Supplementary materials for 'Modeling public opinion over time and space: Trust in state institutions in Europe, 1989-2019'

Contents

1 Project names, links to websites, and references

Asia-Europe Survey (ASES): https://www.icpsr.umich.edu/web/ICPSR/studies/22324 (Inoguchi, 2001)

Candidate Countries Eurobarometer (CCEB): https://ec.europa.eu/commfrontoffice/publicopinion/archives/cceb2_en.htm (Mohedano-Brethes and de Magny, 2004; de Magny, 2004a,b,c; Mohedano-Brethes and de Magny, 2016)

Consolidation of Democracy in Central and Eastern Europe (CDCEE): https://search.gesis.org/research_data/ZA4054 (Rotman et al., 2004)

Eurobarometer (EB): https://ec.europa.eu/commfrontoffice/publicopinion (European Commission, 2012a,b,c,d,e,f,g,h,i,j,k,l; Papacostas, 2012a,b,c; European Commission, 2012m; Papacostas, 2013a, 2012d, 2013b, 2012e,f,g; European Commission, 2013, 2014a,b, 2015a,b, 2017a,b,c, 2018a,b,c,d, 2019a, 2020a,b, 2017d, 2018e,f, 2019b,c,d)

European Quality of Life Survey (EQLS): https://www.eurofound.europa.eu/surveys/european-quality-of-life-surveys (European Foundation for the Improvement of Living and Working Conditions, 2018)

European Social Survey (ESS): https://www.europeansocialsurvey.org/ (European Social Survey, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018)

European Values Study (EVS): https://europeanvaluesstudy.eu/ (Gedeshi et al., 2020b,a)

International Social Survey Programme (ISSP): http://www.issp.org/ (Evans et al., 1993; Kelley et al., 2000; Höllinger et al., 2018)

Integrated and United: A Quest for a Citizenship in an Ever Closer Europe (INTUNE): https://www.mzes.uni-mannheim.de/d7/en/datasets/integrated-and-united-a-quest-for-a-citizenship-in-an-ever-closer-europe (Cotta et al., 2013)

Life in Transition Survey (LITS): https://www.ebrd.com/what-we-do/economic-research-and-data/data/lits.html (European Bank for Reconstruction and Development, 2006, 2010, 2016)

New Baltic Barometer (NBB): http://www.cspp.strath.ac.uk/catalog2_0.html (Rose, 2010a)

New Europe Barometer (NEB): http://www.cspp.strath.ac.uk/nebo.html (Rose and Paul Lazarsfeld Society (Vienna), 2010a,b; Paul Lazarsfeld Society (Vienna) and Rose, 2010; Rose and Paul Lazarsfeld Society (Vienna), 2010c; Rose, 2010b; Rose and Mishler, 2010)

World Values Survey (WVS): http://www.worldvaluessurvey.org/wvs.jsp (World Values Survey, 2015)

2 Source data description

2.1 Sample types and weights

Sample classification is based on the one proposed by Kohler (2007), which includes: (1) single-stage register samples drawn from individual (name) registers, often with stratification; (2) multi-stage samples based on address registers; (3) multi-stage samples based on address or household registers; (4) multi-stage listing samples, where enumeration of households is performed and constitutes a sampling frame for household selection; (5) multi-stage samples with selection of households performed via random route procedures; (6) samples with a quota component, typically with age and gender quotas applied to within-household respondent selection; (7) inadequately documented or undocumented samples.

Codes for sample types in CCEB, EB, EQLS, ESS, and ISSP were taken from the harmonized methodological survey documentation presented in Jabkowski and Kołczyńska (2020). The remaining coding was performed on the basis of the available survey documentation.

Of the analyzed projects, only the European Social Survey consistently provides weights that account for the sampling design. The European Quality of Life Survey provides design weights that account for the entire sampling design in Wave 3. The other projects typically provide poststratification weights that correct sample proportions of selected demographic characteristics to their shares in the respective populations, or provide no weights at all.

Table 1: Summary of sample types in the analyzed surveys.

