

Against all odds: On the robustness of probability samples against
decreases in response rates
Replication materials for tables and figures

Table 1

Project characteristics.					
Project	Number of			Year	
	surveys	countries	waves	from	to
EQLS	124	35	4	2003	2016
ESS	231	37	9	2002	2018
EVS	68	39	3	1999	2017
ISSP	353	31	19	1999	2018

Table 2

Distribution of sample types across projects.

Project	Individual register	Household register	Area samples	Total
EQLS	10	33	81	124
ESS	111	103	17	231
EVS	24	22	22	68
ISSP	157	189	7	353
Total	302	347	127	776

Table 3

Distribution of survey modes across projects.

Project	Face-to-face	Not face-to-face	Total
EQLS	124	0	124
ESS	231	0	231
EVS	67	1	68
ISSP	237	116	353
Total	659	117	776

Table 4: source of coefficients

Full table in Table C1.

Models estimating the effect of time on response rates.

DV = Response rate	Model 1.1		Model 1.2		Model 1.3		Model 1.4	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Intercept	0.618*	0.014	0.566*	0.016	0.642*	0.025	0.585*	0.026
Time	-0.007*	0.001	-0.007*	0.001	-0.007*	0.002	-0.008*	0.002
Project: ESS			0.125*	0.015			0.137*	0.011
Project: EVS			0.102*	0.020			0.085*	0.016
Project: ISSP			0.029*	0.014			0.045*	0.011
R ²	0.061		0.175					
Adj. R ²	0.060		0.170					
AIC					-1033.586		-1168.607	
BIC					-1005.676		-1126.742	
Log Likelihood					522.793		593.303	
Variance: Country intercept					0.017		0.019	
Variance: Time slope					0.000		0.000	
Covariance: Country intercept, time					-0.001		-0.001	
Variance: Residual					0.012		0.010	
Number of surveys	774		774		774		774	
Number of countries					42		42	

Note: * p<0.05

Table 5: source of coefficients

Full table in Table C2.

Models estimating the effect of time on nonresponse bias.

DV = Nonresponse bias	Model 2.1		Model 2.2		Model 2.3		Model 2.4	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Intercept	1.409*	0.130	1.330*	0.167	1.463*	0.162	1.381*	0.188
Time	-0.002	0.009	-0.002	0.009	-0.006	0.009	-0.006	0.009
Project: ESS			0.103	0.150			0.120	0.144
Project: EVS			-0.098	0.206			-0.086	0.197
Project: ISSP			0.111	0.141			0.141	0.138
R ²	0.000		0.002					
Adj. R ²	-0.001		-0.003					
AIC					2627.931		2638.111	
BIC					2655.840		2679.975	
Log Likelihood					-1307.965		-1310.055	
Variance: Country intercept					0.372		0.378	
Variance: Time slope					0.000		0.000	
Covariance: Country intercept, time					-0.007		-0.007	
Variance: Residual					1.598		1.599	
Number of surveys	774		774		774		774	
Number of countries					42		42	

Note: * p<0.05

Table 6: source of coefficients

Full table in Table C3.

Models predicting absolute unit nonresponse bias.

DV = Absolute unit nonresponse bias	Model 3.1		Model 3.2		Model 3.3	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Intercept	0.767	0.449	0.805	0.484	1.595*	0.181
Time	0.004	0.011	0.004	0.011		
Response rate	0.298	0.621	0.099	0.641	-0.409	0.331
Sample type: Household	0.575*	0.122	0.600*	0.123		
Sample type: Area	0.444*	0.154	0.560*	0.182		
Fieldwork length (100 days)	0.145	0.081	0.102	0.086		
Face-to-face	-0.181	0.150	-0.232	0.167		
Project: ESS			0.274	0.180		
Project: EVS			-0.017	0.204		
Project: ISSP			0.108	0.173		
AIC	2578.604		2586.491			
BIC	2643.727		2665.568			
Log Likelihood	-1275.302		-1276.245			
Variance: Country intercept	4.627		4.627			
Variance: Time slope	10.192		10.334			
Variance: Response rate slope	-0.066		-0.065			
Variance: Residual	-6.866		-6.914			
Covariance: Country intercept, time	0.001		0.001			
Covariance: Country intercept, response rate	0.098		0.097			
Covariance: Response rate, time	1.424		1.422			
Number of surveys	774		774		774	
Number of countries	42		42			
R^2					0.002	
Adjusted R^2					0.001	

Note: * p<0.05

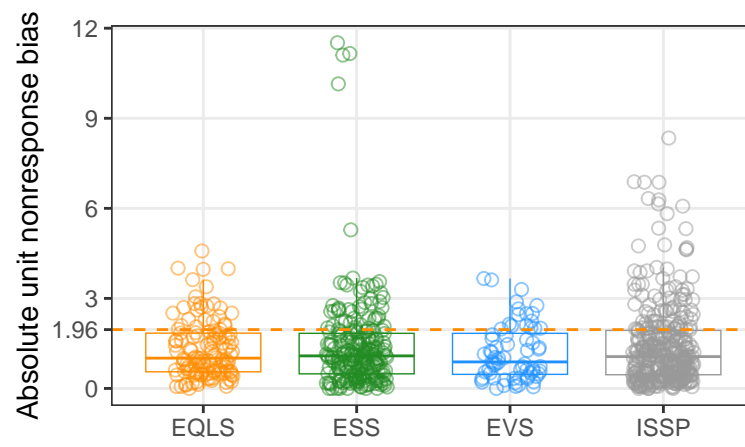
Table D1

Models predicting absolute unit nonresponse bias.

