TUM School of Social Sciences and Technology
TUM School of Management

Munich Papers in Political Economy
Working Paper No. 07/2025

Inequality aversion and international distribution preferences

The case of the Covid-19 vaccine rollout

Henrike Sternberg
Janina Isabel Steinert
Tim Büthe

June 2025

Inequality aversion and international distribution preferences: The case of the Covid-19 vaccine rollout

Henrike Sternberg[1,2,3,4*], Janina Isabel Steinert[1,3,5], and Tim Büthe[1,2,3,6]

[1] *TUM School of Social Sciences and Technology, Technical University of Munich, Germany*
[2] *TUM School of Management, Technical University of Munich, Munich, Germany*
[3] *Munich School of Politics and Public Policy (HfP), Technical University of Munich, Munich, Germany*
[4] *Friedrich-Alexander-Universität Erlangen-Nürnberg, Nuremberg, Germany*
[5] *TUM School of Medicine and Health, Technical University of Munich, Munich, Germany*
[6] *Sanford School of Public Policy, Duke University, Durham, North Carolina, USA*

This version: June 11, 2025

Abstract: This paper examines how inequality aversion shapes public support of international redistributive policies. We investigate this question in the context of the global allocation of vaccines during the Covid-19 pandemic, using online survey data from incentivized behavioral games and a discrete choice experiment conducted with German citizens in April 2021 (N=2,402). We distinguish between aversion to advantageous inequality (others worse off, the 'guilt' parameter) and aversion to disadvantageous inequality (others better off, the 'envy' parameter). These two forms of inequality aversion shape German citizens' attitudes towards the cross-country allocation of resources in distinct ways: While higher levels of the guilt parameter significantly increase respondents' likelihood to prioritize an equitable vaccine allocation, the envy parameter is associated with lower support thereof. These findings suggest that inequality aversion matters for citizens' support of redistribution beyond the national level and emphasize that distinguishing between both forms of inequality aversion is crucial.

Keywords: Distributional preferences; Inequality aversion; International inequality; Covid-19 pandemic; Support for vaccine donations; Survey experiment

JEL codes: C83, D63, D91, H87, I14, I18

[*] Corresponding author at: Department of Governance, School of Social Sciences and Technology, Technical University of Munich, Richard-Wagner-Straße 1, 80333 München.

E-mail addresses: henrike.sternberg@tum.de (Henrike Sternberg), janina.steinert@tum.de (Janina Isabel Steinert), buthe@hfp.tum.de (Tim Büthe).

Funding: We gratefully acknowledge funding from the Horizon 2020 Framework Program PERISCOPE under grant agreement number: 101016233. The funding source had no involvement in the study design, collection, analysis and interpretation of data, in the writing of the report, and in the decision to submit the article for publication.

Declarations of interest: none

1 Introduction

The Member States of the World Health Organization (WHO) have recently adopted the world's first Pandemic Agreement (World Health Organization, 2025). Its principal aim: Ensuring equitable and timely access to vaccines globally in the event of future pandemics. An objective that was not achieved during the global Covid-19 vaccine rollout, which was long characterized by vaccine hoarding of wealthier countries and low availability in poorer countries (Our World in Data, 2022). Apart from inequitable access to healthcare, also economic inequalities between countries remain very high. The average income of the global top 10% is still 38 times higher than that of the bottom 50%. Moreover, the income share of the bottom 50% itself has been stagnating at a historical low (between 5 and 7%) over the past century (World Inequality Lab, 2022). When it comes to public support for redistributive policy measures, however, the academic debate has predominantly focused on examining citizens' perceptions about redistribution *within* countries (see e.g., Alesina and Giuliano, 2011, for a review). By contrast, research on citizens' preferences regarding the *international* (re)allocation of resources remains scarce.

This lack of focus on citizens' international distribution preferences may simply be a consequence of the relatively lower number of institutions or initiatives to implement any redistributive policies at the global level. However, adopting a more international perspective on redistribution becomes increasingly important, as global inequalities in income or healthcare can exacerbate international crises that are becoming more frequent and more interconnected - as the Covid-19 pandemic has demonstrated. While the recent adoption of the WHO Pandemic Agreement may temporarily lend more attention to global equity concerns, a potential prioritization of any such topics will depend on whether national governments fear to pay a price at the ballot box. Thus, it is essential to understand the extent to which policy efforts with international distributional implications are supported by citizens and, more importantly, what factors are shaping voters' preferences in this regard.

We suggest that a major driver of individuals' support for international redistribution may be their tendency to dislike unequal allocations, in other words, their inequality aversion. The literature on within-country redistribution reveals that citizens' level of inequality aversion significantly shapes public support for different forms of national-level redistributive policies or the political parties endorsing them (e.g., Epper et al., 2024; Fehr et al., 2024; Kerschbamer and Müller, 2020; Fisman et al., 2017). However, whether inequality aversion is a significant predictor of global distribution preferences has not yet been examined and is far from straight-forward, given that individuals tend to drastically underestimate their own relative position in the global income distribution (Fehr et al., 2022).

In setting out to fill this gap, we differentiate between two forms of inequality aversion, as initially introduced by Fehr and Schmidt (1999): Advantageous inequality aversion (the guilt parameter) is defined as an individual's aversion to an unequal payoff distribution that is beneficial to them. Disadvantageous inequality aversion (the envy parameter) is defined as an individual's aversion to an unequal payoff distribution that is to their own disadvantage. We argue that distinguishing between these two forms of inequality aversion is crucial, as they may have differential effects on citizens' support for redistributive policies: Gao et al. (2018) provide evidence that they involve distinct neurocognitive mechanisms. Disadvantageous inequality aversion primarily stems from emotional responses, whereas advantageous inequality aversion is associated with advanced cognitive functions. Thus, especially in the case of *international* allocation preferences, a separate consideration of both forms of inequality aversion may be important, given larger-scale ingroup-outgroup dynamics and an increased complexity of the distribution problem.

Against this background, we study how advantageous and disadvantageous inequality aversion shape public preferences for policies with global distributional implications. To the best of our knowledge, this is the first paper to examine the role of inequality aversion for international (re)distribution preferences. The application case for this investigation is the international allocation of scarce vaccine doses during the Covid-19 pandemic.

We conducted an original online survey with a quota-based representative sample of the German population (N=2,402) in April 2021, when infection rates were high and the majority of citizens was still awaiting their immunisation. We measured global vaccine allocation preferences by means of a discrete choice experiment (DCE), where respondents were asked which of two hypothetical recipients with varying characteristics (age, Covid-19 mortality risk, employment situation, country of residence and healthcare system capacity) should be prioritized in the allocation process. The main attribute of interest was *country of residence and healthcare system capacity*, which allows us to elicit variation in respondents' global allocation preferences, while controlling for alternative charactertistics of potential recipients through the other DCE attributes. Advantageous and disadvantageous inequality aversion were measured by means of incentivized allocation games (a modified dictator and ultimatum game), using an online adaptation of the strategy-elicitation method by Blanco et al. (2011). We then analyzed how respondents' global vaccine allocation preferences vary by the two forms of inequality aversion.

We find that survey respondents reveal a slight (1.7 percentage points), but statistically significant, preference for prioritizing German citizens, rather than citizens in lower-income countries, in the DCE vaccine allocation task. However, our results suggest that there is a substantial amount of heterogeneity in this preference with respect to respondents' inequality aversion and that the direction of this heterogeneity depends on the type of inequality aversion: Higher levels of advantageous inequality aversion (guilt parameter) are associated with significantly more support for allocating vaccines to hypothetical recipients in lower-income countries rather than to German recipients, all else equal. By contrast, higher levels of disadvantageous inequality aversion (envy parameter) are associated with less such support.

This heterogeneity is meaningful and more pronounced in the case of advantageous inequality aversion: Respondents with the lowest levels of the guilt parameter are almost 10 percentage points less likely to prioritize a hypothetical vaccine recipient from a lower-income country than to prioritize a German recipient. This preference weakens, the higher a respondent's guilt parameter, up to the point where a hypothetical recipient's country of residence in the DCE becomes statistically irrelevant for respondents' vaccine allocation decisions. These effects are robust to including various alternative predictors (sociodemographic characteristics, political orientation, other social preferences, Covid-19-related characteristics), with estimated effects of advantageous inequality aversion being comparable in magnitude to altruism and right-wing voting. The pattern for disadvantageous inequality aversion is exactly reversed, but lower in magnitude and less robust to including alternative predictors.

These findings are in line with the theoretical expectation that *advantageous* inequality aversion should be more important for shaping German citizens' vaccine allocation preferences since Germany (i) has a higher healthcare system capacity and (ii) had relatively more access to Covid-19 vaccines than most lower-income countries at the time. From a policy persepctive, the insights from our study are valuable not only in retrospect related to the pandemic, but also in anticipation of future global crises beyond the pandemic, by providing insights about which voters are likely to favor redistribution in terms of international aid, humanitarian assistance, or shouldering climate change related costs.

This paper contributes to the following lines of research: First, we make a contribution to the literature identifying social preferences, in particular, inequality aversion, as determinants of citizens' attitudes regarding the (re)allocation of scarce resources. This literature has so far focused almost exclusively on inequality aversion (and related factors) as predictors of *national-level* redistribution preferences, mainly with respect to income-related inequality (Epper et al., 2024; Fehr et al., 2024; Müller and Renes, 2021; Almås et al., 2020; Kerschbamer and Müller, 2020; Fisman et al., 2017; Dhami and Nowaihi, 2010; Tyran and Sausgruber, 2006). To that end, our study is probably closest to the contribution by Epper et al. (2024) who examine how (advantageous and disadvantageous) inequality aversion shape citizens' support for public versus private within-country redistribution. We add to this literature by extending the relevance of inequality aversion to redistributive policies at the *international* level, here investigated in the context of the Covid-19 pandemic with the resource to distribute being scarce vaccine doses.

Second, this paper contributes to the so far scarce literature on the formation of international redistribution preferences. We are only aware of two other studies that investigate determinants of attitudes towards the global (re)allocation of resources and none of them examine inequality aversion as a factor. In that respect, our study is probably closest to the contribution by Fehr et al. (2022) who also analyze preferences for international redistribution in Germany, but mostly focus on (misperceptions about) individuals' own position in the global income distribution as a predictor, while also reporting altruism and luck versus effort beliefs as correlates. Bechtel et al. (2014) examine German voters' perceptions of the eurozone bailouts, also focusing on individuals' own economic standing as a main predictor, and additionally analyzing altruism and cosmopolitanism.

Third, we contribute to the line of research investigating public perceptions about the global Covid-19 vaccine rollout. This literature has so far been largely of a descriptive nature rather than focusing on determinants (Klumpp et al., 2022; Steinert et al., 2022b; Clarke et al., 2021; Guidry et al., 2021; Vanhuysse et al., 2021). One exception is Brun et al. (2023), who examine the role of cognition and find that high-cognition individuals are more likely to support vulnerability-oriented vaccine distribution schemes. We contribute to this literature by zooming in on the different determinants of vaccine allocation preferences, predominantly inequality aversion, but also taking into account a variety of competing predictors, including other economic preferences (risk, time, social), political orientation, Covid-19 related perceptions, and demographic and socioeconomic characteristics of citizens.

Fourth, by distinguishing between advantageous and disadvantageous inequality aversion, we provide new evidence of the importance of this distinction, both conceptually and when examining the way inequality aversion shapes citizens' (international) distribution preferences. Epper et al. (2024), Fehr et al. (2024) and Kerschbamer and Müller (2020) also differentiate between advantageous and disadvantageous inequality aversion as factors of attitudes towards redistributive policy measures, but do so for within-country redistribution, finding only partially opposite effects. More generally, by making this distinction, we provide another data point to these literatures discussing the two forms of inequality aversion theoretically, measure and investigate their potentially differential patterns empirically, and map their overall prevalence across different populations (e.g., Fehr and Schmidt, 1999; Bellemare et al., 2008; Blanco et al., 2011; Fisman et al., 2015; Gao et al., 2018; Kerschbamer and Müller, 2020; Hedegaard et al., 2021; Telle and Tjøtta, 2023; Fehr et al., 2024; Epper et al., 2024).

The remainder of this paper is organized as follows. Section 2 describes the survey design and the empirical strategy, that is, the discrete choice experiment to measure respondents' global vaccine allocation preferences and the incentivized allocation games to elicit the inequality aversion parameters. Section 3 presents the main results and robustness checks. Section 4 discusses the broader significance and policy implications.

2 Material and methods

2.1 Study setting and sampling

The paper employs primary data from an online survey conducted between April 9 and April 20, 2021, at the height of Germany's third intense surge in Covid-19 infections since the beginning of the pandemic (see Figure A1 in the Appendix). At this time, less than 10% of the German population had been fully vaccinated against Covid-19 (i.e., received two doses), while approximately 25% had only received their first dose (ECDC, 2023). The vaccine rollout scheme in Germany was still priority-based at the time and waiting times of several weeks or even months for scheduling vaccination appointments were the norm.[1] The study sample consists of 2,402 respondents who were recruited using quotas matched to the German census in terms of (i) gender, (ii) age group, (iii) education, and (iv) state. In light of the paper's objective, we restrict

[1] Germany had a priorization scheme with six different priority groups based on a combination of the criteria age, medical pre-conditions, and occupation (see RKI, 2021, for more details). There were slight differences across states in terms of the timeline when a certain priority group was eligible to schedule a vaccination appointment, but the earliest time that a state fully lifted the priorization scheme was in May, so several weeks after the completion of the data collection for this study.

the sample to respondents who were not strictly opposed to getting vaccinated against Covid-19.[2] Respondents were recruited from a German access panel maintained by the survey company Respondi/Bilendi and they received 'mingle points', worth between three and five Euros, for participating in the study, which they could redeem in the form of cash, vouchers, or donations.

2.2 Data collection and processing

The survey was programmed in German using Qualtrics and piloted with 140 participants. Ethics approval for this study was obtained from the committee for human subjects and research ethics review of the medical faculty at the Technical University of Munich (TUM, 20/21 S-SR and 118/21 S-EB). Informed consent was obtained from all respondents before they were presented with the questionnaire, which they could interrupt or exit at any time. As part of the debriefing upon completion of the survey, participants were provided with a substantive list of resources for help and information sources about the Covid-19 pandemic as well as mental health support services.

2.3 Survey design and core variables

The survey consisted of two core components: (i) a discrete choice experiment (DCE) to examine respondents' preferences with respect to how Covid-19 vaccines should be allocated across countries and (ii) incentivized allocation games (a modified dictator game and an ultimatum game) to measure inequality aversion. In addition, we collected information about respondents' demographic and socioeconomic status, Covid-19-related characteristics, their political orientation, and other types of economic preferences (risk, time, and social preferences).[3][4]

2.3.1 Covid-19 vaccine allocation preferences

We employed a DCE methodology to elicit variation in respondents' preferences towards how Covid-19 vaccines should be allocated between citizens in different countries.

Background of discrete choice models

Discrete choice experiments are used to measure the relative importance of different factors that respondents weigh against each other when making choices between two or more alternatives (Hall et al., 2004; Louviere et al., 2000). DCEs theoretically originate in random utility theory

[2]Since we want to examine preferences about the distribution of a scarce resource, the resource to be distributed, i.e., here Covid-19 vaccine, needs to be viewed as a resource that is desirable to acquire/receive. This led to the exclusion of 341 out of initially 2,753 surveyed individuals, i.e., 12.39% of the initial sample. Moreover, 10 respondents did not reply to all eight choicesets in the DCE and their responses can thus not be used for the empirical analysis, leading to the final sample of N=2,402.

[3]Respondents' basic demographic and socioeconomic status, their economic preferences, and political orientation had already been collected in an earlier wave of the survey, two months prior. The pandemic situation in terms of e.g., infection rates and restrictions, was very similar during these months.

[4]The survey also included another, separate experiment that tested the effectiveness of different messages to increase vaccination willingness (Steinert et al., 2022a). While the study reports relatively limited average impacts of the tested messages, we still assess our results for robustness by separately examining the subsample of our respondents that was not exposed to any of these treatments (see Section 3 and Tables A14 and A15 in the Appendix).

and are based on the assumption that respondents express their preferences by choosing the alternative associated with the highest individual benefits, i.e., they assume utility-maximizing behavior of individuals (Train, 2009). Translated to the context of this paper, we are interested in the utility that a survey respondent derives from allocating a vaccine to a certain hypothetical recipient (Person A or Person B) with varying characteristics (attributes and levels, see below).

DCE design

The DCE presented respondents with eight different choice sets and asked them to choose whether a hypothetical recipient A or B should receive the Covid-19 vaccine first (see Figure 1 below for a sample choice situation presented to respondents). Respondents were told that the other person of each pair would have to wait substantially longer to receive their vaccine dose.

Which of the following two persons should receive the vaccine first, Person A or Person B?

	Person A	**Person B**
Age	20 years old	40 years old
Risk of COVID-19 death	Increased risk due to comorbidity and/or way of life	No increased risk due to comorbidity and/or way of life
Employment status	Employed in essential services (e.g., health personnel, supermarket employee)	Employed and income losses due to COVID-19 restrictions
Country of residence and healthcare system capacity	Developing country, with low healthcare system capacity (e.g., India, Nigeria, Bolivia)	Germany, with high healthcare system capacity

	Person A	Person B
Your decision:	○	○

Fig. 1. Exemplary DCE choice scenario. *Notes:* Translated version, see Figure A2 for original German version.

The hypothetical recipient's characteristics varied along the following four attributes and levels:

Age:

- 20 years old
- 40 years old
- 60 years old
- 80 years old

Risk of Covid-19 death:

- No increased risk due to comorbidities and/or way of life

- Increased risk due to comorbidities and/or way of life
- Strongly increased risk due to comorbidities and/or way of life

Employment status:

- Not employed
- Employed and guaranteed income
- Employed and income losses due to Covid-19 restrictions
- Employed in essential services

Country of residence and healthcare system capacity:

- Germany, with high healthcare system capacity
- Developing country, with lower healthcare system capacity (e.g., India, Nigeria, Bolivia)

The main attribute of interest in the DCE is the attribute 'Country of residence and healthcare system capacity', which explicitly addresses the cross-country allocation, allowing us to elicit variation in respondents' international distribution preferences.

It does so by asking respondents to choose between a citizen from Germany and a citizen from a lower-income country.[5] The attribute moreover explicitly mentions healthcare system capacity, such that, just like the other attributes, it also directly indicates the degree of vulnerability of the recipient to Covid-19.[6] Germany (rather than any other high-income country) was explicitly mentioned because, in this way, the (German) survey respondents would themselves (though just hypothetically) be 'affected' by the choice they made. For the lower-income country, no one country was specified.[7]

The remaining attributes ('Age', 'Risk of Covid-19 death', and 'Employment status') were reflected in the priority scheme employed by the German government to allocate vaccination appointments and are therefore assumed to also play an important role in respondents' own vaccine allocation preferences. These attributes indicate either the degree of Covid-19-related medical or economic vulnerability of the hypothetical recipient or their degree of importance for ensuring a functioning economy and healthcare system during the pandemic (essential services personnel).[8] By including these attributes in the DCE design, we ensured that any variation

[5] The DCE used the word 'Developing country' (German: 'Entwicklungsland') instead of 'Lower-income country' because (i) the German term for lower-income country is much less common in the general population and (ii) it may have put too much emphasis purely on income differences.

[6] By explicitly adding the information about the country's healthcare system capacity, we take out potential alternative, implicit assumptions among respondents about the healthcare system and its ability to deal with Covid-19 outbreaks. While healthcare system capacities vary substantially across (lower-income) countries, and a variety of other factors, such as population age, also matter for a country's ability to deal with an outbreak, we specifically formulated it in this way for two reasons: (i) it gives us a clear reference point when interpreting our findings and (ii) any evidence of vaccine nationalism/hoarding can be interpreted as a conservative estimate (assuming it would be even higher without giving respondents the information that the healthcare system of the other country has a lower capacity).

[7] Ideally, we would have randomized a number of different countries across scenarios, but this would have not allowed us to analyze the findings by these varying countries because such a DCE design would have required substantially more choicetasks. However, this design has the advantage that the decision-making set-up in the DCE resembled the set-up in the behavioral games used to measure inequality aversion (me vs. an anonymous partner, see below), but adds the HIC-LMIC cross-country dimension.

[8] Note that the attribute 'Risk of Covid-19 death' explicitly refers only to the risk due to comorbidities and/or lifestyle, not due to Age, which is why we include 'Age' as a separate attribute.

in respondents' international vaccine allocation preferences, as measured through the country attribute, already controls for these factors.

