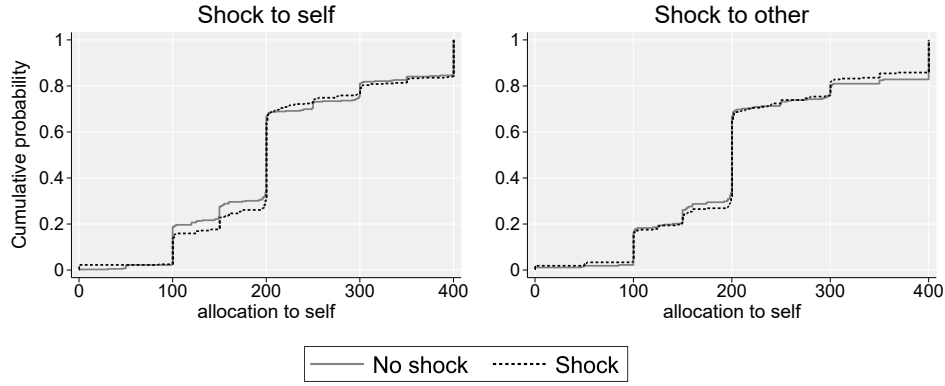


Figure 6: L players' reaction to different shocks

to themselves on own and other's shock. Note that the error term  $\epsilon_i$  is clustered on the individual level as it is non-independent within  $i$ . The reason for this is that each individual is making decisions for three different scenarios. As the decision order is randomised, all regressions control for order effects, although the latter are not significant.<sup>29</sup> In line with the graphical evidence, the results confirm that H players allocate more to themselves after experiencing a negative shock and less to themselves if the other player suffered a negative shock (model 1). These effects are robust to the inclusion of controls (model 2).<sup>30</sup> While both own and other's shocks have a significant effect on allocation decisions for H players, Table 3 also confirms that there is no effect for L players. Income differences thus translate into very distinct reactions to negative shocks.<sup>31</sup>

**Result 2:** *H players react to negative income shocks. They allocate more to themselves after experiencing an own shock and less to themselves if the other player suffered a negative shock. L players' allocation decisions are not affected by the experience of negative shocks.*

Next, I explore whether individuals react differently to the shocks of others conditional on their own experience as well as the relative weight participants put on own and other's shocks. As only H players show a reaction to shocks, I restrict the subsequent analysis to this sub-sample. To answer the question about conditionality, I include an interaction between own and other's shocks in model 3. However, the results show that the latter is statistically insignificant ( $p = 0.35$ ).<sup>32</sup> This means that being affected by a shock does not

<sup>29</sup>In particular, I include a binary variable that takes the value of 0 if participants are first facing the "no shock to other" scenario and 1 if they first take a decision for the "shock to other" situation. Table B.3 in Appendix B shows that there is no significant interaction between treatment indicators and the order dummy.

<sup>30</sup>Model (2) includes demographic controls. The results show that both women and older participants allocate significantly less to themselves ( $p < 0.1$  and  $p < 0.05$  respectively).

<sup>31</sup>The difference between player types is confirmed by a Chow test for the equality of slopes in a pooled regression of H and L players (see Appendix B, Table B.5).

<sup>32</sup>This also holds true when excluding controls from model 3.

Table 3: OLS models for the effect of shocks on allocation to self  $y_i$ 

	H players			L players		
	(1)	(2)	(3)	(4)	(5)	(6)
Shock self	13.10* (7.87)	14.99* (7.77)	11.87 (8.57)	3.10 (11.63)	2.72 (11.85)	6.75 (12.33)
Shock other	-12.06*** (3.29)	-11.71*** (3.39)	-14.82*** (4.33)	-2.29 (3.66)	-1.80 (3.62)	2.15 (5.51)
Shock self x Shock other			6.24 (6.78)			-8.06 (7.20)
Constant	277.61*** (6.74)	305.43*** (35.65)	306.99*** (35.83)	211.72*** (10.02)	291.46*** (43.24)	289.48*** (43.48)
Additional controls	No	Yes	Yes	No	Yes	Yes
N observations	536	518	518	536	510	510
N clusters	268	259	259	268	255	255
R-squared	0.016	0.117	0.118	0.004	0.136	0.137

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

cause participants to become more or less responsive to the shock of their co-player. This finding can also be rationalised with the theoretical framework. The effect of a shock to other on the allocation considered as fair can be isolated by comparing a situation where the other did and did not suffer a shock. It can then be shown that the size of the effect is identical for a situation where there is a shock to self and one where there is no shock to self (see Appendix A.2).

When it comes to the strength of reactions to own and other's shocks, one can see from Table 3 that the coefficient on own shock is slightly larger than the one on shock to other after excluding the interaction. However, a Wald test cannot reject the null hypothesis of no difference between the coefficients of *shock self* and *shock other* for any of the specifications. It thus seems that H players are taking both own and others' shocks into account and are reacting to them in a similar way.<sup>33</sup> However, there are two caveats that reduce the ability to compare the two shocks. First, the reaction to own shocks is measured between subjects, while the reaction to the other's shock is measured within subjects. Despite accounting for a non-independence within subjects by clustering standard errors on the individual level it cannot be ruled out that reactions are stronger within than between subjects. Secondly, while H and L players are suffering the same absolute shocks, L players are more affected

<sup>33</sup>Figure B.2 in Appendix B illustrates graphically that allocations after a shock to both lie between allocations for only a shock to self and only a shock to other.

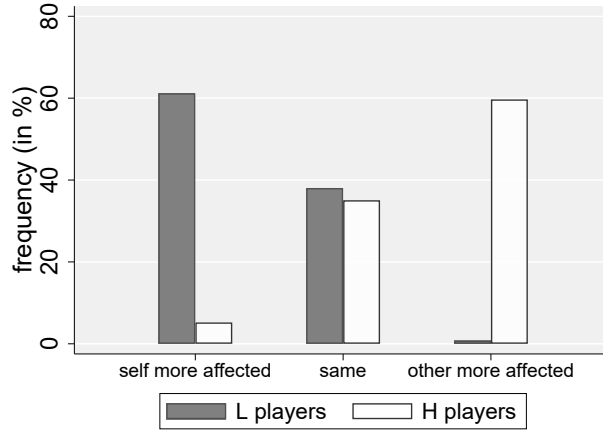


Figure 7: Relative versus absolute perception of shocks by player type

in relative terms. If participants are aware of this and put an equal weight on own and other's shocks, H players should actually show a stronger reaction to the shock to others. As Figure 7 shows, about 60% of both H and L players do indeed state in the ex-post survey that L players are more affected by shocks while the remaining 40% state that they are affected in the same way.<sup>34</sup> When interacting the perception of shocks with the shock to other, however, players with different perceptions show the same response to shocks (see Appendix B, Table B.4). Nevertheless, one has to be careful when drawing conclusions about the weights participants put on own and others' shocks. What can be inferred from the results is that H players are assigning *at least* as much weight to their own shocks than to the shocks of others.<sup>35</sup>

**Result 2.2:** *When making their allocation decisions, H players put at least as much weight on their own shocks than on the shocks of others.*

#### 4.4 The role of incomplete information

So far I have focused on allocation decisions under full information. In one of the three scenarios, however, participants are faced with a situation in which they do not know what happened to the player they have been matched with.<sup>36</sup> What is known, however, is that overall half of the players in the experiment suffer a shock and half of them do not. When asked about their beliefs, on average, 50% of participants should thus state that the other did suffer a shock and 50% that the other did not suffer a shock. Figure 8 shows that while L

<sup>34</sup>Note that the question about who was affected more by a shock can only be asked to the sub-sample of participants who did suffer a shock themselves.

<sup>35</sup>They assign the same weight to both shocks if they feel affected identically by a shock and a higher weight to own shocks if they feel the other was affected more.

<sup>36</sup>The phrasing used in the experiment is that the other player "might or might not have suffered a shock".



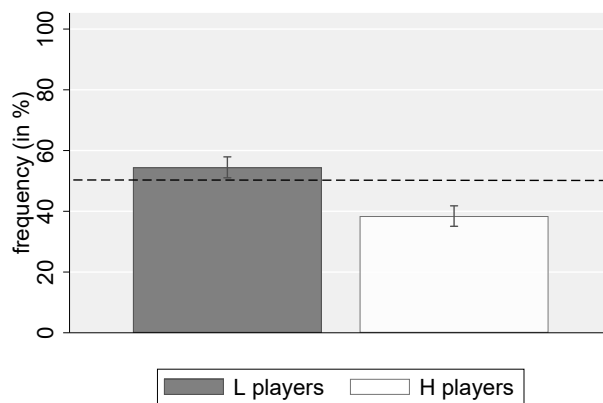


Figure 8: Share of players believing that the other suffered a shock by type

players do not deviate from this prediction, the beliefs of H players are significantly downwards biased with less than 50% stating that the other did suffer a shock ( $p < 0.01$ ). This self-serving bias is in line with Hypothesis 3. As H players are the ones who react to shocks, acknowledging that the other player might have suffered a shock would imply that H players should allocate less to themselves and more to the other. If, by contrast, they tell themselves that the other probably did not suffer a shock, H players can justify higher allocations to self without deviating from the contribution-based fairness view. For L players, on the other hand, there is no incentive to distort beliefs, as the most prevalent fairness ideal is the egalitarian one which translates into an equal split independent of the experience of shocks.<sup>37</sup>

In addition to beliefs, I find that incomplete information has a significant effect on allocation decisions for H, but not for L players. Table 4 shows the results of regressing allocations to self on shock to self and the available information about the other player.<sup>38</sup> The table shows that under no information, H players behave as if the other player did not suffer a shock. Similarly, a Wald test shows that allocations to self are significantly higher under incomplete information than if it is known that the other suffered a shock ( $p < 0.01$ ). For L players, by contrast, allocation decisions are indistinguishable across all three scenarios, strengthening the argument that their allocation decisions are following an egalitarian fairness ideal and do not respond to shocks.

<sup>37</sup>This bias for H players is independent of the own shock experience (see Appendix B, Figure 8). For L players without a shock, beliefs are indistinguishable from the hypothesised value 50%. If they suffer a shock themselves they are even slightly more likely to believe that the other suffered a shock ( $p < 0.1$ ). Given that L players are already receiving lower initial earnings, this might be wishful thinking in the sense that they do not want to be twice disadvantaged relative to the H player.

<sup>38</sup>The regressions control for order effects. As in the complete information scenarios, order effects are jointly insignificant.



Table 4: OLS models for the effect of shocks and information on allocation to self  $y_i$ 

	H players		L players	
	(1)	(2)	(3)	(4)
Shock self	11.74 (7.81)	13.14* (7.60)	4.37 (11.81)	4.52 (11.60)
<i>Information (ref.: Info = no shock other)</i>				
Info = Shock other	-12.06*** (3.30)	-11.71*** (3.37)	-2.29 (3.67)	-1.80 (3.60)
Info = No information	-1.53 (3.26)	-0.52 (3.30)	2.16 (3.57)	1.45 (3.72)
Constant	272.74*** (11.98)	301.58*** (35.57)	219.81*** (15.41)	259.91*** (41.66)
Additional controls	No	Yes	No	Yes
N observations	804	777	804	765
N clusters	268	259	268	255
R-squared	0.02	0.12	0.02	0.15

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Information* is a categorical variable that takes the value of 0 if player  $i$  is informed that the other did not suffer a shock, 1 if player  $i$  is informed that the other did suffer a shock and 2 if the other's shock is unknown. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

**Result 3:** *Under incomplete information H players' beliefs are systematically biased towards the other not suffering a shock. Consistent with that, H players behave as if the other did not suffer a shock in their allocation decisions. L players do not show biased beliefs and allocate total earnings in the same way across conditions.*

## 5 Study 2: Design

While Study 1 isolates the effect of income differences and negative shocks through a controlled lab experiment, Study 2 moves away from a purely exogenous variation and brings real world shocks into the lab. Although this entails certain challenges with respect to endogeneity, the design provides additional insights into how people react to shocks and in how far findings from a pure laboratory experiment extend to a less abstract environment.

The real-life shock experience I focus on in this study is how people's economic situation has been affected by the Covid-19 pandemic. The structure of Study 2 closely follows the pure laboratory experiments. As before, half of the participants engage in an easier task earning a lower flat fee  $x_L$ , the other half in a more difficult task earning the higher flat fee  $x_H$ , before deciding how to redistribute total earnings between themselves and the other player. However, this time there is no negative shock that reduces earnings from the pro-

duction stage. Instead after being matched with another player, participants learn about the *real world shock* of the other person. In particular, they either learn that the other player i) did suffer a significant loss in livelihood due to Covid-19, ii) did not suffer a significant loss in livelihood due to Covid-19 or iii) are not provided with information about the other player. For iii), participants again have to guess the other player's real world experience and receive a bonus if their beliefs are correct. The information about the loss in livelihood is thereby presented in the exact same way as previously the information about income shocks within the lab.<sup>39</sup>

To define whether participants suffered a *significant loss in livelihood* I use information about changes in their employment status that is accessible on Prolific. Participants who experienced a change from full-time employment to unemployment due to the current Covid-19 crisis are classified as having suffered a shock, while participants who remained in full-time employment are classified as not having suffered a shock.<sup>40</sup> While this information is used to inform participants about the shocks of the other player, I directly ask participants whether they suffered a significant loss in livelihood in the ex-post questionnaire and use this question as a proxy for own shock.<sup>41</sup> Even if somebody lost their job due to Covid-19, whether this constitutes a significant loss in livelihood will depend on many other factors such as assets, savings or income provided by other family members. I thus use the survey question to make shocks to self and other more comparable.<sup>42</sup> This results in 62% of participants being categorised as having experienced no negative shock, while 38% are categorised as having suffered a shock.<sup>43</sup>

It is important to note that while Study 2 closely mirrors the design of Study 1, there are two key difference. First, while the shock to the other player remains exogenous in Study 2, the own experience of shocks becomes endogenous. Moreover, the environment in which I study negative shocks differs significantly between studies. While Study 1 constitutes a very abstract and controlled environment, Study 2 moves closer to people's real world experiences and explores shocks in a specific economic context. Study 2 thus complements and extends the findings from Study 1 and shows how the combination of different degrees of control and realism can contribute to a broader understanding of behavioural mechanisms.

