

Supplementary material

Article: Fair Enough? Citizens' preferences on refugee distribution in the EU (European Journal of Political Research)

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Appendix I: Survey documentation

Adherence to the Principles and Guidance for Human Subjects Research

The survey detailed in the article received full IRB approval (CUREG-2024-07-87). Participants were recruited via the online survey panel from bilendi and programmed in Qualtrics. Bilendi handles incentivising the participants and the researchers pay bilendi a cost per completed interview (CPI) and bilendi provides a portion of those earnings to participants. Before entering the survey, participants first completed a consent form that included the researcher's name and affiliation, the general purpose of the research, an explanation of the survey (including duration), the costs and benefits of participation, and contact information for the lead researcher. They were also informed that no identifying information would be collected, and that they were able to opt out of the research at any time. The project did not involve any deception, and no identifying information about the participants was collected. We also did not intervene in any political processes.

Pre-registration

This study was pre-registered on the Open Science Framework (OSF) before starting the data collection [https://osf.io/5bwzc/overview?view_only=c58a074fae2a44948e56fd983e3f1170]. The pre-registration documents the survey design, including the item battery used to measure fairness preferences, and states the explanatory hypotheses. The formulation of the hypotheses slightly deviates from the pre-registered version to make them clearer and more accessible without changing their substantive meaning.

Sampling

We fielded surveys in six member states of the European Union (Denmark, Germany, Italy, Greece, Poland, Hungary), drawing samples of $N = 1,700$ adult residents in each, for a total sample size of $N = 10,200$. Within each country, respondents were recruited using quotas for age (18–24, 25–34, 35–44, 45–54, 55–79), gender (male, female), and education (low, high) to approximate the demographic structure of the resident population. To ensure data quality, the survey included a commitment check at the beginning and an attention check at the end. The commitment check asked respondents to pledge that they would answer the survey honestly. The attention check was an instructed-response item asking respondents to select a pre-specified answer option. Respondents who failed either check were excluded from the sample and replenished.

Questionnaire

The survey items are part of a larger questionnaire on public attitudes and preferences on migration and asylum governance in the European Union. The questionnaire was fielded in the six national languages of the country sample (German, Danish, Italian, Greek, Polish, and Hungarian). The survey was translated by the survey company Bilendi into those six languages and double-checked with native speakers for clarity and comprehension.

Commitment check

We value the quality of our survey data. It is very important for our research that we obtain an accurate picture of your opinion. We hope that you will provide honest and considered answers to all questions in this survey. Do you promise to answer the questions in this survey honestly?

Response scale: Yes; No

Age

First, we would like to learn a little about you as a person. How old are you?

Gender

Please indicate your gender.

Response scale: Male; Female; Other

Education

What is your highest level of education?

Response scale: Primary school not completed; Primary school certificate; Secondary school certificate, internship, vocational preparation year; A-levels, technical college/university entrance qualification, completed apprenticeship, college; Technical secondary school, technical college, vocational school, evening school, dual system; Technical/vocational academy, administrative college, technical college; Bachelor's degree, state-certified technician, master craftsman's certificate, diploma from a technical college; Master's degree, diploma from a university

Refugee attitudes

Below we ask you a few questions about what you think about the political treatment of refugees. Refugees are people who have to flee their country for fear of political persecution and need protection in a safe country.

What is your opinion on the following statements?

Refugees in need of protection should be given humanitarian protection in a safe country.

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree

Intro text fairness module:

In the following, we would like to know your perceptions and preferences on the distribution of refugees within the European Union.

Fairness perception

To what extent do you agree with the following statement?

Refugees are distributed fairly across EU member states.

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree

Preferences on distributive fairness

Different criteria are discussed to distribute refugees in a fair manner among EU member states. To what extent do you agree with the following criteria?

A member state should admit **more** refugees ...

- A. ... the larger its population is.
- B. ... the wealthier it is.
- C. ... the lower its unemployment rate is.
- D. ... the lower its costs of hosting refugees are.
- E. ... the fewer refugees it has admitted in the past.

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree

Preferences on procedural fairness

Furthermore, there are different ways in which the distribution of refugees across EU member states can be organised. To what extent do you agree with the following distribution mechanisms?

The distribution of refugees should ...

- A. ... be based on a common distribution key agreed on the EU-level.
- B. ... depend on how many refugees each member state is willing to admit.
- C. ... be based on in which member state refugees want to seek asylum.
- D. ... be based on in which member state a refugee arrives first.
- E. ... include the option of member states paying other member states to take over parts of their refugees

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree

Aims of refugee allocation

The European migration policy should be designed in a way that ...

- A. ... keeps the number of refugees in my own country at a minimum.
- B. ... ensures that the distribution of refugees within Europe is as fair as possible.

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree.

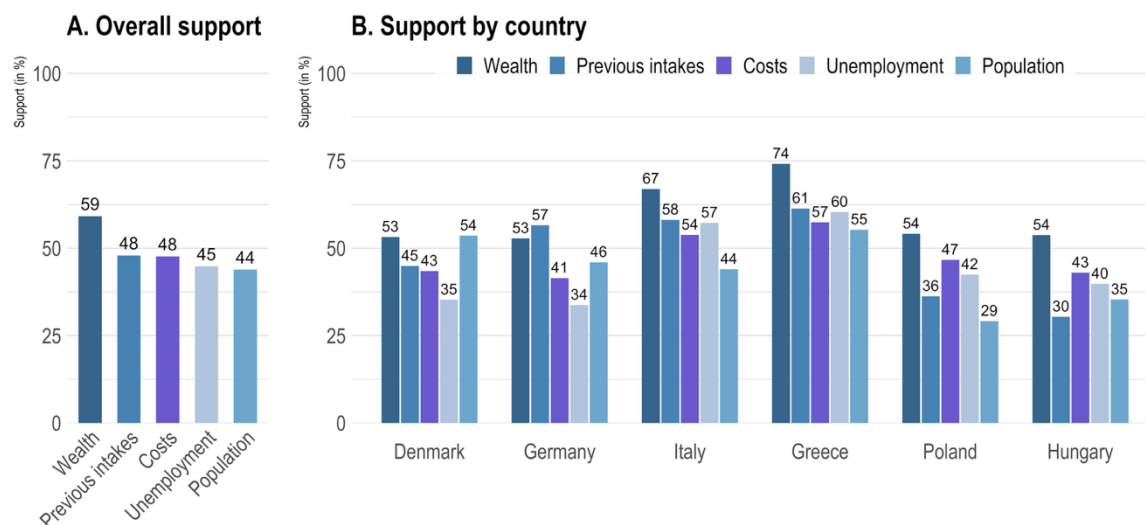
Attention check

Select the answer 'Agree' to show that you have read the question carefully.

