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# Procedural fairness and equality of opportunity

Stefan T. Trautmann<sup>1,2</sup> 

<sup>1</sup>Heidelberg University, Heidelberg, Germany

<sup>2</sup>Department of Economics, Tilburg University, Tilburg, The Netherlands

## Correspondence

Stefan T. Trautmann,  
Alfred-Weber-Institute for Economics,  
University of Heidelberg, Bergheimer Str.  
58, 69115 Heidelberg, Germany.  
Email: [s.t.trautmann@uvt.nl](mailto:s.t.trautmann@uvt.nl),  
[trautmann@uni-hd.de](mailto:trautmann@uni-hd.de)

## Abstract

In this article, we discuss concepts of procedural fairness and equality of opportunity, and review the descriptive evidence regarding such procedural fairness preferences and their dynamic consistency. We then review the empirical relationship between equality of opportunity and preferences for redistribution. We discuss evidence derived from both survey and experimental studies.

## KEYWORDS

equality of opportunity, outcome fairness, procedural fairness, redistribution

## JEL CLASSIFICATION

C91, D63

## 1 | INTRODUCTION

Much of the public discourse on inequality concerns the unequal distribution of income and wealth. In particular, it is widely discussed whether such distributional inequality is to be considered unfair, whether it is acceptable, and what the potential societal consequences of inequality are (e.g., Fehr et al., 2020; Marandola & Xu, 2021; Piketty, 2014; Scanlon, 2018; Wilkinson & Pickett, 2010). Although extreme inequality is often considered undesirable per se, “simple equality” (Walzer, 1983), that is, equalizing financial resources, is also often considered both undesirable and unattainable. Simple equality can be conceived of as undesirable because it does not consider potential differences in merit and risk tolerance that in itself may justify differences in financial outcomes (Scanlon, 2018), and can also be important as an incentive mechanism. It can be unattainable because, as Walzer (1983) argues, a state of full equality in the economic domain will not be very persistent. Differences in consumption and saving, effort and talent, or risk taking and investment will quickly induce new differences in financial status. It would thus require a

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permanent redistribution of wealth in the face of these centrifugal forces. If we accept that there have to be some differences in income and wealth, because of the differences in people's talents and behaviors as described above, we can still ask if the mapping of these underlying aspects on outcomes can be considered fair. That is, we are interested in aspects of the process that leads to a certain distribution of resources in society. Concepts of procedural fairness have been developed to understand the fairness properties of different allocation processes. In Section 2 we will present these concepts, and discuss how procedural fairness may serve as a substitute for outcome-based distributional fairness. Here we will also introduce the closely related concept of equality of opportunity, and how it has been operationalized.

Having laid out the theoretical foundations, in Section 3 we will then review experimental evidence on procedural fairness preferences: How prevalent are procedural fairness preferences, that is, do people consider it a compelling fairness criterion? Moreover, we will discuss studies that test whether procedural fairness views are applied in a time-consistent manner. The problem can be described as follows. Consider an allocation process that will lead to some unequal outcome distribution (for example because of indivisibilities), but that all individuals are equally likely to obtain each outcome.<sup>1</sup> Ex-ante all individuals agree to the allocation procedure, as it provides equal opportunities for the good outcome and is considered fair by everybody. However, after the actual distribution of outcomes has been determined, distributional inequality becomes more salient and, thus, maybe more relevant. Although they considered the allocation process fair, ex-post unsuccessful individuals may reject the emerging allocation, shifting to an outcome-based view on fairness. Such dynamic inconsistency would be a fundamental problem to any application of procedural fairness criteria.

Building on the previously raised question whether fair procedures can substitute for equal outcomes, Section 4 will then summarize the evidence on the empirical relationship between equality of opportunity and preferences for redistribution. Both survey and (survey) experimental evidence will be discussed. It will become clear that the relationship between outcome fairness and procedural fairness becomes more complex if we consider it in the context of equality or opportunities, and several remarkable patterns will emerge. Finally, Section 5 offers concluding remarks and suggestions for future research.<sup>2</sup>

## 2 | CONCEPTIONS OF PROCEDURAL FAIRNESS AND EQUALITY OF OPPORTUNITY

This section reviews conceptions of procedural fairness and equality of opportunity. We discuss whether the procedural view may be preferable to an outcome-based view of fairness, in particular in the light of efficiency concerns.

### 2.1 | Conceptions of procedural fairness

When considering the fairness of an allocation process, we can distinguish between aspects that relate to the process's ultimate effect on the distribution of outcomes, and those that do not. In the former view, the fairness of a process is instrumental to the allocation of outcomes (i.e., it affects the outcomes), and may thus still be judged, implicitly, from an outcome perspective. In contrast, a purely non-instrumental view on procedural fairness would be fully independent of

the resulting outcomes: whether or not the process is fair has no effect on the potential outcome distribution. We will consider both views in the following.

An important property of the instrumental view of procedural fairness is the role of conditional and expected outcomes in the judgment of the process's fairness. That is, the fairness of the process has an effect on the resulting outcome distribution that can be expected to eventually obtain. For example, if the process leads to an allocation of outcomes that is proportional to the effort exerted by the agents, we may consider it procedurally fair from a merit perspective. In particular, if any differences in outcomes are due to factors that are under the control of the agents, neither libertarian nor liberal egalitarian perspectives (Cappelen et al., 2007) would recommend redistribution of these outcomes, because the allocation process was fair from these perspectives.