<sup>39</sup>See Appendix F.1 and F.2 for instructions and screenshots of the experiment.

<sup>40</sup>The formulation a *significant loss in livelihood* was chosen to avoid any connotations with being unemployed.

<sup>41</sup>The question asked on a scale from 1 to 7 how much do you agree with the statement that you suffered a significant loss in livelihood due to Covid-19. I classify everyone who disagrees with the statement as not having suffered a shock (1-4) and everyone who agrees as having suffered a shock (5-7).

<sup>42</sup>Moreover, there are some discrepancies between the information on Prolific and the ex-post survey. While 82% of participants who indicated on Prolific that they are still fully employed confirm this in this study, only 48% of participants who indicated that they became unemployed do so. This might either mean that people who lost their jobs have already moved on to a new job, or that there are mistakes in one of the two surveys.

<sup>43</sup>The correlation between whether a participant stated they suffered a significant loss in livelihood and that they lost their employment due to Covid-19 is 0.44 ( $p < 0.01$ ).

## 6 Study 2: Results

### 6.1 Sample and data collection

As in Study 1, the experiment was programmed with LIONESS Lab (Giamattei et al., 2020) and run online via Prolific in July 2021. The median completion time was 14.7 minutes and participants earned on average £7.76/h.<sup>44</sup> A total of 536 participants was equally split by player type and Covid-19 employment status.<sup>45</sup> As discussed above, I define a participant's own shock based on their self-perceived loss in livelihood, while the shock to other is informed by a participant's employment status. Table 5 gives an overview of the sample size across player types, employment status and loss in livelihood.

<i>Loss in livelihood</i>	Still fully employed		Unemployed	
	H players	L players	H players	L players
Shock self	23	22	78	81
No shock self	111	111	56	54
N	133	134	135	134

Table 5: Sample size across loss in livelihood, employment status and player type

As before, the experiment was complemented by a survey eliciting demographics, perceptions of own and other's shocks, affect reactions, perceived closeness to the other player<sup>46</sup>, and general attitudes towards redistribution and solidarity during a crisis. I find that participants who state they suffered a significant loss in livelihood are more likely to be female, to have lost their employment, to be from a lower income category, to have a lower perceived social status, to have recently faced financial struggles and to be from the US. They are less likely to have a graduate degree, be fully employed and to be from a European country (see Appendix C, Table C.1). This demonstrates that shocks to self are not orthogonal to individual characteristics. However, generalising from a lab experiment will always be accompanied by a loss of control, while offering a deeper understanding of the problem in a specific context.

### 6.2 The importance of relative income differences

Again, I first examine differences between player types. The left graph in Figure 9 shows that initial differences in individual earnings translate into differences in allocations to self.

<sup>44</sup>Both completion times and payments are thus very similar across studies.

<sup>45</sup>This is in line with the power calculations and sample size for Study 1.

<sup>46</sup>See Appendix C.4 for an analysis of closeness and affect in Study 2.

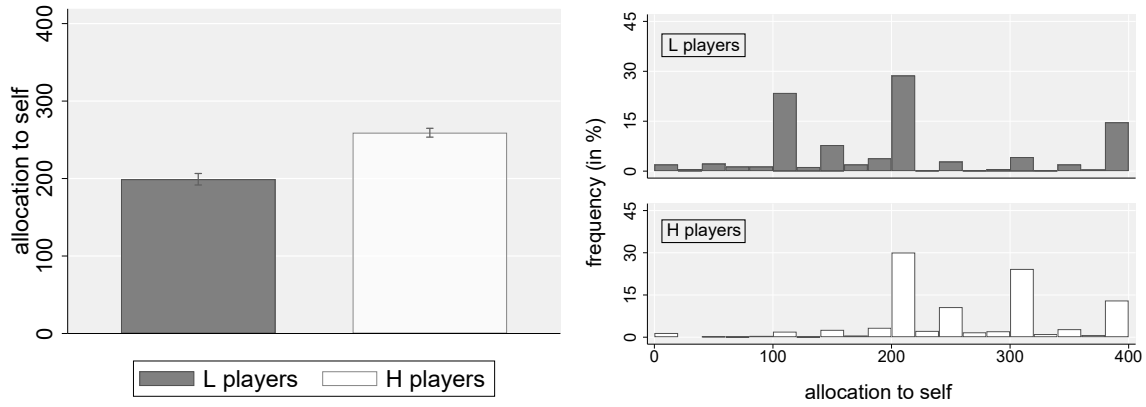


Figure 9: Average allocation to self (LHS) and distribution (RHS) by player type

In line with Study 1, L players allocate significantly less to themselves than H players ( $p < 0.01$ ). However, when looking at the distribution (right graph, Figure 9), the most common allocation for both H and L players is now 200-200, indicating an egalitarian fairness ideal. Also the share of participants who follow a contribution-based fairness view (300-100) is comparable across player types.

It is important to note that income differences are generated within the lab, while the information about the other's shock is based on recent and severe real world experiences. It is thus conceivable that the real world shock information has such a strong impact that differences between experimental player types become less important when deciding what is fair. This notion is confirmed by the fact that when restricting the sample to cases where it is known that the other did not suffer a shock, the finding from Study 1 that different player types follow different fairness ideals re-appears. As Figure 10 shows, H players are again most likely to allocate 300 to themselves, while the modal allocation for L players is an equal split.

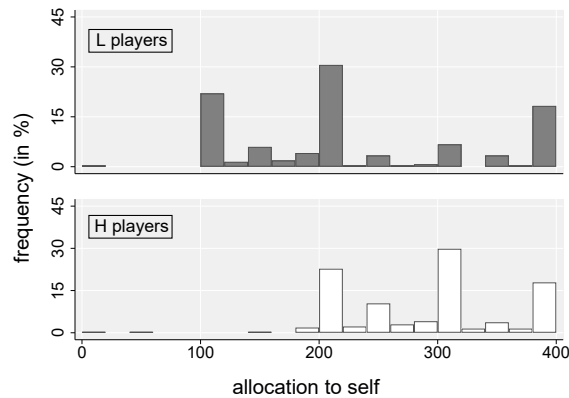


Figure 10: Allocation distribution by player type (no shock to other)

**Result 1:** *Relative income differences in the lab matter for allocation decisions in the absence of real world shocks. When introducing large real world shocks this difference becomes less pronounced and an egalitarian split becomes the most common allocation for all players.*

### 6.3 Effect of different shocks

The results from section 6.2 already indicate that player types that are induced in the lab might lose their importance in face of a large real world shock. When exploring the effect of negative shocks, a Chow test confirms that the reaction to both own and other's shock is statistically indistinguishable between types (see Appendix C, Table C.2). For the rest of the analysis, I therefore pool H and L players and only control for level differences between types.

The left graph in Figure 11 shows how participants with different own real world experiences behave in the experiment. The cumulative distribution of allocations to self for individuals who suffered a significant loss in livelihood is slightly shifted to the right. In line with this, I find that own real world shocks are associated with more selfish allocation decisions ( $p < 0.05$ ). When it comes to the other player's shock, by contrast, the right graph in Figure 11 shows that when learning someone suffered a significant loss in livelihood due to Covid-19, participants become more generous and allocate significantly less to themselves ( $p < 0.01$ ).<sup>47</sup>

To test the reaction to own and others' shocks more formally, I estimate the same regression model as in Study 1, this time controlling for differences between H and L players

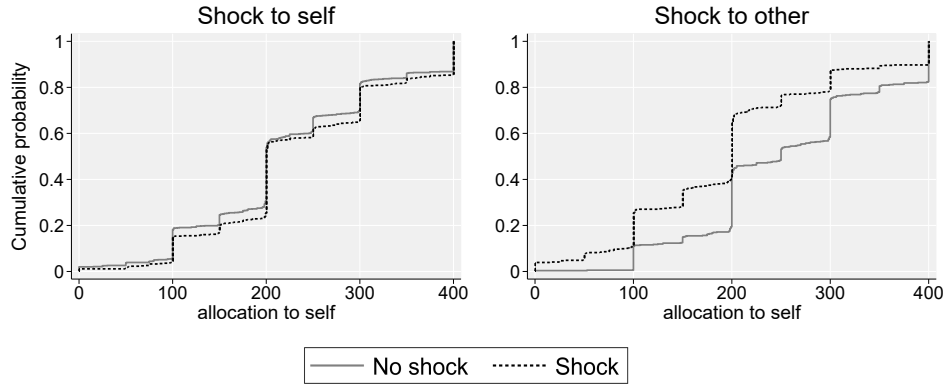


Figure 11: Reaction to different shocks

<sup>47</sup> A Kolmogorov-Smirnov test shows no difference in the overall distributions for shock to self, but a significant difference for shock to other ( $p < 0.01$ ).

within a pooled regression instead of estimating separate models.<sup>48</sup> The regression results confirm the finding that a shock to self has a significant and positive effect on allocations to self<sup>49</sup>, while a shock to other has a significant, strong negative effect on allocations to self (see model 1, Table 6). These effects are robust to the inclusion of demographic controls (see model 2).<sup>50</sup> Note also that while player types do not matter for the reaction to shocks, they do for absolute allocations to self. Across all specifications, H players allocate on average significantly more to themselves than L players.

**Result 2:** *Participants react to negative real world shocks. In particular, they allocate less to themselves if they learn that the other suffered a significant loss in livelihood. Participants who state that they suffered a significant loss in livelihood themselves allocate more to themselves than those who do not.*

Next, I again explore whether the own experience of shocks moderates the reaction to others' shocks, as well as the weight participants assign to both shocks. As in Study 1, the interaction between own and other's shocks is insignificant (see model 3).<sup>51</sup> Individuals

Table 6: OLS models for the effect of shocks on allocation to self  $y_i$

	(1)	(2)	(3)
Shock self	16.47** (7.70)	16.85* (9.00)	14.96 (9.49)
Shock other	-56.88*** (3.25)	-57.00*** (3.33)	-58.42*** (4.32)
H Player	61.38*** (7.46)	64.00*** (7.77)	64.00*** (7.77)
Constant	212.25*** (7.70)	223.80*** (31.03)	224.51*** (30.94)
Additional controls	No	Yes	Yes
N observations	1072	1026	1026
N clusters	536	513	513
R-squared	0.17	0.21	0.21

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. H Player is a binary variable that takes the value of 1 for H players and 0 for L players. Additional controls include employment shock due to Covid-19, age, gender, household size, education, region, subjective social status, and fairness of task.

<sup>48</sup>The regressions again control for order effects. As the latter are jointly significant (see Appendix B Table C.3), I also interact decision order with the *shock to other* as a robustness test. Table C.4 shows that independent of the decision order, a shock to other always leads to a significant reduction in allocations to self.

<sup>49</sup>I find that the effect of own real world experience on allocation decisions is also present in Study 1. Participants who state they suffered a significant loss in livelihood allocate significantly more to themselves (see Appendix B, Table B.6). The size of the effect is indistinguishable from shocks to self *within* the experiment.

<sup>50</sup>Older participants and women again tend to allocate less to themselves. However, the effect is not significant.

<sup>51</sup>This also holds true when excluding controls.

thus react to others' shocks in the same way independent of their own experience. When it comes to the relative weight people place on own and other's shocks, Figure 11 indicates that the reaction to other's shock is much more pronounced. This is confirmed by a Wald test, showing that the coefficient for *shock other* is significantly larger than the one for *shock self* in all specifications ( $p < 0.01$ ). However, this again has to be considered a crude comparison. Firstly, it is important to recall that the information about other shocks is varied exogenously, while the own Covid-19 experience is endogenous. Secondly, by varying the shock to other within subjects, this dimension is very salient to participants. Participants are only asked about own experience of real world shocks in the ex-post survey, meaning they might focus less on this aspect during the experiment. In line with this notion, the majority of participants (66%) state in the questionnaire that the other person was affected more than they were by Covid-19.<sup>52</sup> Even among participants who state they suffered due to Covid-19, 35% believe that the other player was affected more. The data thus suggests that if people perceive that others are suffering more than themselves, they take this into account and put a higher weight on other's shock.