Response scale: 1 Strongly disagree; 2 Disagree; 3 Somewhat disagree; 4 Neither agree nor disagree; 5 Somewhat agree; 6 Agree; 7 Strongly agree.

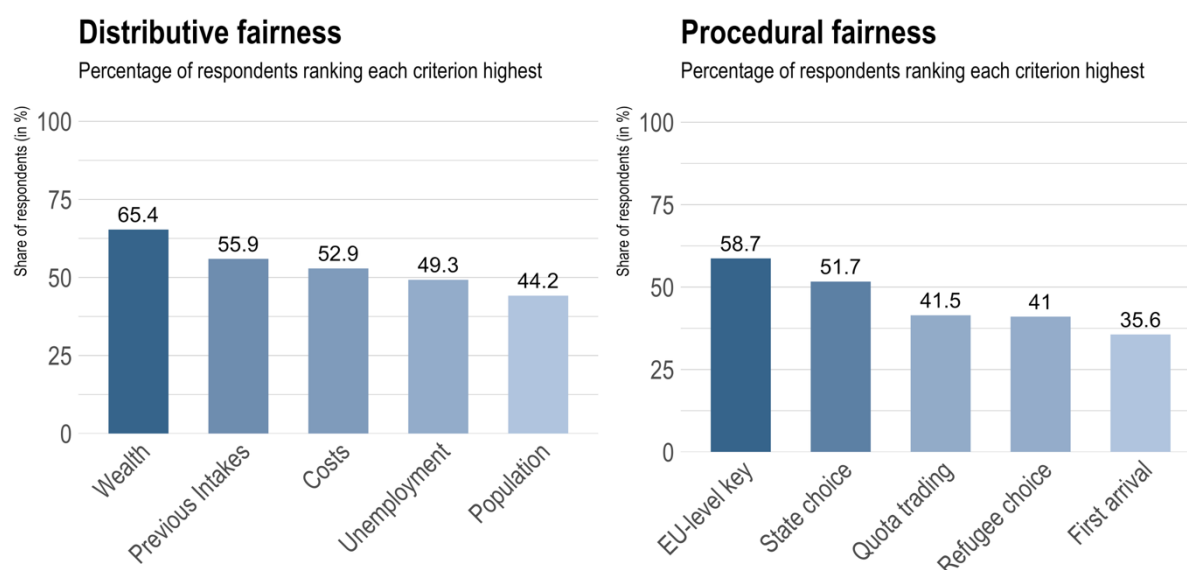
Appendix II: Supplementary analyses

Figure A1: Support for principles of distributive fairness (including neutral responses)



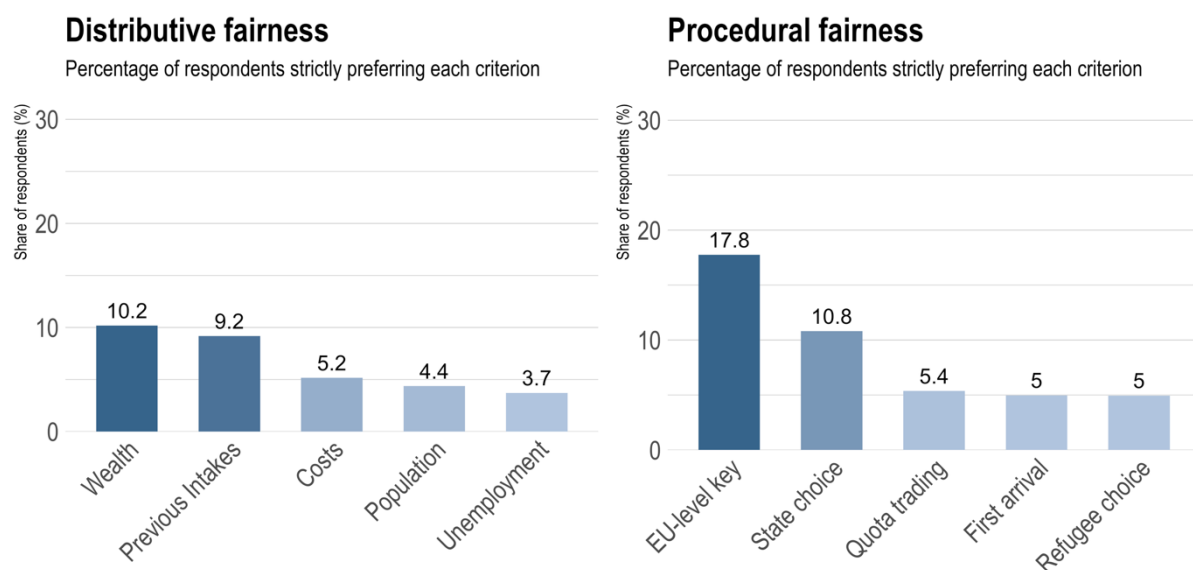
Note: Bar plots displaying the share of respondents that support a fairness principle. Same plot as Figure 4 in the manuscript, with the difference that neutral responses are included, which reduces overall support levels.

Figure A2: Support of fairness principles by share of highest ranking



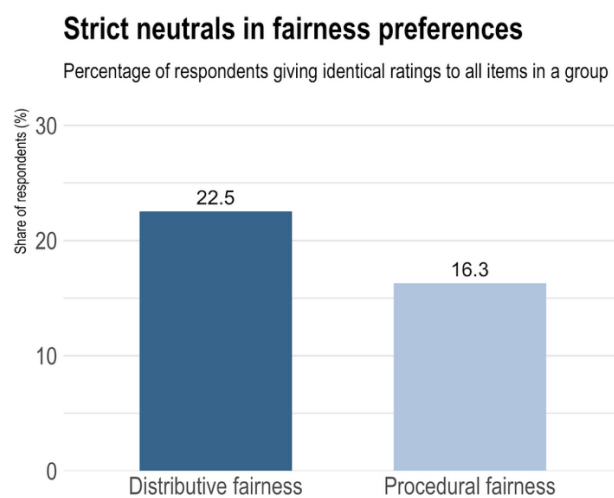
Note: The bar plots display the percentage of respondents that provide the highest value to them (no other principle receiving higher support). The fairness principles are displayed separately for the distributive and procedural dimension and sorted in decreasing order of support.