The specific combination of hypothetical recipient profiles in the eight choice sets, i.e., the experimental design, was selected based on statistical efficiency ('D-efficiency') using the Ngene Software under the assumption of weak priors for the main effects of the four attributes (ChoiceMetrics, 2018).[9] The D-efficiency criterion is the most widely used metric for statistical efficiency in this regard (Johnson et al., 2013; ChoiceMetrics, 2018; Ryan et al., 2012). The final combination of recipient profiles in the eight choice sets is presented in Table A1 in the Appendix. Power calculations based on the procedure by Bekker-Grob et al. (2015) indicated that, with 80% statistical power and an α of 0.05, we would be able to detect the main parameter effects informed by conservative priors with a sample of $N = 2,061$ (see Table A2 in the Appendix).

2.3.2 Inequality aversion

Inequality aversion was measured using an online adaptation of the strategy-elicitation method by Blanco et al. (2011), who quantified parameters for advantageous and disadvantageous inequality aversion based on the theoretical model introduced by Fehr and Schmidt (1999).[10] Advantageous inequality aversion (also referred to as the guilt parameter) is therein defined as an individual's aversion to an unequal payoff distribution that is beneficial to them, while disadvantageous inequality aversion (also, envy parameter) is defined as an individual's aversion to an unequal payoff distribution that is to their own disadvantage. We distinguish between these two types of inequality aversion because they may predict support for redistribution in potentially different ways, though evidence about the importance of this distinction is still relatively scarce.

For the measurement of inequality aversion, respondents participated in two incentivized behavioral games, in which they made decisions regarding the distribution of money between themselves and another, anonymous, randomly assigned survey participant. We employed this measurement approach, which in itself does not contain a cross-country dimension of inequality, to investigate whether the resulting parameters of inequality aversion predict citizens' real-world resource allocation preferences *across countries*, as measured in the DCE.

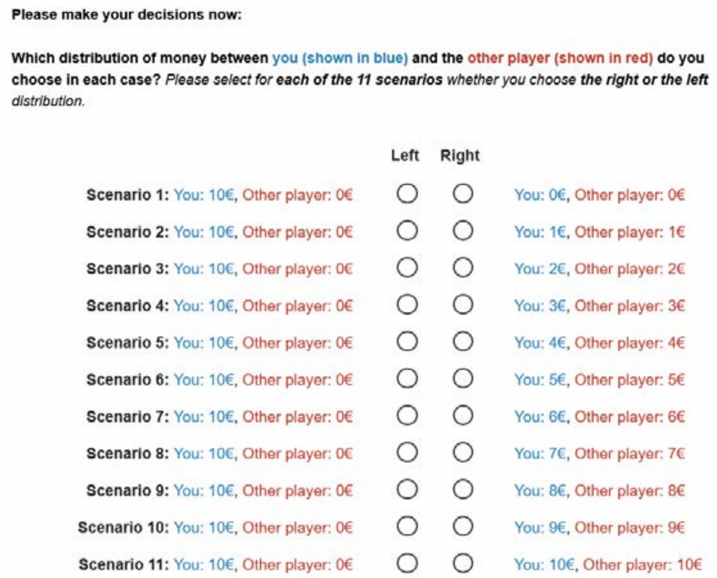
The allocation games

Advantageous inequality aversion was measured based on respondents' decisions in a modified dictator game, in which they were asked to decide between different distributions of money between themselves and another randomly assigned survey respondent (see Figure 2a). In each of the eleven choice situations, they could choose between either a perfectly unequal distribution (they receive 10 Euros and their randomly assigned partner receives nothing) or a perfectly equal distribution, with increasing amounts (both, them and their partner receive 1/2/3/.../10 Euros

[9]Moreover, the design contained a built-in constraint for the attributes 'Age' and 'Employment status' so as to avoid implausible combinations, i.e., an age of 80 was always be combined with not being employed. For the calculation of the initial design in Ngene, the attribute 'Employment' was dummy-coded as categorical (reference category: Employed in essential services), while we assumed linear effects for the other three attributes. We report results for both this initial design and for categorical effects of attributes.

[10]We slightly adjusted the games by using 10 instead of 20 Euros and by changing the setting to an online survey as opposed to a University lab.

each). The level of advantageous inequality aversion was derived from the specific choice among the eleven choice situations, in which the respondent first switched from the unequal to the equal distribution. Specifically, the earlier a respondent switched to the egalitarian distribution, the higher the level of advantageous inequality aversion. Thus, the resulting measure of advantageous inequality aversion (guilt parameter) is rank-ordered with 12 different levels, coded such that a greater numeric value corresponds to a greater level of advantageous inequality aversion.

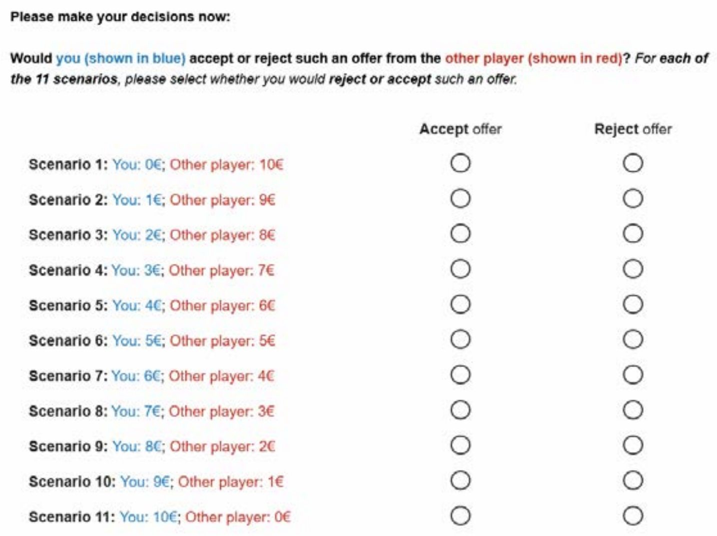


Please make your decisions now:

Which distribution of money between you (shown in blue) and the other player (shown in red) do you choose in each case? *Please select for **each of the 11 scenarios** whether you choose **the right or the left** distribution.*

	Left	Right	
Scenario 1: You: 10€, Other player: 0€	○	○	You: 0€, Other player: 0€
Scenario 2: You: 10€, Other player: 0€	○	○	You: 1€, Other player: 1€
Scenario 3: You: 10€, Other player: 0€	○	○	You: 2€, Other player: 2€
Scenario 4: You: 10€, Other player: 0€	○	○	You: 3€, Other player: 3€
Scenario 5: You: 10€, Other player: 0€	○	○	You: 4€, Other player: 4€
Scenario 6: You: 10€, Other player: 0€	○	○	You: 5€, Other player: 5€
Scenario 7: You: 10€, Other player: 0€	○	○	You: 6€, Other player: 6€
Scenario 8: You: 10€, Other player: 0€	○	○	You: 7€, Other player: 7€
Scenario 9: You: 10€, Other player: 0€	○	○	You: 8€, Other player: 8€
Scenario 10: You: 10€, Other player: 0€	○	○	You: 9€, Other player: 9€
Scenario 11: You: 10€, Other player: 0€	○	○	You: 10€, Other player: 10€

(a) Modified dictator game



Please make your decisions now:

Would you (shown in blue) accept or reject such an offer from the other player (shown in red)? *For **each of the 11 scenarios**, please select whether you would **reject** or **accept** such an offer.*

	Accept offer	Reject offer
Scenario 1: You: 0€; Other player: 10€	○	○
Scenario 2: You: 1€; Other player: 9€	○	○
Scenario 3: You: 2€; Other player: 8€	○	○
Scenario 4: You: 3€; Other player: 7€	○	○
Scenario 5: You: 4€; Other player: 6€	○	○
Scenario 6: You: 5€; Other player: 5€	○	○
Scenario 7: You: 6€; Other player: 4€	○	○
Scenario 8: You: 7€; Other player: 3€	○	○
Scenario 9: You: 8€; Other player: 2€	○	○
Scenario 10: You: 9€; Other player: 1€	○	○
Scenario 11: You: 10€; Other player: 0€	○	○

(b) Ultimatum game

Fig. 2. Decision screens in inequality aversion games. *Notes:* The figure shows translated versions of the final (separate) decision screens in each game, as they appeared to respondents after the games had been explained in detail on previous screens, including an example and the comprehension questions.

Disadvantageous inequality aversion was measured based on respondents' decisions as second movers in an ultimatum game, in which they had to decide whether to accept or reject different hypothetical offers made by the first mover (see Figure 2b). The eleven choice situations covered all possible hypothetical distributions of the 10 Euros between the respondent and the first mover, in steps of 1 Euro (i.e., they receive 10 Euro, their partner receives nothing; they receive 9 Euros, their partner receives 1 Euro; ...). Rejecting an offer would have always resulted in both players receiving nothing. Only the first half of scenarios, i.e., the first six decisions, were relevant for the measurement of disadvantageous inequality aversion (after that, the inequality turns to the favor of the respondent). The level of disadvantageous inequality aversion was derived from the specific choice among these six choice situations, in which the respondent first accepted the offer of the first mover. Specifically, the later a respondent switched from rejecting to accepting the offer, the higher the level of disadvantageous inequality aversion. The resulting measure of disadvantageous inequality aversion (envy parameter) is rank-ordered with 6 different levels, coded such that a greater numeric value corresponds to a greater level of disadvantegeous inequality aversion.[11]

After the explanation of the two games and before respondents made their own decisions, they had to answer two comprehension questions per game in order to assess whether they had understood the choice situations and payout mechanisms. The comprehension questions asked respondents, for one selected decision scenario, which amount of money the respondent and their partner would receive, if the respondent chose the left/right distribution (accepted/rejected the offer). Note also that this elicitation method relies on well-behaved preferences in the sense that respondents only switch (at most) once, i.e., there is (at most) one switching point along the relevant decisions in each game. We examine the extent to which respondents' preferences are well-behaved as well as the extent to which they correctly replied to the comprehension questions in our empirical analysis (below).

Incentivized payouts

Respondents had a 10% chance of actually receiving the payout from either one of their own choices or from one of the choices made by their randomly assigned partner, across the two games. Thus, they could receive up to 10 Euros as a result of participating in the games. Payouts were transferred to respondents' accounts through the panel provider at the latest two weeks after the end of the data collection. We explained the payout scheme and timing of the payouts to respondents prior to the start of the game.[12] Additionally, they were provided with a URL to a more detailed, visualized explanation of the payout scheme after the completion of the survey.

Efficiency changes in modified dictator game

While in the ultimatum game, the total amount of money to be distributed is constant across and within choice scenarios (always 10 Euros), the amount changes throughout the modified dictator game: The left (unequal) distribution is always based on a total amount of 10 Euros, but the amount being distributed on the right side changes in each choice scenario, starting

[11] Respondents who first switched at scenario 6 (the equal scenario) or at any point after that are all assigned the highest level of disadvantageous inequality aversion on the 6-point scale. Note that only 3.47% of respondents with well-behaved preferences and who passed the comprehension questions first switched after scenario 6.

[12] The payout randomization was done as follows: First, one of the 22 game scenarios across the two games was randomly selected as the scenario to be paid out. Second, 5% of the survey respondents, who fully completed both games, were randomly selected as 'winners'. Third, the winners were randomly matched with another respondent (among those not selected as winners) to be their anonymous game partner. The winners and their assigned game partners were paid out the amount according to the winner's decision in the randomly selected choice situation.

at 0 Euro in the first scenario (both players receive 0 Euro) and then increasing incrementally from scenario to scenario up until 20 Euro in the last scenario (both players receive 10 Euros). While this incremental change in the game design is crucial to determine different levels of advantageous inequality aversion, it may raise the concern that a second factor, namely efficiency, may influence respondents choices in this game. To address this concern, we additionally use two alternative measures of advantageous inequality aversion in the empirical analysis. The first alternative measure is the mere binary choice a respondent made in the sixth scenario of the modified dictator game (10|0 vs. 5|5), as here the amount to be distributed is identical on the left and on the right side. The second alternative measure makes use of the second half of scenarios in the ultimatum game, where the inequality is reversed again after Scenario 6 (see Figure 2b). Thus, a potential switching (back) point in the second half of the ultimatum game may also indicate advantageous inequality aversion (the earlier a respondent switches back to rejecting, the higher their level of advantageous inequality aversion).

2.3.3 Other predictors of vaccine allocation preferences

Economic preferences

In addition to inequality aversion, we elicited respondents' level of altruism, positive and negative reciprocity, risk aversion and patience. For the measurement of these factors, we adapted the items and measurement procedure from the German version of the Global Preference Module (Falk et al., 2023; Falk et al., 2018): We used both (i) attitudinal measures that ask about generally behaving in a certain way, and (ii) actual incentivized choices (such as donation decisions in the case of altruism or lottery participation in the case of risk aversion).[13] These survey items were standardized and then used to construct one final measure for each preference, based on the weights for the survey items that emerged from the experimental validation procedure by Falk et al. (2018, p.1653).[14]

Covid-19 related characteristics

To take into account respondents' experiences with and attitudes towards the Covid-19 pandemic, we measured their general threat perception of the pandemic using three items from Betsch et al. (2021), their attitudes towards the Covid-19 vaccines (5C scale by Betsch et al. (2018), henceforth referred to as the vaccination hesitancy index), and their own vaccination status at the time of the survey.

Political orientation

To factor in respondents' political orientation and their views towards the acting government, we asked them about their party vote in the last national election (2017) and their trust in

[13]For positive reciprocity, we were only able to collect one of the two survey items intended to form the final measure for positive reciprocity, due to feasibility constraints. Thus, for positive reciprocity we merely use this single attitudinal measure in the empirical analysis.

[14]The experimental validation procedure allowed Falk et al. (2018) to analyze which linear combination of the different survey items performed best in predicting the corresponding behavior in an experimental setting in the lab. We used these same identified weights to form our preference measures. Falk et al. (2018) conducted the validation procedure with a German sample and thus, in the same country context as this study.

the current national government (coalition of Christian and Social Democrats at the time). Moreover, we collected information on respondents' nationalistic attitudes and their hostility towards foreigners using four selected items from Decker and Brähler (2020), which were used to compute a composite scale, henceforth referred to as right-wing extremism scale. Note that, in our approach to consider respondents' political orientation, we focus on the right rather than the left end of the political spectrum, given that it was especially the right-wing 'Alternative für Deutschland' (AfD), which took the counterposition to the center and left parties throughout the discussions about pandemic policies in Germany.

2.4 Empirical strategy

We investigate how respondents' international vaccine allocation preferences, as identified through their choices in the DCE, vary by their level of advantageous and disadvantageous inequality aversion, as measured by respondents' decisions in the modified dictator and ultimatum game. The empirical analysis comprises the following steps:

In a first step, we utilize the data from the DCE to identify variation in respondents' international vaccine allocation preferences. To do so, we estimate a mixed logit model to assess the impact of a hypothetical recipient's country of residence and healthcare system capacity on the probability of respondents prioritizing the recipient in the allocation decision, controlling for the other three DCE attributes (age, Covid-19 mortality risk, employment situation). Mixed logit models have the advantage of modeling parameter *distributions* rather than fixed parameters, therefore explicitly capturing heterogeneity in respondents' preferences. In order to further examine this heterogeneity, we calculate the posterior respondent-level mixed-logit parameters for the country attribute, which allow us to illustrate how respondents' international vaccine allocation preferences are distributed within our sample.[15]

As a second step, we examine how this variation in respondents' international vaccine allocation preferences differs by their level of inequality aversion. To do so, we regress the posterior respondent-level mixed-logit parameters for the country attribute (from step 1) on respondents' level of advantageous and disadvantageous inequality aversion, using OLS regressions. As part of this analysis, we also separately estimate the regression for the subsamples of respondents who (i) correctly answered the comprehension questions and (ii) had well-behaved preferences in the two games. Moreover, we examine robustness against alternative drivers of international vaccine allocation preferences, including sociodemographic characteristics, political orientation, economic preferences, and Covid-19 related factors (i.e., the variables outlined in Section 2.3.3).

Note that respondents' vaccine allocation preferences were measured through binary choices between who should be prioritized in the allocation process (the person from Germany or the person from the lower-income country), rather than through decisions about the distribution of the resource in question, as in the behavioral games to measure inequality aversion. However, given that respondents made a series of eight consecutive choices, the resulting coefficient estimates

[15]To calculate respondent-level parameters, we apply the method proposed by Revelt and Train (2000), implemented in the mixlogit STATA package by Hole (2007), which was used to estimate all these DCE analyses.

yield a measure of distributional preferences between countries. For instance, a statistically insignificant coefficient for the country attribute would suggest that hypothetical recipients were treated equally in the allocation process, regardless of whether they are from Germany or from a lower-income country, all else equal. The analysis described above then investigates how the (un-)equal treatment of recipients from Germany versus lower-income countries varies by respondents' advantageous and disadvantageous inequality aversion.

3 Results

3.1 Sample characteristics

Table A3 in the Appendix reports basic characteristics for the 2,402 German survey respondents included in our main analysis. The sample is largely representative of the German adult population with respect to gender, age, education and federal state: Half of the survey participants are female and the level of education is rather high, with almost 40% of respondents having completed at least 12 years of education (German high school degree/University entry qualification).[16] Almost every second respondent is at least 50 years old, reflecting the age structure of the German society. Roughly 14% of respondents live in one of the eastern German states of the former GDR. In terms of pandemic-related characteristics, 18% of respondents had already received at least their first dose of a Covid-19 vaccine at the time of taking the survey. This is in line with the data reported by the European Centre for Disease Prevention and Control for Germany at the time (ECDC, 2023). The perceived threat of the pandemic was relatively high (on average 5 on a 7-point scale), in line with the survey data being collected in the midst of the second surge of infections in Germany.

The next two sections first separately discuss the empirical patterns of the two main variables of interest, namely international vaccine allocation preferences and inequality aversion.

3.2 Global Covid-19 vaccine allocation preferences

The findings from the DCE to elicit international vaccine allocation preferences are summarized in Figure 3 below and in Table A4 in the Appendix. Figure 3 reports the results of conditional and mixed logit models estimating the effect of the DCE attribute 'Country of residence and healthcare system capacity' on the probability of a hypothetical recipient being prioritized in the allocation decision. The attribute is coded such that we are estimating the effect of a recipient living in a lower income country rather than in Germany, i.e., Germany is the reference category. The logit models control for the other three attributes in the DCE, namely the recipient's age, Covid-19 mortality risk and employment status. Estimated coefficients for all attributes throughout different model specifications are reported in Table A4 in the Appendix.

[16] We observe a slight deviation from the Census population, mostly in terms of education, which is most likely a result of excluding those participants who were strongly opposed to getting vaccinated against Covid-19.

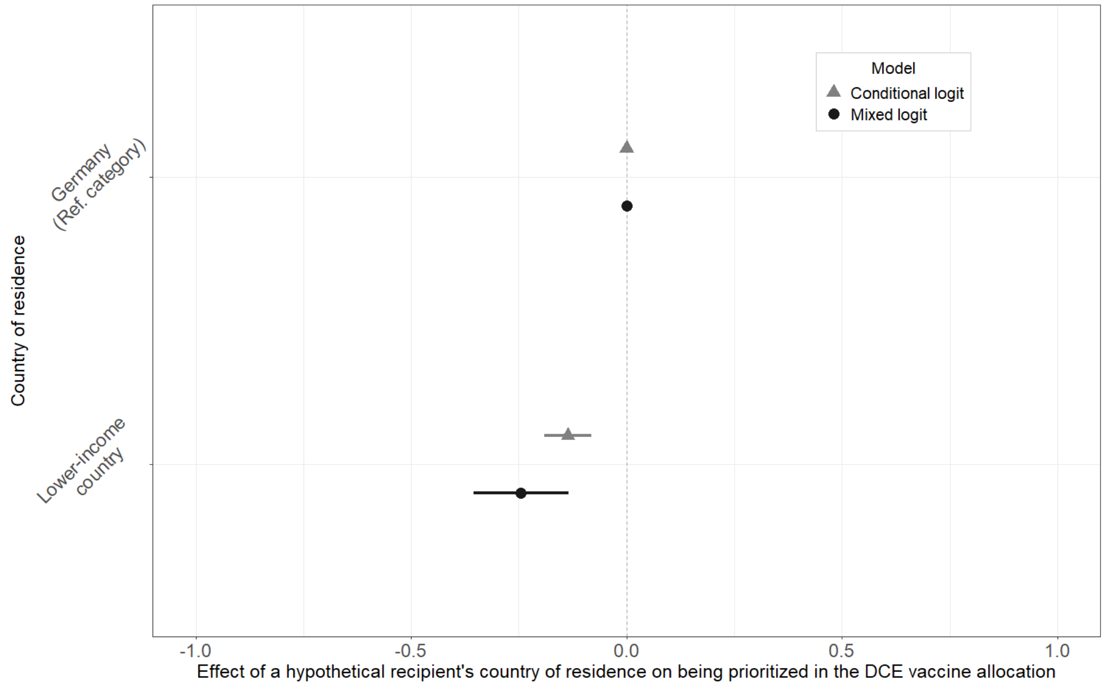


Fig. 3. DCE results: Effect of country attribute.
Notes: Shown are mixed and conditional logit estimates for the effect of the country attribute in the DCE. For the coefficients of all attributes throughout different model specifications see Table A4 in the Appendix. The dependent variable was an indicator variable for prioritizing a hypothetical recipient in the DCE vaccine allocation decision. The mixed logit model was estimated in Stata using the mixlogit command with 500 Halton draws and standard errors clustered at the respondent level (Hole, 2007). The conditional logit model was estimated with standard errors clustered at the respondent level.