**Result 2.2:** *Most participants in the experiment feel the other player has been affected more by Covid-19 than themselves. As a consequence they react stronger to the other's shock than to own shocks.*

## 6.4 The role of incomplete information

Finally, I explore what happens if there is uncertainty about the real world shock of the other player. In the incomplete information scenario, participants are only told that the other “*might or might not have suffered a significant loss in livelihood due to Covid-19*”. They do know, however, that among all participants half did and half did not suffer a shock. As for Study 1, one would thus expect that when asked to guess the other's shock, half of the participants say that the other did suffer a significant loss in livelihood and half that they did not. On aggregate, the share of participants who believes that the other did suffer a shock is very close to 50%<sup>53</sup> and if anything is slightly above the probability of a real world shock ( $p < 0.1$ ). Moreover, I find that own shock experiences matters for beliefs about the other player. Figure 12 shows that while the share of participants who believe the other suffered a shock is below 50% - although statistically insignificant - if participants did experience a shock themselves, this share is significantly above 50% if there was no shock to self ( $p < 0.01$ ).<sup>54</sup> As people seem to acknowledge others' shocks by allocating

<sup>52</sup> Another 30% state that they were affected in the same way and 4% state that they were affected more.

<sup>53</sup> Overall 53.7% of participants guess that the other suffered a shock versus 46.3% who guess they did not.

<sup>54</sup> The same pattern holds true when examining H and L players separately. See Appendix C, Figure C.1.

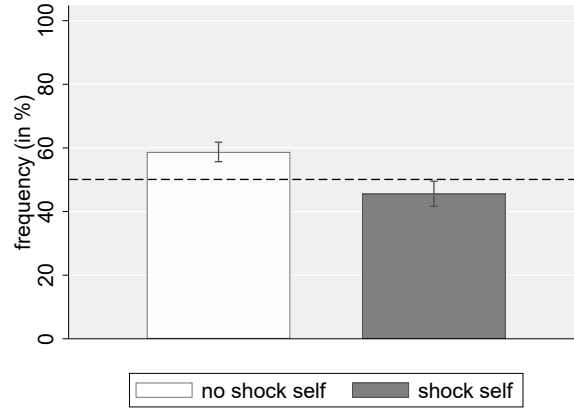


Figure 12: Share of players believing that the other suffered a shock

more to them, stating that they believe the other did not suffer a shock would allow them to behave more selfishly in the allocation decision. However, there is no evidence for such self-serving beliefs in the data. By contrast, it seems that individuals rather guess the other *did* suffer a significant loss in livelihood. Intuitively, as the real word shock is so large, it might be psychologically less costly to wrongly assume someone did suffer a shock and be too generous than wrongly being too selfish towards someone who really suffered a significant loss in livelihood.

In addition to beliefs, I test the effect of incomplete information on distributive preferences by regressing allocations to self on shock to self and the available information about

Table 7: OLS models for the effect of shocks and information on allocation to self  $y_i$

	(1)	(2)
Shock self	11.57 (7.58)	13.00 (8.78)
<i>Type of information (ref.: Info = No shock other)</i>		
Info = Shock other	-56.88*** (3.25)	-57.00*** (3.31)
Info = No information	-21.38*** (2.26)	-21.78*** (2.34)
H Player	59.89*** (7.32)	62.92*** (7.58)
Constant	215.25*** (7.63)	229.20*** (29.87)
Additional controls	No	Yes
N observations	1608	1539
N clusters	536	513
R-squared	0.15	0.19

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Information* is a categorical variable that takes the value of 0 if player  $i$  is informed that the other did not suffer a shock, 1 if player  $i$  is informed that the other did suffer a shock and 2 if the other's shock is unknown. *H Player* is a binary variable that takes the value of 1 for H players and 0 for L players. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.



the other player.<sup>55</sup> As Table 7 shows, if there is no information about what happened to the other, participants allocate significantly less to themselves than if they know the other did not suffer a significant loss in livelihood. However, the reaction is not as strong as if they know for sure the other suffered a shock. A Wald test confirms that the coefficients are statistically different at the 1%, independent of the decision order.<sup>56</sup> Allocation decisions under incomplete information thus lie between the decisions when it is known that the other did or did not suffer a shock. This stresses again that there is no self-serving bias among participants.

**Result 3:** *There is no bias in beliefs when participants are asked to guess the real world shock experience of other players. Consistent with that, their allocation behaviour lies exactly between the scenarios where it is known that the other did or did not suffer a shock.*

## 7 Discussion and conclusion

In this paper, I use two experimental studies to provide causal evidence on the effect of negative income shocks on redistributive preferences. In both studies, participants first earn an initial endowment and then face different negative income shocks before being given the opportunity to redistribute earnings between themselves and another player. Players differ with respect to their initial earnings, which allows to explore the importance of income differences for redistributive preferences and their interaction with negative shocks. While both studies are very similar in terms of the general set-up, what constitutes a shock differs substantially between them. In Study 1, I exogenously vary whether participants are affected by a negative income shock *within* the experiment. This allows maximal control to identify the causal link between negative shocks and distributive behaviour. In Study 2, by contrast, I study real world shocks defined as whether a person *suffered a significant loss due to Covid-19*. While this means a certain loss of control, it enables me to explore negative income shocks in a less abstract environment. Both studies are therefore complementing each other and provide evidence for the same mechanism in different settings.

In both studies, I find that people take both own and other's shocks into account. In particular, participants become more selfish after the experience of own shocks, but more generous when learning that another person was hit by a shock. This has important implications for understanding the support for redistribution when facing economic crises

<sup>55</sup>Table C.5 in Appendix C confirms once more that H and L players can be pooled for Study 2. As in section 6.3, I again find significant order effects, which is why I control both for the decision order and its interaction with the available information as a robustness check (see Table C.6).

<sup>56</sup>Again, participants react less to shocks if they face the situation where the other suffered a shock first. Independent of the decision order the reaction to a shock to other is negative and significant at the 1% level.

and can explain conflicting previous results regarding compassion and selfishness. In addition, Study 1 shows that relative income differences play an important moderating effect in the response to shocks. In particular, I find that only relatively richer players react to shocks. They thereby behave in line with a contribution-based fairness view which means the amount they allocate to each participant is equivalent to individual post-shock earnings. Relatively poorer participants, by contrast, contribute an equal amount to each player in line with an egalitarian fairness ideal and make the same allocation decision independent of own or other's shocks. Moreover, I find that when introducing uncertainty about the other's shock, participants in Study 1 behave as if the other did not suffer a shock and self-servingly report downward biased beliefs about the other's shock. I furthermore show that the behaviour observed in the experiments is in line with a theoretical framework in which individuals form their fairness views in a self-serving manner. Once formed, however, these fairness views prescribe how individuals react to shocks and leave no room for further self-serving behaviour. While differences between player types are very pronounced in Study 1, their importance is reduced after bringing real world shocks into the lab in Study 2. A possible explanation for this finding is that the gravity of a real world shock such as *a significant loss in livelihood* overrules the importance of income differences generated within the lab. In line with this, when looking at the sub-sample of situations where the other player does not suffer a significant loss in livelihood the difference in allocation behaviour and associated fairness views between player types reappears.

This paper provides an important contribution to understanding the vast heterogeneity of fairness views observed between individuals. In two complementary studies, I show that individuals do react to negative income shocks in systematic ways and that this response is moderated by differences in relative income. The study thus strengthens the importance of taking changing economic environments into account, as the latter can have substantive effects on the demand and acceptance of redistributive policies. It also shows how different experimental approaches can be combined to test a behavioural pattern and achieve a balance between control and realism.

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## A Theoretical framework: Application

### A.1 Allocations perceived as fair before and after negative shocks

The design keeps the final allocation decision and thus  $m_{i2,j2}$  constant across treatments ( $x_H = 300, x_L = 100$ ). Using equations (6) and (7) the hypothetical fair allocation to self after the shock  $m_{i2}$  can be written as:

$$\begin{aligned} m_{i2} &= \alpha_i^* 300 + (1 - \alpha_i^*) 200 = 300 \text{ for H players} \\ m_{i2} &= \alpha_i^* 100 + (1 - \alpha_i^*) 200 = 200 \text{ for L players} \end{aligned} \quad (9)$$

And  $m_{j2}$  as:

$$\begin{aligned} m_{j2} &= X_2 - m_{i2} = 100 \text{ for H players} \\ m_{j2} &= X_2 - m_{i2} = 200 \text{ for L players} \end{aligned} \quad (10)$$

The pre-shock situation, by contrast, varies between treatments. Table A.1 shows the range of what players consider as a fair allocation for themselves and the other player before the shock ( $m_{i1,j1}$ ).

	H players	L players
No shock	300, 100	200, 200
Shock to H	400, 100	250, 250
Shock to L	300, 200	250, 250
Shock to both	400, 200	300, 300

Table A.1: Allocations considered as fair before the shock ( $m_{i1,j1}$ )

The final allocation individuals consider as fair for themselves ( $m_{i2}^*$ ) can then be calculated using  $m_{i1}$ ,  $m_{i2}$ , and equation (8). Table A.2 shows  $m_{i2}^*$  for both H and L players. The allocation considered as fair to the other player can be derived simply by using:  $m_{j2}^* = X_2 - m_{i2}^* = 400 - m_{i2}^*$ .

	H players	L players
No shock	300	200
Shock to H	$300 + \rho_i \gamma_i 100$	$200 + \rho_i \gamma_i 50 - \rho_i (1 - \gamma_i) 50$
Shock to L	$300 - \rho_i (1 - \gamma_i) 100$	$200 + \rho_i \gamma_i 50 - \rho_i (1 - \gamma_i) 50$
Shock to both	$300 + \rho_i \gamma_i 100 - \rho_i (1 - \gamma_i) 100$	$200 + \rho_i \gamma_i 100 - \rho_i (1 - \gamma_i) 100$

Table A.2: Final evaluation of fair allocations to self ( $m_{i2}^*$ )

Table A.2 illustrates that for L players, following the egalitarian fairness view implies that across conditions L players allocate similar amounts to themselves (200).<sup>57</sup> I thus expect that they show no reaction to shocks. Following the contribution-based ideal, by contrast, implies for H players that they will react to shocks. In particular, after a shock to themselves they would consider it fair to allocate more to themselves, while after a shock to the other person a lower allocation to self is considered as fair. For a common shock,  $\gamma_i$  prescribes which effect dominates for the allocation decisions. If the shock to self (other) is given a larger weight, H players would allocate more (less) to themselves.

## A.2 Interaction between own and other's shock experience

As discussed in Section 4.3, an interesting question is whether the own experience of shocks affects the response to a shock to other. The theoretical framework allows to isolate the effect of a shock to other by comparing the fair allocation to self ( $m_{i2}^*$ ) in a situation where the other did suffer a shock to one where they did not. Moreover, this can be done conditionally on an individual's own shock experience.

First, I derive the effect of a shock to other in a situation where there is no shock to self. As only H players are predicted to react to shocks, I thus calculate the difference in what is perceived as fair from the point of view of an H player. To do so, I compare a situation with *no shock* to one where there is only a *shock to the L player*. Using the results from Table A.2, the difference between *No shock* and *Shock to L* can be calculated as follows:

$$\text{No shock} - \text{Shock to L} = 300 - (300 - \rho_i(1 - \gamma_i)100) = \rho_i(1 - \gamma_i)100 \quad (11)$$

Similarly, in situations where the H player suffers a shock as well, the effect of a shock to other can be calculated as the difference between *Shock to H* and *Shock to both*:

$$\begin{aligned} \text{Shock to H} - \text{Shock to both} &= 300 + \rho_i\gamma_i100 - (300 + \rho_i\gamma_i100 - \rho_i(1 - \gamma_i)100) \\ &= \rho_i(1 - \gamma_i)100 \end{aligned} \quad (12)$$

The response to a shock to other is thus always to reduce allocations to self by  $\rho_i(1 - \gamma_i)100$ . In other words, the theoretical framework predicts that own experiences of shocks do not affect the response to a shock to other. This is confirmed by the experiment, where I find no significant interaction between own and other's shocks.

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<sup>57</sup> As  $\rho_i$  and  $\gamma_i$  are exogenous, any deviation from 200 will be identical in the shock to H, shock to L, and shock to both condition.



## B Additional figures and analysis for Study 1

### B.1 Study 1: Sample and data collection

Table B.1 shows the sample characteristics regarding demographics and survey answers. As one can see, participants who suffer or do not suffer a shock within the experiment are balanced across most variables. The only small differences are with respect to education, where participants without a shock are slightly more likely to have a secondary school degree or a PhD and less likely to have a graduate degree. Moreover, participants who do not suffer a shock are in a slightly higher income bin. All differences are however very small.