Alternatively, if the process leads to equal expected outcomes (but not necessarily equal realized outcomes) for similar agents, we may consider it fair because the agents had equal chances, the process was unbiased (Krawczyk, 2011; Trautmann, 2009). The idea of unbiasedness can be a compelling fairness criterion. It is often much easier to attain than equal outcomes, and can be applied in a broader range of settings. In many contexts, outcomes may not be easily divisible, but chances are. If agents are considered similar or equally deserving, equal chances imply an unbiased process, but still allow for an unequal allocation of outcomes, if this is unavoidable. However, differences in merit can also be accounted for. Weighted lotteries can allocate higher chances for desirable outcomes in proportion to an agent's desert. An example is Edgeworth's (1890) suggestion to allocate admission to the civil service according to merit-weighted "graduated lotteries" based on chances in proportion to examination scores. As Boyle (1998) argues, such lotteries help implementing fairness by incorporating both efficiency and equity considerations.

We have discussed before that simple outcome equality may not be easily attainable over a longer time frame, because it would require to be continuously restored, as people's financial status changes due to their different attitudes toward consumption and investment. Procedural fairness in terms of equality of opportunities does not intrinsically suffer from the same problem: unbiased allocation procedures will, on average, balance outcomes, and today's losers may be tomorrow's winners. Today's chances in itself cannot be saved or invested to increase future chances for good outcomes, which prevents the emergence of unequal future expected outcomes. However, financial outcomes will differ among agents even if expected outcomes are equalized, and agents will still differ with respect to the use of their financial resources. A fair process must then guarantee that, in a dynamic context, outcomes are not transformed into increased future chances for good outcomes at the expense of other individuals.<sup>3</sup> In contrast, naturally emerging differences in financial status may be corrected by dynamically adjusting chances for good outcomes downward for more successful relative to less successful individuals (a handicap, in the spirit of affirmative action; see e.g., Fehr et al., 2022). Such dynamically adjusted opportunities seem more feasible than continued outcome-based redistribution, because chances are easier to redistribute by manipulating thresholds, requirements, or eligibility etc., than monetary outcomes.

If a process leads to an allocation of outcomes that is proportional to the talents that the agents are born with, we may consider it unfair, as individuals hold no agency over their initial endowments. A similar point may be made with regard to people's parental income and inheritance. However, it may be argued in the latter examples, that the distribution of talents or parental endowments over children could be interpreted as a sort of initial random allocation process (Grimalda et al., 2016): all children in principle had the chance to be born to wealthy parents. Clearly, this interpretation can be challenged. However, the example illustrates the difficulty in

clearly defining the allocation process for some outcomes, and its boundaries. We will discuss this issue in more detail in the context of inequality of opportunity in Section 2.2.

While the previous discussion of fair processes ultimately relates to the fair distribution of outcomes, procedural fairness has sometimes also been interpreted in a completely non-instrumental way. One aspect of non-instrumental procedural fairness concerns the idea of decision rights. People value autonomy and agency, as these are important for people's notion of self (Anand, 2001; Bartling et al., 2014). They may value these aspects intrinsically, and may be willing to even forgo better outcomes to maintain their autonomy (Arad & Rubinstein, 2018; Bartling et al., 2014).

Another prominent concept in this context is the idea of *voice*. Voice implies that those individuals exposed to some outcome can express their views on the allocation, and must be heard (Anand, 2001; Lind et al., 1990). In particular, those unhappy with the outcome may express their discontent. However, importantly, to be truly non-instrumental, such expression of discontent should not have any effect on the outcomes. This includes both the current outcome commented on, as well as the allocation of future outcomes. Clearly, in most contexts with repeated interactions between agents and institutions, it will be very difficult to identify such truly non-instrumental aspects, because we can never fully exclude influence on future outcomes. We will discuss this problem when reviewing the evidence on procedural fairness in Section 3.

## 2.2 | Equality of opportunity

In simple, abstract settings, equality of opportunity has often been considered conceptually similar to procedural fairness. For example, Sugden and Wang (2020) define equality of opportunity in a game-theoretic context in terms of unbiasedness and symmetry in the rules of the game: players have identical strategic opportunities, which also imply ex-ante equal expected payoffs to all players. However, the authors emphasize that their definition of equality of opportunity is not relying on expected outcomes per se. Equal strategic opportunities do not ensure equal average payoffs in people's actual play. Neither does *inequality* of opportunity imply that people do not have equal expected payoffs: a game with asymmetric opportunities may well have a Nash equilibrium with equal payoffs or even better payoffs for the player with worse strategic opportunities. The idea is related to Chlaß et al. (2019) concept of purely procedural preferences, incorporating decision and information rights in people's utility. Consider a simplified dictator game in which the dictator can choose between the allocation \$7 for herself and \$3 for the other player, and an equal split of \$5 each; and an ultimatum game with the same alternatives for the proposer, but with the possibility for the responder to reject the offer, which yields a payoff of \$0 for both players. Assume further that the responder expects the proposer, respectively dictator, to choose the \$7-\$3 allocation in both games and is not going to reject in the ultimatum game. Thus, in both games the actual and expected outcomes are equal, from the responder's perspective. Still, there are clear differences in decision rights for the responder between the two games; considering opportunities as intrinsically valuable commends a preference for the ultimatum game.

If we move beyond simple, abstract allocation settings as studied in theoretical and most experimental work, equality of opportunity becomes conceptually broader than procedural justice. It is typically understood implying equal life chances for all citizens (e.g., Roemer & Trannoy, 2016; Scanlon, 2018): people should be held accountable for their effort and preferences, but not for exogenously given circumstances that are beyond their influence. Equality of opportunity is often associated with social mobility across generations (although there is not necessarily a one-to-one mapping, see Corak (2013) for a detailed discussion). It is a topic widely discussed in popular

discourses whether there is sufficient social mobility in a society (e.g., *The Economist*, 2021a). Social mobility may be low if the circumstances under which individuals lead their lives differ so strongly as to make it unlikely that they move beyond the social class of their parents, either upward or downward. Aspects like heritage, where wealthy parents provide large initial financial endowments to their offspring, differences in upbringing and education that differ across families from different social strata, as well as differences in inborn talents and skills can lead to vastly different starting positions. These factors reduce the impact of individual effort and choices on life outcomes. If life outcomes are mainly affected by circumstances that are beyond the influence of the individual, equality of opportunity does not hold. Redistribution in terms of wealth or estate taxes, public provision of education, as well as affirmative action may reduce the effect of circumstances based on endowment and nurture on life outcomes.