Figure A3: Support for fairness principles based on strict preference



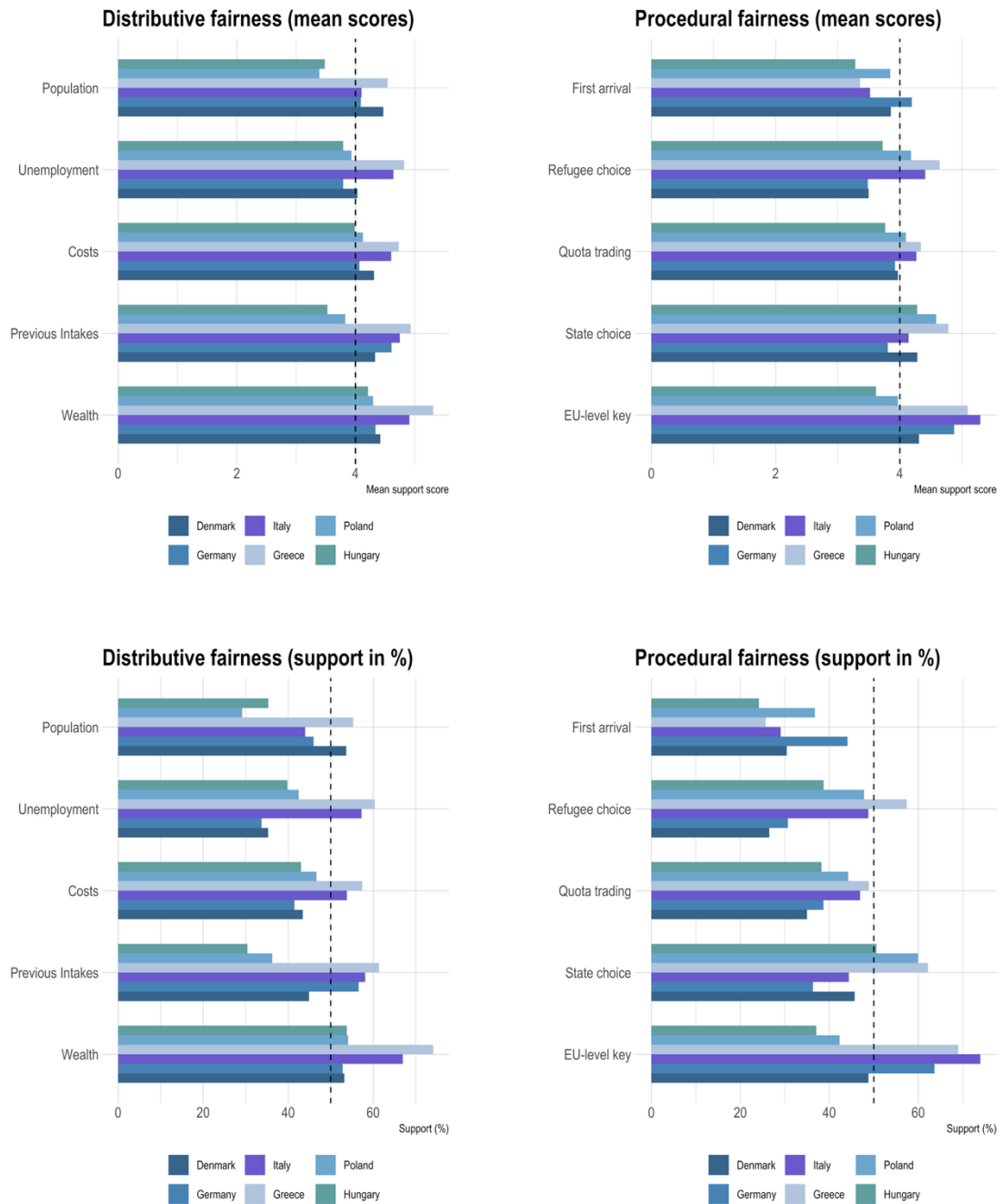
Note: Bar plot showing for each fairness principle the share of respondents that prefer a principle over all others within the two fairness dimensions (distributive and procedural). The fairness principles are displayed separately for the distributive and procedural dimension and sorted in decreasing order of support.

Figure A4: Share of respondents with neutral views on fairness



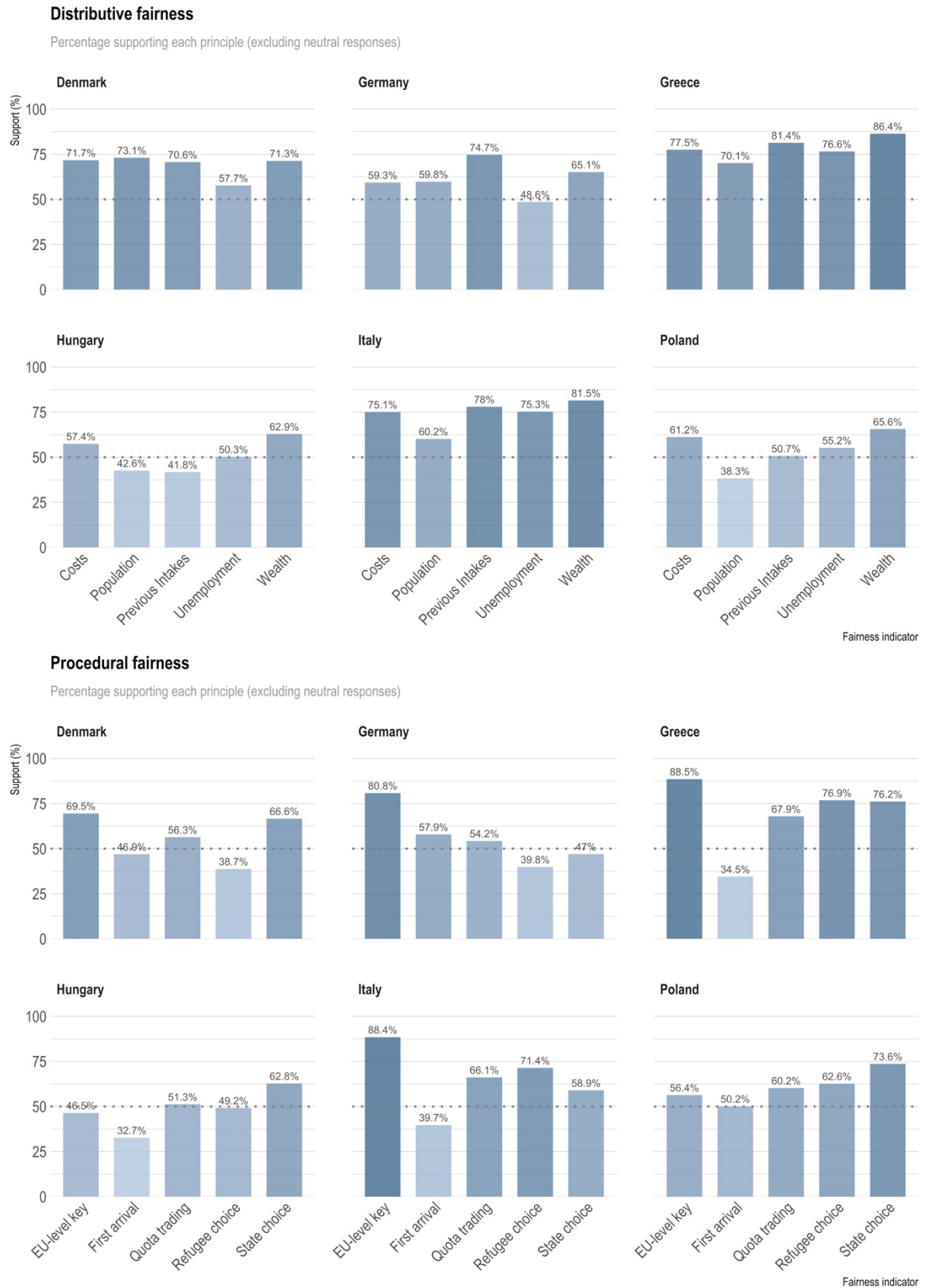
Note: Bar plot showing the share of respondents that choose consistently the neutral category across the different fairness principles in each dimension (distributive and procedural fairness).