We find that, in the DCE vaccine allocation decision, survey respondents prioritize hypothetical recipients from Germany over those from lower-income countries ($\beta_{\text{lower-income}} = -0.25$ for the mixed logit model and $\beta_{\text{lower-income}} = -0.13$ for the conditional logit model). Both mixed and conditional logit estimates are statistically significant at the 1% level, the former being larger in magnitude than the latter. Since the actual values of the logit estimates are not incredibly informative, we calculate marginal effects by means of predicted probabilities to obtain a more meaningful interpretation of respondents' allocation preferences. Doing so reveals that the predicted probability of being prioritized to receive the vaccine is 1.7 percentage points lower for citizens from lower-income countries than for German citizens, on average and all else equal. Thus, the (German) survey respondents in our panel have a statistically clear and significant, but substantively rather weak preference for prioritizing German citizens in the allocation process.

Taking into account the other attributes suggests that the hypothetical recipient's mortality risk and employment situation are, on average, also important predictors of survey respondents' vaccine allocation preferences (differences in predicted probabilities vary between 5 and more than 20 percentage points). Specifically, higher risk in terms of mortality and income losses significantly increases the likelihood of being prioritized in the DCE vaccine allocation decision. The hypothetical recipient's age does not seem to have a linear statistically significant impact on respondents' considerations about how to allocate the vaccine.[17]

[17] One reason for this result could be that respondents incorporate age into their evaluation of the risk attribute.

In sum, the DCE results suggest that, while being a less dominant determinant than mortality risk or employment situation, a hypothetical recipient's country of residence plays a statistically significant role for respondents' vaccine allocation preferences. The observed prioritization of German citizens may be expected, given that respondents are themselves German and may be subject to ingroup (and other) biases in this regard. Nevertheless, the country attribute is the only attribute, for which respondents' allocation preferences are not aligned with vulnerability considerations, but rather against them. Importantly, the country attribute is also the attribute where we observe the most heterogeneity in individual preferences: Figure 4 illustrates this variation by mapping the distribution of respondent-level parameters retrieved from the mixed logit results in Figure 3 or Table A4. The figure reveals that estimated parameters vary substantially around the discussed mean of -0.25 (red dashed line). We propose that respondents' inequality aversion may be an important factor in explaining this variation, which we lay out in the next sections.

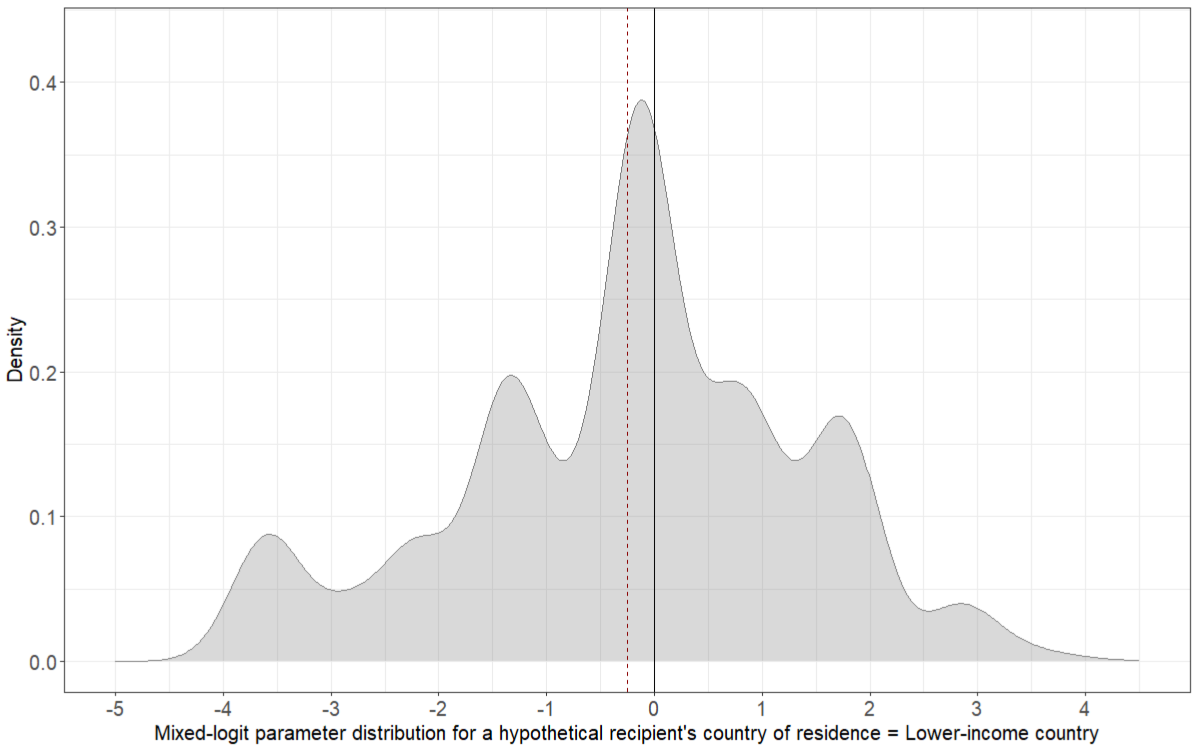


Fig. 4. Distribution of posterior mixed-logit parameters for country attribute.
Notes: Shown is the distribution of the respondent-level posterior parameters retrieved from the mixed logit model in Figure 3 or Table A4 (column 2) in the Appendix. Mixed logit parameters were retrieved by, first, estimating the mixed logit model in Stata using the mixlogit command, and, second, predicting parameters using the mixlbeta command (Hole, 2007). In both cases, 500 Halton draws were used. The red dashed line indicates the average mixed logit parameter found in the sample, i.e., -0.25 as in Figure 3.

3.3 Prevalence and nature of inequality aversion

Before examining the link between respondents' international vaccine allocation preferences and their inequality aversion, we first separately quantify the extent of inequality aversion in our sample by analyzing respondents' behavior in the modified dictator game and ultimatum game.

3.3.1 Comprehension checks and well-behaved preferences

Among the 2402 survey respondents, 2238 fully completed the modified dictator game and 2326 fully completed the ultimatum game (i.e., responded to the respective comprehension questions and made a choice for all 11 decision scenarios). This corresponds to an attrition rate of between 4 and 7%, depending on the game. Considering only those who fully completed the respective game, 72% correctly answered the comprehension questions for the ultimatum game and 79% correctly answered the comprehension questions for the modified dictator game.[18] Respondents who passed the comprehension checks had significantly higher levels of education and were slightly more likely to be female and younger than those who did not provide the correct answers to these questions (see Tables A5 and A6 in the Appendix).

The elicitation method to measure inequality aversion underlying the two games relies on respondents having well-behaved preferences in the sense that their switching points are consistent. That is, if a respondent in the modified dictator game switches from the unequal offer (always 10|0) to the egalitarian offer at Scenario 3, i.e., at the offer (2|2), well-behaved preferences dictate that they will also choose the egalitarian offer in Scenario 4 (3|3) and in all scenarios thereafter. Thus, respondents are expected to switch only once throughout the eleven scenarios. Similarly, for the ultimatum game, a respondent who accepts the offer at Scenario 3, i.e., at the offer (2|8), should also accept at the offers (3|7), (4|6), and (5|5). Note that here a respondent with well-behaved preferences might switch back (once) after the (5|5) scenario, since the inequality is reversed in the second half of the ultimatum game.

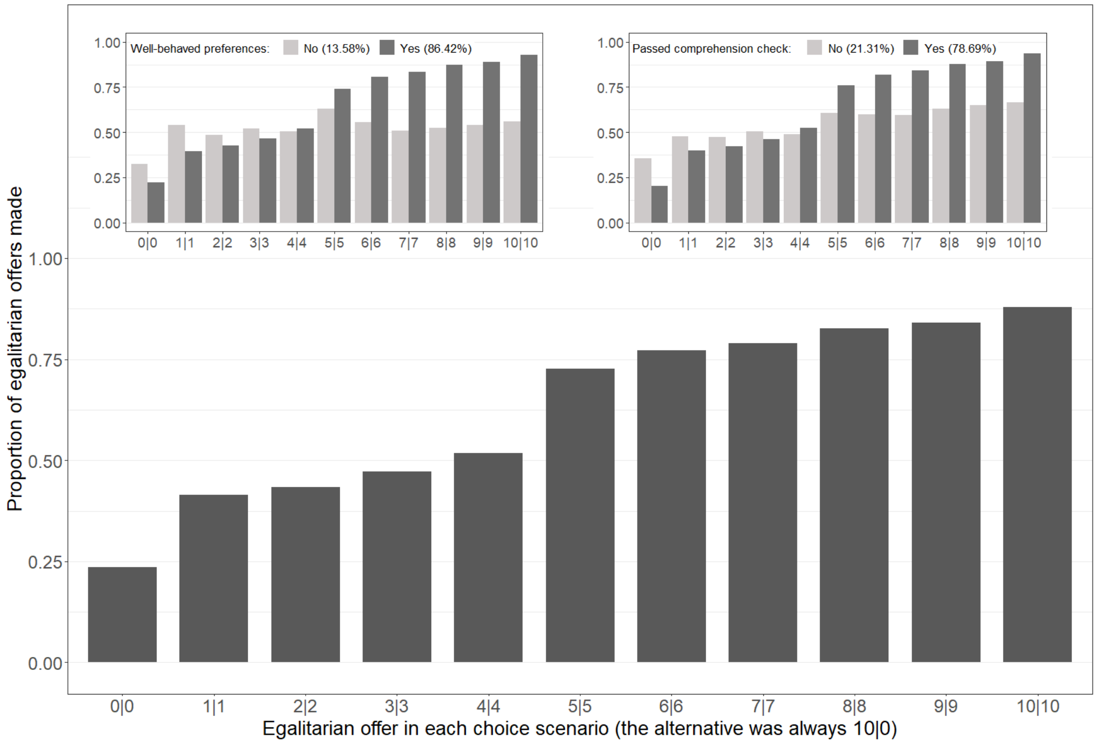
Using these definitions to assess the degree of well-behaved preferences in our sample reveals that 86% of respondents have well-behaved preferences in the Modified dictator game and 89% have well-behaved preferences in the Ultimatum game. Respondents with well-behaved preferences had significantly higher levels of education and were slightly more likely to be female and older than those without well-behaved preferences (see Tables A7 and A8 in the Appendix). Generally, this relatively high proportion of respondents with well-behaved preferences and of those who correctly answered the comprehension questions suggests that such elicitation methods also work well in (i) unsupervised online surveys with (ii) a largely representative population sample. Nevertheless, our empirical analyses (below) separately examined the subsamples of respondents who correctly answered the comprehension questions and had well-behaved preferences, expecting that result patterns will be more pronounced for those subgroups.

[18] The survey included two comprehension questions per game. In the ultimatum game, we included a third question due to its different payout nature. For better comparability, the descriptive statistics in this section refer just to the first two questions, but we report our main empirical findings also for all three comprehension questions. The results remain the same for advantageous inequality aversion and are slightly less pronounced (with respect to statistical significance) for disadvantageous inequality aversion (see Table A17 in the Appendix).

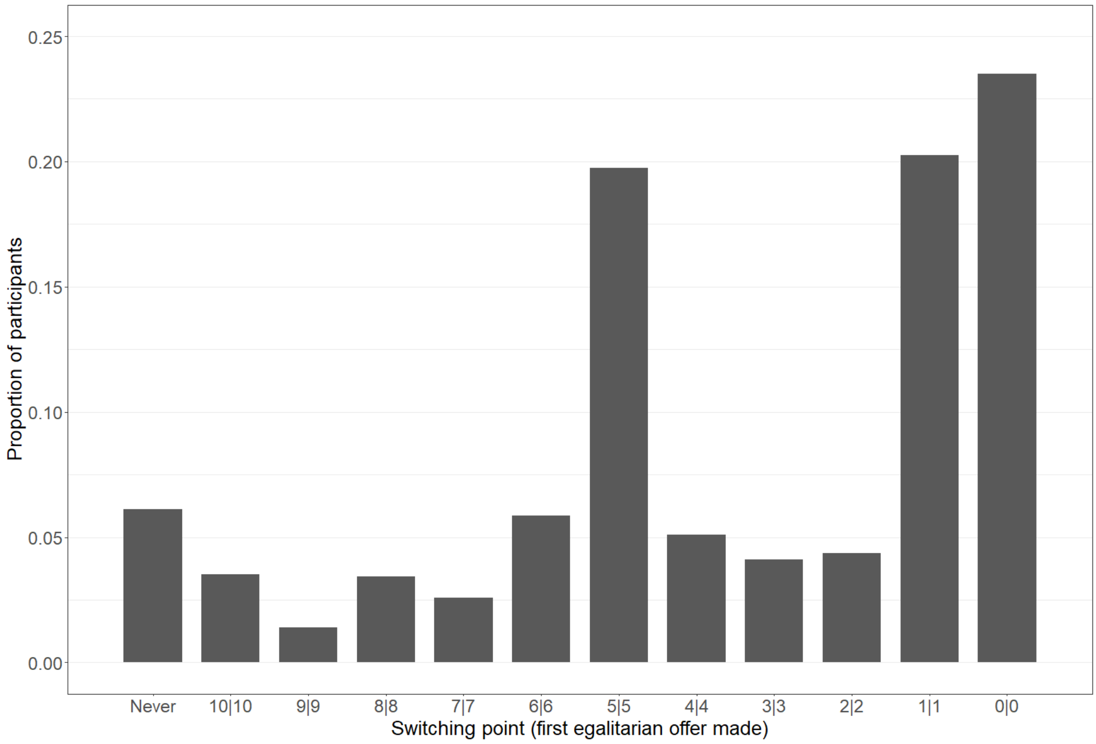
3.3.2 Distribution of choices in games and levels of inequality aversion

Figure 5 shows respondents' choices across the 11 scenarios of the modified dictator game (Figure 5a) and the corresponding levels of advantageous inequality aversion (ordered from low to high, Figure 5b), determined by the scenario where respondents' first switched to the egalitarian offer. As expected, the proportion of respondents' choosing the egalitarian offer over the unequal offer (always 10|0) increases continuously, the higher the egalitarian offer (see Figure 5a). This pattern is driven by respondents who passed the comprehension questions and have well-behaved preferences (the vast majority of respondents). A relatively large proportion of almost 25% of respondents already chose the egalitarian offer in the first choice scenario (0|0), where both they and their partner would receive nothing. The largest jumps (i.e., additional respondents choosing the egalitarian offer) are at scenario 2 (egalitarian offer is 1|1) and at scenario 6 (egalitarian offer is 5|5), where in each case an additional 15% to 20% switched to the egalitarian offer. In terms of the corresponding level of advantageous inequality aversion, this results in a distribution where almost half of respondents exhibit a very high level of inequality aversion (the highest or second highest level, i.e., they switch very early), another almost 20% exhibit a moderate level of inequality aversion (i.e., they switch at 6|6), and only a relatively small proportion of respondents exhibits lower levels of inequality aversion (i.e., they switch relatively late or never) (see Figure 5b).

Figure 6 shows respondents' choices across the 11 scenarios of the ultimatum game (Figure 6a) and the corresponding levels of disadvantageous inequality aversion (ordered from low to high, Figure 6b), determined by the scenario where respondents first accepted the offer. As expected, the proportion of respondents accepting the offer increases continuously, the more equal the offer and the more the respondent would receive, up until scenario 6, where both players would receive 5 Euro (see Figure 6a). After that scenario, the inequality reverses and the proportion of accepted offers drops again (note that this second half of the ultimatum game is not relevant for the measurement of disadvantageous inequality aversion). This overall pattern is driven by respondents who passed the comprehension checks and have well-behaved preferences (the vast majority of respondents). A relatively large proportion of almost 30% of respondents already accepted the first offer (0|10), where they would get nothing and the first mover would get 10 Euro. The largest jump (i.e., additional proportion of respondents accepting the offer) is at scenario 6 (offer is 5|5), where an additional approximately 30% accepted the first mover's offer. In terms of the corresponding level of disadvantageous inequality aversion, this results in a U-shaped distribution where almost 30% of respondents exhibit the lowest level of inequality aversion (i.e., already accepted the first offer), another almost 40% of respondents exhibit the highest level of inequality aversion (i.e., first accepted offer is at 5|5 or later), and only a relatively small proportion of respondents exhibit more moderate levels of inequality aversion anywhere in-between these two extremes (see Figure 6b).

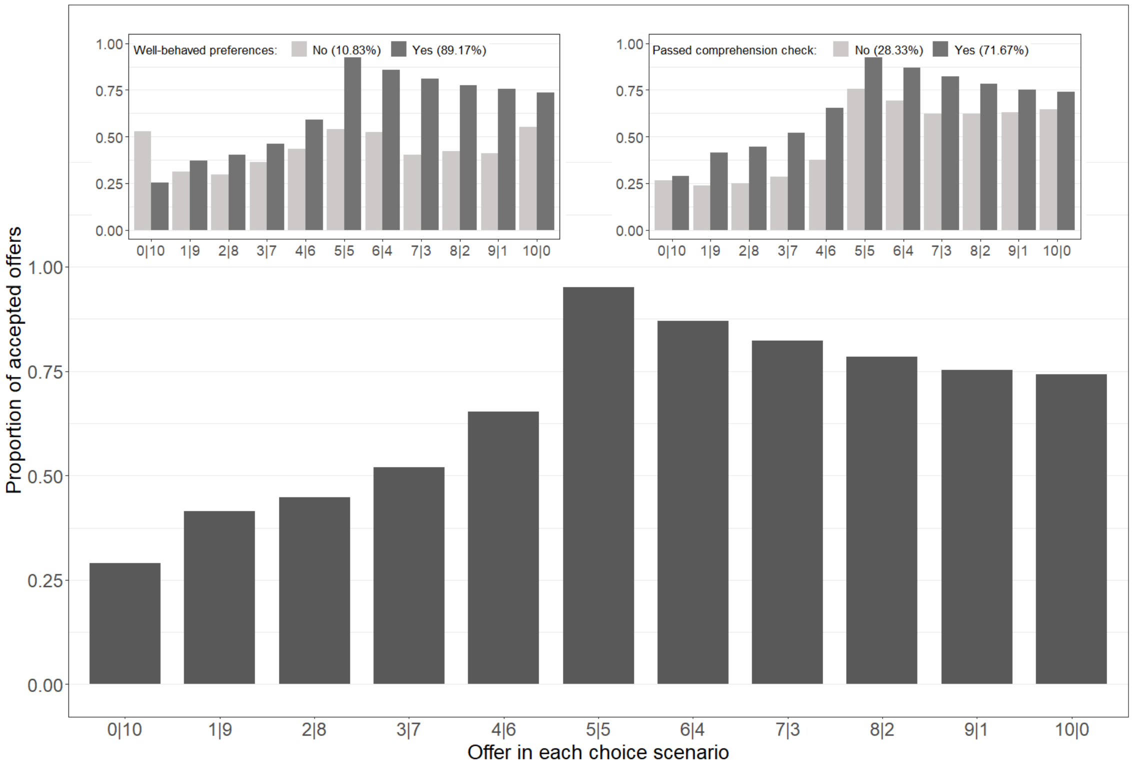


(a) MDG choices (full sample and by comprehension checks/well-behaved preferences)

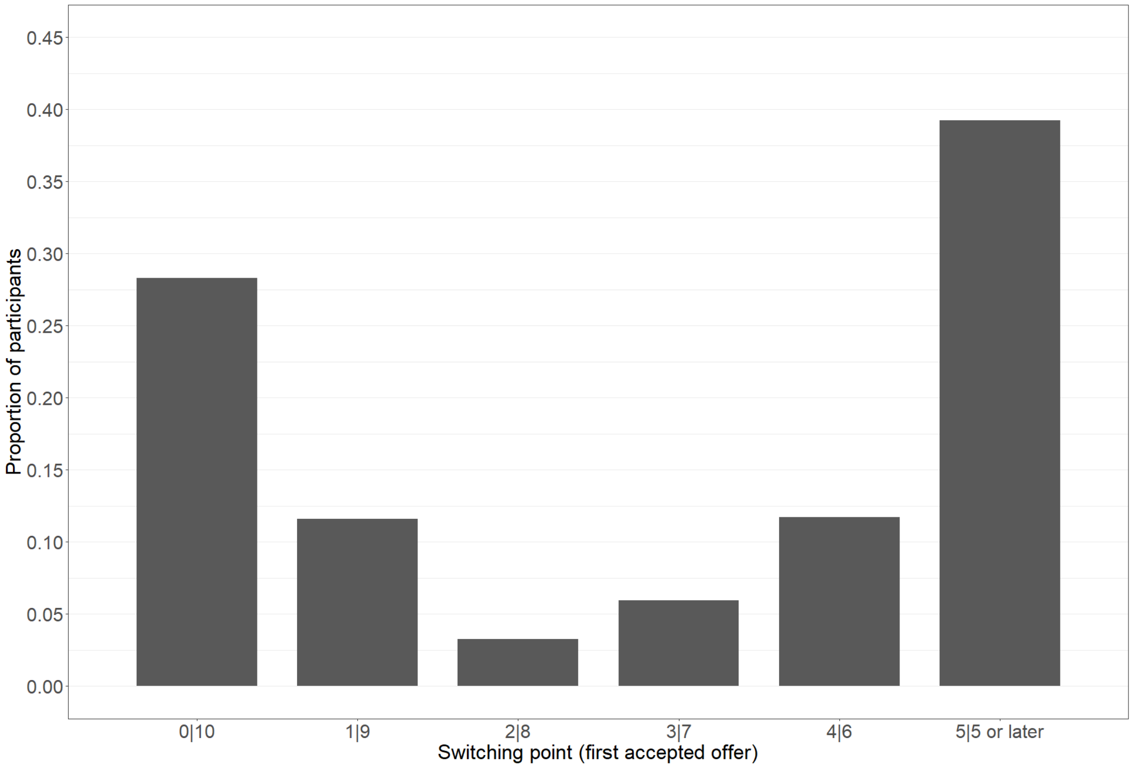


(b) Level of advantageous inequality aversion (guilt), full sample

Fig. 5. Modified dictator game (MDG) choices and levels of inequality aversion.