The situation becomes more complicated if we consider differences in inborn talents. Should these differences be allowed to lead to differences in outcomes, that is, are they consistent with equality of opportunity; or should they be corrected? Scanlon (2018) argues that, in many situations, individuals' talents will benefit society more broadly, and the institutions that reward such talents can therefore be justified. Consequently, it can be consistent with equality of opportunity if talented people have access to financially more rewarding occupations. For example, under this view, a talented individual may become a high paid medical doctor to the benefit of society at large. Others have been less convinced by this argument. Hufe et al. (2015), focusing on the distribution of financial opportunities, do not agree that valuable traits justify higher income; they acknowledge that this implies that market prices are in conflict with equality of opportunity, if the market allocates according to valuable talents. In some contexts, this may lead to issues of incentive compatibility, if talented people will not necessarily select into certain occupation in the absence of sufficient financial incentives.

An important issue regarding the provision of equal opportunities if children differ both in terms of their genetic endowment and their family background in terms of wealth, values, and culture, is how much society can in fact do to equalize opportunities. Clearly discrimination and outright corruption need to be contained (Scanlon, 2018; Walzer, 1983). Preventing wealthy parents from providing an excellent environment for the development of their children will be impossible (e.g., *The Economist*, 2021b), and probably undesirable. When considering people for careers, the best we can probably do is to employ selection criteria that are least affected by aspects that differ by family background, focusing on pure talents. Scanlon (2018) also makes the important point that, even conditional on equal opportunities to develop one's talents, a merit-based approach rewarding a person's effort, is far from obvious. He argues that there is no moral superiority of effort over sloth. However, there is a case for holding people accountable for their choices to develop or not develop their talents. If someone decides not to develop certain skills, he cannot be considered for certain positions. However, to be held accountable, a person needs to be in the position to make an informed choice and, in addition, be equipped with will power and self-control to execute that choice. These dispositions, however, again strongly depend on family background, in particular early childhood education and genetic code. Under this premise, individuals cannot always be held responsible for their industriousness, or will power, more generally. Acknowledging this clear path dependency, Hufe et al. (2015) argue for considering children's circumstances in evaluating the choices they made, and which will influence their financial future, up to an age of at least 16 years. That is, adequate consideration of circumstances should put all children at equal footing once they enter adulthood. In Section 4 we will review the evidence on the relationship between equality of opportunity and preference for redistribution that emerges from these considerations.

### 3 | PROCEDURAL FAIRNESS: EXPERIMENTAL EVIDENCE

#### 3.1 | Prevalence of procedural fairness preferences

*Instrumental Procedural Fairness.* In this section we will review the evidence on the prevalence of procedural fairness preferences, and when and how they are considered a substitute for outcome equality. An influential study by Bolton et al. (2005) aimed to answer these questions experimentally. Bolton et al. (2005) use two paradigms. In the first experiment, they study rejection rates in mini-ultimatum games, under three different conditions. In the first condition, the proposer can only choose between an unequal allocation in favor of herself or in favor of the responder; responders can accept the proposed allocation or reject, leading to a zero payoff for both players. They find low rejection rates in case the proposer chooses the option favorable to herself: Equality is unattainable and the responders do not seem to expect the proposer to choose the unfavorable position for themselves. This is consistent with the finding that people do not expect others to behave like “saints” (e.g., Bolton et al., 1998; Murnighan et al., 2001). In the second condition, an equal-outcome option is added to the game. In this case, self-favoring choices by the proposer are severely punished, with about 40% of the offers rejected. In the third condition, Bolton et al. (2005) replace the equal-outcome allocation by an equal-chance draw between the two unequal outcome allocations, i.e., a fair procedure. As in the condition with an equal-outcome option, proposers choosing the self-favorable option although a fair procedure is available, are punished in around 40% of the cases. That is, the availability of an unbiased random draw has the same effect as the availability of the equal outcome option: a fair procedure is perceived as a substitute for a fair outcome.

In a second experiment, the authors compare rejection rates in the ultimatum game with an equal allocation option directly to a situation in which the three options (favorable for proposer, favorable for responder, equal) are chosen randomly, and where the random process is either unbiased symmetric, or favoring one of the players. For the symmetric game they consider one condition with a high variance of outcomes, and one condition with a low variance of outcomes. They find rejection rates in the case of unfavorably unequal outcomes allocated by a random procedure to be substantially lower if the process is unbiased. The biased procedure does not reduce rejection rates compared to the intentional ultimatum game choices. Again, a fair procedure can substitute for a fair outcome, but this is not the case for an unfair procedure.

While Bolton et al. (2005) focus on how recipients perceive of fair or unfair allocation procedures, several studies have focused on how decision makers select allocation procedures and react to the risks involved. Krawczyk and LeLec (2010) study how dictators allocate outcomes versus expected outcomes (by allocating chances) to themselves and a recipient. In the case of expected outcomes, they consider both competitive (only one prize randomly allocated) and non-competitive risk (each player has an independent chance to receive a prize). They find that allocators are less generous when allocating expected outcomes. That is, dealing with opportunities only rather than outcomes seems to make people more selfish, possibly due to the risk involved to their outcomes. Brock et al. (2013) implement a very similar design, but incorporating some interesting differences. They compare the standard dictator decision with an allocation of chances (for the recipient) that imply the same expected value as the outcomes in the dictator game (e.g., 1 dollar-cent versus a 1% chance on €1). They also find that dictators are less generous in the risky case, indicating that opportunities are not considered equally valuable as equally sized outcomes. Karni et al. (2008) study whether dictators in a 3-player winning-chances allocation



game are willing to sacrifice some of their own chances to make the allocation of chances to the other two players more equal. They find some evidence for such an effect, but conclude that the effect is small, and certainly smaller than in related designs that study the allocation of outcomes instead of chances. The results of Brock et al. (2013) and Karni et al. (2008), Krawczyk and LeLec (2010) suggest that opportunities may not be considered a perfect substitute for outcomes, and thus some caution in considering equality of opportunity a substitute for equality in outcomes is warranted.