Figure A5: Mean support of fairness principles



Note: Bar plots of mean support of different distributive and procedural fairness principles by country. Plots on top using mean scores of a seven-point (1-7) Likert scale. Plots on the bottom the percentage of respondents that are supportive (value higher than four).

Figure A6: Average support for fairness principles by country



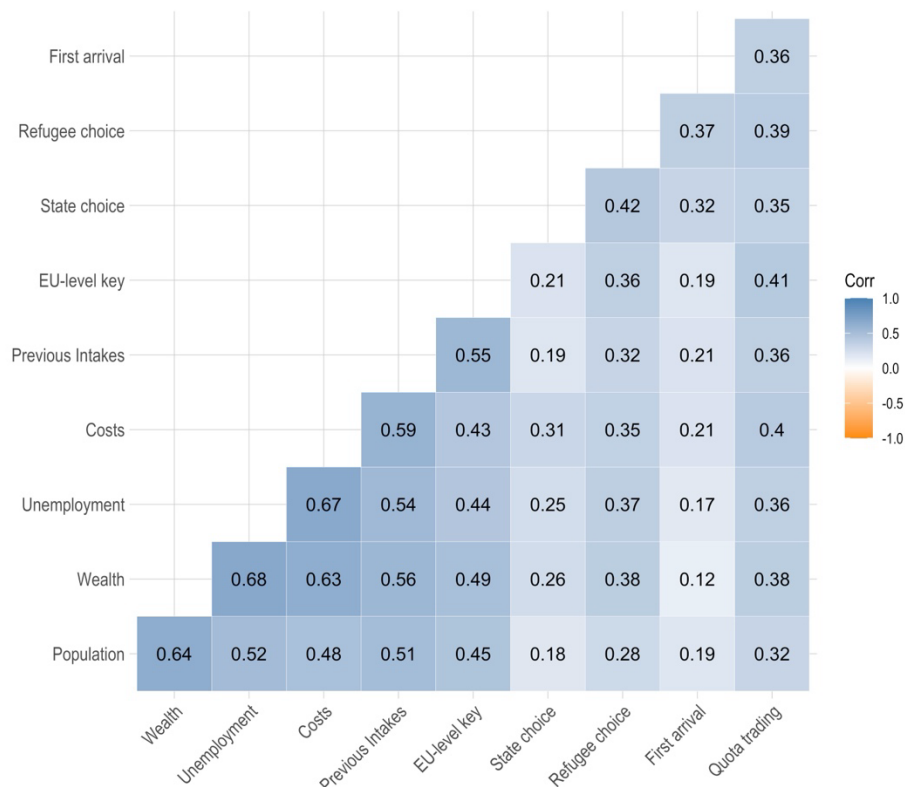
Measurement invariance testing of fairness criteria across countries

A multi-group CFA was conducted to assess whether the ten fairness items (five distributive, five procedural) measured the same latent constructs across countries. We tested three standard levels of invariance:

1. **Configural invariance** (same factor structure, no equality constraints)
 - Model fit: $\chi^2(204) = 4549.45$, $p < .001$; CFI = 0.89; TLI = 0.86; RMSEA = 0.11; SRMR = 0.06
2. **Metric invariance** (factor loadings constrained equal across groups)
 - $\Delta\text{CFI} = -0.011$; $\Delta\text{RMSEA} = -0.004$ (compared to configural model)
3. **Scalar invariance** (loadings and intercepts constrained equal across groups)
 - $\Delta\text{CFI} = -0.087$; $\Delta\text{RMSEA} = +0.024$ (compared to metric model)