(a) UG choices (full sample and by comprehension checks/well-behaved preferences)



(b) Level of disadvantageous inequality aversion (envy), full sample

Fig. 6. Ultimatum game (UG) choices and levels of inequality aversion.

3.3.3 Correlates of inequality aversion

Inequality aversion may be related to other characteristics of survey respondents that also play a role for their attitudes towards policy choices with distributional implications on the global level. Thus, we briefly examine correlations between both types of inequality aversion and (i) basic demographic and socioeconomic characteristics, (ii) other economic preferences, and (iii) political orientation to subsequently control for potential confounders in the main analysis (see below, Section 3.4). Moreover, examining potential correlates of advantageous and disadvantageous inequality aversion gives us an empirical (in addition to the theoretical) indication about whether and how these two forms of inequality aversion differ.

Figure 7 shows a heat map of pairwise polychoric correlation coefficients and statistical significance levels between both types of inequality aversion and the above-mentioned characteristics of survey respondents (positive/negative correlations printed in orange/blue). While the reported correlation coefficients are relatively moderate in terms of magnitude, some clear patterns emerge.

Fig. 7. Inequality aversion correlates (***, **, and * indicate significance at the 1, 5, and 10 percent level).

First, in terms of demographic and socioeconomic characteristics, we may expect inequality aversion to vary by gender, age and socioeconomic status, as often observed with other types of social preferences. We find that inequality aversion - regardless of the type - is positively and significantly correlated with being female and being older, but negatively and significantly correlated with socioeconomic status (education and household income). We do not observe any significant variation in inequality aversion with respect to the former states of the GDR.

Second, inequality aversion belonging to the group of social preferences, we may expect it to be correlated with other social (or generally economic) preferences. Figure 7 reveals a negative, significant correlation between both types of inequality aversion and respondents' level of patience. For the other economic preferences, we find differential, sometimes clearly opposing, patterns, most pronounced in the case of altruism: More altruistic individuals generally show higher levels of advantageous inequality aversion (guilt parameter), but lower levels of disadvantageous inequality aversion (envy parameter). For risk aversion, we observe a positive, statistically significant correlation only with the envy parameter, and for positive (negative) reciprocity, we find a positive (negative), statistically significant correlation only with the guilt parameter.

Third, in terms of political orientation, we may expect inequality aversion in general to be higher the more left-leaning/less right-leaning a person is on the political spectrum. We find clearly opposing correlations with the two elicited types of inequality aversion, suggesting differential dynamics of the guilt/envy parameter in this regard: Higher levels of the envy parameter are positively and significantly correlated with the right-wing extremism scale and negatively with trust in the German national government. In contrast, higher levels of the guilt parameter are negatively and significantly correlated with the right wing extremist scale and with reporting to have voted for the right wing party ('Alternative für Deutschland', 'AfD') at the last national election in 2021.

These pairwise correlations provide empirical support for the theoretical distinction between advantageous and disadvantageous inequality aversion. This becomes most visible through clearly contrasting correlation patterns with especially altruism and political orientation, whereas both types of inequality aversion show similar correlations with basic demographic and socioeconomic characteristics. In line with these findings, we find a small, negative, statistically significant correlation between both types of inequality aversion (correlation coefficient: -0.054).[19] Importantly, given the correlation patterns in Figure 7, we control for most of these characteristics in the main analysis examining inequality aversion as a determinant of international distribution preferences (next section).

3.4 Global vaccine allocation preferences by inequality aversion

Combining the data from the behavioral games and the discrete choice experiment, we now examine the variation in respondents' international vaccine allocation preferences by their level of advantageous and disadvantageous inequality aversion.

Figure 8 illustrates how the mixed-logit parameters for the country attribute (=lower-income country), as shown in Figure 4, differ by respondents' level of inequality aversion, as derived in Figures 5 and 6. Specifically, shown are marginal effects for separately regressing the mixed-logit parameters on categorically-coded variables of advantageous and disadvantageous inequality aversion, among respondents with well-behaved preferences and those who have passed the comprehension checks in the respective game. For the sake of a better comparison across the two types of inequality aversion, advantageous inequality aversion (guilt parameter) was also coded into six (instead of 12) categories by combining adjacent categories (see Figure A3 in the Appendix for the same graph using the initial 12-point scale).

Figure 8 suggests that there is a substantial amount of variation in respondents' international vaccine allocation preferences by their level of inequality aversion and that the direction of this heterogeneity depends on the type of inequality aversion. Higher levels of advantageous inequality aversion, the guilt parameter, are associated with more support for prioritizing citizens from lower-income countries, rather than German citizens, all else equal (left graph in Figure 8). In contrast, higher levels of disadvantageous inequality aversion, the envy parameter, are associated with less support for allocating vaccines to hypothetical recipients from lower-income countries (right graph in Figure 8). The effect of the envy parameter is less pronounced than the effect of the guilt parameter and largely driven by those individuals with the highest level of disadvantageous inequality aversion.

[19]Note that we do not calculate the actual model parameters as initially theorized by Fehr and Schmidt (1999).

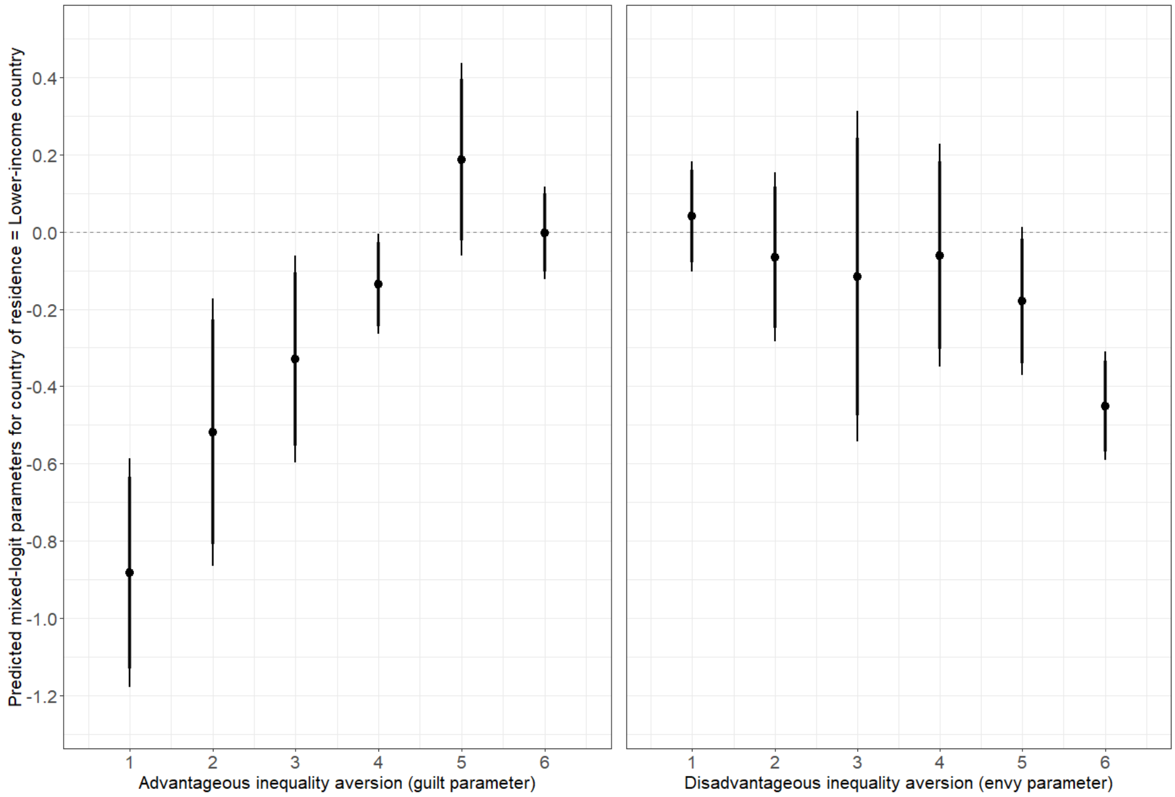


Fig. 8. Predictive margins of global vaccine allocation preferences by levels of inequality aversion.
Notes: Marginal effects are based on two OLS regressions. The dependent variables are in both cases the posterior parameters for the country attribute (=lower-income country), shown in Figure 4 and obtained from the mixed logit model in Figure 3 or column 2 of Table A4. The explanatory variables are categorical variables of advantageous and disadvantageous inequality aversion, respectively. The regression was conducted among respondents who passed the comprehension checks and had well-behaved preferences in the respective games. The measure for advantageous inequality aversion was coded into a 6-point scale (instead of 12, i.e., the previous levels 1 or 2 are now combined into the lowest level; 3 and 4, into the second lowest; and so on) to make it comparable to disadvantageous inequality aversion.

These results allow us to decipher the weak, but statistically significant mean preference for prioritizing German citizens in the DCE allocation decision, which we observed in Figure 3: At lower levels of the guilt parameter and higher levels of the envy parameter, respondents in our sample have a strong and statistically significant preference for allocating vaccines to German citizens, rather than to citizens from lower-income countries, all else equal. In terms of marginal effects: For a respondent with the lowest level of the guilt parameter (highest level of the envy parameter), the predicted probability of prioritizing a hypothetical recipient in the vaccine allocation decision is 9.61 (3.41) percentage points lower for a hypothetical recipient from lower-income countries, on average and all else equal. Recall that, in the average sample, the marginal effect was 1.7 percentage points. This preference for German recipients disappears at higher levels of the guilt parameter and low/moderate levels of the envy parameter - up to the point that the hypothetical recipient's country of residence in the DCE becomes irrelevant for respondents' vaccine allocation decision. Note that across all levels of inequality aversion, respondents never reveal a statistically significant allocation preference in favor of citizens in lower-income countries.

To assess the robustness of the heterogeneity in Figure 8, Table 1 reports the detailed results of regressing the mixed-logit parameters for the country attribute on the (continuously coded) guilt and envy parameter throughout a variety of specifications. The table reports standardized regression coefficients for all included regressors, such that betas can be compared in magnitude and should be interpreted as the effect of a one standard deviation increase/decrease on the log odds of a hypothetical recipient being prioritized in the vaccine allocation decision. Columns 1 to 5 report the estimated effects of advantageous inequality aversion, columns 6 to 10 show estimated effects for disadvantageous inequality aversion, and column 11 adds both forms of inequality aversion at the same time.

Table 1 Standardized effects of inequality aversion on global vaccine allocation preferences

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt)	0.135***	0.154***	0.162***	0.120***	0.093***						0.105***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)						(0.01)
Disadvantageous IA (envy)						-0.097***	-0.119***	-0.107***	-0.085***	-0.047*	-0.042
						(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Female			0.018	0.013	0.028			0.029	0.011	0.014	0.019
			(0.08)	(0.08)	(0.08)			(0.08)	(0.09)	(0.08)	(0.09)
Age group			-0.049*	-0.038	-0.000			-0.092***	-0.105***	-0.064**	-0.046
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Education			0.082***	0.058**	-0.024			0.034	0.021	-0.054**	-0.052*
			(0.05)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.06)
CV19 vaccinated			0.007	-0.007	-0.001			0.034	0.020	0.023	0.013
			(0.10)	(0.10)	(0.10)			(0.11)	(0.11)	(0.10)	(0.11)
Vaccine hesitancy index			-0.029	0.009	0.070***			-0.044*	-0.009	0.047*	0.058**
			(0.05)	(0.06)	(0.06)			(0.06)	(0.06)	(0.06)	(0.06)
CV19 threat perception scale			-0.028	-0.026	-0.018			-0.024	-0.025	-0.020	-0.006
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Patience				0.049*	0.037				-0.001	0.005	0.039
				(0.05)	(0.05)				(0.06)	(0.05)	(0.06)
Risk aversion				-0.045*	-0.045*				-0.028	-0.032	-0.046
				(0.06)	(0.06)				(0.06)	(0.06)	(0.06)
Neg. reciprocity				-0.036	0.019				-0.045*	0.005	0.004
				(0.05)	(0.05)				(0.05)	(0.05)	(0.05)
Pos. reciprocity				-0.018	-0.006				-0.016	-0.006	-0.011
				(0.02)	(0.02)				(0.03)	(0.02)	(0.03)
Altruism				0.144***	0.073***				0.172***	0.107***	0.076**
				(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Trust in Government					0.036					0.008	0.021
					(0.02)					(0.02)	(0.03)
RW extremism scale					-0.304***					-0.294***	-0.299***
					(0.04)					(0.05)	(0.05)
Voted AfD (2021)					-0.080***					-0.126***	-0.090***
					(0.15)					(0.16)	(0.18)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	2244	1654	1643	1550	1525	2334	1584	1573	1482	1454	1247
R^2	0.018	0.024	0.035	0.062	0.162	0.009	0.014	0.029	0.061	0.166	0.174
Adjusted R^2	0.018	0.023	0.031	0.054	0.154	0.009	0.014	0.024	0.053	0.157	0.163

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), shown in Figure 4 and resulting from the mixed logit model in Figure 3 or column 2 of Table A4. Advantageous and disadvantageous inequality aversion (as well as the other regressors) are coded as continuous variables. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The estimated effects of both types of inequality aversion are statistically significant at the 1%-level when initially added as only predictors (columns 1 and 6). In line with Figure 8, the guilt parameter has a positive effect on respondents prioritizing citizens from lower-income countries in the DCE vaccine allocation ($\beta_{guilt} = 0.135$), while the envy parameter has a negative, but less pronounced effect ($\beta_{envy} = -0.096$). As expected, these effects become slightly larger in magnitude when restricting the sample only to those respondents with well-behaved preferences and who passed the comprehension checks ($\beta_{guilt} = 0.160$, column 2; $\beta_{envy} = -0.122$, column 7).

One may argue that other respondent characteristics could act as alternative, possibly confounding, predictors of international vaccine allocation preferences. To assess this, we add three sets of control variables to the regression: (i) socioeconomic and Covid-19 related variables (gender, age, education, vaccination status, vaccination hesitancy, threat perception; columns 3 and 8), (ii) other economic preferences (patience, risk aversion, positive and negative reciprocity, altruism; columns 4 and 9), and (iii) political orientation (right-wing extremism scale, right-wing voting, trust in the national government; columns 5 and 10).

We find that the guilt parameter reduces in magnitude to $\beta_{guilt} = 0.097$ (column 5), but remains statistically significant at the 1%-level throughout all specifications. The envy parameter also drops in magnitude and also in statistical significance to a borderline statistically significant effect ($\beta_{envy} = -0.048$, p-value<0.1; column 10). These changes in the estimated coefficients occur in both cases specifically when including other social preferences and political orientation in the regression. In that regard, especially respondents' degree of altruism, right-wing extremism, and right-wing voting in the last national election are strong and statistically significant alternative estimated predictors.

When including both inequality aversion parameters simultaneously in the regression (controlling for all alternative predictors), the estimated effect of the envy parameter remains essentially unchanged in magnitude, but loses statistical significance. The estimated effect of the guilt parameter remains statistically significant at the 1%-level and is slightly larger in magnitude ($\beta_{guilt} = 0.114$, column 11). This result is in line with the theoretical expectation of *advantageous* inequality aversion playing a more important role for German citizens' vaccine allocation preferences since Germany has a higher healthcare system capacity and had relatively more access to Covid-19 vaccines than most lower-income countries at the time.

In sum, we provide evidence that (especially advantageous) inequality aversion seems to be an important source of the observed variation in respondents' preferences regarding the cross-country allocation of Covid-19 vaccines. While specifically altruism and political orientation are other major predictors, advantageous inequality aversion seems to capture a distinct dynamic that may even offset parts of these other predictors' effects (altruism and AfD-vote: see reductions in magnitude from column 10 to 11).

3.5 Extensions and robustness checks

3.5.1 Efficiency-neutral coding of advantageous inequality aversion

In the modified dictator game, another factor, namely efficiency, may influence respondents' choices. To address this concern, we repeat the same analysis from Table 1 (columns 1-5, column 11) for the two alternative measures of the guilt parameter (second half of ultimatum game; merely 6th choice in modified dictator game). The results are reported in Table A9 in the Appendix. For both alternative measures of the guilt parameter, we also find a positive and statistically significant estimated impact on respondents prioritizing citizens from lower-income countries in the DCE vaccine allocation decision (rather than to German recipients). The coefficients are smaller in magnitude, but that may be expected, given that we are only using one of the 11 choice scenarios in the modified dictator game and only half of the scenarios in the ultimatum game, respectively. The estimated effects remain robust across all estimated specifications including the different sets of control variables.

3.5.2 Distribution-sensitive coding of inequality aversion

Given the non-normal distribution of advantageous and disadvantageous inequality aversion in our sample, we repeat the main heterogeneity analysis from Table 1 and Figure 8, but now encode measures for the guilt and envy parameter not only in terms of the consecutively ordered levels, but also to reflect their actual distribution among the individuals in our sample. To obtain measures of both types of inequality aversion that have a more or less equal proportion of individuals on each segment (approximate quintiles), advantageous inequality aversion was encoded into five levels (1-6 | 7 | 8-10 | 11 | 12) and disadvantageous inequality aversion was encoded into five levels (1 | 2 | 3-4 | 5 | 6) (compare Figures 5 and 6 for the distribution). The results of instead employing this distribution-sensitive coding of inequality aversion are reported in Table A10 and in Figure A4 in the Appendix. The estimated effects in Table A10 are almost identical to those in Table 1. Figure A4 additionally reveals that respondents' preference against allocating the vaccines to recipients in lower-income countries originates from the approximately 40% of the sample with the lowest (highest) guilt (envy) parameter, all else equal. For the respective other sample cohorts, the country of residence of a hypothetical recipient in the DCE does not have any statistically significant effect, all else equal.

3.5.3 Main analysis based on alternative logit model specifications

To rule out that the findings are an artifact of a certain way of specifying the initial logit model, we repeat the core analysis from Table 1, using the other model specifications in Table A4.

First, the results of repeating the core analysis with parameters from a mixed-logit model without the attribute age (since insignificant in the initial model) are reported in Table A11. The estimated coefficients and statistical significance of both forms of inequality aversion are almost identical to the results of the core analysis, only that the magnitudes are even slightly larger.

Second, the results when instead estimating different conditional (rather than mixed) logit model specifications are reported in Tables A12 and A13. Since conditional logit models assume fixed, not random, parameters for attributes and levels, we can not calculate posterior parameter distributions. Thus, we instead examine heterogeneity in the DCE results by including interactions between (i) the country attribute and (ii) both forms of inequality aversion. Across all three conditional logit models and varying specifications, the interaction effects of the guilt and envy parameter remain robust in terms of direction, statistical significance and relative magnitude (absolute magnitudes cannot be directly compared to those in Table 1 due to the different estimation method).