Schmidt and Trautmann (2021) also consider the decision maker's perspective. They study situations where the decision maker has to allocate some funds to two recipients, and where there will always be an unequal allocation of outcomes. The decision maker has some information about the political attitudes of the recipients and their similarity to her own political attitudes. In a baseline condition, the authors find that the information on the attitudes strongly affects the allocation (politically closer recipients are favored). In several conditions they then offer decision makers tools that can help to make a procedurally fair choice that is not affected by the personal information about the recipients. These tools include a private fine-grained randomization device allowing for weighted lotteries, a public equal-chance randomization device, as well as blinding the political attitudes information (thus basically also implementing an equal chance allocation). Importantly, the decision makers are free to take up the tools, or allocate according to their own choice as in the baseline condition. Schmidt and Trautmann (2021) find strong use of the three tools, especially of the randomization devices. That is, decision makers seem to be aware of their biases, try to avoid them, and implement procedural fairness.

The results of Schmidt and Trautmann (2021) bear some resemblance with earlier work by Sandroni et al. (2013). These authors have dictators choose between an unfair allocation (to their advantage), a fair allocation with lower payoffs for themselves compared to the unfair allocation, and the possibility to delegate the choice to a random device. The authors find a substantial share of subjects choosing randomization. They point out that randomization violates basic principles of decision making: if one of the alternatives is preferred, it should simply be selected for sure. Importantly, they also show that the preference for randomization does not obtain for individual decision situations with no social outcomes. In light of the results in Sandroni et al. (2013), Schmidt and Trautmann (2021) results may be interpreted as an attempt by dictators to shift responsibility, given that they understand that they are possibly biased because of self-interest.

Finally, Ku and Salmon (2013) study procedural fairness in the context of the Pareto criterion. They study a game in which two players, one with a small and the other with a large endowment, can realize an increase in both of their payoffs. However, the increase in payoff will be larger for the already better-off player, and it depends on the decision of the worse-off player. The authors study how different conditions for the allocation of the endowment affect the worse-off player's willingness to increase payoffs under these circumstances. They find that the low-payoff players are most willing to realize pareto improvements that strongly favor the other player in the case of a random allocation of the endowments (using experimental subject IDs). Surprisingly, allocation according to merit (test scores) performs poorly, and performs similarly to an "arbitrary" allocation according to preferences for two pieces of art, as well as an allocation according to being least social in a public goods game (least social receive the high endowment). The results suggest that the perception of what constitutes a fair procedure can be very sensitive to framing effects. Test score merit induces the same fairness effects as competitive allocation according to freeriding, suggesting merit is rather perceived as competitiveness here. Arbitrary allocation is basically random, but does not seem to be perceived as such. Such subtle framing effects have also been shown by Micheli and Gagnon (2020) who study fairness ratings for several factors determining



winning chances in a highly unfair allocation procedure with one person having a 10%, and the other person having a 90% chance to win €10. The authors find allocation according to effort, knowledge and benevolence score high in terms of fairness, and in terms of perceived individual control. Several other factors such as height, nationality or gender score low on fairness and perceived control. Allocation according to luck (a die-role) performs high in terms of fairness, but low in terms of control; in contrast, allocation according student IDs, arguable random as well and apparently perceived as such in Ku and Salmon (2013), performs low on fairness and control.

*Non-Instrumental Procedural Fairness.* We have introduced the concept of non-instrumental procedural fairness in terms of voice or decision rights in Section 2.1. Several studies in economics have looked at voice. Ong et al. (2012) study different implementations of voice in an ultimatum game context to identify if and how it works. In particular, they test if the possibility to express and explain what they consider an appropriate allocation leads responders to be more or less accepting of unfair offers. They indeed find that responders who are allowed to express their opinion to the experimenter, are more accepting of unfair offers. They call this the value-expression effect, as their opinions have not been submitted to the proposer and therefore cannot be instrumental to better outcomes. They also find that if responders can express their opinion directly to the proposers, they are less accepting of unfair offers. That is, voice is then seen as an instrument to obtain better outcomes, and poor outcomes are consequently more disappointing. This result is supported by work by Corgnet and Hernan Gonzalez (2014). In a principal agent context, these authors also find that consulting the opinion of the agent but not considering it in their decisions leads to negative reactions by the agent. Consistent with Ong et al. (2012) value-expression effect, Kessler and Leider (2016) show that voice reduces the hidden cost of control, i.e., agents reducing their effort if their actions are more tightly controlled. Although these latter studies do not implement a clean non-instrumental test of voice, they are consistent with its importance in principal-agent settings.

Kleine et al. (2017) look at voice in the context of a game where two players contribute to a joint total payoff that needs to be distributed among them by a third player, the allocator. The two players have different externally set productivities in contributing to the joint payoff. Different equity criteria would therefore dictate different allocations. Voice is implemented by one player being able to voice his opinion about the fair distribution of the joint payoff to the allocator. Subsequently, but before learning about the actual allocation, this player has the opportunity to share an additional amount with the allocator in a dictator game. The strategy method is used, and for each possible outcome of the allocator's decision, the player has to indicate the amount he is willing to give to the dictator. Kleine et al. (2017) find that voice unambiguously leads to larger transfers to the allocator for all possible allocations of the joint payoff chosen, compared to a no-voice condition. However, the effect is strongly moderated by the allocation, and for unfavorable allocation the effect is rather small. Still, for all reasonable allocations that are based on several typical fairness norms, the effect of voice is very strong. Thus, the results of Kleine et al. (2017) and the value expression channel found by Ong et al. (2012) provide clear evidence for a non-instrumental voice effect.