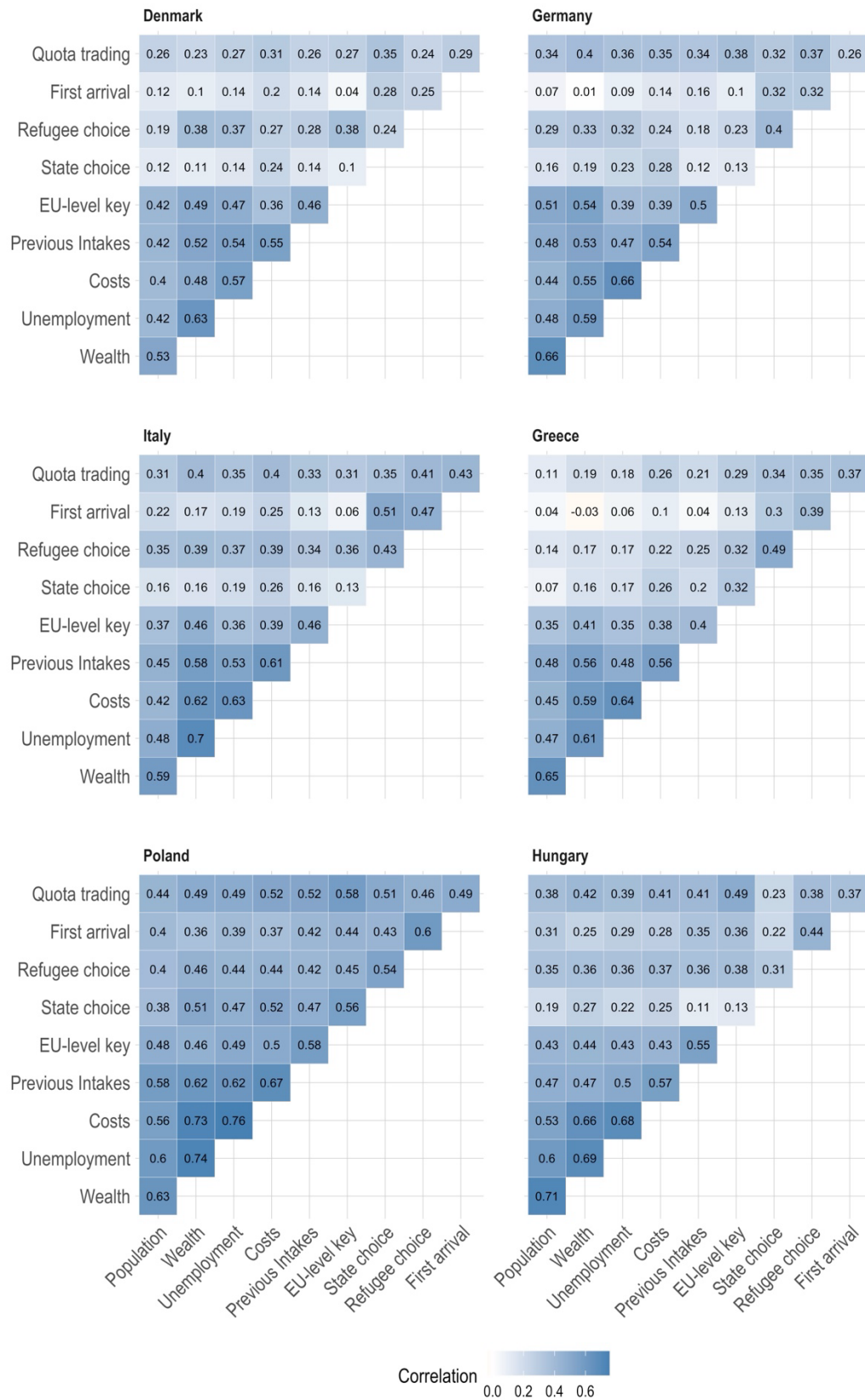
The configural model fits the data, supporting a shared two-factor fairness structure. However, metric and scalar invariance were not supported, indicating that the relative weighting of fairness criteria and baseline agreement levels differ cross-nationally. For substantive analyses, partial invariance or alignment optimisation should be considered before comparing latent means across countries.

Figure A7: Correlation plot of fairness preferences



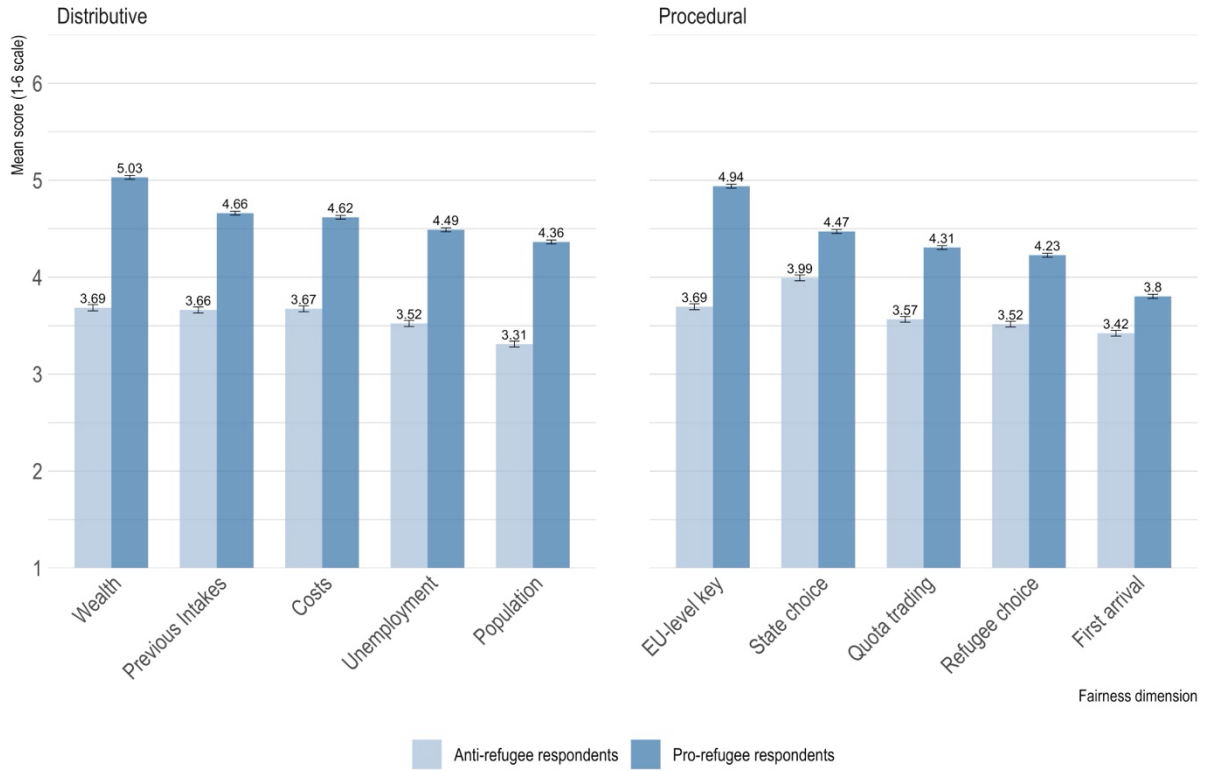
Note: Plot displaying the bivariate correlation between fairness preferences using Pearson's correlation coefficients.

Figure A8: Correlation plots of fairness preferences by country



Note: Plot displaying the bivariate correlation between fairness preferences using Pearson's correlation coefficients.