Project	Wave	Years	Surveys	Sample types	Weights
ASES	1	2000	9	primarily multi-stage samples with quota-based selection within households	no weights
CCEB	5 waves*	2001-2004	50	multi-stage random route	poststratification
CDCEE	1	1990-1991	5	most samples not documented	no weights
CDCEE	2	1998-2001	11	most samples not documented	poststratification
EB	44 waves**	1996-2019	1000	multi-stage random route	poststratification
EQLS	2	2007	26	multi-stage random route	poststratification
EQLS	3	2011	25	multi-stage random route and multi-stage address	poststratification
EQLS	4	2016	25	multi-stage random route multi-stage address and multi-stage individual-register samples	design and poststratification
ESS	1-9	2002-2019	193	multi-stage listing multi-stage address multi-stage individual register samples and single-stage individual-register samples	design and poststratification
EVS	2	1990-1993	21	primarily quota samples	poststratification
EVS	3-5	1999-2018	74	multi-stage random route multi-stage address and multi-stage individual-register samples	poststratification
INTUNE	2009	2009	16	phone register samples, random route samples and random digit dialling	poststratification
ISSP	1991, 1998, 2008	1990-2010	51	multi-stage random route multi-stage register samples and single-stage individual-register samples	poststratification
LITS	2006	2006	10	samples not documented	poststratification
LITS	2010, 2016	2010,2016	28	mix of multi-stage random route and multi-stage register samples	poststratification
NBB	1, 3, 5, 6	1993-2004	12	primarily multi-stage random route samples	poststratification
NEB	2, 3	1992,1993	10	samples not documented	poststratification
NEB	4	1995	6	random route multi-stage address or multi-stage individual register samples; some samples undocumented	poststratification
NEB	5	1998	7	random route multi-stage address or multi-stage individual-register samples	poststratification
NEB	6	2001	7	multi-stage address or multi-stage individual register samples and samples with a quota component	poststratification
NEB	7	2004	7	multi-stage individual register samples and samples with a quota component	poststratification

WVS	2	1989-1991	4	samples not documented	poststratification
WVS	3	1995-1998	16	samples with a quota component multi-stage random route multi-stage register samples; some samples without documentation	poststratification
WVS	4	2000	1	multi-stage random route	poststratification
WVS	5	2005-2009	15	samples with a quota component multi-stage random route multi-stage register samples	poststratification
WVS	6	2011-2013	8	samples with a quota component and multi-stage register samples	poststratification

*CCEB waves: 2001.1, 2002.2, 2003.2, 2003.4, 2004.1. **EB waves: 44.2bis, 48, 51, 54.1, 55.1, 56.2, 57.1, 59.1, 60.1, 61, 62, 64.2, 65.2, 66.1, 66.3, 67.2, 68.1, 69.2, 70.1, 71.1, 71.3, 72.4, 73.4, 74.2, 75.3, 76.3, 77.3, 78.1, 79.3, 80.1, 81.2, 81.4, 82.3, 83.1, 83.3, 84.3, 85.2, 86.2, 87.3, 88.3, 89.1, 90.3, 91.2, 91.5.

2.2 Variables

Names of source variables from each dataset are provided in the replication materials (https://osf.io/uyzfe/): `vars_all.xlsx` in `1_harmonization\harmonization.zip`.

Table 2: Response scale lengths by project.

Project	Trust scale length
ASES	4
CCEB	2
CDCEE	4
EB	2
EQLS	10
ESS	11
EVS	4
INTUNE	11
ISSP	5
ISSP	4*
LITS	5
NBB	4
NBB	7
NEB	7
WVS	4

*Only in ISSP, wave 1991, Slovenia.

2.2.1 Question wording

This section provides the full question wording, including the request for answer, response options, and items (corresponding to names of institutions) in the analysed projects, based on the information in English-language master questionnaires.

In most cases, question design did not change from wave to wave within projects, and the wording the most recent wave is given. The exception is New Baltic Barometer, where response scales changed from 4 points in waves 1 and 3 to 7 points in waves 5 and 6. Both versions are provided.

2.2.1.1 ASES Now, could you tell me how much confidence you have in each of the following? There may be one or two items on the list that you haven't thought much about. If so, just tell me and we'll go to the next item.