Finally, we also estimate all of the above logit models and our main analysis for a subsample of respondents that was not exposed to experimental treatments of an experiment on vaccination intentions, which was also part of the survey. Specifically, the experiment tested the effectiveness of different messages on respondents' willingness to get vaccinated against Covid-19. The study found that the messaging was partly effective and reported only partially borderline statistically significant average impacts. Still, the messages may have had an impact on respondents' choices in the DCE about the distribution of Covid-19 vaccines. Tables A14 and A15 therefore repeat the main analyses with the subsample of respondents who had been randomly assigned to the control group of the described experiment or were initially not exposed to any part of that experiment because they had already been vaccinated against Covid-19.

The mixed and conditional logit models to estimate the effects of and parameter distribution for the country attribute reveal the same pattern as the results found in the whole sample (see Table A14). The only difference is that the negative impact of the country attribute is slightly lower in statistical significance, which may be a result of the smaller sample. The results of repeating the core analysis (i.e., Table 1) with this restricted sample also remain robust, with the exception that (i) the impacts of both types of inequality aversion when included jointly are even larger in magnitude and (ii) the impact of the envy parameter keeps its statistical significance throughout all specifications (see Table A15).

3.5.4 Excluding straight-liners

A common issue in (online) surveys are the so-called 'straight-liners', i.e., respondents who just keep checking all the answers on the left or on the right due to a lack of attention or care in filling out the survey. Straight-liners are especially relevant to examine in Likert Agree-Disagree questions. Note that, in the behavioral games, a person who exclusively accepts/rejects or exclusively chooses the egalitarian/unegalitarian distribution is not necessarily a straight-liner in the described sense, but may just have a very high or very low level of inequality aversion, which can also be observed in various previous elicitations of inequality aversion. Still, we examine robustness of our findings when excluding *potential* straight-liners in the behavioral games and report the results in Table A16 in the Appendix.

In the modified dictator game roughly a quarter of survey respondents exclusively chose the egalitarian offer or the unegalitarian offer. In the ultimatum game roughly one fifth of respondents exclusively accepted or rejected the hypothetical offer. When excluding all of these participants, we find that the coefficients remain largely robust in terms of statistical significance, but are slightly smaller than when considering the entire sample. The reduction in statistical significance and magnitude affects only the findings for advantageous inequality aversion (guilt parameter). This is to be expected for two reasons. First, we observed a large proportion of individuals (almost 25%) with the highest level of the guilt parameter, i.e., who always chose the egalitarian distribution in the modified dictator game and, thus, would here be identified as potential straight-liners. Second, in the ultimatum game (i.e., when eliciting the envy parameter), the exclusion of potential straight-liners is much less relevant, given that only the first half of choices was used for quantifying disadvantageous inequality aversion.

We do not interpret these deviations as challenging the main findings, given that we have analyzed actual comprehension questions, which serve as much better attention checks in this set-up and which actual straight-liners would not have have passed. Moreover, actual straight-liner behavior would probably not drive survey respondents' answers when monetary incentives are involved.

Finally, if these respondents were actual straight-liners, we would observe such a behavior also in other survey questions, for instance, in the DCE. In the DCE, however, only 19 among the 2402 respondents exclusively chose either Person A or Person B, suggesting a very low proportion of actual straight-liners in our sample. Thus, in the behavioral games, the observed choices most likely present respondents' actual preferences in the game.

4 Discussion and conclusion

Social preferences and inequality aversion in particular have been shown to play an essential role for citizens' support of redistributive policies at the national level and for the political parties endorsing them (e.g., Epper et al., 2024; Fehr et al., 2024; Müller and Renes, 2021; Almås et al., 2020; Kerschbamer and Müller, 2020; Fisman et al., 2017; Dhami and Nowaihi, 2010; Tyran and Sausgruber, 2006). Our paper provides empirical evidence that this role of inequality aversion extends to *international-level* distribution problems. We demonstrated this in the context of the global allocation of Covid-19 vaccines, which was characterized by vaccine hoarding of the Global North throughout the crucial periods of the pandemic. To that end, our contribution further shows that inequality aversion is a crucial factor for citizens' policy preferences even during a global crisis they themselves are directly affected by, such as a pandemic.

Eliciting two different types of inequality aversion, advantageous and disadvantageous, we find that they play opposing roles for citizens' attitudes towards policies with global distributional implications. While advantageous inequality aversion (the guilt parameter), is associated with higher support for a more equitable global vaccine allocation, we find the opposite (though less clear) association for disadvantageous inequality aversion (the envy parameter).

Our results further indicate that only those respondents at lower levels of the guilt parameter and at the highest level of the envy parameter hold a strong and statistically significant preference for prioritizing German citizens in the vaccine allocation, rather than citizens in lower-income countries with less-equipped health-care systems. Especially advantageous inequality aversion seems to capture a dynamic that is distinct from a variety of alternative predictors, including demographic and socioeconomic characteristics, political orientation, other social preferences, and Covid-19-related perceptions. Even if not causal by design, this documented heterogeneity is meaningful: Respondents with the lowest level of the guilt parameter are roughly 10 percentage points less likely to allocate the vaccine to a hypothetical recipient in a lower-income country than to a German potential recipient.

Our contribution raises a number of valuable considerations in relation to existing and potential future research: First, the results presented in this paper speak to the importance of distinguishing between the two types of inequality aversion when trying to understand public preferences about policy choices with distributional implications, both national and international (Epper et al., 2024; Fehr et al., 2024; Kerschbamer and Müller, 2020). To that end, it would be interesting for future studies to systematically investigate how the two inequality aversion parameters differ in their importance for national versus international distribution problems as well as for different types of resources being (re)distributed. Relatedly, future research could identify whether there may be need for separate concepts of inequality aversion specifically for *international* distribution problems or, generally, for different identifiers of in- and outgroups (Enke et al., 2023).

Second, additional evidence on the overall prevalence and distribution of both types of inequality aversion parameters in large, population-representative samples would be helpful to improve measurement, confirm important sociodemographic correlates, and obtain a better understanding of their relation to each other. Comparing the different predictors in our study, we find that the estimated impact of the guilt parameter is comparable in magnitude to those of altruism and having voted for the AfD in the last national election, but smaller than the impact of general right-wing extremist beliefs, which is clearly the strongest predictor of respondents' support for international (re-)distribution. More research in this regard would be useful to improve our understanding of the relative importance of inequality aversion in relation to other factors, including so far less examined factors, such as cognitive ability (Brun et al., 2023).

Third, the finding of respondents - across all levels of inequality aversion - never revealing a statistically significant allocation preference in favor of citizens in lower-income countries raises another interesting question. Specifically, how do the estimated effects of inequality aversion as a predictor, but also the mere level of inequality aversion, vary by the (accuracy of) beliefs about the actual degree of global inequality in the world? While we do not have the data to examine this question within the scope of our study, it seems worthwhile to explore it in subsequent studies - especially given that evidence on international distribution preferences and their predictors in general is still scarce (Bechtel et al., 2014; Fehr et al., 2022).

From a policy perspective, our findings have implications way beyond the examined case of the Covid-19 pandemic: Inequality aversion, in its different forms, likely plays a role also for other global (re)distribution problems, for instance, the ongoing policy debates about international aid, humanitarian or military assistance, or shouldering the costs of mitigating the consequences of climate change. With many governments being under increasing financial pressure and refocusing on national priorities, we provide nuanced insights about which voters are likely to favor redistribution, characterizing inequality aversion as a central motive.

References

Alesina, A. and Giuliano, P. (2011). “Preferences for redistribution”. *Handbook of social economics.* Vol. 1. Elsevier, 93–131.

Almås, I., Cappelen, A. W., and Tungodden, B. (2020). “Cutthroat capitalism versus cuddly socialism: Are Americans more meritocratic and efficiency-seeking than Scandinavians?” *Journal of Political Economy* 128(5), 1753–1788.

Bechtel, M. M., Hainmueller, J., and Margalit, Y. (2014). “Preferences for international redistribution: The divide over the Eurozone bailouts”. *American Journal of Political Science* 58(4), 835–856.

Bekker-Grob, E. W. de, Donkers, B., Jonker, M. F., and Stolk, E. A. (2015). “Sample size requirements for discrete-choice experiments in healthcare: a practical guide”. *The Patient-Patient-Centered Outcomes Research* 8, 373–384.

Bellemare, C., Kröger, S., and Van Soest, A. (2008). “Measuring inequity aversion in a heterogeneous population using experimental decisions and subjective probabilities”. *Econometrica* 76(4), 815–839.

Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., and Böhm, R. (2018). “Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination”. *PloS one* 13(12), e0208601.

Betsch, C., Wieler, L., Bosnjak, M., Ramharter, M., Stollorz, V., Omer, S., Korn, L., Sprengholz, P., Felgendreff, L., Eitze, S., et al. (2021). *Germany COVID-19 Snapshot MOnitoring (COSMO Germany): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak in Germany - Wave 27.* DOI: 10.23668. URL: https://projekte.uni-erfurt.de/cosmo2020/web/summary/27/.

Blanco, M., Engelmann, D., and Normann, H. T. (2011). “A within-subject analysis of other-regarding preferences”. *Games and Economic Behavior* 72(2), 321–338.

Brun, M., D’Ambrosio, C., Carbonell, A. Ferrer-i, and Ramos, X. (2023). “After you. Cognition and health-distribution preferences”. *IZA Discussion Paper No. 16126.*

ChoiceMetrics (2018). *Ngene 1.2 User Manual & Reference Guide, Australia.*

Clarke, P. M., Roope, L. S., Loewen, P. J., Bonnefon, J.-F., Melegaro, A., Friedman, J., Violato, M., Barnett, A., and Duch, R. (2021). “Public opinion on global rollout of COVID-19 vaccines”. *Nature Medicine* 27(6), 935–936.

Decker, O. and Brähler, E. (2020). “Autoritäre Dynamiken: Alte Ressentiments–Neue Radikalität”. *Autoritäre Dynamiken.* Psychosozial-Verlag, 13–26.

Dhami, S. and Nowaihi, A. al (2010). “Redistributive policies with heterogeneous social preferences of voters”. *European Economic Review* 54(6), 743–759.

ECDC (2023). *COVID-19 Vaccine Tracker by the European Centre for Disease Control and Prevention*. [Online; accessed 12-February-2025]. URL: https://vaccinetracker.ecdc.europa.eu/public/extensions/covid-19/vaccine-tracker.html#uptake-tab.

Enke, B., Rodríguez-Padilla, R., and Zimmermann, F. (2023). "Moral universalism and the structure of ideology". *The Review of Economic Studies* 90(4), 1934–1962.

Epper, T. F., Fehr, E., Kreiner, C. T., Leth-Petersen, S., Olufsen, I. S., and Skov, P. E. (2024). "Inequality aversion predicts support for public and private redistribution". *Proceedings of the National Academy of Sciences* 121(39), e2401445121.

Falk, A., Becker, A., Dohmen, T., Enke, B., Huffman, D., and Sunde, U. (2018). "Global evidence on economic preferences". *The Quarterly Journal of Economics* 133(4), 1645–1692.

Falk, A., Becker, A., Dohmen, T., Huffman, D., and Sunde, U. (2023). "The preference survey module: A validated instrument for measuring risk, time, and social preferences". *Management Science* 69(4), 1935–1950.

Fehr, D., Mollerstrom, J., and Perez-Truglia, R. (2022). "Your place in the world: Relative income and global inequality". *American Economic Journal: Economic Policy* 14(4), 232–268.

Fehr, E., Epper, T., and Senn, J. (2024). "Social preferences and redistributive politics". *Review of Economics and Statistics*, 1–45.

Fehr, E. and Schmidt, K. M. (1999). "A theory of fairness, competition, and cooperation". *The Quarterly Journal of Economics* 114(3), 817–868.

Fisman, R., Jakiela, P., and Kariv, S. (2017). "Distributional preferences and political behavior". *Journal of Public Economics* 155, 1–10.

Fisman, R., Jakiela, P., Kariv, S., and Markovits, D. (2015). "The distributional preferences of an elite". *Science* 349(6254), aab0096.

Gao, X., Yu, H., Sáez, I., Blue, P. R., Zhu, L., Hsu, M., and Zhou, X. (2018). "Distinguishing neural correlates of context-dependent advantageous-and disadvantageous-inequity aversion". *Proceedings of the National Academy of Sciences* 115(33), E7680–E7689.

Guidry, J. P., Perrin, P. B., Laestadius, L. I., Vraga, E. K., Miller, C. A., Fuemmeler, B. F., Burton, C. W., Ryan, M., and Carlyle, K. E. (2021). "US public support for COVID-19 vaccine donation to low-and middle-income countries during the COVID-19 pandemic". *Vaccine* 39(17), 2452–2457.

Hall, J., Viney, R., Haas, M., and Louviere, J. (2004). "Using stated preference discrete choice modeling to evaluate health care programs". *Journal of Business research* 57(9), 1026–1032.

Hedegaard, M., Kerschbamer, R., Müller, D., and Tyran, J.-R. (2021). "Distributional preferences explain individual behavior across games and time". *Games and Economic Behavior* 128, 231–255.

Hole, A. R. (2007). “Fitting mixed logit models by using maximum simulated likelihood”. *The stata journal* 7(3), 388–401.

Johnson, F. R., Lancsar, E., Marshall, D., Kilambi, V., Mühlbacher, A., Regier, D. A., Bresnahan, B. W., Kanninen, B., and Bridges, J. F. (2013). “Constructing experimental designs for discrete-choice experiments: report of the ISPOR conjoint analysis experimental design good research practices task force”. *Value in health* 16(1), 3–13.

Kerschbamer, R. and Müller, D. (2020). “Social preferences and political attitudes: An online experiment on a large heterogeneous sample”. *Journal of Public Economics* 182, 104076.

Klumpp, M., Monfared, I. G., and Vollmer, S. (2022). “Public opinion on global distribution of COVID-19 vaccines: evidence from two nationally representative surveys in Germany and the United States”. *Vaccine*.

Louviere, J. J., Hensher, D. A., and Swait, J. D. (2000). *Stated choice methods: analysis and applications*. Cambridge university press.

Müller, D. and Renes, S. (2021). “Fairness views and political preferences: evidence from a large and heterogeneous sample”. *Social Choice and Welfare* 56(4), 679–711.

Our World in Data (2022). *COVID-19 vaccination dataset*. https://ourworldindata.org/covid-vaccinations. Accessed: 2022-08-12.

RKI (2021). *Stufenplan der STIKO zur Priorisierung der COVID-19-Impfung, compiled by the Robert Koch Institut*. [Online; accessed 12-February-2025]. URL: https://www.rki.de/DE/Themen/Infektionskrankheiten/Impfen/Impfungen-A-Z/COVID-19/Stufenplan.pdf?__blob=publicationFile&v=1.

Revelt, D. and Train, K. (2000). “Customer-specific taste parameters and mixed logit: Households’ choice of electricity supplier”. *Working Paper, Department of Economics, University of California, Berkeley.*

Ryan, M, Kolstad, J, Rockers, P, and Dolea, C (2012). *User guide with case studies: How to conduct a discrete choice experiment for health workforce recruitment and retention in remote and rural areas*. WHO, USAID, CapacityPlus, The World Bank.

Steinert, J. I., Sternberg, H., Prince, H., Fasolo, B., Galizzi, M. M., Büthe, T., and Veltri, G. A. (2022a). “COVID-19 vaccine hesitancy in eight European countries: Prevalence, determinants, and heterogeneity”. *Science advances* 8(17), eabm9825.

Steinert, J. I., Sternberg, H., Veltri, G. A., and Büthe, T. (2022b). “How should COVID-19 vaccines be distributed between the Global North and South: a discrete choice experiment in six European countries”. *Elife* 11.

Telle, I. O. and Tjøtta, S. (2023). “Context and preferences for equality in the spectator game”. *Journal of the Economic Science Association* 9(2), 227–238.

Train, K. E. (2009). *Discrete choice methods with simulation*. Cambridge university press.

Tyran, J.-R. and Sausgruber, R. (2006). "A little fairness may induce a lot of redistribution in democracy". *European Economic Review* 50(2), 469–485.

Vanhuysse, P., Jankowski, M., and Tepe, M. (2021). "Vaccine alliance building blocks: a conjoint experiment on popular support for international COVID-19 cooperation formats". *Policy sciences* 54(3), 493–506.

World Health Organization (2025). *World Health Assembly adopts historic Pandemic Agreement to make the world more equitable and safer from future pandemics*. https://www.who.int/news/item/20-05-2025-world-health-assembly-adopts-historic-pandemic-agreement-to-make-the-world-more-equitable-and-safer-from-future-pandemics. Accessed: 2025-06-07.

World Inequality Lab (2022). *World Inequality Report*. https://wir2022.wid.world/. Accessed: 2023-02-20.

Acknowledgements

The authors wish to thank the members of the International Relations Research Group at the Hochschule für Politik/Department of Governance at the Technical University of Munich, the members of the Development Economics Seminar at the Friedrich-Alexander University of Erlangen-Nuremberg, and the participants of the PhD Conference at the Department of Economics at Royal Holloway, University of London. We further wish to thank the participants of the 11th Thurgau Experimental Economics Meeting, the BSE Summer Forum workshop on the External Validity, Generalizability and Replicability of Economic Experiments, the 2024 conference of the European Health Economics Association, and the 2024 conference of the German Association for Health Economics. The authors gratefully acknowledge funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 101016233 PERISCOPE. The funding source had no involvement in the study design, collection, analysis and interpretation of data, in the writing of the report, and in the decision to submit the article for publication.

Appendix

Tables

Table A1 DCE design.

Choice set	Age	COVID-19 mortality risk	Employment status	Country of residence and healthcare system capacity
1	40 years old	No increased risk due to comorbidity and/or lifestyle	Not employed	Germany, with high healthcare system capacity
1	40 years old	Strongly increased risk due to comorbidity and/or lifestyle	Employed and guaranteed income	Developing country, with poor healthcare system capacity)
2	60 years old	Strongly increased risk due to comorbidity and/or lifestyle	Employed and guaranteed income	Germany, with high healthcare system capacity
2	60 years old	No increased risk due to comorbidity and/or lifestyle	Employed in essential services	Developing country, with poor healthcare system capacity)
3	60 years old	Increased risk due to comorbidity and/or lifestyle	Employed and income losses due to COVID-19 restrictions	Germany, with high healthcare system capacity
3	80 years old	Increased risk due to comorbidity and/or lifestyle	Not employed	Developing country, with poor healthcare system capacity
4	20 years old	Increased risk due to comorbidity and/or lifestyle	Employed in essential services	Developing country, with poor healthcare system capacity
4	40 years old	No increased risk due to comorbidity and/or lifestyle	Employed and income losses due to COVID-19 restrictions	Germany, with high healthcare system capacity
5	40 years old	No increased risk due to comorbidity and/or lifestyle	Employed in essential services	Germany, with high healthcare system capacity
5	20 years old	Increased risk due to comorbidity and/or lifestyle	Not employed	Developing country, with poor healthcare system capacity
6	20 years old	Strongly increased risk due to comorbidity and/or lifestyle	Employed and income losses due to COVID-19 restrictions	Developing country, with poor healthcare system capacity
6	20 years old	No increased risk due to comorbidity and/or lifestyle	Employed and guaranteed income	Germany, with high healthcare system capacity
7	80 years old	Increased risk due to comorbidity and/or lifestyle	Not employed	Developing country, with poor healthcare system capacity
7	60 years old	Increased risk due to comorbidity and/or lifestyle	Employed and income losses due to COVID-19 restrictions	Germany, with high healthcare system capacity
8	40 years old	No increased risk due to comorbidity and/or lifestyle	Employed and guaranteed income	Developing country, with poor healthcare system capacity
8	40 years old	Strongly increased risk due to comorbidity and/or lifestyle	Employed in essential services	Germany, with high healthcare system capacity

Notes: The experimental design was calculated in Ngene, determined as a D-efficient design based on weak priors for the main effects of the above attributes (without interactions). Statistical efficiency was measured by the D-optimality criterion (D-error). The design contained a built-in constraint for the attributes 'Age' and 'Employment', so as to avoid implausible combinations, i.e. an age of 80 will always be combined with not being employed. The attribute 'Employment' was dummy-coded as categorical (reference category: employed in essential services), while we assumed linear effects for the other two attributes that have more than 2 categories (Risk and Age). This led to a total number of seven parameters to be estimated.

Table A2 Power calculations sensitivity analysis (assuming weak priors).