Table B.1: Sample characteristics and balance test across shocks

	Total	No shock to self	Shock to self	Difference
Age	31.82	31.62	32.02	-0.40
Gender (Female=1)	0.44	0.43	0.45	-0.02
<i>Education level</i>				
No formal education	0.01	0.01	0.01	0.00
Secondary school/GCSE	0.11	0.13	0.08	0.05*
College/A levels	0.17	0.17	0.17	0.00
Undergraduate degree	0.34	0.34	0.34	0.00
Graduate degree	0.34	0.30	0.39	-0.09**
PhD	0.03	0.05	0.02	0.03*
<i>Employment status</i>				
Full-time	0.50	0.50	0.50	0.00
Unemployed	0.19	0.19	0.19	0.00
Part-time	0.31	0.31	0.31	0.00
Income bin (1-8)	3.62	3.79	3.45	0.34**
Household size	2.79	2.80	2.79	0.01
Social ladder (1-10)	5.45	5.50	5.40	0.11
Loss in livelihood (1-7)	3.55	3.52	3.59	-0.07
Financial struggles (1-7)	3.59	3.59	3.60	-0.01
Fairness task (1-7)	4.08	4.07	4.09	-0.02
<i>Region</i>				
Europe	0.80	0.78	0.81	-0.03
North America	0.09	0.09	0.09	0.00
Other	0.11	0.12	0.10	0.02
N	536	268	268	536

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Similarly, table B.2 shows that the sample is balanced across all observable demographics with respect to H and L players. The only significant difference lies in the fairness perception of the task. This, however, is an intuitive result as L players are assigned lower initial earnings and might thus feel disadvantaged compared to H players.

### B.2 Study 1: Effect of different shock experiences

Figure B.1 shows how people feel after learning they did/ did not experience a negative shock within the experiment. Affect is measured on a scale from -50 to +50, where higher values are associated with more positive reactions. For both player types learning about a

Table B.2: Sample characteristics and balance test across player types

	Total	H players	L players	Difference
Age	31.82	31.94	31.70	0.24
Gender (Female=1)	0.44	0.47	0.41	0.07
<i>Education level</i>				
No formal education	0.01	0.01	0.00	0.01
Secondary school/GCSE	0.11	0.12	0.09	0.04
College/A levels	0.17	0.17	0.16	0.01
Undergraduate degree	0.34	0.32	0.36	-0.04
Graduate degree	0.34	0.34	0.35	-0.01
PhD	0.03	0.03	0.04	-0.02
<i>Employment status</i>				
Full-time	0.50	0.50	0.50	0.00
Unemployed	0.19	0.19	0.19	0.00
Part-time	0.31	0.31	0.31	0.00
Income bin (1-8)	3.62	3.61	3.63	-0.02
Household size	2.79	2.74	2.85	-0.11
Social ladder (1-10)	5.45	5.54	5.35	0.19
Loss in livelihood (1-7)	3.55	3.55	3.56	0.00
Financial struggles (1-7)	3.59	3.58	3.60	-0.02
Fairness task (1-7)	4.08	4.27	3.88	0.39***
<i>Region</i>				
Europe	0.80	0.80	0.79	0.01
North America	0.09	0.09	0.09	0.00
Other	0.11	0.11	0.12	-0.01
N	536	268	268	536

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

negative shock leads to significantly more negative affect reactions ( $p < 0.01$ ). This provides evidence that the shock matters to participants and is perceived as a negative event.

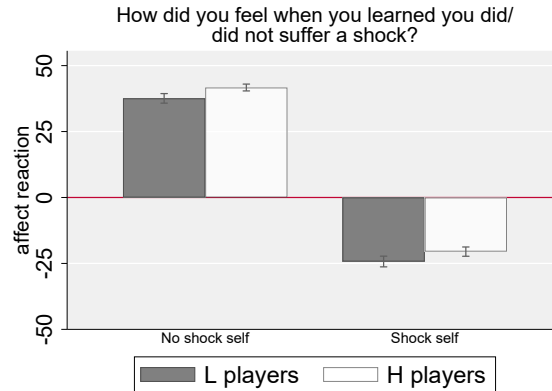


Figure B.1: Affect reactions to finding out about a shock/ no shock to self

For the regression analysis in section 4.3, order effects might be a concern as participants take repeated allocation decisions in different scenarios. Table B.3 shows the results of a regression that interacts order dummies with the treatment indicators for both H and L players. Individually, none of the order effects are statistically significant. I then perform a test for the joint significance of order dummies themselves and their interactions. Again, there are no significant results.

Table B.3: Testing for order effects. Dependent variable = allocation to self  $y_i$

	H players		L players	
	(1)	(2)	(3)	(4)
Shock self	5.134 (0.48)	13.10* (1.66)	-9.339 (-0.56)	3.096 (0.27)
Shock other	-14.56** (-2.50)	-13.99*** (-2.97)	6.000 (0.80)	2.790 (0.52)
Shock self x Shock other	1.161 (0.12)		-6.030 (-0.56)	
<i>Decision order</i>				
Shock other first	-11.68 (-0.92)	-5.691 (-0.64)	1.602 (0.09)	17.72 (1.45)
Shock other x Shock other first	-1.426 (-0.17)	4.678 (0.73)	-6.224 (-0.60)	-9.457 (-1.29)
Shock self x Shock other x Shock other first	23.64 (1.33)		24.93 (1.05)	
Constant	282.4*** (36.47)	278.6*** (40.19)	215.8*** (17.81)	209.2*** (20.26)
N	536	536	536	536
Additional controls	No	No	No	No
N clusters	268	268	268	268
R-squared	0.02	0.02	0.01	0.01

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *Shock other first* finally is a binary variable that takes the value of 1 if an individual was first faced with the decision situation where the other player had suffered a shock and 0 otherwise.

Figure B.2 explores differences in the reaction to own and other's shocks. As stated in section 4.2, the difference between the two shocks is not statistically significant. This is also illustrated graphically by B.2. Allocations to self after a common shock lie exactly between the allocations after a shock that only happens to oneself and one that only happens to the other player.

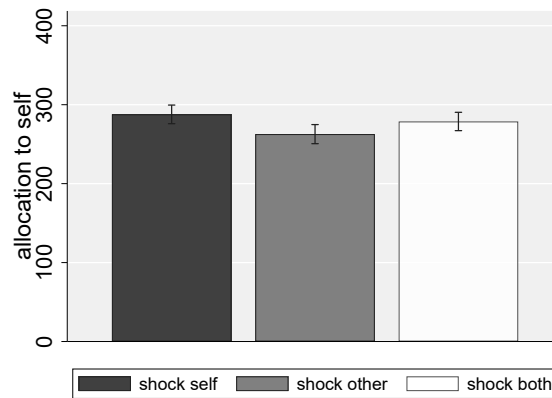


Figure B.2: Allocations to self after own, other's or joint shocks

Table B.4 explores how the relative perception of shocks matters for allocation decisions. This analysis can only be done for the sub-sample of participants who suffered a shock themselves. As can be seen from the regression results, H players show a negative reaction to the shock to others independent of their relative perception of shocks. All interaction terms are insignificant. Moreover, the relative perception of shocks does not matter for allocation decisions. The same result holds true for L players who unlike H players also show no reaction to shocks.<sup>58</sup>

Table B.4: OLS models for the effect of shocks on allocation to self  $y_i$  after controlling for relative perception of shocks

	H players		L players	
	(1)	(2)	(3)	(4)
Shock other	-15.91** (6.70)	-14.09** (6.86)	1.57 (6.38)	-2.47 (5.61)
<i>Perception of shock (ref.: same)</i>				
Self more affected	5.64 (27.12)	10.04 (27.08)	10.82 (17.99)	12.36 (19.35)
Other more affected	-0.89 (12.50)	-5.68 (13.03)	-30.18* (16.73)	25.53 (44.24)
<i>Interactions</i>				
Shock other x self more affected	37.34 (29.66)	35.52 (30.91)	-14.02 (9.70)	-5.56 (8.94)
Shock other x other more affected	8.33 (9.78)	6.07 (10.21)	-5.57 (6.38)	-1.53 (5.61)
Constant	285.37*** (9.10)	321.37*** (46.83)	203.17*** (16.23)	263.29*** (58.64)
Additional controls	No	Yes	No	Yes
N observations	268	258	268	250
N clusters	134	129	134	125
R-squared	0.01	0.16	0.02	0.17

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

Note: Regressions control for order effects. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *Perception of shock* is a categorical variable that takes the value of 0 if shock to self and shock to other are perceived to be identical, 1 if shock to self is perceived as larger and 2 if shock to other is perceived as larger. Additional controls include age, gender, income, household size, education, region, subjective social status, and fairness of task.

Table B.5 pools all decisions for H and L players and interacts the treatment dummies (*Shock self* and *Shock other*) with the player type. There is a significant difference in both the intercept as well as the slope for *shock other* between H and L players. This is also confirmed by a Chow test ( $p < 0.01$  respectively). Although the difference in the slope of *shock to self* is of similar size than the one of *shock to other* it is not statistically significant due to larger standard errors. Nevertheless, overall the results confirm that H and L players show significantly different reactions to shocks in the experiment.

<sup>58</sup>While Table B.4 shows that L players allocate significantly less to themselves if they feel the other has been affected more by the shock, there are only 3 participants who expressed this feeling.

Table B.5: OLS model for the difference between player types in allocation to self  $y_i$ 

	(1) H players	(2) L players	(3) Difference
Shock self	13.10* (7.86)	3.10 (11.62)	-10.00 (14.03)
Shock other	-12.06*** (3.29)	-2.29 (3.66)	9.76** (4.92)
Constant	277.61*** (6.73)	211.72*** (10.02)	-65.89*** (12.07)
Additional controls	No		
N observations	1072		
N clusters	536		
R-squared	0.11		

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regression controls for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. Additional controls include employment shocks due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

Table B.6 shows what happens if one combines real world shocks and shocks within the experiment. A real world shock is defined as a *significant loss in livelihood due to Covid-19*. When controlling for the experience of real world shocks, I find that H players who state they suffered a significant loss in livelihood are allocating more to themselves. This effect becomes significant after including controls and is of a similar, statistically indistinguishable, size as the effect of within-experiment shocks.

Table B.6: OLS models for the effect of real world shocks on allocation to self  $y_i$ 

	H players		L players	
	(1)	(2)	(3)	(4)
Real world shock	12.07 (8.00)	15.26* (8.33)	0.52 (12.01)	-4.45 (13.11)
Shock self	12.54 (7.82)	14.61* (7.78)	3.07 (11.63)	3.38 (11.78)
Shock other	-12.06*** (3.29)	-11.71*** (3.39)	-2.29 (3.66)	-1.80 (3.62)
Constant	272.95*** (7.71)	317.88*** (34.94)	211.54*** (10.91)	289.57*** (42.67)
Additional controls	No	Yes	No	Yes
N observations	536	518	536	510
N clusters	268	259	268	255
R-squared	0.023	0.105	0.004	0.134

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Real world shock* is a binary variable that takes the value 1 if an individual states they suffered a significant loss in livelihood due to Covid-19 and 0 otherwise. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. Additional controls include age, gender, income, household size, education, region, subjective social status, and fairness of task.

### B.3 Study 1: The role of incomplete information

Figure B.3 shows beliefs about the other player by type and own experience of shocks. As mentioned in the main text, H players show downward biased beliefs independent of shock to self. L players, by contrast, have rational beliefs if they did not suffer a shock themselves, but are slightly more likely to believe the other suffered a shock if they suffered a shock themselves. This might be wishful thinking in the sense that they do not want to be twice unlucky relative to H players (with respect to initial earnings *and* shocks).

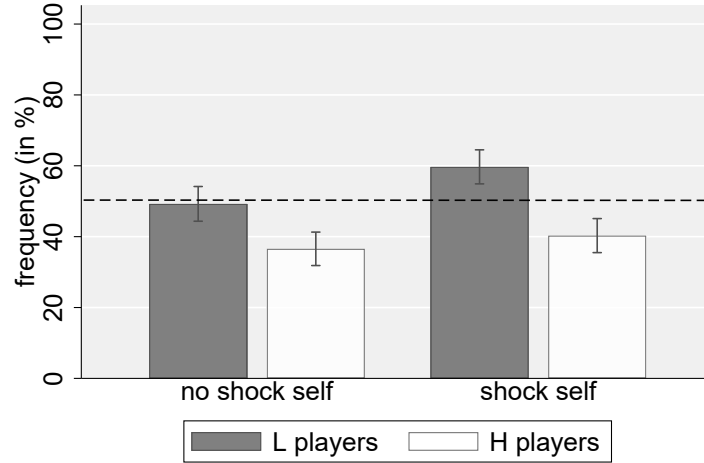


Figure B.3: Share of players believing that the other suffered a shock

### B.4 Study 1: Relationship closeness and affect

While the main focus of the experiment is understanding the effect of negative shocks on redistributive preferences, I also explore whether shocks change the perception individuals have of the other player. In particular, I investigate perceptions of closeness between participants and positive/ negative affect. I elicit closeness between participants using the IOS scale (Aron et al., 1992) after each allocation decision.<sup>59</sup> For the affect questions, I asked participants how they felt when they learned that they/ the other player did or did not suffer a shock. Affect was measured on a scale from -50 to 50, corresponding to very negative or very positive affect reactions. I thereby used a variation of the pictorial assessment scale developed by Desmet et al. (2001).

When it comes to relationship closeness, I find that overall the experience of shocks does not have large effects (see Figure B.4). While a shock to the other player slightly increases closeness, this effect is only significant if players suffer a shock themselves ( $p < 0.1$ ). In

<sup>59</sup>The IOS scale measures closeness on a scale from 1 to 7, represented by pairs of circles with different degrees of overlap. A larger value thereby represents a higher degree of closeness.