DV = Absolute unit nonresponse bias	Model A3.1		Model A3.2	
	Coef.	S.E.	Coef.	S.E.
Intercept	0.775*	0.240	0.707*	0.260
Time	0.001	0.007	0.002	0.007
Response rate	0.250	0.322	0.240	0.341
Fieldwork length (100 days)	0.068	0.061	0.070	0.065
Sample type: Household	0.339*	0.089	0.345*	0.090
Sample type: Area	0.458*	0.109	0.514*	0.134
Project: ESS			0.067	0.133
Project: EVS			-0.005	0.150
Project: ISSP			0.084	0.124
AIC	2045.028		2058.161	
BIC	2105.141		2132.146	
Log Likelihood	-1009.514		-1013.080	
Variance: Country intercept	0.536		0.533	
Variance: Time slope	1.312		1.299	
Variance: Response rate slope	-0.003		-0.003	
Variance: Residual	-0.838		-0.831	
Covariance: Country intercept, time	0.000		0.000	
Covariance: Country intercept, response rate	0.005		0.005	
Covariance: Response rate, time	0.792		0.794	
Number of surveys	753		753	
Number of countries	42		42	

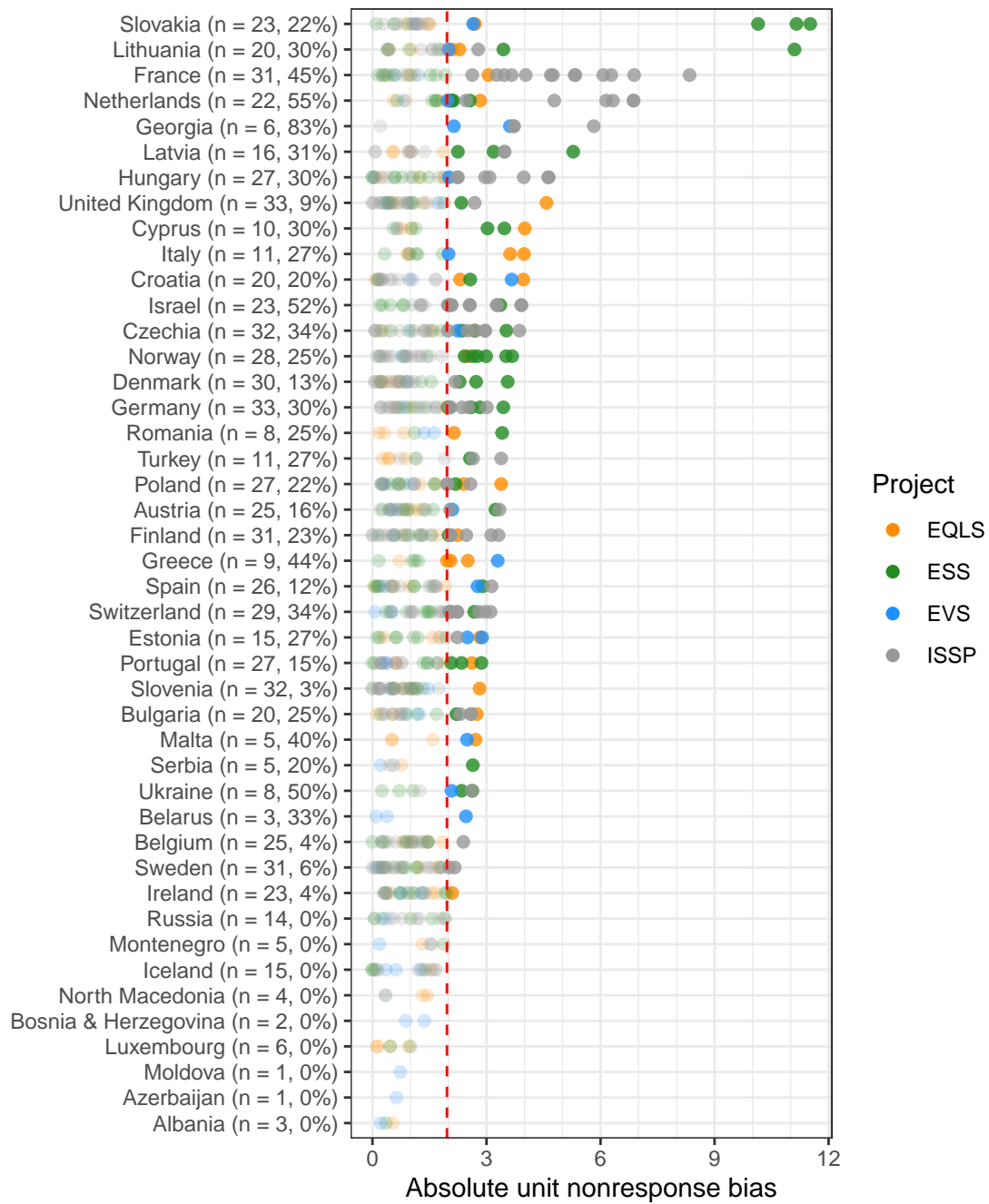
Note: * p<0.05

Figure 4



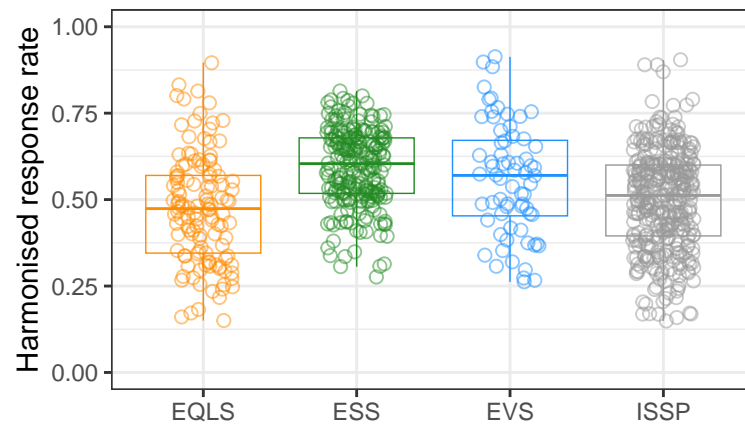
Distribution of absolute unit nonresponse bias across projects

Figure 5



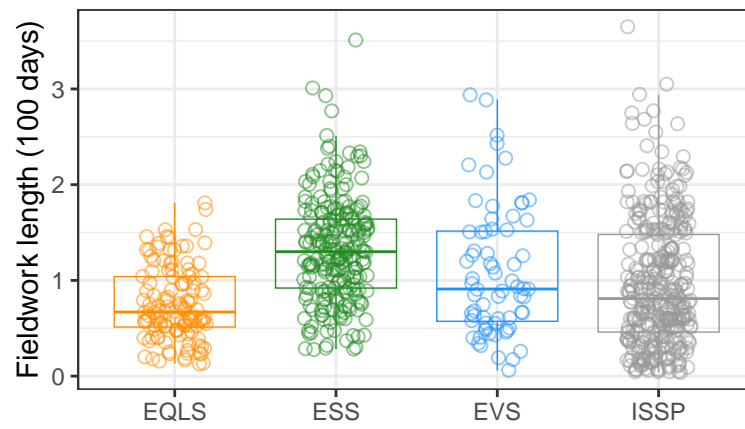
Distribution of absolute unit nonresponse bias across countries. Numbers next to country names indicate the number of surveys from that country and the percentage of samples in which unit nonresponse bias exceeds 1.96.

Figure 6



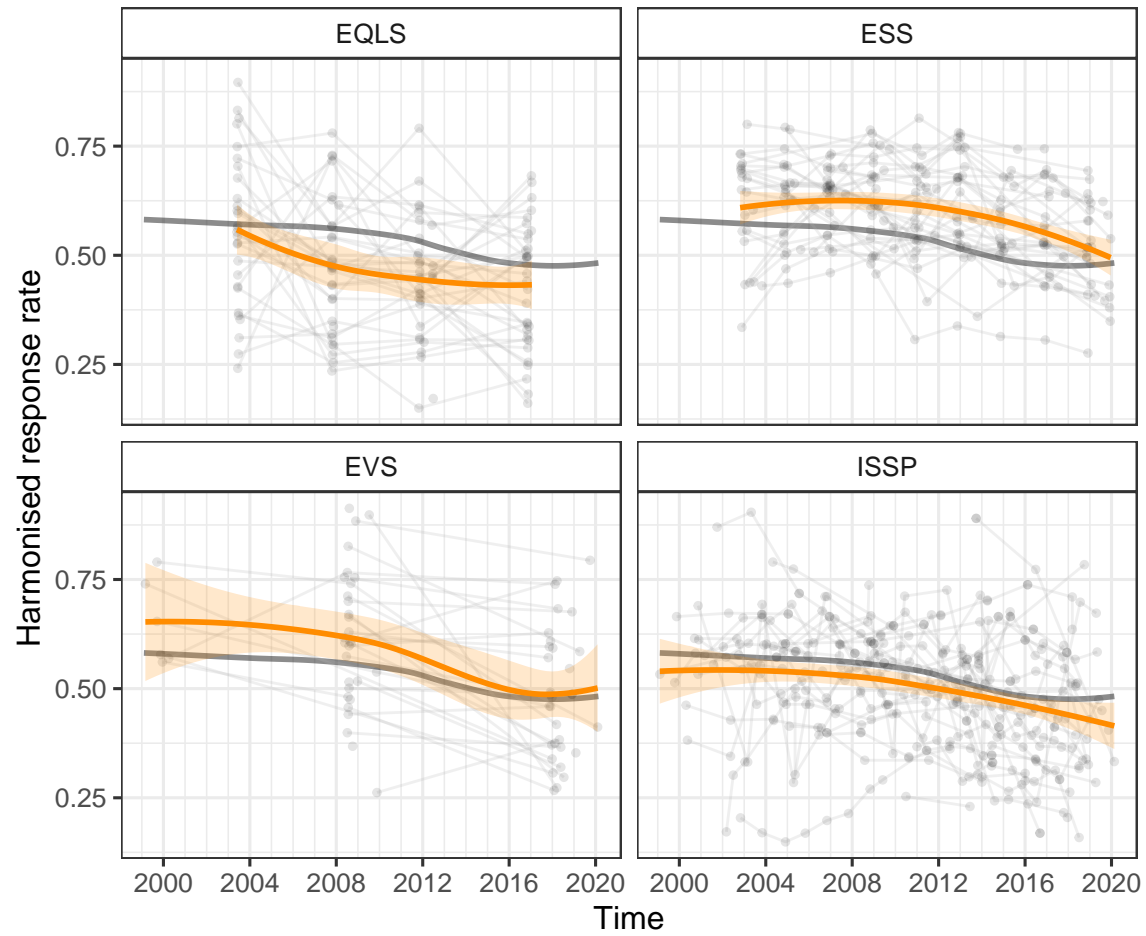
Distribution of response rates across projects.