$\alpha =$	$1-\beta =$	Constant	I. Age	II. Risk	III. Employment			IV. Country
		A	B	C	D1	D2	D3	E
0.1	0.6	750	1	64	383	718	786	681
0.05	0.6	1148	2	97	586	1099	1201	1042
0.025	0.6	1560	3	132	797	1494	1633	1416
0.01	0.6	2120	4	180	1082	2029	2219	1924
0.1	0.7	1039	2	88	530	995	1087	943
0.05	0.7	1499	3	127	765	1435	1569	1360
0.025	0.7	1966	4	167	1004	1882	2057	1784
0.01	0.7	2589	6	220	1322	2478	2710	2349
0.1	0.8	1436	3	122	733	1375	1503	1303
0.05	0.8	1969	4	167	1006	1885	2061	1787
0.025	0.8	2500	5	212	1277	2393	2617	2269
0.01	0.8	3197	6	271	1632	3060	3346	2901
0.1	0.9	2093	4	178	1068	2003	2190	1899
0.05	0.9	2728	5	232	1393	2611	2855	2475
0.025	0.9	3347	7	284	1709	3204	3503	3037
0.01	0.9	4146	8	352	2117	3969	4340	3763

Notes: Power calculations based on the procedure by (Bekker-Grob et al., 2015). The attributes for Age and Risk are here continuous because they were assumed as continuous in the initial calculation of the design in Ngene.

Table A3 Sample characteristics.

	Mean	Sd	Min	Max	Observations
Female	0.49	0.50	0.00	1.00	2402
Age 18-29	0.17	0.37	0.00	1.00	2402
Age 30-39	0.17	0.38	0.00	1.00	2402
Age 40-49	0.19	0.39	0.00	1.00	2402
Age 50-59	0.22	0.42	0.00	1.00	2402
Age 60+	0.25	0.44	0.00	1.00	2402
Low education	0.32	0.47	0.00	1.00	2387
Medium education	0.31	0.46	0.00	1.00	2387
High education	0.37	0.48	0.00	1.00	2387
Eastern German state	0.14	0.35	0.00	1.00	2402
CV19 vaccinated	0.18	0.39	0.00	1.00	2402
Vaccine hesitancy index (std)	-0.00	0.89	-0.72	3.77	2402
CV19 threat perception scale	4.99	1.37	1.00	7.00	2401
Trust in Government	4.38	1.78	1.00	7.00	2402
Voted AFD (2021)	0.09	0.28	0.00	1.00	2340
RW extremism scale	2.72	1.00	1.00	5.00	2342
Altruism (std.)	0.00	0.83	-1.70	1.53	2380
Pos. reciprocity	9.47	1.89	1.00	11.00	2402
Neg. reciprocity (std.)	0.00	0.83	-1.30	2.30	2400
Risk aversion (std.)	-0.00	0.73	-1.66	1.33	2397
Patience (std.)	0.01	0.82	-1.74	1.31	2234

Notes: The vaccination-related variables (vaccination status and vaccination hesitancy index) and the right-wing extremism scale were collected in the second wave of the survey in April 2021 (along with the DCE and the MDG/UG), while all other variables had already been collected in an earlier wave of the survey two months prior (February 2021).

Table A4 DCE results: Effects of attributes across specifications.

	Initial design		Without Age	
	Clogit	Mlogit	Clogit	Mlogit
DV: Prioritized in vaccine allocation	(1)	(2)	(3)	(4)
Covid-19 mortality risk				
Covid-19 mortality risk (cont.)	0.68***	1.53***		
	(0.02)	(0.06)		
Average	Reference category			
Increased risk			0.71***	1.42***
			(0.04)	(0.11)
Strongly increased risk			1.36***	3.01***
			(0.03)	(0.14)
Employment situation				
Not employed	Reference category			
Empl. (guaranteed income)	0.33***	0.70***	0.34***	0.68***
	(0.03)	(0.06)	(0.03)	(0.06)
Empl. (income losses)	0.59***	1.21***	0.61***	1.01***
	(0.03)	(0.07)	(0.03)	(0.07)
Empl. (essential services)	1.25***	2.70***	1.26***	2.78***
	(0.03)	(0.11)	(0.03)	(0.14)
Country of residence				
Germany	Reference category			
Lower-income country	-0.13***	-0.25***	-0.14***	-0.28***
	(0.03)	(0.06)	(0.03)	(0.06)
Age				
Age (cont.)	-0.02	0.05		
	(0.02)	(0.05)		
Alternative 2	0.04**	0.05	0.04**	-0.02
	(0.01)	(0.03)	(0.01)	(0.03)
SD for random parameters:	(1)	(2)	(3)	(4)
Covid-19 mortality risk (cont.)		1.18***		
		(0.06)		
Increased risk				2.66***
				(0.22)
Strongly increased risk				2.10***
				(0.11)
Empl. (guaranteed income)		-0.07		0.01
		(0.06)		(0.05)
Empl. (income losses)		-0.76***		0.93***
		(0.10)		(0.09)
Empl. (essential services)		1.65***		1.89***
		(0.09)		(0.13)
Lower-income country		1.96***		1.91***
		(0.09)		(0.09)
Age (cont.)		1.29***		
		(0.08)		
Observations	38432	38432	38432	38432
Pseudo R^2	0.222		0.222	
AIC	20744.862	18611.665	20744.862	18990.260
BIC	20804.759	18722.901	20804.759	19101.497
Log-likelihood	-10365.43	-9292.83	-10365.43	-9482.13

Notes: Mixed logit (columns 2 and 4) and conditional logit (columns 1 and 3) estimates for the effects of the different attributes and levels. The dependent variable was an indicator variable for respondents prioritizing a certain hypothetical recipient in the DCE vaccine allocation decision. In the first two columns, Age and Risk are included as continuous variables in both models (initial assumption in DCE design). Since Age does not significantly affect respondents' choices in both models, columns 3 and 4 estimate the model without this attribute and include all others as categorical. The mixed logit models were estimated with 500 Halton draws and standard errors clustered at the respondent level. The Conditional Logit models were estimated with standard errors clustered at the respondent level. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5 Sample characteristics by MDG comprehension checks.

	Comprehension check = 0		Comprehension check = 1		Sample average		Pairwise t-test
Variable	N	Mean/(SE)	N	Mean/(SE)	N	Mean/(SE)	Mean difference
Female	477	0.449 (0.023)	1761	0.496 (0.012)	2238	0.486 (0.011)	-0.048*
Age 18-29	477	0.170 (0.017)	1761	0.175 (0.009)	2238	0.174 (0.008)	-0.005
Age 30-39	477	0.161 (0.017)	1761	0.171 (0.009)	2238	0.169 (0.008)	-0.010
Age 40-49	477	0.178 (0.018)	1761	0.187 (0.009)	2238	0.185 (0.008)	-0.009
Age 50-59	477	0.220 (0.019)	1761	0.217 (0.010)	2238	0.218 (0.009)	0.003
Age 60+	477	0.270 (0.020)	1761	0.250 (0.010)	2238	0.254 (0.009)	0.021
Low education	475	0.425 (0.023)	1748	0.279 (0.011)	2223	0.310 (0.010)	0.146***
Medium education	475	0.284 (0.021)	1748	0.316 (0.011)	2223	0.309 (0.010)	-0.032
High education	475	0.291 (0.021)	1748	0.404 (0.012)	2223	0.380 (0.010)	-0.114***

Notes: The value displayed for t-tests are the differences in the means across the groups.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table A6 Sample characteristics by UG comprehension checks.

	Comprehension check = 0		Comprehension check = 1		Sample average		Pairwise t-test
Variable	N	Mean/(SE)	N	Mean/(SE)	N	Mean/(SE)	Mean difference
Female	659	0.457 (0.019)	1667	0.499 (0.012)	2326	0.487 (0.010)	-0.042*
Age 18-29	659	0.131 (0.013)	1667	0.182 (0.009)	2326	0.167 (0.008)	-0.051***
Age 30-39	659	0.162 (0.014)	1667	0.173 (0.009)	2326	0.170 (0.008)	-0.011
Age 40-49	659	0.179 (0.015)	1667	0.187 (0.010)	2326	0.185 (0.008)	-0.008
Age 50-59	659	0.244 (0.017)	1667	0.212 (0.010)	2326	0.221 (0.009)	0.032*
Age 60+	659	0.284 (0.018)	1667	0.245 (0.011)	2326	0.256 (0.009)	0.038*
Low education	656	0.431 (0.019)	1655	0.268 (0.011)	2311	0.314 (0.010)	0.164***
Medium education	656	0.296 (0.018)	1655	0.316 (0.011)	2311	0.310 (0.010)	-0.020
High education	656	0.273 (0.017)	1655	0.416 (0.012)	2311	0.376 (0.010)	-0.143***

Notes: The value displayed for t-tests are the differences in the means across the groups.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table A7 Sample characteristics by MDG well-behaved preferences.

	Well-behaved pref. = 0		Well-behaved pref. = 1		Sample average		Pairwise t-test
Variable	N	Mean/(SE)	N	Mean/(SE)	N	Mean/(SE)	Mean difference
Female	304	0.438 (0.028)	1934	0.494 (0.011)	2238	0.486 (0.011)	-0.056*
Age 18-29	304	0.211 (0.023)	1934	0.168 (0.009)	2238	0.174 (0.008)	0.042*
Age 30-39	304	0.194 (0.023)	1934	0.165 (0.008)	2238	0.169 (0.008)	0.029
Age 40-49	304	0.138 (0.020)	1934	0.192 (0.009)	2238	0.185 (0.008)	-0.054**
Age 50-59	304	0.197 (0.023)	1934	0.221 (0.009)	2238	0.218 (0.009)	-0.024
Age 60+	304	0.260 (0.025)	1934	0.253 (0.010)	2238	0.254 (0.009)	0.007
Low education	302	0.454 (0.029)	1921	0.288 (0.010)	2223	0.310 (0.010)	0.166***
Medium education	302	0.248 (0.025)	1921	0.319 (0.011)	2223	0.309 (0.010)	-0.071**
High education	302	0.298 (0.026)	1921	0.393 (0.011)	2223	0.380 (0.010)	-0.095***

Notes: The value displayed for t-tests are the differences in the means across the groups.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table A8 Sample characteristics by UG well-behaved preferences.

	Well-behaved pref. = 0		Well-behaved pref. = 1		Sample average		Pairwise t-test
Variable	N	Mean/(SE)	N	Mean/(SE)	N	Mean/(SE)	Mean difference
Female	252	0.440 (0.031)	2074	0.493 (0.011)	2326	0.487 (0.010)	-0.052
Age 18-29	252	0.214 (0.026)	2074	0.162 (0.008)	2326	0.167 (0.008)	0.053**
Age 30-39	252	0.202 (0.025)	2074	0.166 (0.008)	2326	0.170 (0.008)	0.036
Age 40-49	252	0.167 (0.024)	2074	0.187 (0.009)	2326	0.185 (0.008)	-0.020
Age 50-59	252	0.171 (0.024)	2074	0.228 (0.009)	2326	0.221 (0.009)	-0.057**
Age 60+	252	0.246 (0.027)	2074	0.257 (0.010)	2326	0.256 (0.009)	-0.011
Low education	250	0.428 (0.031)	2061	0.300 (0.010)	2311	0.314 (0.010)	0.128***
Medium education	250	0.260 (0.028)	2061	0.316 (0.010)	2311	0.310 (0.010)	-0.056*
High education	250	0.312 (0.029)	2061	0.383 (0.011)	2311	0.376 (0.010)	-0.071**

Notes: The value displayed for t-tests are the differences in the means across the groups.***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table A9 Standardized effects of inequality aversion on international vaccine allocation preferences: Efficiency-neutral coding of advantageous inequality aversion

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country											
Alternative for Advant. IA:	2nd half of UG						6th choice in MDG					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Advantageous IA (guilt) (UG)	0.053**	0.054**	0.066***	0.045*	0.037	0.055**						
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)						
Advantageous IA (guilt) (MDG6)							0.127***	0.145***	0.147***	0.105***	0.071***	0.076***
							(0.07)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)
Disadvantageous (envy)						-0.059**						-0.040
						(0.02)						(0.02)
Female			0.018	-0.004	-0.001	0.001			0.023	0.016	0.031	0.022
			(0.08)	(0.09)	(0.08)	(0.08)			(0.08)	(0.08)	(0.08)	(0.09)
Age group			-0.095***	-0.106***	-0.059**	-0.056**			-0.044*	-0.035	0.002	-0.042
			(0.03)	(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Education			0.060**	0.040	-0.041	-0.046*			0.076***	0.054**	-0.028	-0.055*
			(0.05)	(0.05)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.06)
CV19 vaccinated			0.037	0.022	0.026	0.028			0.007	-0.008	-0.001	0.012
			(0.11)	(0.11)	(0.10)	(0.10)			(0.10)	(0.10)	(0.10)	(0.11)
Vaccine hesitancy index			-0.046*	-0.007	0.056**	0.056**			-0.025	0.011	0.071***	0.058**
			(0.06)	(0.06)	(0.06)	(0.06)			(0.05)	(0.06)	(0.06)	(0.06)
CV19 threat perception scale			-0.038	-0.041	-0.032	-0.031			-0.028	-0.026	-0.019	-0.007
			(0.03)	(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Patience				0.005	0.002	-0.003				0.045*	0.034	0.034
				(0.06)	(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Risk aversion				-0.030	-0.032	-0.033				-0.044*	-0.045*	-0.045
				(0.06)	(0.06)	(0.06)				(0.06)	(0.06)	(0.06)
Neg. reciprocity				-0.054**	-0.000	0.003				-0.037	0.018	0.003
				(0.05)	(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Pos. reciprocity				-0.010	-0.001	0.001				-0.019	-0.006	-0.012
				(0.03)	(0.02)	(0.02)				(0.02)	(0.02)	(0.03)
Altruism				0.186***	0.117***	0.109***				0.147***	0.078***	0.082***
				(0.05)	(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Trust in Government					0.016	0.016					0.035	0.020
					(0.02)	(0.02)					(0.02)	(0.03)
RW extremism scale					-0.301***	-0.293***					-0.306***	-0.301***
					(0.05)	(0.05)					(0.05)	(0.05)
Voted AfD (2021)					-0.122***	-0.124***					-0.081***	-0.091***
					(0.16)	(0.16)					(0.15)	(0.18)
WB preferences & CC		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	1992	1529	1518	1430	1404	1404	2307	1654	1643	1550	1525	1247
R^2	0.003	0.003	0.022	0.058	0.169	0.171	0.016	0.021	0.031	0.059	0.159	0.169
Adjusted R^2	0.002	0.002	0.017	0.050	0.160	0.162	0.016	0.020	0.027	0.051	0.151	0.158

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), shown in Figure 4 and resulting from the mixed logit model in Figure 3 or column 2 of Table A4. The first six columns employ the second half of choices from the Ultimatum Game as an alternative (continuously coded) measure of advantageous inequality aversion to account for efficiency confounding concerns in the Modified dictator game. The columns 7 to 12 employ purely the binary choice in the sixth scenario in the Modified disctator game (10|0 vs. 5|5) as an alternative measure of advantageous inequality aversion. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A10 Standardized effects of inequality aversion on international vaccine allocation preferences: Distribution-sensitive coding of inequality aversion

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt) (approx. quintiles)	0.112***	0.127***	0.140***	0.101***	0.084***						0.095***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)						(0.03)
Disadvantageous (envy) (approx. quintiles)						-0.099***	-0.122***	-0.109***	-0.085***	-0.047*	-0.046*
						(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
Female			0.020	0.013	0.028			0.029	0.011	0.014	0.018
			(0.08)	(0.08)	(0.08)			(0.08)	(0.09)	(0.08)	(0.09)
Age group			-0.049*	-0.038	-0.001			-0.091***	-0.104***	-0.063**	-0.045
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Education			0.086***	0.059**	-0.023			0.033	0.021	-0.053**	-0.051*
			(0.05)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.06)
CV19 vaccinated			0.009	-0.006	0.000			0.033	0.020	0.023	0.014
			(0.10)	(0.10)	(0.10)			(0.11)	(0.11)	(0.10)	(0.11)
Vaccine hesitancy index			-0.035	0.007	0.068***			-0.044*	-0.009	0.047*	0.057*
			(0.05)	(0.06)	(0.06)			(0.06)	(0.06)	(0.06)	(0.06)
CV19 threat perception scale			-0.030	-0.028	-0.020			-0.025	-0.026	-0.021	-0.007
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Patience				0.051*	0.039				-0.002	0.004	0.040
				(0.05)	(0.05)				(0.06)	(0.05)	(0.06)
Risk aversion				-0.046*	-0.046*				-0.028	-0.032	-0.047*
				(0.06)	(0.06)				(0.06)	(0.06)	(0.06)
Neg. reciprocity				-0.041	0.016				-0.045*	0.005	0.001
				(0.05)	(0.05)				(0.05)	(0.05)	(0.05)
Pos. reciprocity				-0.017	-0.006				-0.016	-0.006	-0.012
				(0.02)	(0.02)				(0.03)	(0.02)	(0.03)
Altruism				0.151***	0.077***				0.172***	0.106***	0.080***
				(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Trust in Government					0.036					0.009	0.022
					(0.02)					(0.02)	(0.03)
RW extremism scale					-0.307***					-0.294***	-0.301***
					(0.04)					(0.05)	(0.05)
Voted AfD (2021)					-0.080***					-0.126***	-0.091***
					(0.15)					(0.16)	(0.18)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	2244	1654	1643	1550	1525	2334	1584	1573	1482	1454	1247
R^2	0.013	0.016	0.029	0.058	0.161	0.010	0.015	0.029	0.061	0.166	0.172
Adjusted R^2	0.012	0.015	0.024	0.051	0.152	0.009	0.014	0.025	0.053	0.157	0.161

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), shown in Figure 4 and resulting from the mixed logit model in Figure 3 or column 2 of Table A4. The measures for inequality aversion were coded not merely in terms of the consecutively ordered level, but also to reflect the distribution of individuals in our sample (as parameters are not normally distributed). To obtain a scale of inequality aversion that has a more (or less) equal proportion of individuals on each level, advantageous inequality aversion was coded into 5 levels as follows: 1-6 | 7 | 8-10 | 11 | 12. Disadvantageous inequality aversion was coded into 5 levels as follows: 1 | 2 | 3-4 | 5 | 6. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A11 Standardized effects of inequality aversion on international vaccine allocation preferences: Posterior distribution based on mixed logit model without Age attribute.

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt)	0.135***	0.154***	0.160***	0.120***	0.095***						0.103***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)						(0.01)
Disadvantageous IA (envy)						-0.097***	-0.115***	-0.105***	-0.082***	-0.044*	-0.037
						(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Female			0.017	0.013	0.029			0.028	0.012	0.016	0.022
			(0.08)	(0.08)	(0.08)			(0.08)	(0.08)	(0.08)	(0.09)
Age group			-0.027	-0.020	0.016			-0.073***	-0.087***	-0.047*	-0.026
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Education			0.082***	0.060**	-0.020			0.035	0.020	-0.053*	-0.047
			(0.05)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.06)
CV19 vaccinated			0.016	-0.001	0.005			0.037	0.022	0.025	0.015
			(0.10)	(0.10)	(0.09)			(0.10)	(0.10)	(0.10)	(0.11)
Vaccine hesitancy index			-0.024	0.009	0.069***			-0.041	-0.008	0.048*	0.060**
			(0.05)	(0.05)	(0.05)			(0.05)	(0.06)	(0.06)	(0.06)
CV19 threat perception scale			-0.015	-0.013	-0.006			-0.014	-0.014	-0.009	0.004
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)	(0.03)
Patience				0.046*	0.034				0.005	0.010	0.040
				(0.05)	(0.05)				(0.05)	(0.05)	(0.05)
Risk aversion				-0.045*	-0.044*				-0.030	-0.034	-0.045
				(0.06)	(0.05)				(0.06)	(0.05)	(0.06)
Neg. reciprocity				-0.030	0.024				-0.041	0.008	0.009
				(0.05)	(0.05)				(0.05)	(0.05)	(0.05)
Pos. reciprocity				-0.017	-0.006				-0.015	-0.006	-0.011
				(0.02)	(0.02)				(0.02)	(0.02)	(0.03)
Altruism				0.142***	0.071***				0.167***	0.101***	0.074**
				(0.05)	(0.05)				(0.05)	(0.05)	(0.06)
Trust in Government					0.045*					0.016	0.031
					(0.02)					(0.02)	(0.03)
RW extremism scale					-0.300***					-0.293***	-0.297***
					(0.04)					(0.04)	(0.05)
Voted AfD (2021)					-0.069***					-0.117***	-0.080***
					(0.15)					(0.15)	(0.17)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	2244	1654	1643	1550	1525	2334	1584	1573	1482	1454	1247
R^2	0.018	0.024	0.033	0.059	0.156	0.009	0.013	0.025	0.055	0.158	0.166
Adjusted R^2	0.018	0.023	0.028	0.051	0.147	0.009	0.013	0.020	0.047	0.149	0.155

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), resulting from the mixed logit model in column 4 of Table A4. Advantageous and disadvantageous inequality aversion (as well as the other regressors) are coded as continuous variables. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A12 Effects of inequality aversion on international vaccine allocation preferences: Conditional logit model initial design.