Several studies have looked at the value of decision rights. Bartling et al. (2014) develop a design where they elicit principals' indifference points between making a project choice and effort decision themselves, and delegating it to an agent who may choose another project that is less attractive to the principal but reduces her effort cost. Indifference points are measured in terms of the agent's effort level that makes the principal indifferent between delegation and making the decision herself. Because effort only influences the chance that the chosen project is successful, both making the decision themselves and the equally preferred delegation decision implicitly

define a lottery over outcomes. In a second step, Bartling et al. (2014) elicit principals' certainty-equivalent valuations for these implied lotteries outside the delegation context. They find that the principals value the delegation-implied lotteries substantially higher than the own-decision lotteries, despite being indifferent between the two, by design, in the delegation task. That is, in the delegation task, principals seem to perceive additional value in being able to make the project choice and effort decisions themselves. The authors interpret the results as evidence for the intrinsic value of decision rights.

Similarly, Chlaß et al. (2019) show that agents have preferences over different allocation procedures that do not differ in either outcomes or expected outcomes, nor in their reciprocity. Handgraaf et al. (2008) use a design developed by Suleiman (1996) to study how people value power in social decision settings. Their design can be interpreted in terms of decision-making rights as well. They study an ultimatum game with a discount factor, which measures how strongly the rejection of the responder affects the proposed allocation. A discount factor of 0 implies that both players end up with zero payoff, the standard ultimatum game. A discount factor of 1 implies that the proposal is unaffected, the standard dictator game. Discount factors between 0 and 1 partly destroy the allocated shares for the two players. Handgraaf et al. (2008) show that responders prefer having at least some rejection power (discount factor smaller than 1) to having no rejection power. That is, decision rights are important to them. Importantly, this decision power comes at a price: proposers' offers to responders are in fact somewhat larger for the case of no rejection power than for the case of a low degree of rejection power. This effect has already been demonstrated in the earlier contribution by Suleiman (1996). It implies that responders pay a positive price for having at least some decision rights.<sup>4</sup>

### 3.2 | Dynamic consistency of procedural fairness

Fairness preferences are prone to salience effects. Exley and Kessler (2018) provide an extreme illustration. In their study, participants have to allocate tokens among two recipients that differ in terms of physical size and in terms of their value. Exley and Kessler (2018) find that allocation decisions are driven by the (irrelevant) size of the tokens, rather than just their valuation. That is, allocators distribute tokens of each size fairly, instead of focusing on the total amount of cash allocated to each recipient. This evidence on salience effects is important to the assessment of (instrumental) procedural fairness preference, because the salience of unbiased opportunities versus potentially unequal outcomes varies, depending on when in the process the assessment is made. In particular, *ex-ante*, i.e., before the allocation process is implemented and the outcomes determined, unbiased opportunities are very salient. In contrast, once outcomes are allocated, inequalities become more salient.<sup>5</sup> An important question therefore concerns whether preferences for procedural fairness remain robust also after the uncertainty regarding the actual allocation of outcomes is resolved (Trautmann & Wakker, 2010).<sup>6</sup> If unequal outcomes negatively influence the assessment of unbiased opportunities, equality of opportunity may not serve as a substitute for equal outcomes in dynamic contexts, because people may reconsider their assessment over time.

Two studies have looked at the dynamic consistency of procedural fairness preferences. Trautmann and van de Kuilen (2016) consider the behavior of agents exposed to payoffs in a simple allocation game where agent A receives a high payoff of €9 and agent B receives a low payoff of €1, or the other way around, with equal chance. Agents can either accept the allocation *ex-ante*, i.e., before the uncertainty regarding who receives the high offer is resolved, or reject, leading to equal

payoffs of €2 for both agents. In two experiments, they find that 91%–98% of the agents accept the advantageous allocation, and still 37%–46% accept the disadvantageous allocation, *ex-ante*. Given the chance to reconsider their choices after the uncertainty has been resolved, 100% accept the advantageous allocation and 24%–30% accept the disadvantageous allocation, *ex-post*. That is, they find some modest evidence for reconsideration and dynamic inconsistency. The effect points in the direction of more egoistic evaluations of outcomes and outcome inequality. Overall, however, the evidence for procedural fairness is still strong with almost 30% acceptance rate of disadvantageous outcomes, given the design that favors rejecting unfair allocations (the low-payoff agent can only win by rejecting).

Andreoni et al. (2020) study a design in which an allocator distributes lottery tickets among two poor families, where the winning ticket earns a \$10 donation. While the setup is more complex, the main question of interest in our context is whether allocators change their allocation as more information about the set of tickets that includes the winning ticket becomes available. For example, if *ex-ante* tickets 1–10 are allocated to family A and tickets 11–20 are allocated to family B, does the allocator change her allocation if she learns that the winning ticket has a number between 11 and 20? This is what the authors find. It suggests that, in a dynamic process, allocators try to maintain an equal chance allocation as long as possible. On the one hand, this approach does not really harm or benefit anybody, except for potential inefficiencies created by repeated re-allocation of tickets and a potential delay of the decision (which did not matter in this experiment though): if chances are initially symmetric and tickets get re-allocated irrespective of which set of tickets (family A's or family B's) contains the winning ticket, the approach indeed simply maintains equal chances as long as possible in the process. However, by extension, we may also expect that allocators who subscribe to this approach would also strictly prefer to re-allocate outcomes after the resolution of the lottery uncertainty. If they were willing to incur efficiency losses (which is not clear from the study), this would then reject the idea that equal opportunity substitutes for equal outcomes. The study thus provides suggestive evidence for dynamic inconsistency.