Figure 7



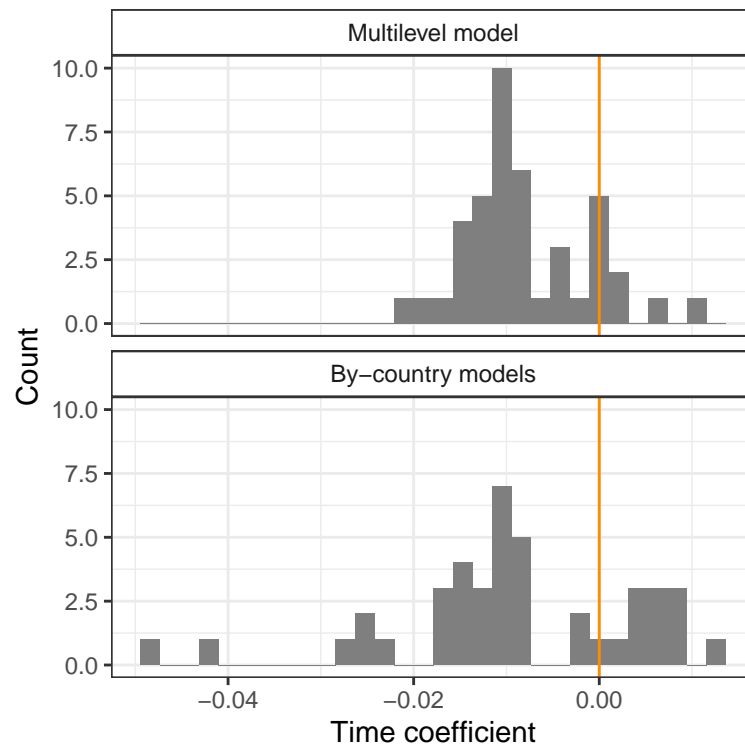
Distribution of fieldwork length (in 100 days) across projects.