A great deal
Quite a lot
Not much
None at all
Don't know
Haven't thought much about it

The [NATIONAL PARLIAMENT - INSERT ACCORDING TO COUNTRY]
The political parties
The law and the courts

Source: ASES 22324-0001-Codebook.pdf

2.2.1.2 CCEB (wave 2004.1) I would like to ask you a question about how much trust you have in certain institutions. For each of the following institutions, please tell me if you tend to trust it or tend not to trust it?

tend to trust
Tend not to trust
DK / No opinion
Refused

Justice / the [COUNTRY] legal system
Political parties
The [COUNTRY] parliament (USE PROPER NAME FOR LOWER HOUSE)

Source: ZA4246_bq_en.pdf

2.2.1.3 CDCEE (wave 2) In order to get ahead, people need to have confidence and to feel that they can trust themselves and others. To what degree do you think that you trust the following totally, to a certain point, little, or not at all?

Totally
To a certain point
Little
Not at all
DK
NA

Political parties
The Parliament

Source: CDCEE II basic questionnaire.pdf

2.2.1.4 EB (round 91.5) I would like to ask you a question about how much trust you have in certain media and institutions. For each of the following media and institutions, please tell me if you tend to trust it or tend not to trust it.

Tend to trust
Tend not to trust
DK

Political parties
Justice the (NATIONALITY) legal system
The (NATIONALITY PARLIAMENT) (USE PROPER NAME FOR LOWER HOUSE)

Source: ZA7576_bq.pdf

2.2.1.5 EQLS (wave 4, 2016) Please tell me how much you personally trust each of the following institutions. Please tell me on a scale of 1 to 10, where 1 means that you do not trust at all, and 10 means that you trust completely.

Do not trust at all
Trust completely
(Don't know)
(Refusal)

[NATIONALITY] parliament
The legal system

Source: 4th_eqls_final_master_source_questionnaire_12_june_2017_-_updated_07_september_2017.pdf

2.2.1.6 ESS (wave 9, 2018) Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. Firstly...

No trust at all
Complete trust
(Refusal)
(Don't know)

[country]'s parliament
the legal system
political parties

Source: ESS9_source_questionnaires.pdf

2.2.1.7 EVS (wave 5, 2017) Please look at this card and tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all?

a great deal
quite a lot
not very much
none at all
DK
NA

Parliament
The justice system
Political parties

Source: ZA7500_bq_CAPI.pdf

2.2.1.8 INTUNE (wave 2, 2009) Please tell me on a scale of 0 to 10, how much you personally trust each of the following institutions to usually take the right decisions. '0' means that "you do not trust an institution at all" and '10' means "you have complete trust".

The (NATIONALITY) Parliament

Source: 34272-0001-Questionnaire.pdf

2.2.1.9 ISSP (wave 2008) How much confidence do you have in ...

Complete confidence
A great deal of confidence
Some confidence
Very little confidence
No confidence at all
Can't choose

[Parliament] <use national legislature, e.g. U.S. Congress>
Courts and the legal system

Source: ZA4950_bq.pdf

Exception ISSP/1991/Slovenia:

To what extent can you trust the following:

Slovenian Assembly
Courts

Totally
A lot
Somewhat
Not at all
I don't know

Source: ZA2150_q_si.pdf

2.2.1.10 LITS (wave 3, 2016)

To what extent do you trust the following institutions?

Complete distrust
Some distrust
Neither trust nor distrust
Some trust
Complete trust
Not applicable
Don't know

The parliament
Courts
Political parties

Source: LiTS III - Questionnaire.pdf

2.2.1.11 NBB

Waves 1, 3:

To what extent do you trust the following public institutions? Do you trust them completely or somewhat trust or somewhat distrust or completely distrust?

Complete trust
General trust
General distrust
Complete distrust

Parliament
Political parties
Courts

Waves 5, 6:

To what extent do you trust each of these political institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 great trust.

Parliament
Political parties
Courts

Source: 6510nbb_trend_codebook.pdf

2.2.1.12 NEB (wave 7, 2004)

To what extent do you trust each of the following institutions to look after your interests? Please indicate on a scale with 1 for no trust at all and 7 great trust.