Figure A9: Fairness preferences by refugee attitudes



Note: Bar plot comparing fairness preferences of respondents that do not support refugee protection (33.3% anti-refugee respondents) and those that do (66.7% pro-refugee respondents). Refugee attitudes measured on a 1-to-7 Likert scale with values from 1 to 3 classified as anti-refugee and values from 5 to 7 classified as pro-refugee.

Table A1: Regression estimates for the effect of allocation objectives

	Dependent variable:				
	Distribution key (1)	State choice (2)	Refugee choice (3)	First arrival (4)	Quota trading (5)
Fairness	-0.236*** (0.009)	0.119*** (0.011)	-0.120*** (0.010)	0.039*** (0.011)	-0.073*** (0.011)
Self-interest	0.503*** (0.010)	0.142*** (0.013)	0.219*** (0.012)	0.065*** (0.012)	0.265*** (0.012)
Constant	2.854*** (0.074)	3.061*** (0.081)	2.941*** (0.079)	3.367*** (0.080)	2.978*** (0.079)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	10,200	10,200	10,200	10,200	10,200
R ²	0.355	0.066	0.116	0.039	0.076
Adjusted R ²	0.355	0.066	0.115	0.038	0.076

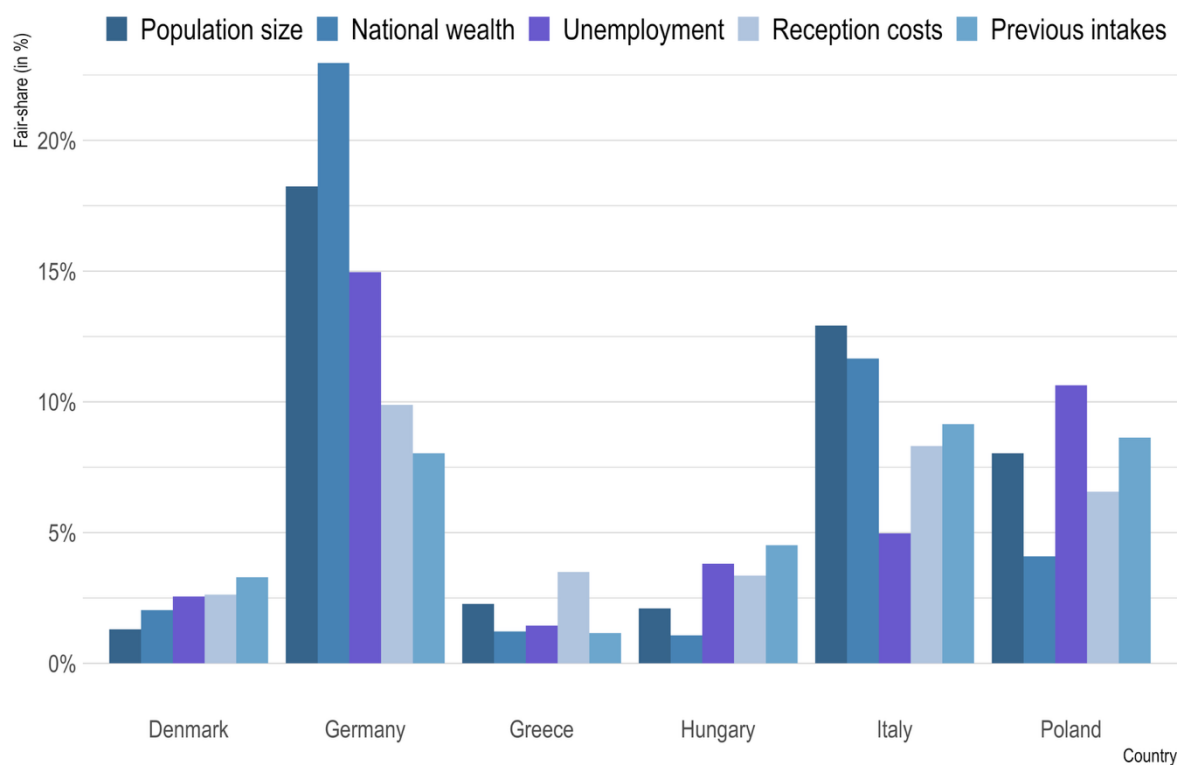
Note: Estimates from linear regression models with country fixed effects and clustered standard errors. The dependent variables measure the support for different procedural fairness principles (1-7 scale). The independent variables are the individual agreement with fairness and self-interest as objectives of refugee allocation. Level of statistical significance reported as follows: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table A2: Regression estimates for the effect of fairness perceptions on policy preferences

	<i>Dependent variable:</i>			
	Prefers distribution key	Prefers state choice	Prefers refugee choice	Prefers quota trading
	(1)	(2)	(3)	(4)
Perceived unfairness	0.146* (0.071)	0.137*** (0.019)	0.122*** (0.031)	0.119*** (0.018)
Age	−0.0004 (0.0003)	−0.0003* (0.0001)	−0.0002 (0.0002)	−0.0001 (0.0001)
Gender (male)	−0.046 (0.064)	0.002 (0.074)	0.074* (0.033)	0.098* (0.044)
Gender (other)	−0.358 (0.720)	0.375 (0.996)	−0.249 (0.676)	−0.629 (0.688)
Education (low)	−0.196** (0.067)	−0.166** (0.060)	−0.109 (0.071)	−0.202*** (0.061)
Refugee attitudes	0.303*** (0.035)	0.121** (0.044)	0.244*** (0.035)	0.206*** (0.015)
Constant	−2.310*** (0.435)	−1.535*** (0.170)	−2.958*** (0.201)	−2.240*** (0.113)
Country Fixed Effects	Yes	Yes	Yes	Yes
Observations	8,487	8,487	8,487	8,487

Note: Estimates from logistic regression models with country fixed effects and clustered standard errors. The dependent variables measure whether respondents prefer the alternative allocation principle over the status quo of the first arrival rule. The independent variable is the perceived unfairness of current refugee distribution among EU member states. The models include age, gender, education and refugee attitudes as control variables. Level of statistical significance reported as follows: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure A10: Fair-shares of countries based on different fairness criteria



Note: Hypothetical fair-share of the six member states using five different distributive criteria. The fair share is proportional to countries population size, national wealth and the inverse of their unemployment rate, reception costs and previous intakes. Shares calculated based on all member states minus Cyprus, Luxembourg and Estonia due to missing data. Unemployment, reception costs and previous intakes are adjusted for population size to account for the different sizes of the countries.