Figure 8



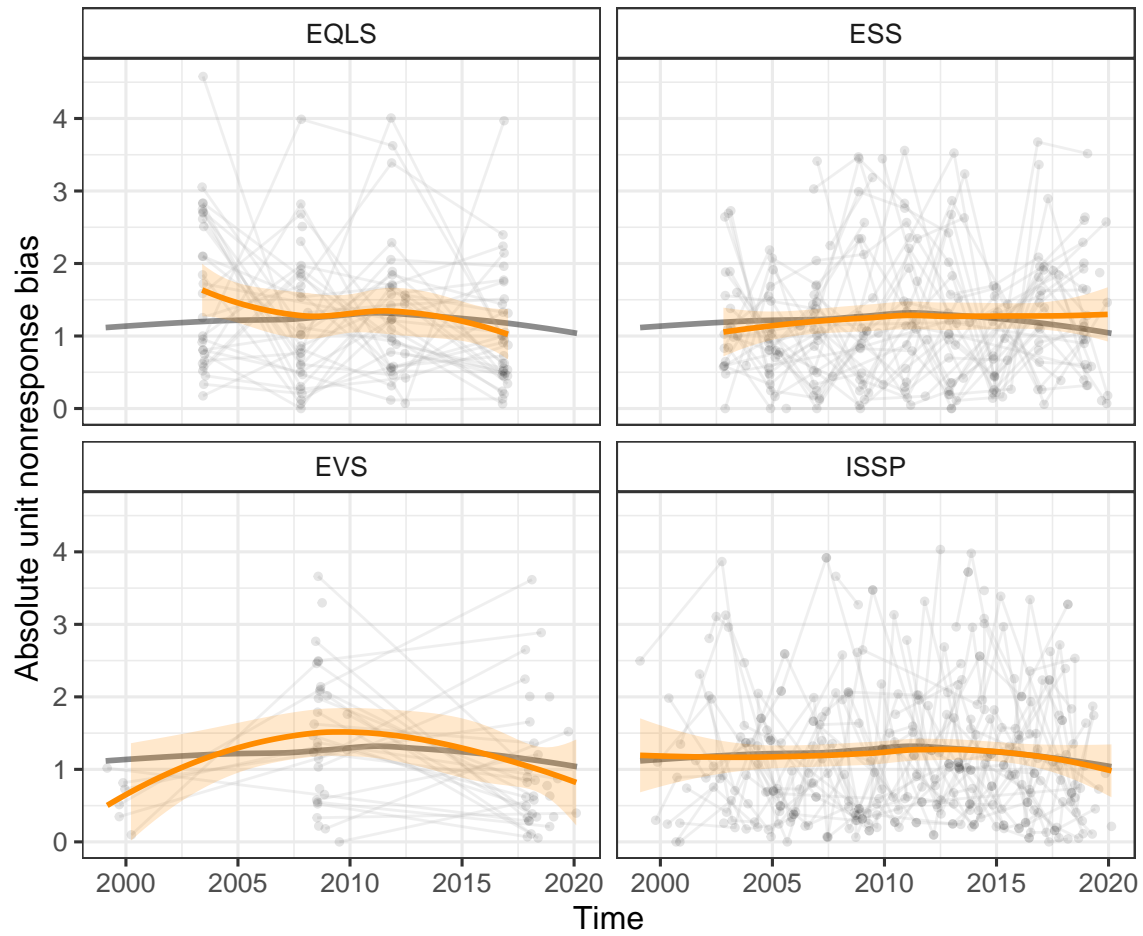
Harmonised response rates over time by project. The grey curve indicates the LOESS trend in all surveys in the estimation sample. The orange curves indicate the LOESS trends within each project, with the 95% confidence interval indicated by the ribbon.

Figure 9



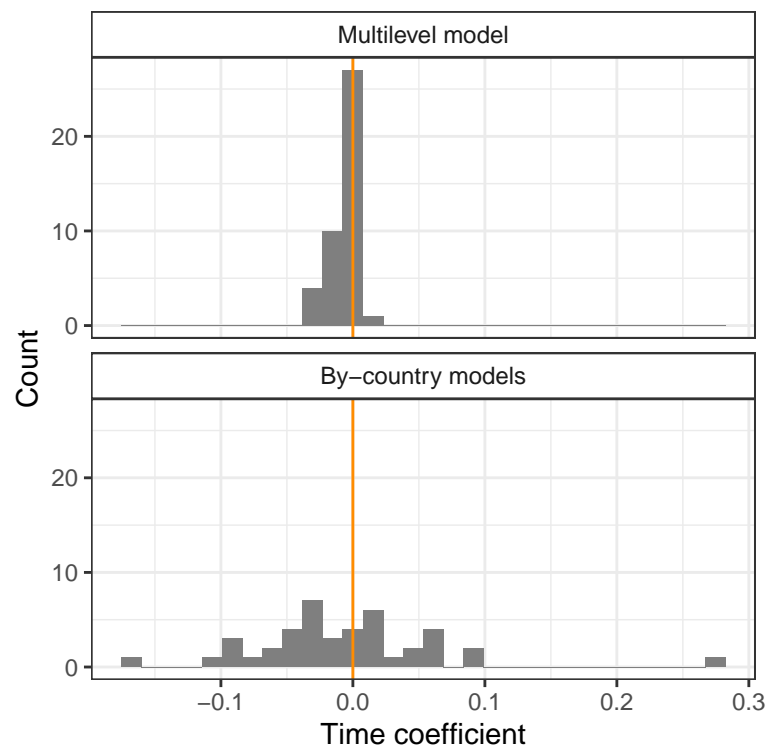
Distribution of the effect of time on response rates from the multi-level model and from by-country OLS models. Adjustment set 4.