Courts
Political parties
Parliament

Source: 5243userguide.pdf

2.2.1.13 WVS (wave 6, 2010-2014) I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?

A great deal
Quite a lot
Not very much
None at all

The courts
Political parties
Parliament

Source: F00001101-WV6_Official_Questionnaire_v4_June2012.pdf

3 Calculated rescaled means of single trust items

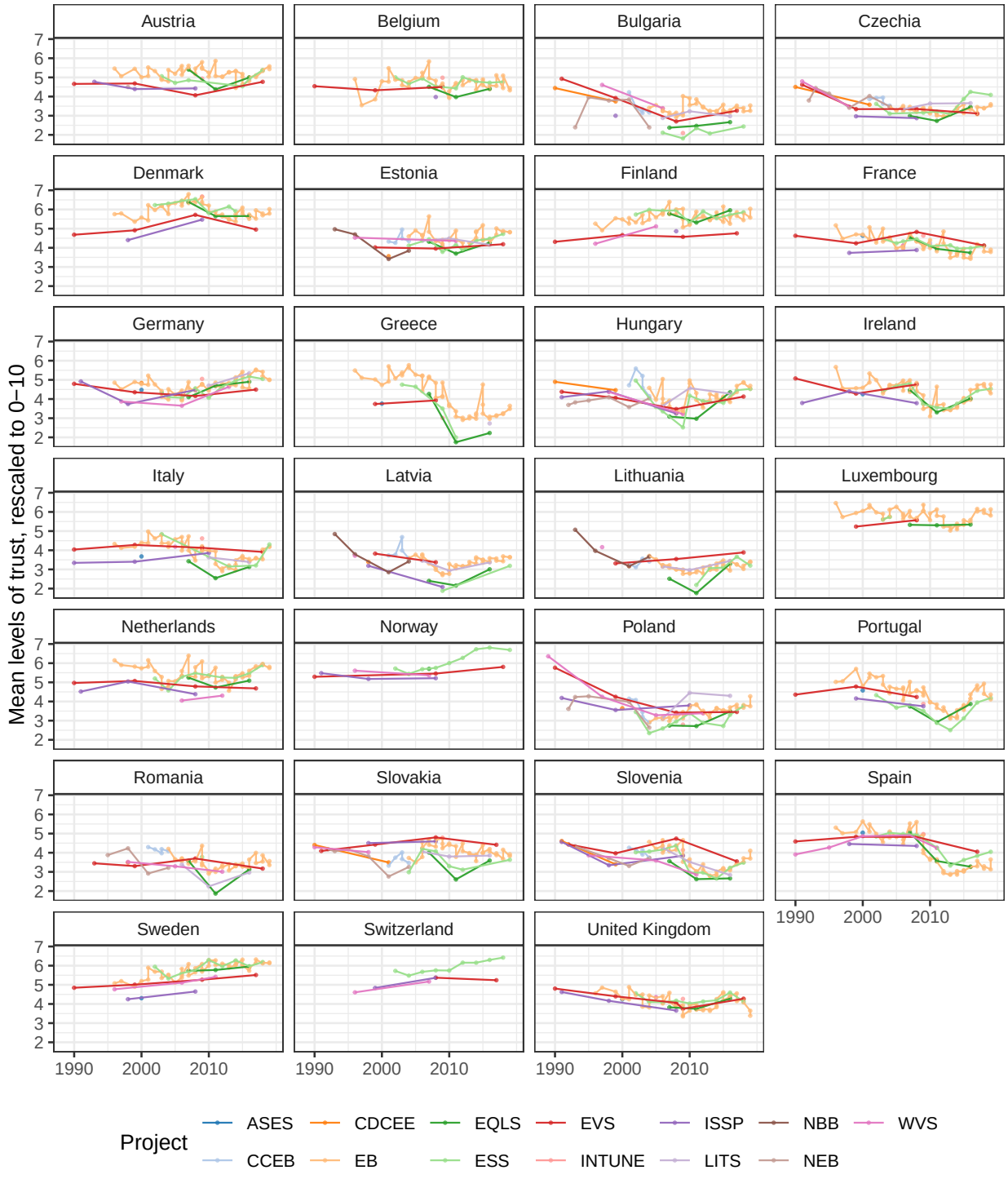

Figure 1: Raw means of trust in parliament (rescaled to 0-10).