Model equation to test hypothesis H2

To investigate the relationship between citizens' support for different fairness principles and the implied fair-share for their country, we estimate the following within-individual fixed effects model:

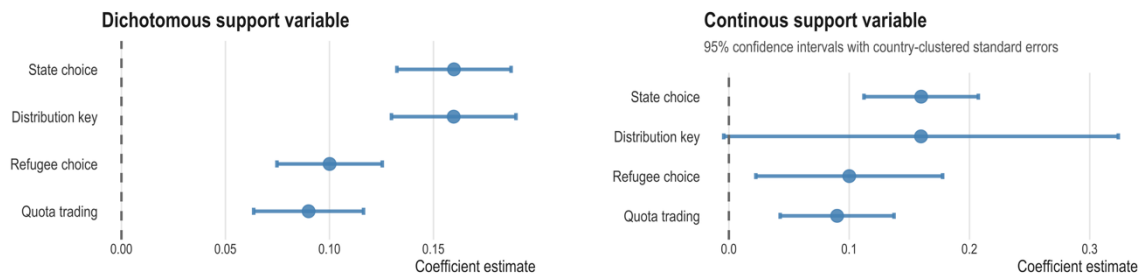
$$\text{Support}_{i,p} = \alpha_i + \beta \text{Share}_{i,p} + \varepsilon_{i,p} \quad (1)$$

where:

- $\text{Support}_{i,p}$ is respondent i 's support for principle p ,
- α_i is a respondent-specific fixed effect capturing all time-invariant traits of respondent i ,
- $\text{Share}_{i,p}$ is the fair-share implied by principle p for respondent i 's country,
- $\varepsilon_{i,p}$ is the idiosyncratic error term.

Standard errors are clustered at the respondent level. This model provides a within-individual estimate of whether respondents systematically prefer principles that imply a lower fair-share for their country. Additional models with interaction terms are employed to explore effect heterogeneity.

Figure A11: Effect of perceived unfairness on support of policy alternatives



Note: Coefficient plots of perceived unfairness of refugee distribution on preferring alternative allocation procedures over the status-quo rule of first-arrival. The plot on the left uses a dichotomous dependent variable (alternative preferred or not) and the plot on the right a continuous dependent variable (extent to which the alternative is supported more than the status quo). Estimates based on regression models (linear and logistic) including country fixed effects, control variables (age, gender, education, refugee attitudes), and country-clustered standard errors. Point estimates and 95% confidence intervals shown.

Table A3: Regression models on the effect of fair-shares on respondent support

	Baseline (linear)	Log-transformed share	Ranked share
Baseline (linear)	-2.79***		
	0.20		
Log-transformed share		-0.32***	
		-0.01	
Rank share			-0.41***
			-0.02
N	51000	51000	51000
R2	0.66	0.66	0.66

Note: All models are respondent fixed-effects regressions predicting support for fairness principles based on each country's hypothetical fair-shares. Model (1) uses the raw shares, Model (2) uses log-transformed shares, and Model (3) uses ranked shares within each country. Standard errors are clustered at the respondent level. Level of statistical significance as follows: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Figure A12: Fairness bias across countries

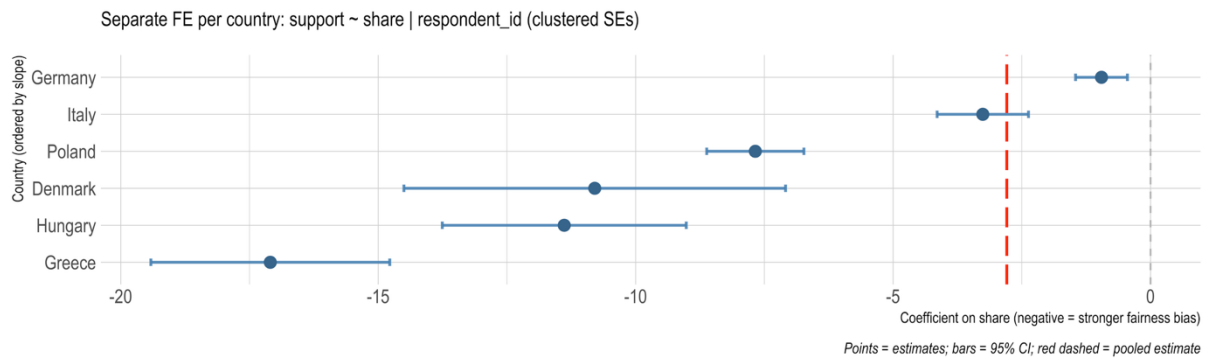
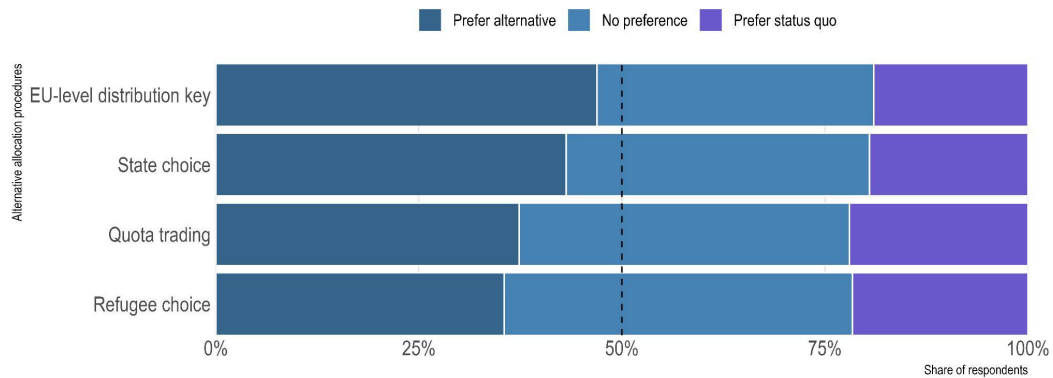
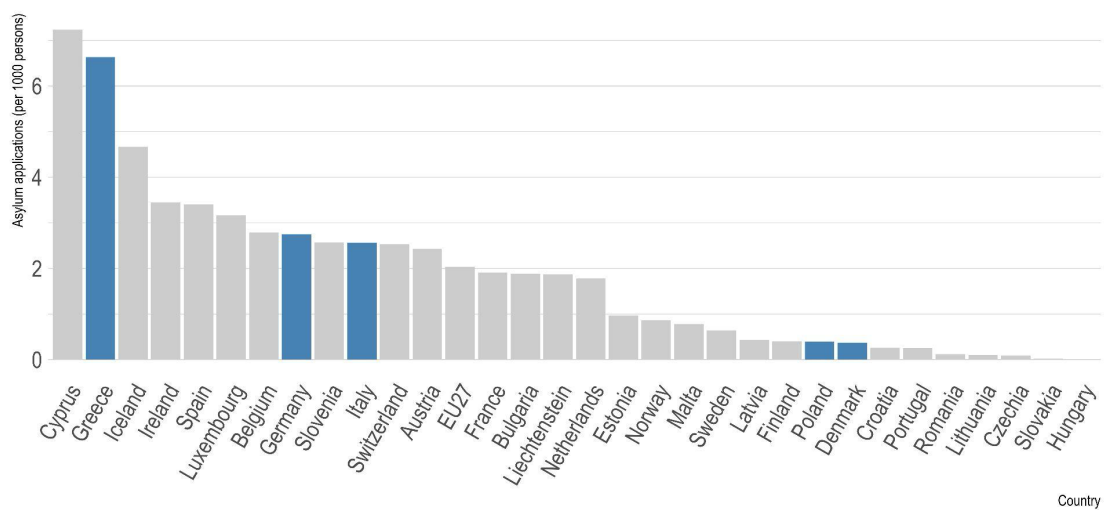