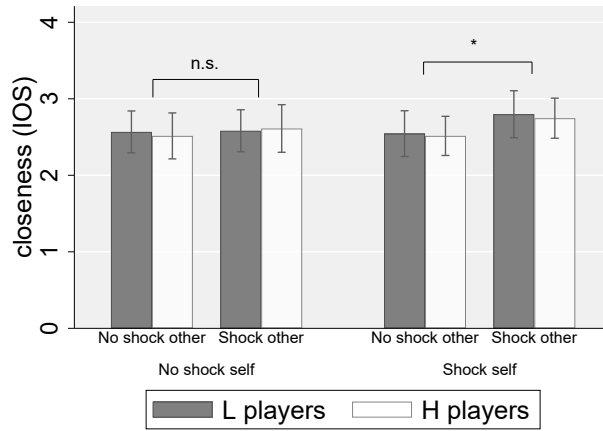


Figure B.4: Reported closeness between players after different shocks

addition, closeness is very similar for both player types. While participants' reported closeness to each other did not vary systematically across experience of shocks, I do find that there is a significant correlation between allocation decisions and closeness. Both H and L players who report a higher level of closeness to their matched partner allocate significantly less to themselves. As Table B.7 shows the effect of shocks on allocation decisions is robust to the inclusion of IOS scores as an additional control variable. H players allocate more to themselves after experiencing a shock and less to themselves after the other does so. L players, by contrast, still show no reaction to any shocks.

Table B.7: OLS models for the effect of shocks on allocation to self  $y_i$  after controlling for perceived closeness

	H players		L players	
	(1)	(2)	(3)	(4)
Shock self	14.15* (7.22)	15.38** (7.28)	3.72 (11.49)	2.78 (11.77)
Shock other	-9.25*** (2.99)	-8.87*** (3.09)	-1.03 (3.65)	-0.58 (3.67)
Closeness (IOS)	-17.09*** (1.98)	-16.36*** (2.03)	-9.35*** (3.49)	-9.36** (3.71)
Constant	318.95*** (8.56)	324.61*** (33.41)	237.84*** (15.61)	308.61*** (41.92)
Additional controls	No	Yes	No	Yes
N observations	536	518	536	510
N clusters	268	259	268	255
R-squared	0.18	0.26	0.03	0.16

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *Closeness* is measured via the IOS scale, where a value of 1 indicates the lowest and a level of 7 the highest degree of perceived closeness between players. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

Figure B.5 shows affect reactions to the information that the other person did/ did not suffer a shock. A shock to the other leads to a significantly more negative reaction than learning that the other did not suffer a shock ( $p < 0.01$ ). However, this is particularly true if players themselves did not suffer a shock. They are significantly less happy (sad) for the other player avoiding (suffering) the shock if they were hit by a shock themselves.

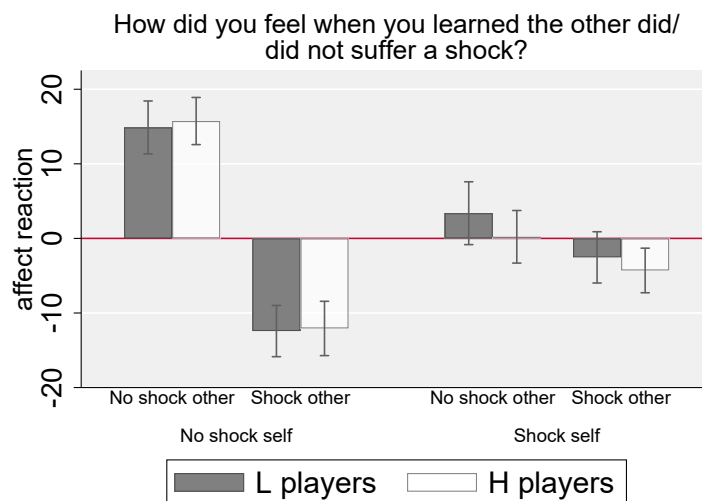


Figure B.5: Affect responses to other's shock



## C Additional figures and analysis for Study 2

### C.1 Study 2: Sample and data collection

Table C.1 shows the sample characteristics for Study 2. As expected, suffering a significant loss in livelihood is not orthogonal to demographic characteristics. In particular, participants who state they suffered a significant loss in livelihood are more likely to be female, to have lost their employment, to be from a lower income category, to have a lower perceived social status, to have recently faced financial struggles and to be from the US. Moreover, they are less likely to have a graduate degree, be full-time employed or to come from a European country.

Table C.1: Sample characteristics and balance test across real world shocks

	Total	No Covid shock	Covid shock	Difference
Age	31.21	31.08	31.42	-0.34
Gender (Female=1)	0.43	0.39	0.49	-0.10**
<i>Education level</i>				
No formal education	0.01	0.00	0.01	-0.01
Secondary school/GCSE	0.15	0.13	0.18	-0.05
College/A levels	0.16	0.16	0.17	-0.01
Undergraduate degree	0.34	0.33	0.35	-0.02
Graduate degree	0.31	0.34	0.26	0.08*
PhD	0.04	0.04	0.03	-0.01
<i>Employment status (prolific)</i>				
Full-time	0.50	0.67	0.22	0.45***
Unemployed	0.50	0.33	0.78	-0.45***
<i>Employment status (survey)</i>				
Full-time	0.42	0.57	0.19	0.38***
Unemployed	0.25	0.11	0.46	-0.35***
Other	0.33	0.32	0.35	-0.04
Income bin (1-8)	3.47	3.65	3.18	0.47***
Household size	2.87	2.83	2.94	-0.11
Social ladder (1-10)	5.26	5.58	4.75	0.83***
Financial struggles (1-7)	3.94	2.96	5.55	2.59***
Fairness task (1-7)	4.09	4.13	4.03	-0.10
<i>Region</i>				
Europe	0.77	0.81	0.71	0.11***
North America	0.10	0.05	0.19	-0.14***
Other	0.12	0.14	0.10	0.03
N	536	332	204	536

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

### C.2 Study 2: Effect of different shock experiences

To test whether H and L players can be pooled, I run a regression of allocations to self on shock experiences, player types and their interactions. As table C.2 shows, the only significant difference between H and L players is with respect to levels. Their reactions to shocks, by contrast, are statistically indistinguishable. These results are also confirmed by a Chow test. I thus pool player types for the rest of the analysis, while controlling for level differences in allocations to self.

Table C.2: OLS model for the difference between player types in allocations to self  $y_i$ 

	(1) H players	(2) L players	(3) Difference
Shock self	9.10 (9.38)	23.77* (12.19)	-14.68 (15.37)
Shock other	-57.56*** (4.26)	-56.21*** (4.91)	-1.34 (6.50)
Constant	276.78*** (6.71)	209.14*** (8.60)	67.64*** (9.54)
Additional controls		No	
N observations		1072	
N clusters		536	
R-squared		0.17	

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

Note: Regression controls for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise.

As participants are taking several allocation decisions for different participants I control for order effects in the analysis. Table C.3 shows the results of a regressing allocations to self on treatment indicators and their interaction with order effects. Model 2 moreover

Table C.3: Testing for order effects. Dependent variable = allocation to self  $y_i$ 

	(1)	(2)
Shock self	16.47** (2.14)	28.41** (2.49)
Shock other	-67.59*** (-14.55)	-66.09*** (-10.50)
Shock self x Shock other		-3.708 (-0.40)
<i>Decision order</i>		
Shock other first	1.308 (0.17)	11.55 (1.20)
Shock other x Shock other first	21.26*** (3.30)	16.41* (1.93)
Shock self x Shock other x Shock other first		-14.00 (-0.82)
H Player	61.38*** (8.23)	61.28*** (8.21)
Constant	217.6*** (27.70)	212.8*** (25.54)
N	1072	1072
Additional controls	No	No
N clusters	536	536
R-squared	0.18	0.18

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

Note: *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *Shock other first* is a binary variable controlling for order effects that takes the value 1 if a participant was first matched with another player who did suffer a shock and 0 if they were first matched with another player who did not suffer a shock.

includes an interaction term between *shock self* and *shock other*. The latter is however not significant. Table C.3 shows that for the effect of a shock to other, the decision order plays a significant role. More precisely, participants allocate more to themselves in the scenario where the other suffered a shock if they see that scenario first. Moreover, when testing for the joint effect of order effects, a Wald test confirms that they are significant at the 5% level in model 2 and the 1% level in model 1.

As order effects are jointly significant, I do not only include level effects but also interact the decision order with *shock other* as a robustness check. As Table C.4 shows the effect of a shock to other is smaller when participants first face the situation where the other suffered a shock and then the situation where the other did not suffer a shock. Nevertheless, independent of the decision order, a shock to the other player always leads to a significant reduction in allocations to self.

Table C.4: OLS models for the effect of shocks on allocation to self  $y_i$

	(1)	(2)	(3)
Shock self	16.47** (7.71)	16.85* (9.01)	28.52** (12.54)
<i>Shock other</i>			
Decision order: no shock other first	-67.59*** (4.65)	-67.58*** (4.82)	-66.35*** (6.52)
Decision order: shock other first	-46.33*** (4.46)	-46.38*** (4.49)	-51.16*** (5.68)
Shock self x Shock other			-3.05 (9.62)
H Player	61.38*** (7.46)	64.00*** (7.77)	63.98*** (7.78)
Decision order	1.31 (7.81)	0.46 (8.15)	11.44 (10.09)
Constant	217.60*** (7.85)	229.09*** (31.03)	221.80*** (31.21)
Additional controls	No	Yes	Yes
N observations	1072	1026	1026
N clusters	536	513	513
R-squared	0.18	0.21	0.21

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *H Player* is a binary variable that takes the value of 1 for H players and 0 for L players. *Decision order* is a binary variable controlling for order effects that takes the value 1 if a participant was first matched with another player who did suffer a shock and 0 if they were first matched with another player who did not suffer a shock. Additional controls include employment shock due to Covid-19, age, gender, household size, education, region, subjective social status, and fairness of task.

### C.3 Study 2: The role of incomplete information

As stated in the main text, the belief pattern about the other player under incomplete information that I find for the aggregate data also holds when looking separately at H and L players. If players suffer a shock themselves, their aggregate beliefs of whether the other did suffer a real world shock are not statistically different from 50% (see Figure C.1). If they did not suffer a shock themselves, by contrast, players are significantly more likely to believe that the other did suffer a shock ( $p < 0.05$  respectively).

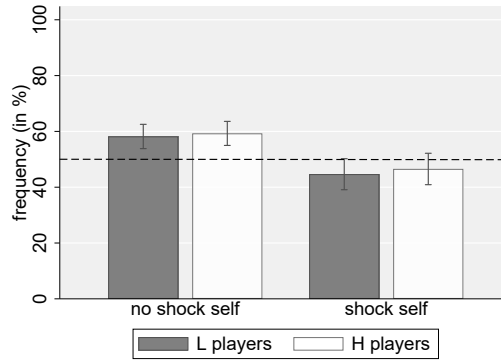


Figure C.1: Share of players believing that the other suffered a shock by player type

I also test for the incomplete information condition whether H and L players can be pooled. As Table C.5 shows, the slopes between H and L players are not significantly different from each other. The only significant difference between player types are again level differences, with H players allocating significantly more to themselves than L players.

Table C.5: OLS model for the difference between player types in allocation to self  $y_i$

	(1) H players	(2) L players	(3) Differences
Shock self	4.08 (9.02)	19.01 (12.15)	-14.93 (15.13)
<i>Information (ref.:Info = No shock other)</i>			
Info = Shock other	-57.56*** (4.26)	-56.21*** (4.91)	-1.34 (6.50)
Info = No information	-23.94*** (3.37)	-18.83*** (3.02)	-5.10 (4.52)
Constant	279.07*** (6.63)	211.35*** (8.53)	67.72*** (9.51)
Additional controls	No		
N observations	1608		
N clusters	536		
R-squared	0.15		

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regression controls for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Information* is a categorical variable that takes the value of 0 if player  $i$  is informed that the other did not suffer a shock, 1 if player  $i$  is informed that the other did suffer a shock and 2 if the other's shock is unknown.

Table C.6: OLS models for the effect of shocks and information on allocation to self  $y_i$ 

	(1)	(2)
Shock self	11.57 (7.59)	13.00 (8.78)
<i>Type of information (ref.: Info = no shock other)</i>		
Info = Shock other (order: after no shock other)	-67.59*** (4.65)	-67.58*** (4.80)
Info = Shock other (order: before no shock other)	-46.33*** (4.46)	-46.38*** (4.48)
Info = No information	-25.89*** (3.58)	-26.65*** (3.65)
H Player	59.89*** (7.32)	62.92*** (7.58)
Decision Order	1.09 (7.81)	0.94 (8.12)
Constant	220.32*** (7.84)	234.35*** (29.93)
Additional controls	No	Yes
N observations	1608	1539
N clusters	536	513
R-squared	0.15	0.19

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Information* is a categorical variable that takes the value of 0 if player  $i$  is informed that the other did not suffer a shock, 1 if player  $i$  is informed that the other did suffer a shock and 2 if the other's shock is unknown. *H Player* is a binary variable that takes the value of 1 for H players and 0 for L players. *Decision order* is a binary variable controlling for order effects that takes the value 1 if a participant was first matched with another player who did suffer a shock and 0 if they were first matched with another player who did not suffer a shock. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

Table C.6 shows that the results for the incomplete information treatment hold also after interacting the decision order with the available information.<sup>60</sup>

## C.4 Study 2: Relationship closeness and affect

I find that the experience of shocks does not only affect redistributive preferences, but also closeness between players and affect reactions. Figure C.2 shows how reported closeness as measured by the IOS scale (1-7) changes with the experience of real world shocks. While a shock to the other player has no effect on perceived closeness if the players did not suffer a shock themselves, it has a quite large and significant effect if players suffer a shock themselves ( $p < 0.01$ ). This is in line with findings from Study 1. However, the increase in reported closeness is much more pronounced if both participants suffered a real world shock. There is again a significant correlation between allocation decisions and closeness.