DV: Prioritized in vaccine allocation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Covid-19 mortality risk										
Covid-19 mortality risk (cont.)	0.68***	0.71***	0.82***	0.70***	0.80***	0.85***	0.86***	0.85***	0.87***	0.90***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Employment situation										
Not employed					Reference category					
Empl. (guaranteed income)	0.33***	0.32***	0.31***	0.32***	0.29***	0.27***	0.28***	0.27***	0.27***	0.29***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Empl. (income losses)	0.59***	0.61***	0.59***	0.60***	0.60***	0.56***	0.57***	0.56***	0.57***	0.59***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Empl. (essential services)	1.25***	1.28***	1.42***	1.26***	1.40***	1.44***	1.45***	1.44***	1.44***	1.53***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Country of residence										
Germany					Reference category					
Lower-income country	-0.13***	-0.58***	-0.66***	0.08	0.15*	-0.45***	-0.52*	-0.42*	-0.25	0.50*
	(0.03)	(0.08)	(0.11)	(0.05)	(0.07)	(0.14)	(0.21)	(0.20)	(0.28)	(0.21)
Lower-income country × AdvIA (guilt)		0.10***	0.13***			0.13***	0.14***	0.13***	0.10***	0.11***
		(0.02)	(0.02)			(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Lower-income country × DisIA (envy)				-0.06***	-0.07***	-0.07***	-0.06***	-0.07***	-0.05**	-0.03
				(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Lower-income country × Female							0.06			
							(0.07)			
Lower-income country × Age group							-0.07**			
							(0.02)			
Lower-income country × Education							0.08			
							(0.05)			
Lower-income country × CV19 vaccinated								0.11		
								(0.09)		
Lower-income country × Vaccine hesitancy index								-0.05		
								(0.06)		
Lower-income country × CV19 threat perception scale								-0.01		
								(0.03)		
Lower-income country × Patience									0.10*	
									(0.05)	
Lower-income country × Risk aversion									-0.10*	
									(0.05)	
Lower-income country × Neg. reciprocity									-0.07	
									(0.05)	
Lower-income country × Pos. reciprocity									-0.02	
									(0.03)	
Lower-income country × Altruism									0.22***	
									(0.05)	
Lower-income country × Trust in Government										0.02
										(0.02)
Lower-income country × RW extremist scale										-0.42***
										(0.04)
Lower-income country × Voted AfD (2021)										-0.53**
										(0.18)
Age										
Age (cont.)	-0.02	-0.02	-0.03	-0.02	-0.04	-0.05	-0.05	-0.05	-0.04	-0.05
	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Alternative 2	0.04**	0.04**	0.05**	0.04**	0.06***	0.06**	0.06**	0.06**	0.05*	0.06**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
WB preferences & CC			✓		✓	✓	✓	✓	✓	✓
Observations	38432	35904	26464	37344	25344	21552	21424	21552	20432	21136
Pseudo R^2	0.222	0.235	0.275	0.229	0.268	0.284	0.286	0.285	0.290	0.312
AIC	20744.862	19051.797	13308.266	19985.169	12871.488	10708.133	10620.732	10708.242	10079.457	10097.058
BIC	20804.759	19119.705	13373.734	20053.393	12936.611	10779.937	10716.400	10803.981	10190.405	10192.563
Loglikelihood	-10365.43	-9517.90	-6646.13	-9984.58	-6427.74	-5345.07	-5298.37	-5342.12	-5025.73	-5036.53

Notes: Conditional Logit estimates for effects of the different attributes and levels (initial design, i.e., Age and Risk as continuous variables), including interaction effects for the country of residence attribute. The dependent variable was an indicator variable for respondents prioritizing a certain hypothetical recipient in the DCE vaccine allocation decision. The Conditional Logit models were estimated with standard errors clustered at the respondent level. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A13 Standardized effects of inequality aversion on international vaccine allocation preferences: Conditional logit model without Age attribute.

DV: Prioritized in vaccine allocation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Covid-19 mortality risk										
Increased risk	0.71***	0.75***	0.88***	0.73***	0.86***	0.93***	0.93***	0.93***	0.92***	0.98***
	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
Strongly increased risk	1.36***	1.43***	1.64***	1.39***	1.60***	1.70***	1.70***	1.70***	1.72***	1.79***
	(0.03)	(0.04)	(0.05)	(0.03)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
Employment situation										
Not employed					Reference category					
Empl. (guaranteed income)	0.34***	0.33***	0.32***	0.33***	0.31***	0.29***	0.30***	0.29***	0.29***	0.31***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)
Empl. (income losses)	0.61***	0.62***	0.62***	0.62***	0.63***	0.60***	0.61***	0.60***	0.60***	0.63***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Empl. (essential services)	1.26***	1.29***	1.43***	1.27***	1.42***	1.46***	1.47***	1.46***	1.46***	1.55***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Country of residence										
Germany					Reference category					
Lower-income country	-0.14***	-0.58***	-0.67***	0.08	0.14*	-0.46***	-0.53*	-0.43*	-0.26	0.49*
	(0.03)	(0.08)	(0.11)	(0.05)	(0.07)	(0.14)	(0.21)	(0.20)	(0.28)	(0.21)
Lower-income country × AdvIA (guilt)		0.10***	0.13***			0.13***	0.14***	0.13***	0.10***	0.11***
		(0.02)	(0.02)			(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Lower-income country × DisIA (envy)				-0.06***	-0.07***	-0.07***	-0.06***	-0.07***	-0.05**	-0.03
				(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Lower-income country × Female							0.06			
							(0.07)			
Lower-income country × Age group							-0.07**			
							(0.02)			
Lower-income country × Education							0.08			
							(0.05)			
Lower-income country × CV19 vaccinated								0.11		
								(0.09)		
Lower-income country × Vaccine hesitancy index								-0.05		
								(0.06)		
Lower-income country × CV19 threat perception scale								-0.01		
								(0.03)		
Lower-income country × Patience									0.10*	
									(0.05)	
Lower-income country × Risk aversion									-0.10*	
									(0.05)	
Lower-income country × Neg. reciprocity									-0.07	
									(0.05)	
Lower-income country × Pos. reciprocity									-0.02	
									(0.03)	
Lower-income country × Altruism									0.22***	
									(0.05)	
Lower-income country × Trust in Government										0.02
										(0.02)
Lower-income country × RW extremist scale										-0.42***
										(0.04)
Lower-income country × Voted AfD (2021)										-0.53**
										(0.18)
Alternative 2	0.04**	0.04**	0.05**	0.04**	0.06***	0.06**	0.06**	0.06**	0.05*	0.06**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
WB preferences & CC			✓		✓	✓	✓	✓	✓	✓
Observations	38432	35904	26464	37344	25344	21552	21424	21552	20432	21136
Pseudo R^2	0.222	0.235	0.275	0.229	0.268	0.284	0.286	0.285	0.290	0.312
AIC	20744.862	19051.797	13308.266	19985.169	12871.488	10708.133	10620.732	10708.242	10079.457	10097.058
BIC	20804.759	19119.705	13373.734	20053.393	12936.611	10779.937	10716.400	10803.981	10190.405	10192.563
Loglikelihood	-10365.43	-9517.90	-6646.13	-9984.58	-6427.74	-5345.07	-5298.37	-5342.12	-5025.73	-5036.53

Notes: Conditional Logit estimates for effects of the different attributes and levels (Age excluded since insignificant in initial model, all others categorical), including interaction effects for the country of residence attribute. The dependent variable was an indicator variable for respondents prioritizing a certain hypothetical recipient in the DCE vaccine allocation decision. The Conditional Logit models were estimated with standard errors clustered at the respondent level. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A14 DCE results: Effects of attributes across specifications (among those not exposed to other experimental treatment).

	Initial design		Without Age	
	Clogit	Mlogit	Clogit	Mlogit
DV: Prioritized in vaccine allocation	(1)	(2)	(3)	(4)
Covid-19 mortality risk				
Covid-19 mortality risk (cont.)	0.69***	1.45***		
	(0.03)	(0.10)		
Average	Reference category			
Increased risk			0.67***	1.31***
			(0.06)	(0.17)
Strongly increased risk			1.39***	2.86***
			(0.06)	(0.23)
Employment situation				
Not employed	Reference category			
Empl. (guaranteed income)	0.33***	0.67***	0.33***	0.65***
	(0.05)	(0.10)	(0.05)	(0.10)
Empl. (income losses)	0.63***	1.20***	0.62***	1.00***
	(0.06)	(0.12)	(0.06)	(0.11)
Empl. (essential services)	1.36***	2.81***	1.36***	2.91***
	(0.06)	(0.19)	(0.06)	(0.25)
Country of residence				
Germany	Reference category			
Lower-income country	-0.11*	-0.22*	-0.10*	-0.21*
	(0.05)	(0.09)	(0.05)	(0.10)
Age				
Age (cont.)	0.01	0.04		
	(0.04)	(0.08)		
Alternative 2	0.06*	0.05	0.06*	-0.01
	(0.03)	(0.05)	(0.03)	(0.05)
SD for random parameters:	(1)	(2)	(3)	(4)
Covid-19 mortality risk (cont.)		1.01***		
		(0.08)		
Increased risk				2.45***
				(0.37)
Strongly increased risk				1.77***
				(0.19)
Empl. (guaranteed income)		0.06		-0.06
		(0.06)		(0.06)
Empl. (income losses)		0.91***		1.03***
		(0.16)		(0.15)
Empl. (essential services)		1.71***		1.89***
		(0.16)		(0.21)
Lower income country		1.85***		1.82***
		(0.14)		(0.15)
Age (cont.)		1.23***		
		(0.13)		
Observations	13392	13392	13392	13392
Pseudo R^2	0.233		0.233	
AIC	7137.222	6490.193	7137.222	6597.120
BIC	7189.739	6587.724	7189.739	6694.652
ll	-3561.61	-3232.10	-3561.61	-3285.56

Notes: Mixed logit (columns 2 and 4) and conditional logit (columns 1 and 3) estimates for the effects of the different attributes and levels. The sample was restricted to respondents that were not exposed to any experimental treatments from anohter experiment. The dependent variable was an indicator variable for respondents prioritizing a certain hypothetical recipient in the DCE vaccine allocation decision. In the first two columns, Age and Risk are included as continuous variables in both models (initial assumption in DCE design). Since Age does not significantly affect respondents' choices in both models, columns 3 and 4 estimate the model without this attribute and include all others as categorical. The mixed logit models were estimated with 500 Halton draws and standard errors clustered at the respondent level. The Conditional Logit models were estimated with standard errors clustered at the respondent level. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A15 Standardized effects of inequality aversion on international vaccine allocation preferences (among those not exposed to other experimental treatments).

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt)	0.130***	0.159***	0.161***	0.088*	0.063						0.142***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)						(0.02)
Disadvantageous IA (envy)						-0.096***	-0.135***	-0.132***	-0.107**	-0.090**	-0.098**
						(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Female			0.017	0.032	0.034			0.053	0.051	0.036	0.049
			(0.12)	(0.13)	(0.13)			(0.13)	(0.14)	(0.13)	(0.14)
Age group			-0.128***	-0.110**	-0.082*			-0.135***	-0.143***	-0.109**	-0.125**
			(0.04)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.05)
Education			0.029	0.004	-0.062			-0.045	-0.044	-0.103**	-0.097*
			(0.08)	(0.08)	(0.08)			(0.08)	(0.09)	(0.09)	(0.09)
CV19 vaccinated			-0.006	-0.040	-0.042			0.043	0.021	0.016	-0.005
			(0.13)	(0.13)	(0.13)			(0.13)	(0.13)	(0.13)	(0.14)
Vaccine hesitancy index			-0.079*	-0.025	0.009			-0.073	-0.016	0.026	0.001
			(0.09)	(0.09)	(0.09)			(0.09)	(0.10)	(0.10)	(0.10)
CV19 threat perception scale			0.053	0.054	0.061			0.080*	0.066	0.055	0.094**
			(0.05)	(0.05)	(0.05)			(0.05)	(0.05)	(0.05)	(0.05)
Patience				0.082*	0.079*				0.036	0.044	0.074
				(0.08)	(0.08)				(0.09)	(0.08)	(0.09)
Risk aversion				-0.085*	-0.074				-0.097**	-0.084*	-0.073
				(0.09)	(0.09)				(0.09)	(0.09)	(0.10)
Neg. reciprocity				-0.050	-0.015				-0.037	-0.018	-0.029
				(0.08)	(0.08)				(0.08)	(0.08)	(0.09)
Pos. reciprocity				-0.024	-0.026				0.006	-0.001	-0.052
				(0.04)	(0.04)				(0.05)	(0.04)	(0.05)
Altruism				0.164***	0.081*				0.159***	0.074	0.045
				(0.09)	(0.09)				(0.09)	(0.09)	(0.10)
Trust in Government					0.003					-0.011	-0.014
					(0.04)					(0.04)	(0.04)
RW extremism scale					-0.234***					-0.218***	-0.224***
					(0.07)					(0.08)	(0.08)
Voted AfD (2021)					-0.093**					-0.177***	-0.131***
					(0.25)					(0.25)	(0.29)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	775	562	559	530	524	811	535	531	500	494	421
R^2	0.017	0.025	0.047	0.084	0.144	0.009	0.018	0.051	0.094	0.176	0.196
Adjusted R^2	0.016	0.023	0.035	0.063	0.119	0.008	0.016	0.038	0.071	0.151	0.164

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), resulting from the mixed logit model in column 2 of Table A14. Advantageous and disadvantageous inequality aversion (as well as the other regressors) are coded as continuous variables. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A16 Standardized effects of inequality aversion on international vaccine allocation preferences: Excluding potential straight-liners

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt)	0.087***	0.130***	0.143***	0.088***	0.074**						0.060
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)						(0.02)
Disadvantageous IA (envy)						-0.083***	-0.110***	-0.099***	-0.084***	-0.055*	-0.075**
						(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Female			0.019	0.002	0.013			0.022	0.001	0.008	-0.009
			(0.09)	(0.09)	(0.09)			(0.10)	(0.10)	(0.10)	(0.12)
Age group			-0.066**	-0.069**	-0.024			-0.091***	-0.098***	-0.063**	-0.029
			(0.03)	(0.03)	(0.03)			(0.03)	(0.04)	(0.04)	(0.05)
Education			0.092***	0.058*	-0.019			0.037	0.029	-0.045	-0.019
			(0.06)	(0.06)	(0.06)			(0.06)	(0.06)	(0.06)	(0.08)
CV19 vaccinated			-0.007	-0.016	-0.011			0.054*	0.030	0.031	0.034
			(0.11)	(0.11)	(0.11)			(0.13)	(0.13)	(0.12)	(0.15)
Vaccine hesitancy index			-0.051*	-0.011	0.052*			-0.041	-0.017	0.036	0.033
			(0.06)	(0.07)	(0.07)			(0.07)	(0.07)	(0.07)	(0.09)
CV19 threat perception scale			-0.049*	-0.045	-0.027			-0.031	-0.038	-0.028	-0.035
			(0.04)	(0.04)	(0.03)			(0.04)	(0.04)	(0.04)	(0.05)
Patience				0.035	0.033				-0.023	-0.016	-0.006
				(0.06)	(0.06)				(0.06)	(0.06)	(0.08)
Risk aversion				-0.018	-0.026				-0.037	-0.040	-0.052
				(0.07)	(0.06)				(0.07)	(0.07)	(0.09)
Neg. reciprocity				-0.013	0.036				-0.069**	-0.017	0.002
				(0.06)	(0.06)				(0.06)	(0.06)	(0.08)
Pos. reciprocity				-0.038	-0.020				-0.013	-0.011	-0.029
				(0.03)	(0.03)				(0.03)	(0.03)	(0.04)
Altruism				0.205***	0.124***				0.158***	0.099***	0.124***
				(0.06)	(0.06)				(0.06)	(0.06)	(0.08)
Trust in Government					0.040					0.001	0.021
					(0.03)					(0.03)	(0.04)
RW extremism scale					-0.285***					-0.291***	-0.284***
					(0.05)					(0.05)	(0.07)
Voted AfD (2021)					-0.074**					-0.118***	-0.055
					(0.17)					(0.18)	(0.23)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	1676	1242	1235	1173	1153	1842	1180	1170	1096	1078	663
R^2	0.008	0.017	0.036	0.074	0.164	0.007	0.012	0.028	0.057	0.157	0.164
Adjusted R^2	0.007	0.016	0.030	0.064	0.153	0.006	0.011	0.023	0.047	0.145	0.143

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), shown in Figure 4 and resulting from the mixed logit model in Figure 3 or column 2 of Table A4. Advantageous and disadvantageous inequality aversion (as well as the other regressors) are coded as continuous variables. In all regressions, we excluded individuals who in all 11 scenarios of the respective game chose either exclusively the right or exclusively the left option. Standard errors in parentheses. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A17 Standardized effects of inequality aversion on international vaccine allocation preferences: Additional comprehension check in UG.

Dependent variable:	Mixed-logit parameters for hypothetical recipient's country of residence = lower-income country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Advantageous IA (guilt)	0.135***	0.154***	0.162***	0.120***	0.093***						0.108***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)						(0.02)
Disadvantageous IA (envy)						-0.097***	-0.097***	-0.089***	-0.057*	-0.026	-0.029
						(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Female			0.018	0.013	0.028			0.047	0.034	0.032	0.046
			(0.08)	(0.08)	(0.08)			(0.10)	(0.11)	(0.10)	(0.11)
Age group			-0.049*	-0.038	-0.000			-0.081**	-0.087**	-0.026	-0.026
			(0.03)	(0.03)	(0.03)			(0.04)	(0.04)	(0.04)	(0.04)
Education			0.082***	0.058**	-0.024			0.005	-0.016	-0.088***	-0.100***
			(0.05)	(0.05)	(0.05)			(0.07)	(0.07)	(0.07)	(0.07)
CV19 vaccinated			0.007	-0.007	-0.001			0.026	0.025	0.037	0.031
			(0.10)	(0.10)	(0.10)			(0.14)	(0.14)	(0.13)	(0.13)
Vaccine hesitancy index			-0.029	0.009	0.070***			-0.071**	-0.028	0.053	0.056
			(0.05)	(0.06)	(0.06)			(0.07)	(0.07)	(0.07)	(0.08)
CV19 threat perception scale			-0.028	-0.026	-0.018			-0.022	-0.026	-0.019	-0.014
			(0.03)	(0.03)	(0.03)			(0.04)	(0.04)	(0.04)	(0.04)
Patience				0.049*	0.037				0.028	0.020	0.054
				(0.05)	(0.05)				(0.07)	(0.06)	(0.07)
Risk aversion				-0.045*	-0.045*				-0.058*	-0.075**	-0.081**
				(0.06)	(0.06)				(0.08)	(0.07)	(0.07)
Neg. reciprocity				-0.036	0.019				-0.019	0.028	0.024
				(0.05)	(0.05)				(0.07)	(0.06)	(0.07)
Pos. reciprocity				-0.018	-0.006				0.001	0.004	-0.002
				(0.02)	(0.02)				(0.03)	(0.03)	(0.03)
Altruism				0.144***	0.073***				0.182***	0.106***	0.077**
				(0.05)	(0.05)				(0.07)	(0.06)	(0.07)
Trust in Government					0.036					0.011	0.031
					(0.02)					(0.03)	(0.03)
RW extremism scale					-0.304***					-0.328***	-0.318***
					(0.04)					(0.06)	(0.06)
Voted AfD (2021)					-0.080***					-0.142***	-0.112***
					(0.15)					(0.20)	(0.21)
WB preferences & CC		✓	✓	✓	✓		✓	✓	✓	✓	✓
Observations	2244	1654	1643	1550	1525	2334	981	978	933	918	822
R^2	0.018	0.024	0.035	0.062	0.162	0.009	0.009	0.022	0.061	0.197	0.203
Adjusted R^2	0.018	0.023	0.031	0.054	0.154	0.009	0.008	0.015	0.048	0.184	0.187

Notes: Shown are standardized OLS estimates. The dependent variable are the mixed-logit parameters for the country attribute (indicator variable for country of residence = lower-income country), shown in Figure 4 and resulting from the mixed logit model in Figure 3 or column 2 of Table A4. Advantageous and disadvantageous inequality aversion (as well as the other regressors) are coded as continuous variables. The comprehension questions for the Ultimatum game contain an additional third question. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figures

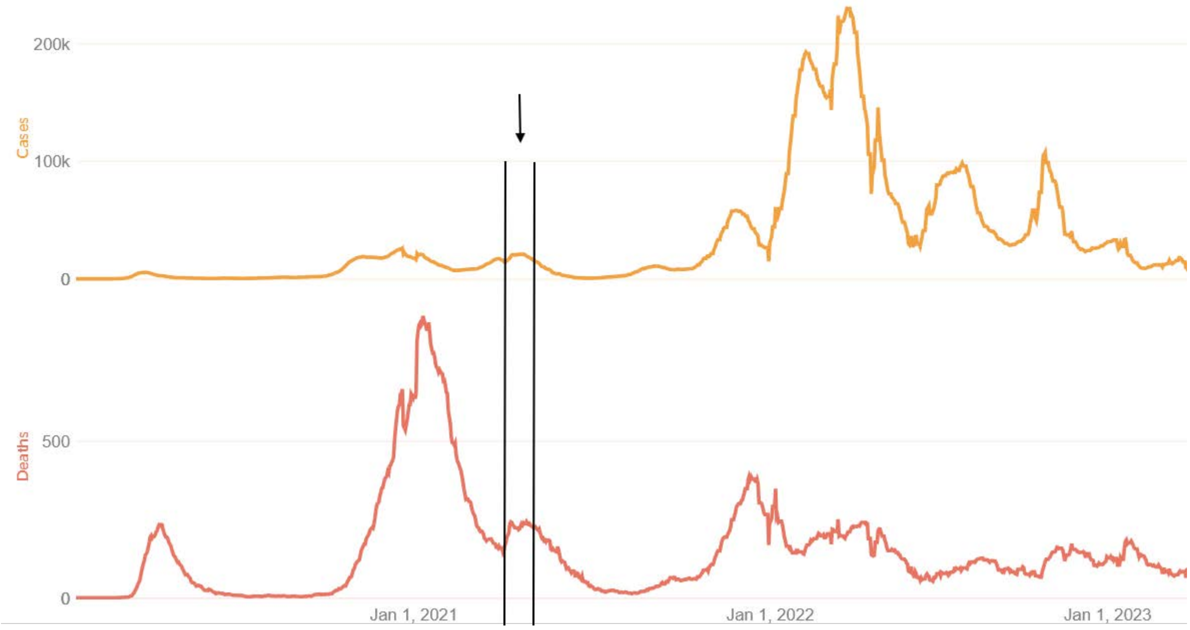


Fig. A1. Period of data collection.