Figure A13: Procedural fairness preferences relative to the status quo



Note: Stacked bar plot showing the share of respondents that prefer alternative allocation procedures over the policy status quo of the first-arrival principle, prefer the status quo (first-arrival rule) or have no preference (equal support levels).

Figure A14: Distribution of asylum-applications across member states

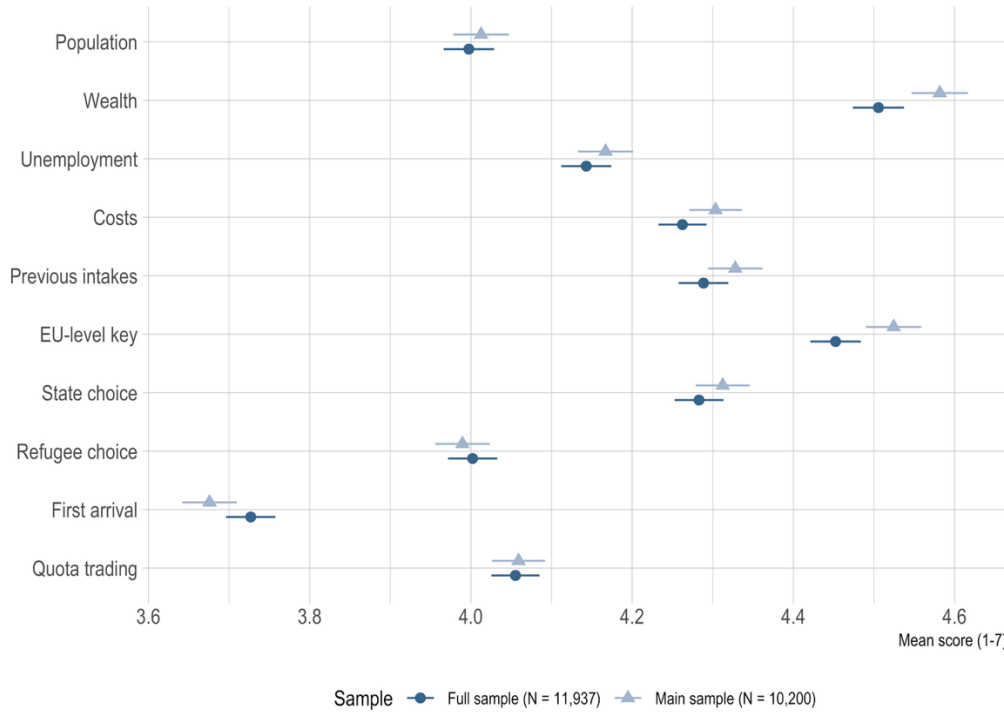


Note: Bar plot showing the number of first-time asylum applications in 2024 for each member state. The six countries investigated in this study are highlighted in blue. Data from Eurostat (migr_asyappctza).

Robustness to attention check exclusions

This appendix replicates the main regression analyses using the full sample, including respondents who failed the attention check. Excluded respondents were replenished to maintain the target sample of $N = 1,700$ per country, so the full sample ($N = 11,937$) comprises the main sample plus those who were replaced (Germany: 1863; Denmark: 1912; Greece: 1949; Hungary: 2081; Italy: 2096; Poland: 2036). All results are substantively unchanged.

Figure A15: Mean scores of fairness indicators by sample composition



Note: Dots indicate mean scores on a 1-7 scale with 95% confidence intervals. The main sample ($N=10,200$) excludes respondents who failed the attention check. The full sample ($N=11,937$) retains them. Excluded respondents were replenished to maintain quota targets.

Table A4: OLS regression estimates for fairness and self-interest (full sample)

	Dependent variable:				
	Distribution key	State choice	Refugee choice	First arrival	Quota trading
	(1)	(2)	(3)	(4)	(5)
Self-interest	-0.200*** (0.032)	0.139*** (0.039)	-0.087** (0.032)	0.049 (0.043)	-0.047 (0.029)
Fairness	0.521*** (0.025)	0.163* (0.080)	0.244*** (0.037)	0.075 (0.065)	0.275*** (0.056)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	11,937	11,937	11,937	11,937	11,937

Note: Clustered standard errors (by country) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A5: Logistic regression models (full sample)

	<i>Dependent variable:</i>			
	Prefers distribution key	Prefers state choice	Prefers refugee choice	Prefers quota trading
	(1)	(2)	(3)	(4)
Perceived unfairness	0.187* (0.074)	0.172*** (0.020)	0.161*** (0.033)	0.144*** (0.020)
Age	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Gender (male)	-0.024 (0.055)	0.032 (0.078)	0.108* (0.046)	0.111* (0.051)
Education (low)	-0.244** (0.085)	-0.230*** (0.058)	-0.148 (0.086)	-0.225*** (0.067)
Refugee attitudes	0.323*** (0.041)	0.149*** (0.032)	0.250*** (0.028)	0.216*** (0.009)
Country Fixed Effects	Yes	Yes	Yes	Yes
Observations	11,937	11,937	11,937	11,937

Note: Clustered standard errors (by country) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Fixed-effects model (H2): The within-person fair-share effect is virtually identical across samples (main sample: $\beta = -2.792$, $SE = 0.203$; full sample: $\beta = -2.599$, $SE = 0.186$; both $p < 0.001$).