On balance, the two studies and the evidence on general salience effects in fairness assessments suggest that dynamic inconsistency can be a problem for the implementation of allocations that are procedurally fair, but lead to unequal outcomes. In many practical situations an additional factor may come into play. Hansson et al. (2021) study fairness perception and *ex-post* behavioral reactions (giving to or taking from the other player) in a competitive real-effort task. The authors show that if the fairness of the competition is unclear to the players, the losers tend to incorrectly believe that the competition was stacked against them, and were more likely to take up the opportunity to take some money from the winners. The effect on beliefs was especially strong in the case where a person lost the competition despite performing well herself. The authors suggest that communication about the fairness of the competitive procedure is important to prevent the biased perception and negative reaction to unequal outcomes in competitive environments. We can speculate that such explicit communication may also support *ex-ante* existing procedural fairness preferences in a dynamic context *ex-post*.

#### 4 | EQUALITY OF OPPORTUNITY AND PREFERENCE FOR REDISTRIBUTION

In Section 2 we have already discussed the conceptual relationship between procedural justice and distributive justice. In the current section, we will review studies that try to elucidate the relationship empirically and experimentally in more detail. In particular, an important question

for societies to understand is whether procedural justice in the form of equality of opportunity affects preferences for redistribution of actual outcomes, and vice versa. That is, do people think that redistribution of wealth and income is less needed, and inequality thus less problematic, if everybody essentially has equal chances of achieving good outcomes or to fail? On the other hand, how does the degree of redistribution affect preferences for mechanisms that aim to induce equality of opportunity, such as educational policies or affirmative action? This latter question has received less attention, but is certainly of much interest.

We will discuss studies that aim to shed some light on this relationship. Because of the more immediate policy relevancy of the questions discussed in this section (compared to the more theoretical discussion of procedural fairness), there has been more empirical work based on large population surveys. Consequently, we distinguish two approaches in the discussion of the evidence. First, survey research considers beliefs and actual measures of equality of opportunity in a country, and typically elicits stated preferences for redistribution in large population samples. In this context, equality of opportunity is often operationalized in terms of social mobility.<sup>7</sup> Sometimes surveys contain some random variation in the information provided to different participants, observing the effect on the preference measures of interest. Such survey experiments allow making causal claims with regard to the salient features of the information provided. Second, a large set of laboratory experimental studies use stylized allocation games with distributional inequalities, controlled variation in procedures and opportunities, and typically elicit revealed preferences for monetary payments in convenience samples. We will first consider some survey studies and then discuss the laboratory experimental work.

Steele (2015) considers the relationship between social mobility and preferences for redistribution in a large multi country social survey data set. Measures are based on self-reports, and for social mobility they are derived from an assessment of current social status versus social status of the family one grew up in. Although the study directly focusses on the relevant public policy concepts (in contrast to abstract laboratory allocation settings), the study is exemplary for the price we pay in terms of problems in interpreting the data. The author finds that upward mobility at the country level (based on the average mobility assessment of all participants from one country) is positively correlated with preferences for redistribution, while upward mobility at the individual level is negatively correlated with preference for redistribution. The negative association of own mobility is consistent with self-serving interpretations of the causes of one's own success. The positive association with country-level social mobility is less easy to interpret. The author offers the interpretation that preferences for redistribution reflect the actual degree of distribution in a country, and that redistribution has a positive effect on social mobility because it levels the playing field, providing better opportunities for the less well off (compare also similar arguments by Scanlon (2018, p.63-66)). Clearly, this mechanism is hard to test with the existing data as causality can run in different directions.

Alesina and La Ferrara (2005) emphasize the relevance of future expected economic status on preferences for redistribution, and use a set of subjective and objective measures of social mobility, as well as a direct measure of belief in equal opportunities, in terms of whether hard work or luck are needed to get ahead in society. Their data are restricted to US survey participants. Similar to the results by Steele (2015) reported above, this study finds that experience of mobility in terms of job prestige compared to the participant's father's job is associated with lower preference for redistribution. In contrast, educational mobility (higher education than the father) is associated with higher preference for redistribution. There is no easy interpretation of this conflicting evidence. Results on income expectations show a consistent pattern though. Both subjective expectation of upward mobility in terms of future financial status, as well as measures of subjective social

mobility, show a negative association with preference for redistribution. Especially interesting from the procedural fairness perspective is the finding that the assessment that getting ahead is mostly achieved by hard work (i.e., an effort-based measure of equality of opportunity) is negatively associated with preference for redistribution, while the assessment that getting ahead is mostly driven by luck is positively associated with preference for redistribution.

Alesina et al. (2018) build on the idea that expectations about mobility are relevant for preferences for redistribution and aim to establish causality by running randomized information experiments. They use survey companies to run their study in the US and several European countries. They measure perceptions of social mobility in terms of participants' beliefs about the social class of children, conditional on the social class of the parents, for 500 families of the general population divided in 5 quintiles of socioeconomic status. In an experimental manipulation, they have participants in the treatment condition watch a movie that shows high-level statements about social mobility without any precise numerical information. Statements read for example "The chances of a poor kids staying poor as an adult are extremely large. Only very few kids from poor families will ever make it and become rich." That is, the treatment aims to induce beliefs in low social mobility, i.e., unequal opportunities. Alesina et al. (2018) find that the manipulation causes survey participants to adjust their beliefs about social mobility in the expected direction. Subsequently, treated participants indicate more support for redistribution, especially for equality of opportunity policies like public education or public health services. Interestingly, the authors also find that beliefs about social mobility are very different across countries, with Europeans being more pessimistic than Americans. Moreover, Europeans are also pessimistic, and Americans optimistic, in comparison to true levels of mobility. That shows that cross-country comparisons may suffer from an unobserved heterogeneity in beliefs, if these are not directly controlled for.