Figure 10



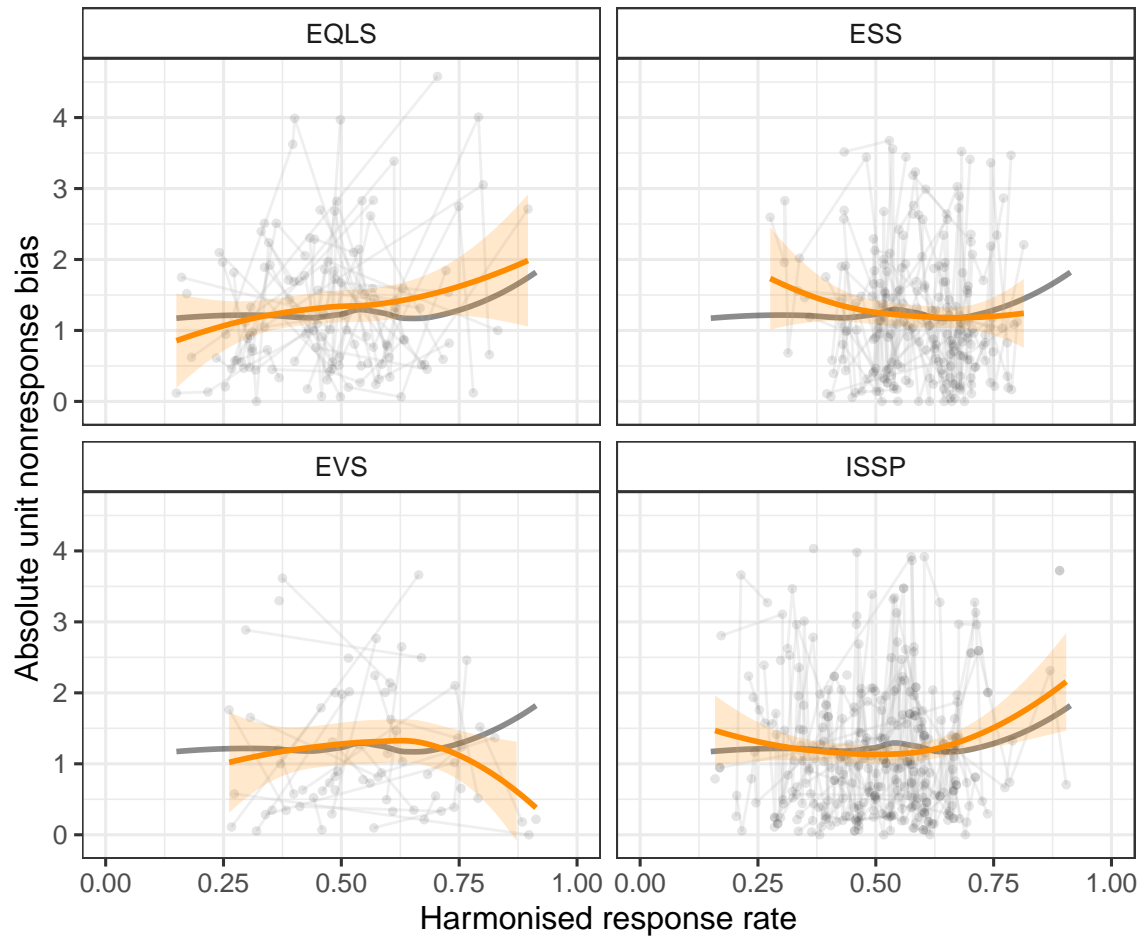
Absolute nonresponse bias over time by project. The grey curve indicates the LOESS trend in all surveys in the estimation sample. The orange curves indicate the LOESS trends within each project, with the 95% confidence interval indicated by the ribbon. Y axes corresponding to nonresponse bias are restricted to exclude outliers with bias exceeding 4.6 to improve readability. LOESS curves are calculated with all observations.

Figure 11



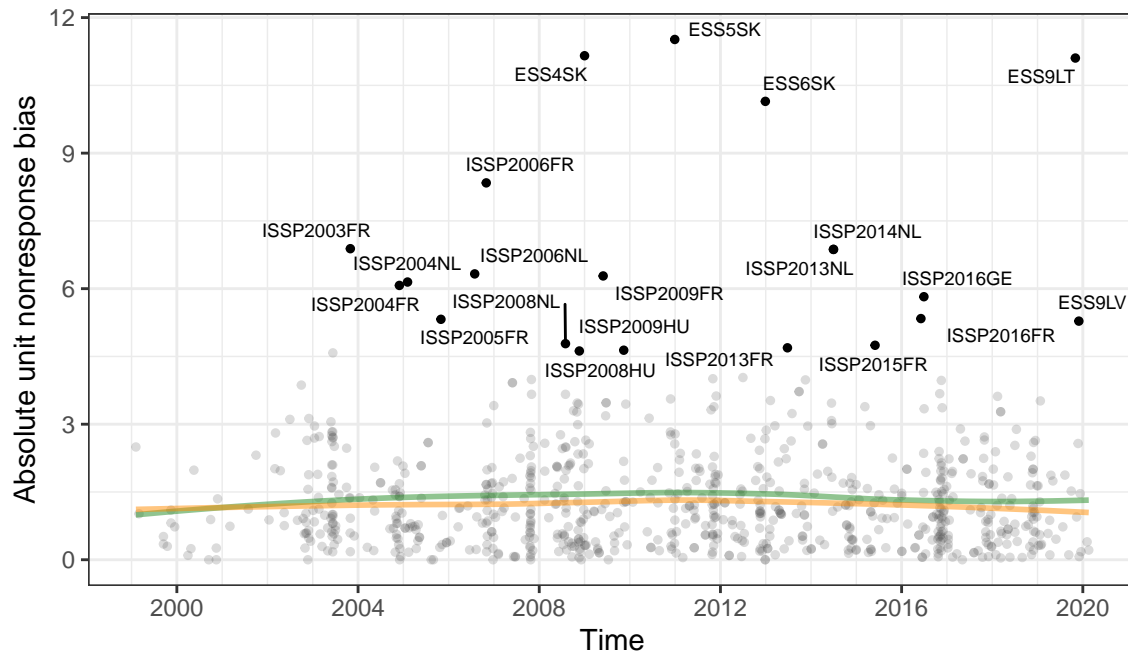
Distribution of effect of time on nonresponse bias from the multi-level model and from by-country OLS models. Adjustment set 4.