<sup>60</sup>With three different decision scenarios, there are in principal 6 different possible decision orders. However, the only significant order effect is whether the shock condition comes before or after the no shock condition.

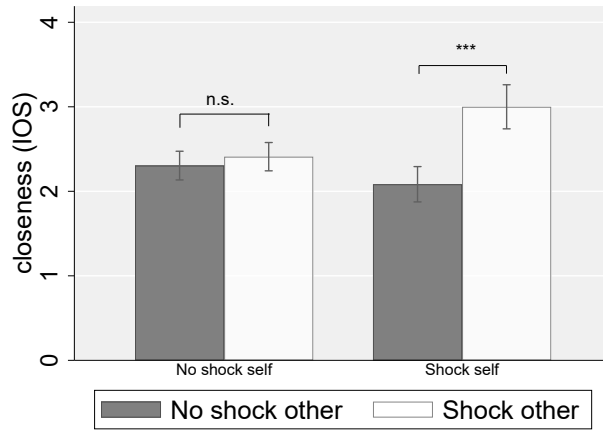


Figure C.2: Reported closeness between players after different shocks

Participants who report a higher level of closeness to their matched partner allocate significantly less to themselves. However, again the effect of shocks on behaviour is robust to the inclusion of IOS scores as an additional control (see Table C.7).

Table C.7: OLS model for the effect of shocks on allocations to self  $y_i$  when controlling for perceived closeness

	(1)	(2)
Shock self	19.13*** (7.36)	18.39** (8.60)
Shock other	-50.44*** (3.45)	-50.60*** (3.53)
Closeness (IOS)	-15.55*** (2.04)	-15.77*** (2.15)
H Player	59.86*** (7.19)	63.29*** (7.47)
Constant	248.35*** (9.71)	256.36*** (29.95)
Additional controls	No	Yes
N observations	1072	1026
N clusters	536	513
R-squared	0.23	0.26

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) are clustered at the individual level.

*Note:* Regressions control for order effects. *Shock self* is a binary variable that takes the value of 1 if an individual  $i$  suffered a shock themselves and 0 otherwise. *Shock other* is a binary variable that takes the value of 1 if the player  $i$  has been matched with suffered a shock and 0 otherwise. *Closeness* is measured via the IOS scale, where a value of 1 indicates the lowest and a level of 7 the highest degree of perceived closeness between players. *H Player* is a binary variable that takes the value of 1 for H players and 0 for L players. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

Figure C.3 shows participants' reaction to the information that the other person did/ did not suffer a shock. A shock to other leads to a significantly more negative reaction than learning that the other did not suffer a shock ( $p < 0.01$ ). Contrasting the results in Study 1, this effect is independent of the experience of own shocks. With such a strong shock as a significant loss in livelihood, people always show a reaction that is empathic to the other person.

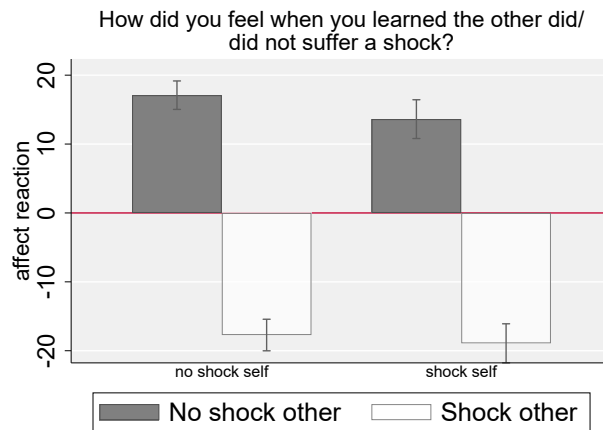


Figure C.3: Affect responses to other's shock

## D Introducing uncertainty about entitlements

### D.1 Motivation and Design

In both Study 1 and 2, the relative income difference between H and L players is justified via different difficulty levels of the real effort task that participants perform at the beginning of the experiment. As discussed in the main text, I deliberately chose this set-up to generate some wiggle room in how people perceive pre-shock earnings. On the one hand, differences in difficulty can generate feelings of entitlement, on the other hand who is allocated which task only comes down to luck.

In addition to the situations described in Study 1, I ran another treatment which introduces uncertainty about entitlements by only telling participants who did the easier or more difficult task but not how much they earned individually. Instead participants only learn how much they and their matched partner earned together and in a next step whether their joint earnings are hit by a shock or not. As before, post-shock earnings are held constant across conditions to identify the effect of a negative shock. In particular, while pairs in the shock condition start with 600 tokens and loose 200 due to a negative shock, pairs in the no shock condition directly start with 400 tokens. As I do not provide information about individual pre-shock earnings, I cannot explore the effect of a shock to self or other, but only compare a situation with no shock to one with common shocks. Note that if the pair suffers a shock they lose 200 tokens. This is identical to the size of a shock to both players in Study 1.

Initially, a main motivation for this treatment was to control for stake size effects. Whenever one of the two players suffers a negative shock, inevitably the total amount that can be distributed between players is shrinking. I thus wanted to isolate the effect of a shock to self or the other from the general effect of a shrinking pie. Previous literature has discussed the importance of stake size effects in dictator and ultimatum games (Cameron, 1999; Raihani et al., 2013; Larney et al., 2019), suggesting that under higher stakes receivers tend to accept lower offers in UG and proposers make smaller offers in DG. However, it is not clear how a shock to the stake size affects allocation decisions. The idea of the additional treatment was to measure this effect. The hypothesis was thus that if there are no stake size effects, there should not be any difference in allocations to self between shock and no shock condition.

**Hypothesis A:** *If there is no stake size effect, I expect no difference in allocations to self between shock and no shock conditions.*

The second motivation for this treatment was to assess how not knowing individual contributions affects allocation decisions. The intuition was that introducing uncertainty about entitlements will weaken the differences between player types. Especially L players



could allocate more to themselves, as the labels *easier* and *more difficult* task leave plenty of room for interpretation and it is in their best interest to play down any differences. In Study 1, by contrast, this was harder as there was a concrete number attached to these differences.

**Hypothesis B:** *If there is uncertainty about entitlements differences between player types will decrease. In particular, I expect L players to allocate more to themselves in this set-up.*

## D.2 Data collection and results

In line with power calculations for Study 1, I recruited 134 participants for the shock condition and 134 for the no shock condition via Prolific in July 2021. The experiment was shorter than the main studies, as participants are only matched with one other player. The median completion time was 12.1 minutes and participants earned on average £9.34/h. I again stratify with respect to the experience of real world employment shocks<sup>61</sup> to get a balanced sample with respect to this dimension. Moreover, I use the same ex-post questionnaire as in Study 1 and 2 and elicit affect measures as well as closeness between participants.

### D.2.1 The importance of relative income differences

I first examine how uncertainty about initial endowments affects differences between H and L players. As the left graph in Figure D.1 shows, H players still allocate significantly more to themselves than L players ( $p < 0.05$ ). This confirms that the different difficulty levels justify different allocations and already generate separate feelings of entitlement between player types. However, this difference has been significantly reduced compared to Study 1. In Study 1, H players allocate on average 58 tokens more to themselves than L players, while they only allocate 24 tokens more to themselves once uncertainty is introduced. This difference is mainly driven by L players. While H players hardly and insignificantly adjust their allocations to self downwards if there is no information about individual pre-shock earnings (-10 tokens), L players show a very strong reaction, increasing their allocations to self significantly under uncertainty (+24 tokens,  $p < 0.01$ ). The results thus confirm Hypothesis B that uncertainty decreases differences between player types and that particularly L players use this uncertainty to justify larger allocations to themselves.

**Result B:** *If there is uncertainty about entitlements, differences between player types diminish. This is mainly driven by L players allocating more to themselves.*

---

<sup>61</sup>By employment shocks I mean whether people became unemployed, moved to part-time work, or remained fully employed as a consequence of Covid-19. This information is available on Prolific and can be used as a filter criteria to recruit participants.

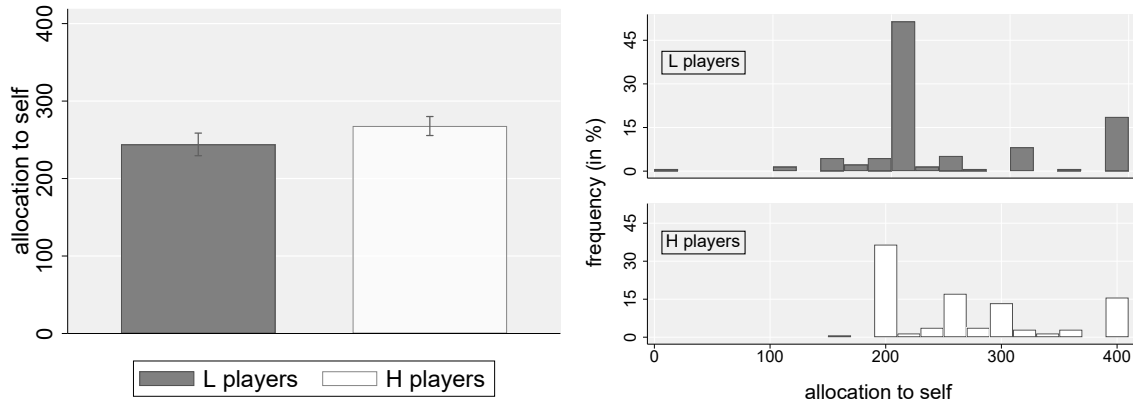


Figure D.1: Average allocation to self (LHS) and distribution (RHS) by player type

The right graph in Figure D.1 shows the distribution of allocations to self for both player types. Interestingly, now the equal split seems to be the most salient allocation for both H and L players. Without any information about individual earnings, this seems to be in fact the most intuitive sharing rule and confirms in line with previous studies the importance of the egalitarian fairness view.

### D.2.2 Effect of shocks

A Chow-test confirms that both H and L players react in the same way to a negative shock. I thus pool the data for H and L players for all subsequent analysis. This also gives more power to detect differences between the shock and no shock condition as the total sample size for this treatment is 268 and participants only take one decision. Figure D.2 shows the cumulative distribution of allocations to self after no shock and a common shock to both players. Contrasting Hypothesis A, there is a clear shift of the distribution to the left under

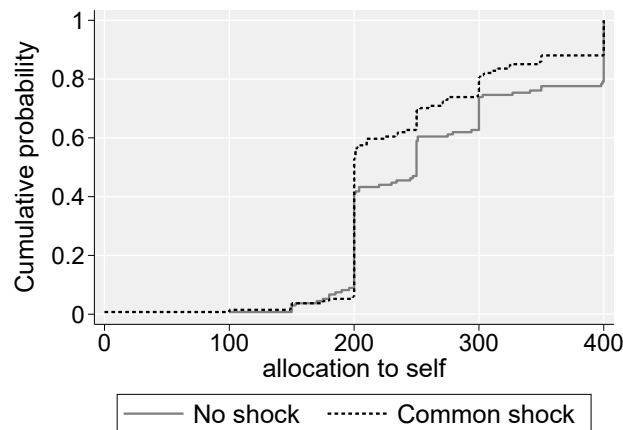


Figure D.2: Reaction to a common shock

Table D.1: Dependent variable = allocation to self  $y_i$ 

	(1) OLS	(2) OLS
Common shock	-23.70** (0.01)	-23.17** (0.02)
H Player	23.73** (0.01)	24.18** (0.02)
Constant	255.91*** (0.00)	296.76*** (0.00)
Additional controls	No	Yes
N observations	268	256
R-squared	0.04	0.14

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

*Note:* *Common shock* is a binary variable that takes the value of 1 if there is a shock to joint earnings and 0 otherwise. *H Player* is a binary variable that takes the value of 1 for H players and 0 for L players. Additional controls include employment shock due to Covid-19, age, gender, income, household size, education, region, subjective social status, and fairness of task.

a common shock, meaning participants allocate less to themselves in this case. In particular, there is a strong increase in allocating 200 to self. The proportion of participants choosing this allocation increases from 32% without a shock to 47% after a common shock ( $p < 0.01$ ).

This finding also holds when regressing the number of tokens individuals allocate to themselves on the experience of a common shock.<sup>62</sup> Table D.1 confirms that the negative effect of a common shock is significant and robust to the inclusion of controls. Moreover, its size is similar to the difference between H and L players. It thus appears that individuals do not only react to own and others' shocks but also to a general reduction of the pie.