Experimental studies using abstract laboratory settings aim to overcome the problems of lacking control and information in survey studies. Several studies have dealt with the interaction between equality of opportunity and redistribution, using a variety of different designs. Some studies provide indirect evidence for the role of equality of opportunity. For example, Schildberg-Hörisch (2010) studies the Rawlsian difference principle using a veil-of-ignorance design, where participants do not know whether they are in the advantaged or disadvantaged position when making a redistribution decision. She compares the degree of redistribution with a situation without uncertainty about the position. She finds more redistribution behind the veil of ignorance. That is, people are more inclined to redistribute if social positions are uncertain. In the context of equality of opportunity, if social positions, or at least the social positions of one's offspring are uncertain because of high social mobility, the results could be interpreted as suggesting that equality of opportunity may be related to a stronger preference for redistribution. This would be in contrast to the interpretation that equality of opportunity is a substitute for equality of outcomes. While the interpretation is not consistent with the above discussed finding that beliefs in equality of opportunity reduce preference for redistribution, it is consistent with the finding by Steele (2015) that higher equality of opportunity at the country level is associated with higher preference for redistribution. The design by Schildberg-Hörisch (2010) shows that the relationship between equality of opportunity and preference for redistribution becomes more complex, because on the one hand the procedural fairness may serve as a, at least partial, substitute for outcome fairness and lower preference for redistribution. On the other hand, it leads to uncertainty about social positions and thereby to potentially to stronger preferences for redistribution due to risky outcomes. In the interpretation of empirical findings, we need to keep these two different mechanisms in mind; different design may emphasize one or the other mechanism more.



Several studies have found results that are broadly consistent with the substitution interpretation. Krawczyk (2010) studies a game in which four participants are allocated different chances to win a prize of €30. Before the uncertainty is resolved and payoffs determined (i.e., behind a veil of ignorance), players have the opportunity to fix a redistribution scheme that requires the prize winners to contribute to a group account, which is shared with the losers of the random allocation. Krawczyk (2010) considers two variations in the basic design. First, he varies the dispersion of the unequal random allocation of prizes. Second, he introduces a real effort task which determines the prize winners. Importantly, for the real effort task, the unequal winning probabilities of the baseline condition remain relevant, because low-probability players had to perform relatively stronger to win the prize. Krawczyk (2010) finds that, despite the implied effect of the winning probability on the real-effort-task payments, participants redistribute less if effort is relevant. This to some extent merit-based procedure seems to substitute for equal outcomes. Moreover, he does not find an effect of the dispersion of chances on redistribution. It is conceivable that the ex-ante symmetric allocation of the winning probabilities over the four players was framed as a fair procedure per se, reducing effects of the degree of dispersion.

Akbas et al. (2019) consider a setting where outcomes are determined by the choice of a risky alternative, or a safe alternative with a lower expected value. In some conditions the choice was restricted such that either the participants were forced to bear risk (pure luck), or that some participants were restricted to choose the low expected value option (unequal opportunities). The authors find that both agency (choice versus pure luck) and procedural fairness (unequal opportunities) affect ex-post redistribution. Consistent with Krawczyk (2010) the authors find that agency, i.e., choosing freely to play risky or safe, reduces redistribution. Unequal opportunities lead to more redistribution. It seems that the asymmetry in the choice set in the current design induces preferences for redistribution that the simple dispersion of winning chances in Krawczyk (2010) did not induce. The study also nicely illustrates the flip-side of merit-based interpretations of success under equality of opportunity, namely the importance of responsibility for one's own choices and activities. Such accountability for one's choices has previously also been shown by Cappelen et al. (2013). Mollerstrom et al. (2015) report a similar effect in a related design, where third-party spectators can redistribute among players who are faced with uncertainty but also have the possibility to reduce their risk exposure. Mollerstrom et al. (2015) find that spectators compensate players if they signal with their choice behavior that they do not like to bear risk, irrespective of the exact risk exposure and possible bad luck in a specific choice situation. That is, they hold players accountable for their "type."

Two articles by Sugden and Wang (2020) and Erkal et al. (2011) provide interesting insights into further consequences of equality of opportunity, respectively its absence, for redistribution. Sugden and Wang (2020) design a two-stage setting to observe the effect of unequal opportunities on social interaction. To this end, in the first stage they let players play games with equal or unequal opportunities, according to their definition discussed in Section 2.2. They implement this through a game where players compare playing cards (the higher card wins), but the players differ in their opportunity to replace their allocated card with a new and potentially better one before comparing to the other player. In the second stage, they let players play a "vendetta game," where players can destroy some of the other player's earnings. They find that unequal stage-1 opportunities lead to more destruction. The results are very similar to findings in Fehr et al. (2020). Fehr et al. (2020) also let players interact in a two-stage setting. Players play a real-effort game in stage 1, which either provides equal or unequal opportunities for winning either a negligible or a substantial amount of money to both players. In stage 2, the two players interact in a trust game. Fehr et al. (2020) find negative effects of the unfair treatment on trustworthiness (the amount sent back by



the trustee in the game), especially for the stage-1 disadvantaged person; players correctly anticipate the negative effect on trustworthiness and show low levels of trust, which is socially harmful. As in Sugden and Wang (2020), the results suggest that inequality of opportunity breeds conflict, and that disadvantaged agents seek to induce more equal outcomes in a socially wasteful way.