Figure 12



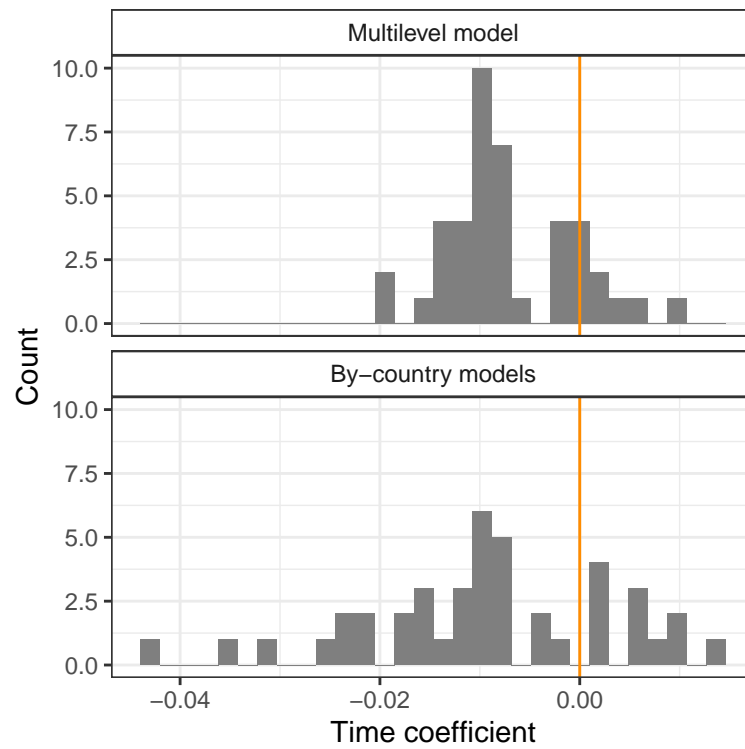
Absolute nonresponse bias and response rates by project. The grey curve indicates the LOESS trend in all surveys in the estimation sample. The orange curves indicate the LOESS trends within each project, with the 95% confidence interval indicated by the ribbon. Y axes corresponding to nonresponse bias are restricted to exclude outliers with bias exceeding 4.6 to improve readability. LOESS curves are calculated with all observations.

Figure E1



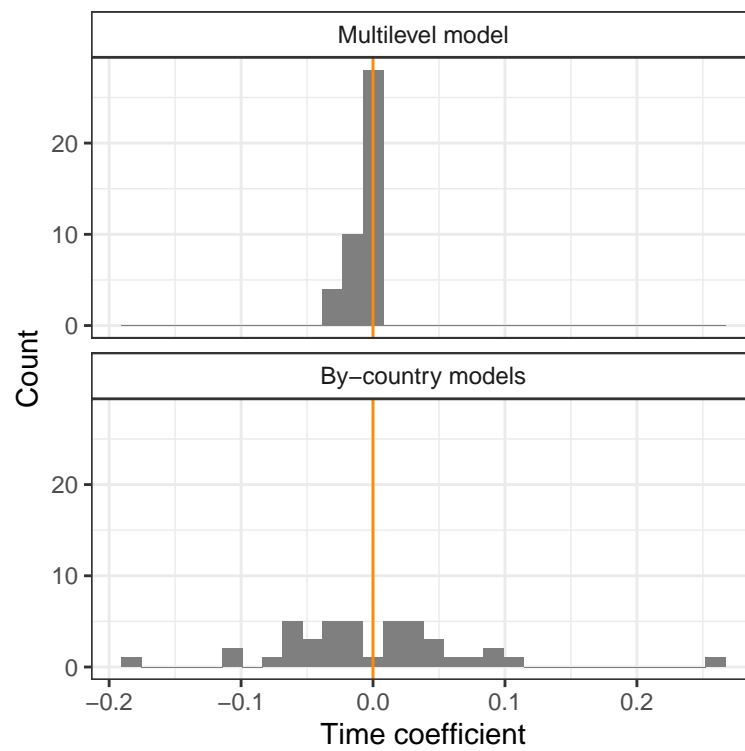
Changes in absolute unit nonresponse bias over time. The green curve indicates the LOESS trend for all observations. The orange curve indicates the LOESS trend after excluding outliers with unit nonresponse bias exceeding 4.6. FR = France, GE = Georgia, HU = Hungary, IT = Italy, LT = Lithuania, LV = Latvia, NL = the Netherlands, SK = Slovakia.