**Result A:** *Negative common shocks have an effect on allocation decisions, with both H and L players allocating significantly less to themselves. In particular, there is a significant increase in the proportion of participants choosing an egalitarian split.*

As mentioned above, I designed this treatment to explore the importance of stake size effects. However, this seems to be only part of what is going on in this treatment. The differences in allocations to self between H and L players show that despite the uncertainty about initial endowments, participants form expectations about how this difference should translate into different earnings. Shocks are then introducing an additional layer of uncertainty, as I do not specify whether one person was affected more by a shock but only inform participants about the reduction in joint earnings. Given this double-layer of uncertainty, it might be more difficult to decide what is the appropriate allocation, driving participants to-

<sup>62</sup>As each individual only takes one decision, I neither cluster standard errors at the individual level nor need to control for order effects.

wards the salient and simple egalitarian split. Another difference between Study 1 and this treatment might be how close participants feel to their matched partner. In Study 1 participants individually perform the real effort task, learn how much they earned and whether they have been hit by a shock before being matched with another player. In this treatment, the order is reversed with participants being directly matched with a partner after the real effort task and then learning joint earnings and whether they and their partner were hit by a negative shock. This could generate a feeling of *we*, which in turn could favour an egalitarian split. In fact, when looking at the IOS scale as a measure of closeness, I find that perceived closeness is significantly higher in the uncertainty treatment than in Study 1 ( $p < 0.1$ ). Moreover, after participants suffer a common shock they report higher (although not significantly higher) levels of closeness than without a shock. This again could move participants more towards the egalitarian split.

Taken together I conclude that this treatment does not allow to isolate the effect of a change in stake sizes, but mainly allows to explore what happens when introducing uncertainty about entitlements. The results show that this reduces differences between player types and leads to an increased focus on the egalitarian split, in particular after participants experience a common shock.

## E Materials for Study 1

### E.1 Instructions

In the following I provide instructions and screenshots for Study 1. As instructions only differ slightly for H and L players, I provide one set of instructions from the perspective of H players and add the corresponding text for L players in brackets when required.

## Instructions

Please read the instructions carefully.

This study consists of three stages: an earning stage, a decision stage, and a short questionnaire. You will be given details about the different stages below. Throughout the study you can earn Experimental Tokens, which are later converted into a bonus (£) at a pre-defined exchange rate (100 tokens = £0.40). Your final bonus will depend partly on your own decision, partly on the decision of another Prolific participant and partly on external factors. How your bonus is determined will be outlined below in greater detail.

**Earning stage:** In this stage, you have to work in order to earn tokens that are then used in the second stage of the study. As a task, you will be given randomly generated strings of letters that you need to type in reverse order. As an example: If you see the string “rl-gowsahc”, the correct answer will be “chaswogl”. In order to earn your tokens, you need to correctly solve 10 strings. All participants are randomly assigned to different difficulty levels and earn a different number of tokens. For a higher difficulty level you will earn more tokens. This will help us to correctly calibrate different difficulty levels for another study. **You have been assigned to a more difficult (easier) level for which you will earn 400 (200) tokens.** After finishing the string reversal task, you will be given more information about external factors that could affect the number of tokens you take into the second stage.

**Decision stage:** The second stage of the study consists of **three separate decision rounds**. In each round, you will be matched with a different Prolific participant who is participating in the same study but has been assigned to an **easier (more difficult) level**. In each round, you have to decide how you want to divide the total number of tokens that you and the other participant took into the second stage between **yourself** and the **other participant**. The other participant will do the same. The screenshot below shows what the decision screen will look like:

### Your choice

The total number of tokens you and the other participant earned to take into the decision stage is **X**. How many of those X tokens do you want to allocate to yourself? How many to the other participant? **Please make your choice by moving the sliders below.** Then click on continue to confirm your decision.



At the end of the experiment, there will be a lottery that selects one of the three decision rounds to count towards your bonus. In other words, each of the three decision rounds can be relevant for your final payment. Once a round has been selected, another lottery will decide whether **your choice** or the **other participant's choice** will determine your final bonuses. With a 50% chance, your choice will determine your and the other participant's final bonuses, with a 50% chance, the other participant's choice will determine your and their final bonuses. All interactions in this study are completely anonymous. You will never know the identity of the other participants, and they will never know yours.

## E.2 Screenshots experiment

### Real effort task

#### Earning stage (1/2)

In order to earn **your tokens** for the decision stage, you need to correctly reverse **10 strings**. As an example: If you see "rlgowsahc", the correct answer will be "chawoglr". **Once you have completed the task, you can move on to the next part of the study.**

To submit a reversed string, either press the 'Submit' button or your 'Enter' key.

Total strings attempted:

Number of correct strings:

Text sequence: nfcslsyew

Your answer:

Submit

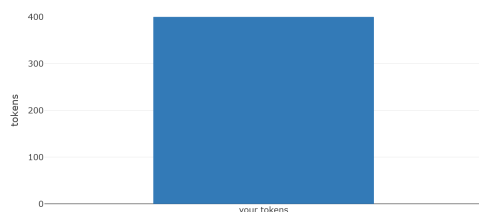
### Learning about shocks

#### a) H players with a shock

##### Earning stage (2/2)

Thank you! You have completed the task and earned **400 tokens**. The graph below shows the total number of tokens that you possess at the moment.

As mentioned in the instructions, the number of tokens you take into the decision stage depends partly on the task and partly on external factors. Each participant could suffer a **negative shock and lose 100 tokens**. **Half of the participants in this study are hit by a shock and half of the participants are not hit by a shock.**

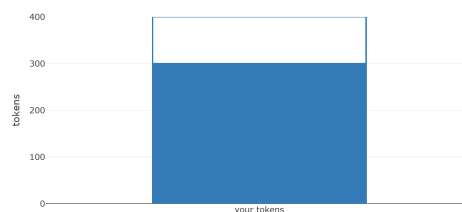


Please click on the button below to find out whether you have been hit by a shock:

Learn about shock

##### Oh no, you have been hit by a shock!

You initially earned **400 tokens**. You **lost 100 tokens** due to a shock and have thus left **300 tokens** to take into the decision stage. The graph below shows your tokens before and after the shock.



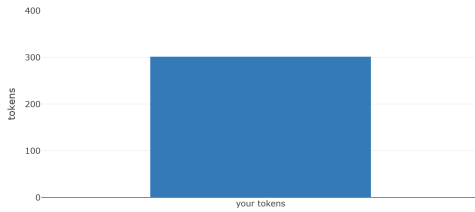
Continue

## b) H players without a shock

### Earning stage (2/2)

Thank you! You have completed the task and earned **300 tokens**. The graph below shows the total number of tokens that you possess at the moment.

As mentioned in the instructions, the number of tokens you take into the decision stage depends partly on the task and partly on external factors. Each participant could suffer a **negative shock and lose 100 tokens**. **Half of the participants in this study are hit by a shock and half of the participants are not hit by a shock.**

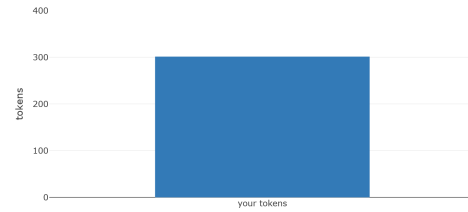


Please click on the button below to find out whether you have been hit by a shock:

Learn about shock

### Phew, you have not been hit by a shock!

You initially earned **300 tokens**. You did not suffer a shock and have thus left all **300 tokens** to take into the decision stage. The graph below shows your tokens before and after the shock.



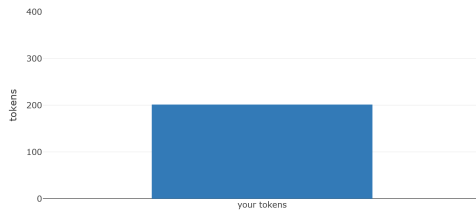
Continue

## c) L players with a shock

### Earning stage (2/2)

Thank you! You have completed the task and earned **200 tokens**. The graph below shows the total number of tokens that you possess at the moment.

As mentioned in the instructions, the number of tokens you take into the decision stage depends partly on the task and partly on external factors. Each participant could suffer a **negative shock and lose 100 tokens**. **Half of the participants in this study are hit by a shock and half of the participants are not hit by a shock.**

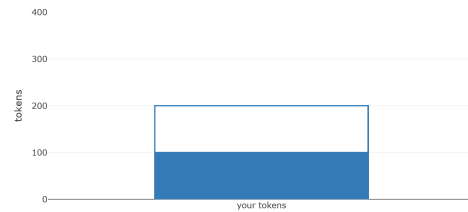


Please click on the button below to find out whether you have been hit by a shock:

Learn about shock

### Oh no, you have been hit by a shock!

You initially earned **200 tokens**. You **lost 100 tokens** due to a shock and have thus left **100 tokens** to take into the decision stage. The graph below shows your tokens before and after the shock.



Continue

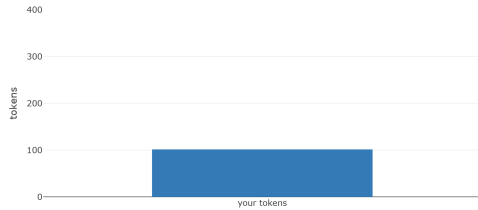


## d) L players without a shock

### Earning stage (2/2)

Thank you! You have completed the task and earned **100 tokens**. The graph below shows the total number of tokens that you possess at the moment.

As mentioned in the instructions, the number of tokens you take into the decision stage depends partly on the task and partly on external factors. Each participant could suffer a **negative shock and lose 100 tokens**. **Half of the participants in this study are hit by a shock and half of the participants are not hit by a shock.**

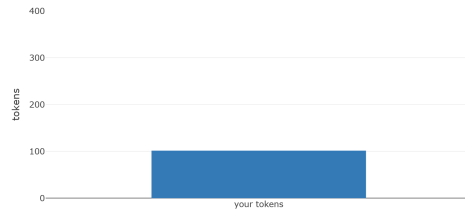


Please click on the button below to find out whether you have been hit by a shock:

Learn about shock

### Phew, you have not been hit by a shock!

You initially earned **100 tokens**. You did not suffer a shock and have thus left all **100 tokens** to take into the decision stage. The graph below shows your tokens before and after the shock.



Continue

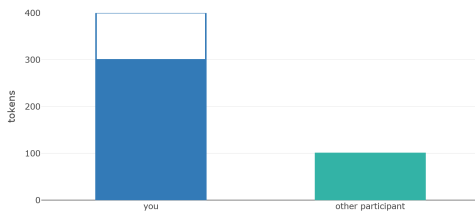
## Decision screen

The decision screen is shown from the perspective of an H player who did suffer a shock. The screen is adjusted accordingly for different scenarios (order and colour of scenarios is randomised). In each of the 3 rounds, participants receive information about the participant they are being matched with.

### Information about Participant 1

The **first player** you have been matched with initially earned **100 tokens**. They **did not suffer a shock** and, so, took all **100 tokens** into the second stage.

In comparison, **you** initially earned **400 tokens**. You **lost 100 tokens** due to a shock and, so, had **300 tokens** left to take into the second stage. The graph below shows both your and the other participant's tokens (before and after the shock).



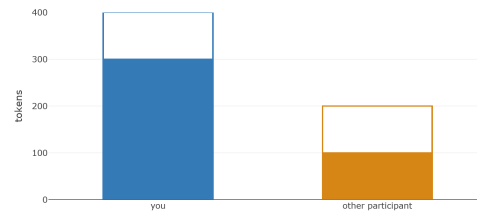
Click continue to proceed to the decision page.

Continue

### Information about Participant 2

The **second participant** you have been matched with initially earned **200 tokens**. They **lost 100 tokens** due to a shock and, so, had **100 tokens** left to take into the second stage.

In comparison, **you** initially earned **400 tokens**. You **lost 100 tokens** due to a shock and, so, had **300 tokens** left to take into the second stage. The graph below shows both your and the other participant's tokens (before and after the shock).



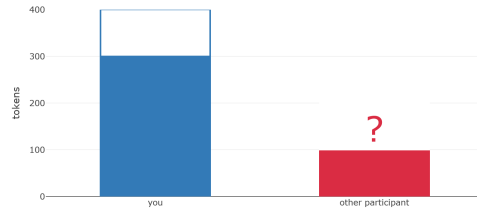
Click continue to proceed to the decision page.

Continue

### Information about Participant 3

The **third participant** you have been matched with initially earned **either 200 or 100 tokens**. You don't know whether they suffered a shock. The only thing you know for sure is that they took **100 tokens** into the second stage.

In comparison, **you** initially earned **400 tokens**. You **lost 100 tokens** due to a shock and, so, had **300 tokens** left to take into the second stage. The graph below shows both your and the other participant's tokens (before and after the shock).

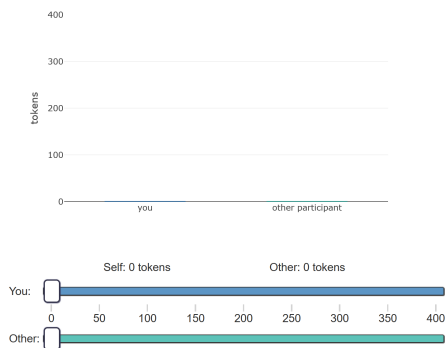


Continue

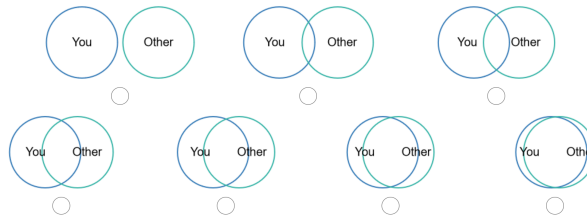
Next, they take a decision about how they want to allocate the total earnings between themselves and the other player (left graph below) and are then asked about how close they feel to the other player.