Erkal et al. (2011) demonstrate another phenomenon in the context of equality of opportunity. In their study, they implement a merit-based approach to equality of opportunity, where players with a higher performance receive higher payments. After the payments are allocated, the players have the opportunity to transfer some of their earnings to other players. In particular, high-earnings players may transfer to low-earnings players, given that experimental payoffs vary substantially from \$15 to \$60. In this real-effort context, Erkal et al. (2011) find that the first-ranked players are substantially less likely to make a transfer than the second-ranked players, despite their higher earnings. In a control treatment, they let players play the same real-effort game, but allocate earnings randomly. Here they find that first-ranked and second-ranked players are equally likely to make transfers. The results show that the merit-based allocation may induce certain types of players to work harder. In Erkal et al. (2011), selfish own-outcome oriented agents, in contrast to other-regarding preference types, were more likely to exert high effort. That implies that in a setting with equality of opportunity, the resulting distribution of wealth potentially correlates with selfish versus other-regarding preferences. This has an influence on redistribution and the distribution of preferences for redistribution in the population. In particular, the better-off may be less likely to hold preferences for redistribution, over and beyond possible assessment of merit, simply because they are of a self-selected, more egoistic type (but see Gsottbauer et al., 2022; Trautmann et al., 2013).

A final laboratory-experimental study that we want to discuss considers the effect of existing redistribution arrangements on support for equality of opportunity, an effect we have already discussed in the context of survey studies. Reindl and Tyran (2021) study a game where two players have to choose from several risky investment options, and their initial endowments affect their set of investment opportunities. Poor players are not able to choose the most efficient investment options, i.e., those with the highest expected return. Rich players have the chance to redistribute their endowment ex-ante to the poor players, which allows both players in a group to take up the high-return investment options, if they want to do so. The important variation introduced in the game concerns the ex-post redistribution of earnings in the group. The authors only concern full redistribution, i.e., equality of outcomes. However, there are three different redistribution settings. Reindl and Tyran (2021) consider a treatment without redistribution, a treatment with redistribution, and a treatment in which redistribution is voted for or against after the investment options are selected and results are revealed. In the case of redistribution, assume that the rich believe that the poor will use any ex-ante transfers to take up the risky, high expected return investment. In this case, the ex-ante transfers are also beneficial to those who make the transfer, in expected-payoff terms. Indeed, the authors find that in the settings with redistribution and with a vote on redistribution, the high-endowment players choose to transfer money to the low-endowment players, thereby implementing equality of opportunity. Interpreting the transfer in terms of equal-opportunity policies in an environment where decisions involve uncertain outcomes, e.g., the expected income conditional on the education chosen, the study shows that environments with more redistribution may lead to more support for equal opportunity policies. That is, equal opportunity may not become redundant in a context of equality of outcomes, but may increase efficiency by creating opportunities, increasing the total pie to allocate in society. The study once again demonstrates the complex relationships between outcome inequality and equality of opportunity.

## 5 | CONCLUSION

Can equality of opportunity substitute for equality in economic outcomes, notably wealth? Given the heterogeneity and possible heredity of talents and skills, and the importance of families and culture for the choices that children make, it is unclear whether equality of opportunity policies can attain this goal. It is also unclear whether people consider a just allocation procedure a full substitute for just outcomes. Our review of the experimental literature suggests that this is not the case. Yet, fair procedures are considered important, and to some extent mitigate the negative aspects of outcome inequality. That is, to understand whether inequality has potentially negative effects on social cohesion, we also have to consider perceptions of procedural justice and equality of opportunity in a society.

Considering the interaction of equality of opportunity and preferences for redistribution, we find that several aspects become important. First, equality of opportunity may be seen as a substitute for equality of outcomes; and inequality of opportunities may thus lead to a stronger demand for equalizing outcomes. Second, equality of opportunity may still lead to risky outcomes, which can lead to a stronger preference for redistribution. Third, merit-based equality of opportunity may lead to a correlation of the distribution of outcomes with different social-preference types; this affects the support of redistribution among different social status groups. Fourth, the presence of substantial redistribution may lead to more support for efficiency-increasing equality of opportunity policies. Future research may aim to disentangle the different effects, and provide more insights under which conditions each pattern prevails. Assessing whether these conditions hold in different societies, we can then understand whether equality of opportunity policies and redistribution will be considered desirable.

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## ORCID

Stefan T. Trautmann  <https://orcid.org/0000-0002-0094-8841>

## ENDNOTES

<sup>1</sup>In the example, we assume that all individuals are equally deserving of the good outcomes.

<sup>2</sup>The current review focusses on descriptive evidence from the (survey) experimental literature. There is also a large normative literature on (in)equality of opportunity, reviewed for example in Ramos and Van de gaer (2016) and Roemer and Trannoy (2016). See also recent contributions by Bosmans and Öztürk (2021, 2022) on normative approaches to ex-ante and ex-post fairness views and redistribution mechanisms.

<sup>3</sup>An example for such a transformation of today's outcomes into tomorrow's opportunities is wealthy parents using their superior funds, by means of sponsoring or outright corruption, to secure a place for their children at prestigious universities, trying to circumvent competitive selection processes. Even if parents do not explicit aim for improving their children's future opportunities, such a transformation often happens through norms and tastes that are affected by today's outcomes (habitus, cultural capital, Bourdieu (1984)).

<sup>4</sup>Note that, as the rejection power of the responders increases beyond a small impact on the allocation, they eventually receive better offers than in the dictator condition with discount factor 0.

<sup>5</sup>These salience effect may be amplified by self-serving interpretations of fairness, which may differ between the ex-ante and the ex-post perspectives (Molina et al. 2019; Kandul and Nikolaychuk, 2020).

<sup>6</sup>Theoretically, procedural fairness preferences reject independence and consequentialism (Machina, 1989; Fudenberg and Levine, 2012). Implementation of procedural fairness after the final allocation is realized requires what Machina (1989) called resolute choice: decision makers do not revert to consequentialism and do not consider forgone opportunities as irrelevant.

<sup>7</sup>Although intergenerational mobility and equality of opportunity are closely related, there is no perfect mapping, because mobility may be influenced by aspects unrelated to equality of opportunity (see e.g. Corak, 2013). This is most problematic for cross-country comparisons where institutional and cultural influence factors may differ significantly.

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