Welche der folgenden Personen sollte den Impfstoff jetzt erhalten, Person A oder Person B?

	Person A	**Person B**
Alter	20 Jahre alt	40 Jahre alt
Risiko der Person, an COVID-19 zu sterben	Erhöhtes Risiko aufgrund von Vorerkrankungen oder Lebensstil	Kein erhöhtes Risiko aufgrund von Vorerkrankungen oder Lebensstil
Beruf	Systemrelevanter Sektor (z.B. Gesundheitspersonal, Supermarkt-Angestellte)	Beruf mit Einkommensverlusten durch COVID-Beschränkungen
Wohnort und Gesundheitssystem	Entwicklungsland, mit niedriger Kapazität des Gesundheitssystems (z.B., Indien, Nigeria, Bolivien)	Deutschland, mit hoher Kapazität des Gesundheitssystems

	Person A	Person B
Ihre Entscheidung:	○	○

Fig. A2. Exemplary choice scenario (as shown to respondents in German).

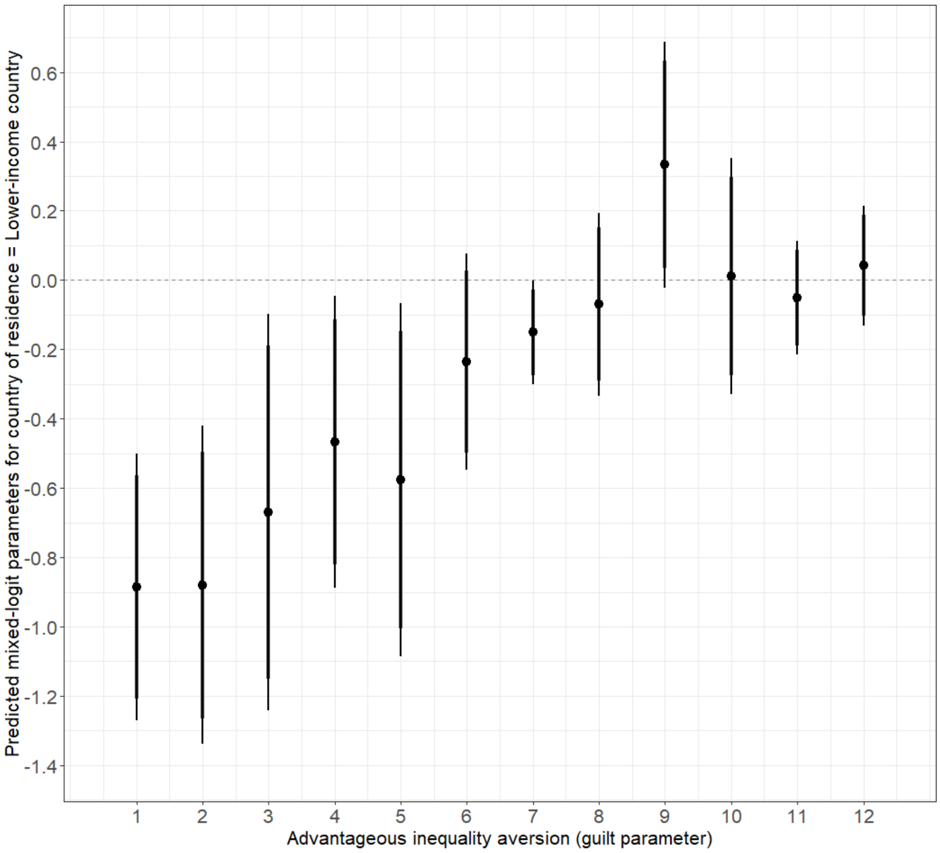


Fig. A3. Predictive margins of international vaccine allocation preferences by levels of inequality aversion (initial 12-point scale).

Notes: Marginal effects are based on two OLS regressions. The dependent variables are in both cases the posterior parameters for the country attribute (=lower-income country), shown in Figure 4 and obtained from the mixed logit model in Figure 3 or column 2 of Table A7. The explanatory variable was a categorical variable of advantageous inequality aversion, in its initial 12-point scale. Results shown for respondents who passed the comprehension questions and had well-behaved preferences in the Modified dictator game.

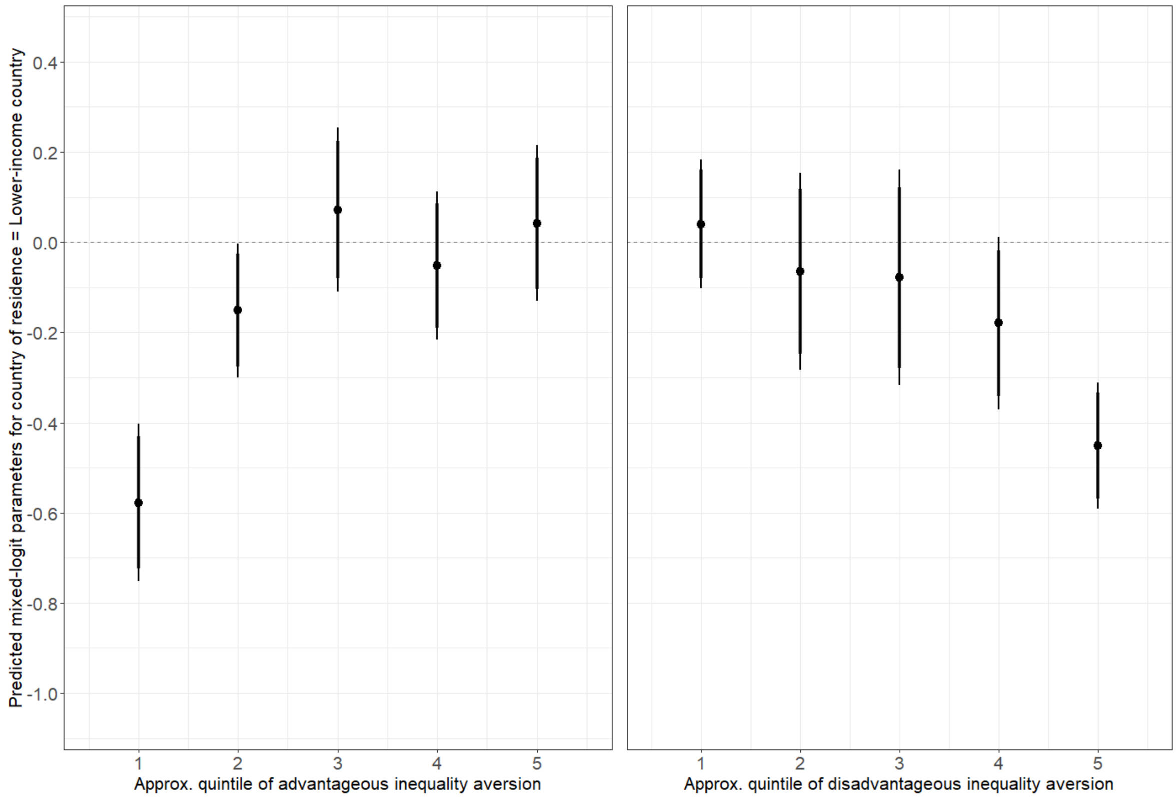


Fig. A4. Predictive margins of international vaccine allocation preferences by levels of inequality aversion (distribution-sensitive coding).

Notes: Marginal effects are based on two OLS regressions. The dependent variables are in both cases the posterior parameters for the country attribute (=lower-income country), shown in Figure 4 and obtained from the mixed logit model in Figure 3 or column 2 of Table A7. The explanatory variable were categorical variables of both types of inequality aversion. The measures for inequality aversion were coded not merely in terms of the consecutively ordered level, but also to reflect the distribution of individuals in our sample (as parameters are not normally distributed). To obtain a scale of inequality aversion that has a more (or less) equal proportion of individuals on each level, advantageous inequality aversion was coded into 5 levels as follows: 1-6 | 7 | 8-10 | 11 | 12. Disadvantageous inequality aversion was coded into 5 levels as follows: 1 | 2 | 3-4 | 5 | 6. Results shown for respondents who passed the comprehension questions and had well-behaved preferences in the respective game.

Previous Munich Papers in Political Economy:

2020

Betz, Timm and Amy Pond. “Political Ownership”, MPPE No. 1/2020, Munich. (ISSN)2701-3456

Chatziathanasiou, Konstantin, Hippel, Svenja and Michael Kurschilgen. “Property, Redistribution, and the Status Quo. A laboratory study”, MPPE No. 2/2020, Munich. (ISSN)2701-3456

Becker, Annette, Hottenrott, Hanna and Anwesha Mukherjee. “Division of Labor in R&D? Firm Size and Specialization in Corporate Research”, MPPE No. 3/2020, Munich. (ISSN)2701-3456

Steinert, Janina Isabel, Satish, Rucha Vasumati, Stips, Felix and Sebastian Vollmer. “Commitment or Concealment? Impacts and Use of a Portable Saving Device: Evidence from a Field Experiment in Urban India, MPPE No. 4/2020, Munich. (ISSN)2701-3456

Messerschmidt, Luca and Nicole Janz. ”Unravelling the `race to the bottom' argument: How does FDI affect different types of labour rights?”, MPPE No. 5/2020, Munich. (ISSN)2701-3456.

Chowdhury, Subhasish M., Esteve-González, Patricia and Anwesha Mukherjee. ”Heterogeneity, Leveling the Playing Field, and Affirmative Action in Contests”, MPPE No. 6/2020, Munich. (ISSN)2701-3456

Drobner, Christoph. ”Motivated Beliefs and Anticipation of Uncertainty Resolution”, MPPE No. 7/2020, Munich. (ISSN)2701-3456

Chatziathanasiou, Konstantin, Hippel, Svenja and Michael Kurschilgen. “Do rights to resistance discipline the elites? An experiment on the threat of overthrow”, MPPE No. 8/2020, Munich. (ISSN)2701-3456

Siddique, Abu, Rahman, Tabassum, Pakrashi, Debayan, Islam, Asad, and Firoz Ahmed. "Raising COVID-19 Awareness in Rural Communities: A Randomized Experiment in Bangladesh and India”, MPPE No. 9/2020, Munich. (ISSN)2701-3456

2021

Siddique, Abu. "Behavioral Consequences of Religious Education”, MPPE No. 01/2021, Munich. (ISSN)2701-3456

Vlassopoulos, Michael, Siddique, Abu, Rahman, Tabassum, Pakrashi, Debayan, Islam, Asad, and Firoz Ahmed. "Improving Women's Mental Health During a Pandemic”, MPPE No. 02/2021, Munich. (ISSN)2701-3456

March, Christoph, Schieferdecker, Ina.”Technological Sovereignty as Ability, not Autarky”, MPPE No. 03/2021, Munich. (ISSN)2701-3456

Hassan, Hashibul, Islam, Asad, Siddique, Abu, and Liang Choon Wang. "Telementoring and homeschooling during school closures: A randomized experiment in rural Bangladesh”, MPPE No. 04/2021, Munich. (ISSN)2701-3456

Angerer, Silvia, Dutcher ,Glenn, Glätzle-Rützler, Daniela, Lergetporer, Philipp, and Matthias Sutter. "The formation of risk preferences through small-scale events”, MPPE No. 05/2021, Munich. (ISSN)2701-3456

Hermes, Henning, Lergetporer, Philipp, Peter, Frauke and Simon Wiederhold. "Behavioral Barriers and the Socioeconomic Gap in Child Care Enrollment”, MPPE No. 06/2021, Munich. (ISSN)2701-3456

Schwierzy, Julian. “Digitalisation of Production: Industrial Additive Manufacturing and its Implications for Competition and Social Welfare”, MPPE No. 07/2021, Munich. (ISSN)2701-3456

Kurschilgen, Michael. “Moral awareness polarizes people's fairness judgments”, MPPE No. 08/2021, Munich. (ISSN)2701-3456

Drobner, Christoph, and Sebastian J. Goerg. ” Motivated Belief Updating and Rationalization of Information”, MPPE No. 09/2021, Munich. (ISSN)2701-3456

Previous Munich Papers in Political Economy:

2022

Lergetporer, Philipp, and Ludger Woessmann. ”Income Contingency and the Electorate’s Support for Tuition”, MPPE No. 01/2022, Munich. (ISSN)2701-3456

Angerer, Silvia, Glätzle-Rützler, Daniela, Lergetporer, Philipp, and Thomas Rittmannsberger. ”How does the vaccine approval procedure affect COVID-19 vaccination intentions?”, MPPE No. 02/2022, Munich. (ISSN)2701-3456

Antonioli, Davide, Alberto Marzucchi, Francesco Rentocchini, and Simone Vannuccini. ”Robot Adoption and Innovation Activities”, MPPE No. 03/2022, Munich. (ISSN)2701-3456

Hoeft, Leonard, Michael Kurschilgen, and Wladislaw Mill. ”Norms as Obligations”, MPPE No. 04/2022, Munich. (ISSN)2701-3456

Stöhr, Valentina. ”Climate protection in Germany: Party cues in a multi-party system”, MPPE No. 05/2022, Munich. (ISSN)2701-3456

Schönmann, Manuela, Anja Bodenschatz, Matthias Uhl, and Gari Walkowitz. ”The Care-Dependent are Less Averse to Care Robots: Comparing Intuitions of the Affected and the Non-Affected”, MPPE No. 06/2022, Munich. (ISSN)2701-3456

Hermes, Henning, Marina Krauß, Philipp Lergetporer, Frauke Peter, and Simon Wiederhold. “Early Child Care and Labor Supply of Lower-SES Mothers: A Randomized Controlled Trial”, MPPE No. 07/2022, Munich. (ISSN)2701-3456

2023

Angerer, Silvia, Glätzle-Rützler, Daniela, Lergetporer, Philipp, and Thomas Rittmannsberger. ”Beliefs about social norms and (the polarization of) COVID-19 vaccination readiness”, MPPE No. 01/2023, Munich. (ISSN)2701-3456

Blesse, Sebastian, Lergetporer, Philipp, Nover, Justus, and Katharina Werner. “Transparency and Policy Competition: Experimental Evidence from German Citizens and Politicians”, MPPE No. 02/2023, Munich. (ISSN)2701-3456

Sternberg, Henrike, Steinert, Janina Isabel, and Tim Büthe. “Compliance in the Public versus the Private Realm: Economic Preferences, Institutional Trust and COVID-19 Health Behaviors ”, MPPE No. 03/2023, Munich. (ISSN)2701-3456

Cantner, Fabienne, Christoph Drobner, and Sebastian J. Goerg. “Greenwashing your personality”, MPPE No. 04/2023, Munich. (ISSN)2701-3456

Goerg, Sebastian, Pondorfer, Andreas, and Valentina Stöhr. “Public support for more ambitious climate policies”, MPPE No. 05/2023, Munich. (ISSN)2701-3456

Fischer, Mira, Elisabeth Grewenig, Philipp Lergetporer, Katharina Werner, and Helen Zeidler. “The E-Word – On the Public Acceptance of Experiments”, MPPE No. 06/2023, Munich. (ISSN)2701-3456

Lergetporer, Philipp, Katharina Wedel, and Katharina Werner. “Automatability of occupations, workers’ labor-market expectations, and willingness to train”, MPPE No. 07/2023, Munich. (ISSN)2701-3456

Previous Munich Papers in Political Economy:

2024

Hermes, Henning, Philipp Lergetporer, Fabian Mierisch, Guido Schwerdt, and Simon Wiederhold. ”Does Information about Inequality and Discrimination in Early Child Care Affect Policy Preferences?”, MPPE No. 01/2024, Munich. (ISSN)2701-3456

Etzerodt, Søren Frank, and Niels Jørgen Mau Pedersen. “Formula-based Grants as Pork Barrel Politics: Targetability and the Political-strategic Use of Grants”, MPPE No. 02/2024, Munich. (ISSN)2701-3456

Angerer, Silvia, Hanna Brosch, Daniela Glätzle-Rützler, Philipp Lergetporer, and Thomas Rittmannsberger. “Discrimination in the general population”, MPPE No. 03/2024, Munich. (ISSN)2701-3456

Kosbab, Ben-Amon. “Trapped in Poverty: The Impact of Large-Scale Land Acquisitions on Education. A Geospatial Approach”, MPPE No. 04/2024, Munich. (ISSN)2701-3456

2025

Angerer, Silvia, Helena Antonie Baier, Daniela Glätzle-Rützler, Philipp Lergetporer, and Thomas Rittmannsberger. ”Economic Preferences Predict COVID-19 Vaccination Intentions and Behavior”, MPPE No. 01/2025, Munich. (ISSN)2701-3456

Hermes, Henning, Marina Krauß, Philipp Lergetporer, Frauke Peter, and Simon Wiederhold. “The Causal Impact of Gender Norms on Mothers’ Employment Attitudes and Expectations”, MPPE No. 02/2025, Munich. (ISSN)2701-3456

Ingersleben-Seip, Nora von. “How the European Union Fell Out of Love with Open-Source Software ”, MPPE No. 03/2025, Munich. (ISSN)2701-3456

Bartscherer, Falk, Felix Kurz, Stefan Wurster, and Hanna Hottenrott. “Conceptualising and mapping mission-oriented innovation policy”, MPPE No. 04/2025, Munich. (ISSN)2701-3456

Garcia-Hernandez, Ana, Nishith Prakash, and Janina Isabel Steinert. “The Empowerment Paradox? The Long-run Impact of a Cycling Program for Girls in Zambia”, MPPE No. 05/2025, Munich. (ISSN)2701-3456

Lergetporer, Philipp, Thomas Rittmannsberger, Katharina Werner, and Helen Zeidler. ” Anchoring Effects in the Elicitation of Multidimensional Beliefs. Evidence from a Representative Survey Experiment”, MPPE No. 06/2025, Munich. (ISSN)2701-3456

Sternberg, Henrike, Janina Isabel Steinert, and Tim Büthe. “Inequality aversion and international distribution preferences: The case of the Covid-19 vaccine rollout, MPPE No. 07/2025, Munich. (ISSN)2701-3456

Impressum:

ISSN:	**2701-3456**
Editors:	Tim Büthe, Hanna Hottenrott
Associate Editors:	Timm Betz, Sebastian Goerg, Michael Kurschilgen, Amy Pond, Sebastian Schwenen, Janina Steinert, Matthias Uhl
Managing Editor:	Falk Bartscherer
Contact:	Technicial University of Munich, Arcisstraße 21, 80333 München mppe@gov.tum.de, mppe@wi.tum.de https://www.wi.tum.de/mppe/ X: @MunichPapers