#### Your choice

The total amount of tokens you and the other participant earned to take into the decision stage is **400**. How many of those 400 tokens do you want to allocate to yourself? How many to the other participant? **Please make your choice by moving the sliders below**. Then click on continue to confirm your decision.



Please consider which of the pairs of circles best represents your connection with the **other participant**. By selecting a pair of circles, please indicate to what extent **you** and the other participant are connected.



Continue

Under incomplete information (here participant 3), participants answer either first the allocation decision or the question about their beliefs about the shock of the other player.

As mentioned before, **you don't know whether the other participant suffered a shock**. However, we would like you to guess what happened. If your guess is correct an additional **50 tokens** will be added to your bonus at the end of the experiment. Please make your guess by clicking on one of the options below:

The other participant suffered a shock and initially earned 200 tokens.

The other participant did not suffer a shock and initially earned 100 tokens.

Continue

## Questionnaire

Again some of the questions vary with roles and experience of shocks. Here I provide the example of an H player who suffered a shock. Questions are adjusted accordingly for other players.

### Questionnaire (1/3)

1) In the first stage of the study, participants were randomly assigned to different difficulty levels and **earned different amounts of tokens**. You were assigned to a more difficult level, for which **you initially earned 400 tokens**. The other participants you have been matched with **initially earned 200 or 100 tokens for an easier level**. What do you think about these differences?

very unfair



very fair

2) At the end of the earning stage, you learned that **you were hit by a shock and lost 100 tokens**. Please rate how this news made you feel by moving the slider below.



3) In one round of the decision stage you learned that **the participant you have been matched with was hit by a shock**. Please rate how this news made you feel by moving the slider below.



4) In another round of the decision stage you learned that **the participant you have been matched with was not hit by a shock**. Please rate how this news made you feel by moving the slider below.



5) **You** initially earned **400 tokens and lost 100 tokens** due to a shock. The **other participant** who suffered a shock, initially earned **200 tokens and lost 100 tokens** due to a shock. How do you judge both shocks?

We were affected in the same way.

The other participant was affected more.

I was affected more.

Continue

## Questionnaire (2/3)

1) What is your age?

2) What is your gender? (male/female/prefer not to say)

3) What is the highest degree or level of schooling you have completed? (No formal qualification/ Secondary school or GCSE/ College or A levels/ Undergraduate degree/ Graduate degree/ PhD/ Prefer not to say)

4) Some people describe political affiliation on a left to right spectrum. Please indicate where you believe your political ideology lies on this spectrum.

Left  Right

5) What was your household pre-tax income last year?

6) Including yourself, how many people currently live in your household?

7) Think of the ladder below as representing where people stand in your country.

At the top of the ladder are the people who are the best off - those who have the most income, the most education, and the most respected jobs. At the bottom are the people who are worst off - who have the least money, the least education, and the least respected jobs or no jobs. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

Where would you place yourself on this ladder?



## Questionnaire (3/3)

### 1) How has your employment status been affected by the COVID-19 (coronavirus) pandemic?

#### 1.1) Before the pandemic I was:

Working full-time
Working part-time
Unemployed or out of work
Self-employed
A student and not employed
Prefer not to say

#### 1.2) My current situation is:

Working full-time
Working part-time
Working fewer part-time hours
My job has been suspended (unpaid leave or furloughed)
Unemployed or out of work
Self-employed
A student and not employed
Prefer not to say

### 2) To what extent do you agree with the following statements:

I suffered a significant loss in livelihood due to the Covid-19 crisis.

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

The pandemic made me struggle financially.

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

The government should aim to reduce economic differences.

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

Compassion for those who are suffering is the most crucial virtue.

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

I think during a crisis people tend to become more

Selfish ☐ ☐ ☐ ☐ ☐ ☐ ☐ Compassionate

Should you give priority to solving your own problems or should you give priority to solving your society's problems?

Own problems ☐ ☐ ☐ ☐ ☐ ☐ ☐ Society's problems

## F Materials for Study 2

### F.1 Instructions

#### Instructions

Please read the instructions carefully.

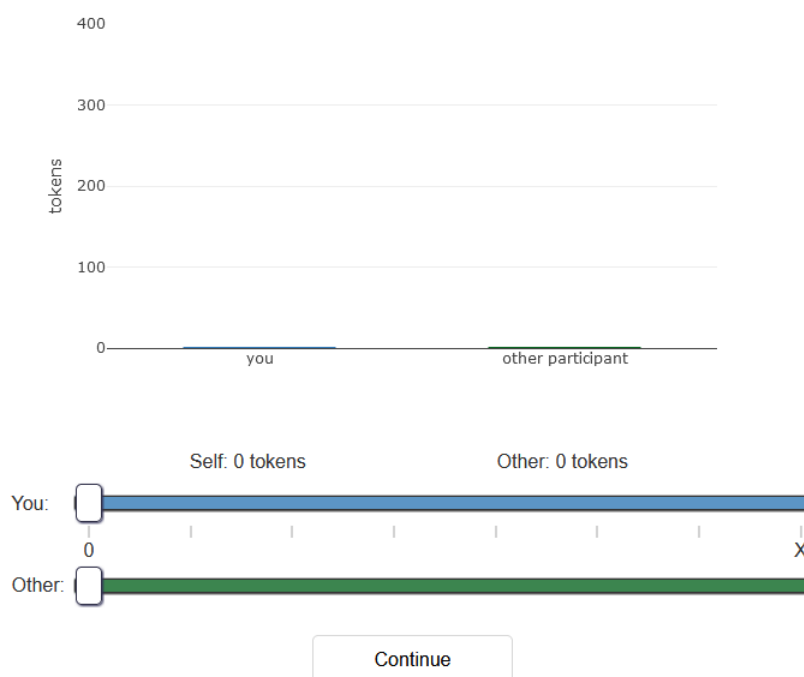
This study consists of three stages: an earning stage, a decision stage, and a short questionnaire. You will be given details about the different stages below. Throughout the study you can earn Experimental Tokens, which are later converted into a bonus (£) at a pre-defined exchange rate (100 tokens = £0.40). Your final bonus will depend partly on your own decision, partly on the decision of another Prolific participant and partly on external factors. How your bonus is determined will be outlined in greater detail below.

**Earning stage:** In this stage, you have to work in order to earn tokens that are then used in the second stage of the study. As a task, you will be given randomly generated strings of letters that you need to type in reverse order. As an example: If you see the string “rl-gowsahc”, the correct answer will be “chaswoglr”. In order to earn your tokens, you need to correctly solve 10 strings. All participants are randomly assigned to different difficulty levels and earn a different number of tokens. For a higher difficulty level you will earn more tokens. This will help us to correctly calibrate different difficulty levels for another study. **You have been assigned to a more difficult (easier) level for which you will earn 300 (100) tokens.**

**Decision stage:** The second stage of the study consists of **three separate decision rounds**. In each round, you will be matched with a different Prolific participant who is participating in the same study but has been assigned to **an easier (more difficult) level**. In each round, you have to decide how you want to divide the total number of tokens that you and the other participant earned between **yourself** and **the other participant**. The other participant will do the same. The screenshot below shows what the decision screen will look like:

### Your choice

The total number of tokens you and the other participant earned to take into the decision stage is **X**. How many of those X tokens do you want to allocate to yourself? How many to the other participant? **Please make your choice by moving the sliders below.** Then click on continue to confirm your decision.



In each round, before making your decision, we may show you some **background information about the other participant**. Concretely, we may tell you whether they suffered a **significant loss in livelihood** due to the Covid-19 crisis. This information comes from self-reports on Prolific. Similarly, we may inform your matched participants whether you reported a significant loss in livelihood on Prolific before they make their decisions. All interactions in this study are **completely anonymous**. You will never know the identity of the other participants, and they will never know yours.

At the end of the experiment, there will be a lottery that selects one of the three decision rounds to count towards your bonus. In other words, each of the three decision rounds can be relevant for your final payment. Once a round has been selected, another lottery will decide whether **your choice** or the **other participant's choice** will determine your final bonuses. With a 50% chance, your choice will determine your and the other participant's final bonuses, with a 50% chance, the other participant's choice will determine your and their final bonuses.

## F.2 Screenshots experiment

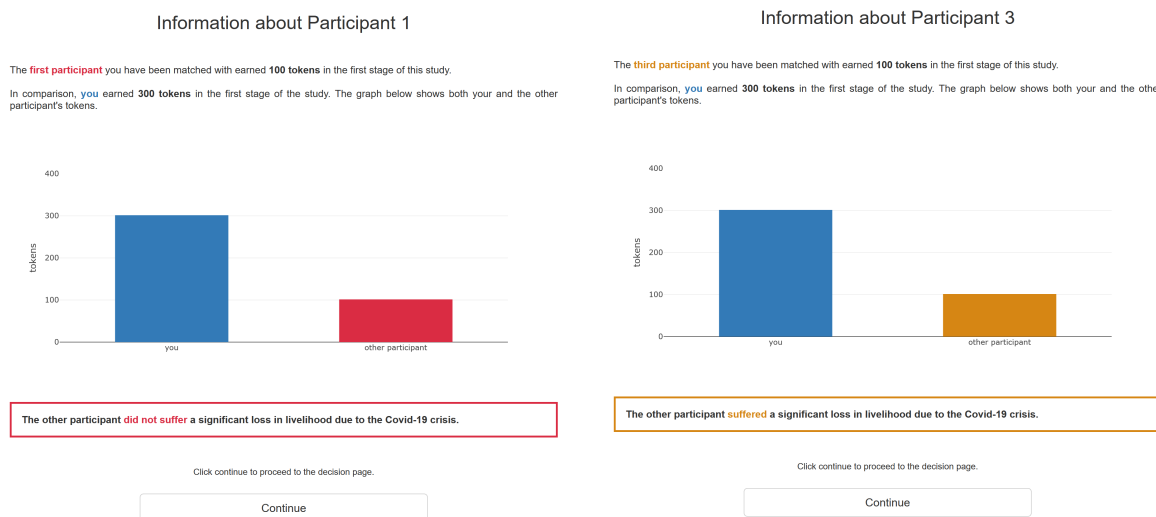
As Study 2 shares the same structure as Study 1, quite a few screens are identical across studies. For reasons of conciseness, I only show screens that differ and refer to Study 1 otherwise.

### Real effort task

See Study 1.

### Information about the other player and beliefs

In each of the 3 rounds, participants receive information about the participant they are being matched with. The order and colour of scenarios is randomised. The decision screen where participants can allocate earnings between themselves and the other player is identical to Study 1.



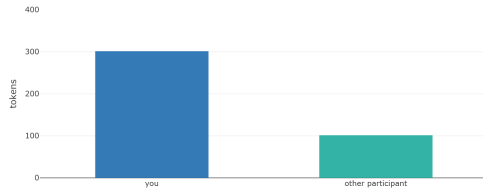
Under incomplete information (here participant 2), participants answer either first the allocation decision or the question about their beliefs about the real world shock of the other player (see Figure RHS below). Screenshots are made from the perspective of an H player. For L players the text and graphs are adjusted accordingly.



## Information about Participant 2

The **second participant** you have been matched with earned **100 tokens** in the first stage of this study.

In comparison, **you** earned **300 tokens** in the first stage of the study. The graph below shows both your and the other participant's tokens.



As mentioned before, **you don't know whether the other participant suffered a significant loss in livelihood**. However, we would like you to guess what happened. If your guess is correct an additional **50 tokens** will be added to your bonus at the end of the experiment. Please make your guess by clicking on one of the options below:

☐ The other participant **suffered** a significant loss in livelihood.

☐ The other participant **did not suffer** a significant loss in livelihood.

The other participant **might or might not have suffered** a significant loss in livelihood due to the Covid-19 crisis. You don't know which of the two options is true.

## Questionnaire

Again the questions are phrased from the perspective of an H player. For L players, the text is adjusted accordingly. Questionnaire 2/3 and 3/3 are identical to Study 1.

### Questionnaire (1/3)

1) In the first stage of the study, participants were randomly assigned to different difficulty levels and **earned different amounts of tokens**. You were assigned to a **more difficult level**, for which **you earned 300 tokens**. **The other participants** you have been matched with **earned 100 tokens for an easier level**. What do you think about these differences?

very unfair



very fair

2) In one round of the decision stage you learned that **the participant you have been matched with suffered a significant loss in livelihood** due to the Covid-19 crisis. Please rate how this news made you feel by moving the slider below.



3) In another round of the decision stage you learned that **the participant you have been matched with did not suffer a significant loss in livelihood** due to the Covid-19 crisis. Please rate how this news made you feel by moving the slider below.



4) **One of the participants** you have been matched with suffered a **significant loss in livelihood due to the Covid-19 crisis**. How do you judge both you and that other participant have been affected by Covid?

The other participant was affected more.

We were affected in the same way.

I was affected more.

5) As mentioned in the instructions, the information about whether other participants suffered from a significant loss in livelihood due to the Covid-19 crisis comes from **self-reports on Prolific**. How truthfully do you believe the other participants reported their situation?

very untruthfully



very truthfully

Continue