Figure E2



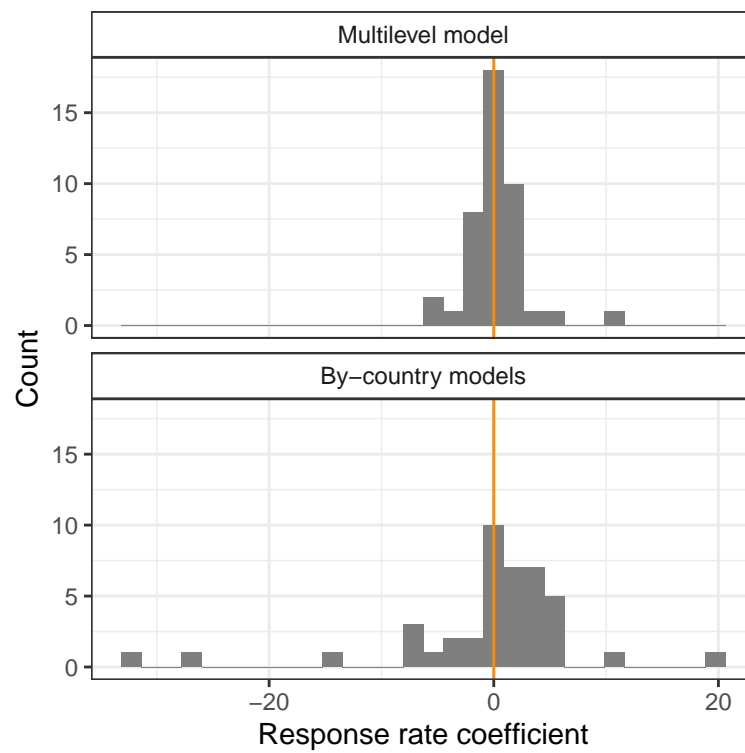
Distribution of the effect of time on response rates from the multi-level model and from by-country OLS models. Adjustment set 3: country.

Figure E3



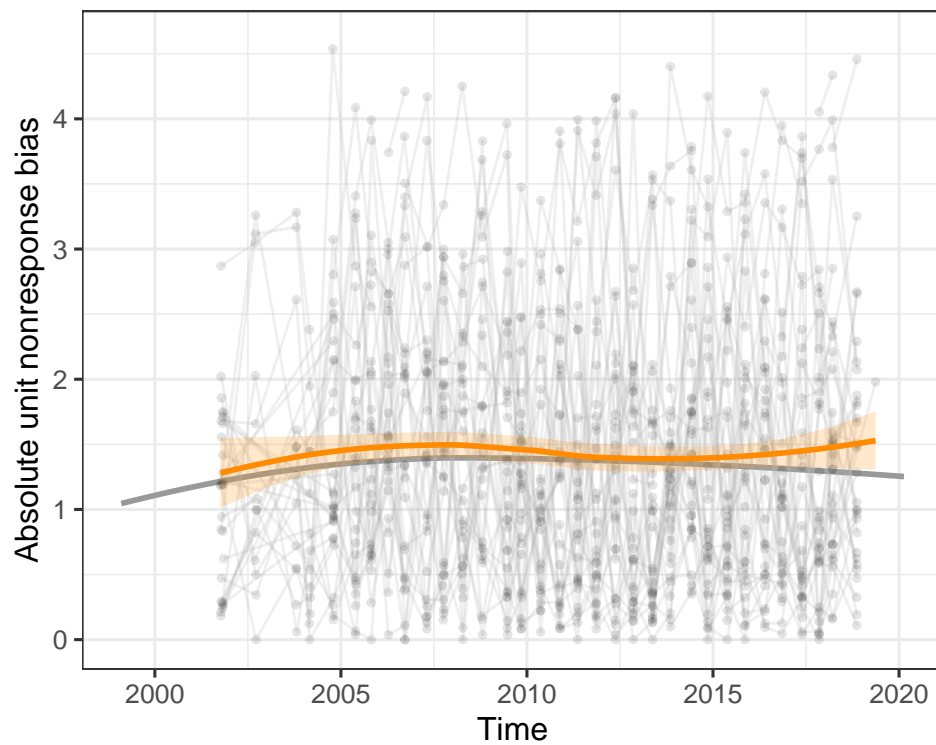
Distribution of effect of time on nonresponse bias from the multi-level model and from by-country OLS models. Adjustment set 3: country.

Figure E4



Distribution of coefficients for response rate from the multi-level model and from by-country OLS models. Adjustment set 2: country, time, survey characteristics, and project.

Figure F1



Absolute nonresponse bias over time in the Eurobarometer. The grey curve indicates the LOESS trend in all surveys including EB, EQLS, ESS, EVS, and ISSP.