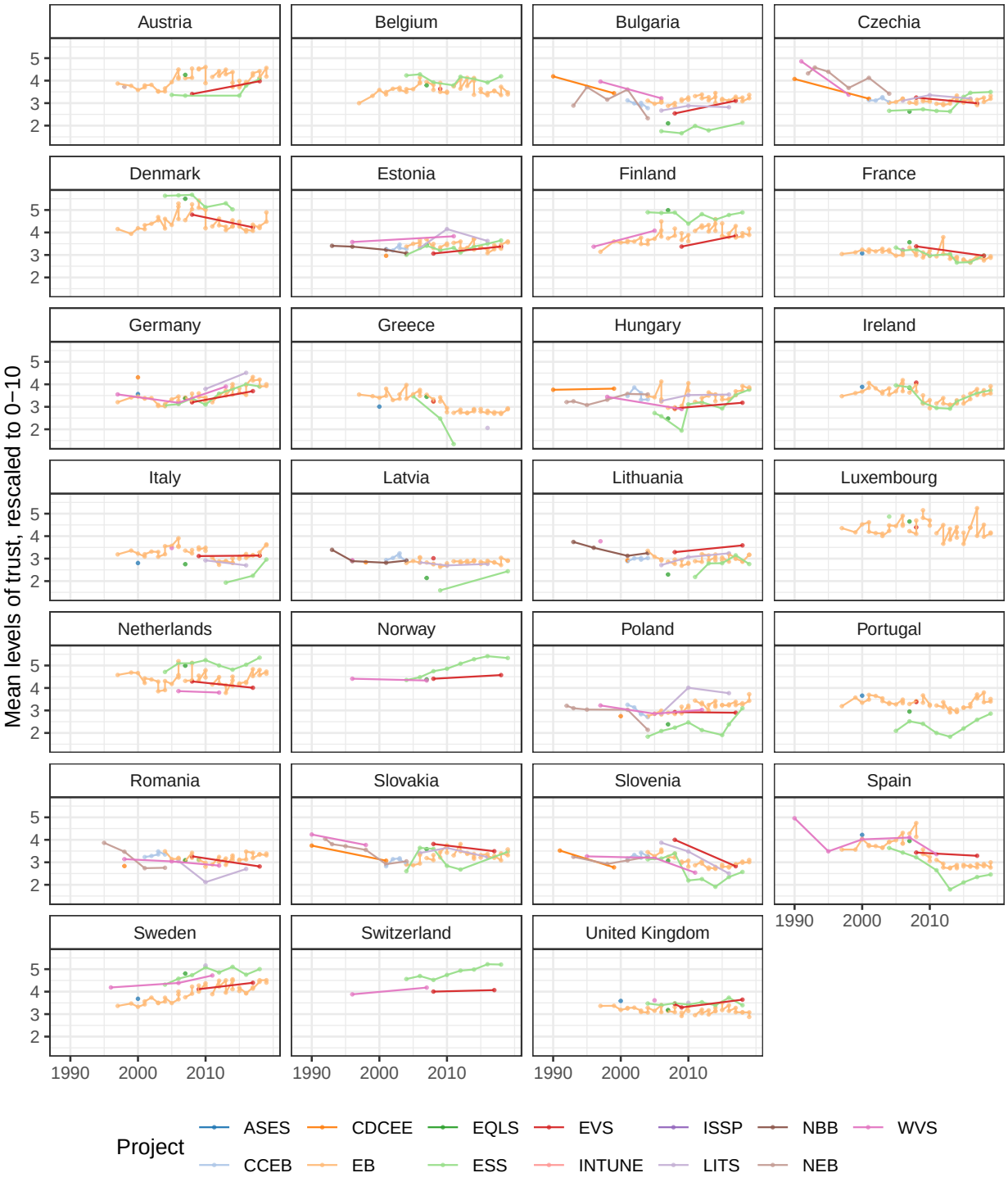

Figure 2: Raw means of trust in political parties (rescaled to 0-10).

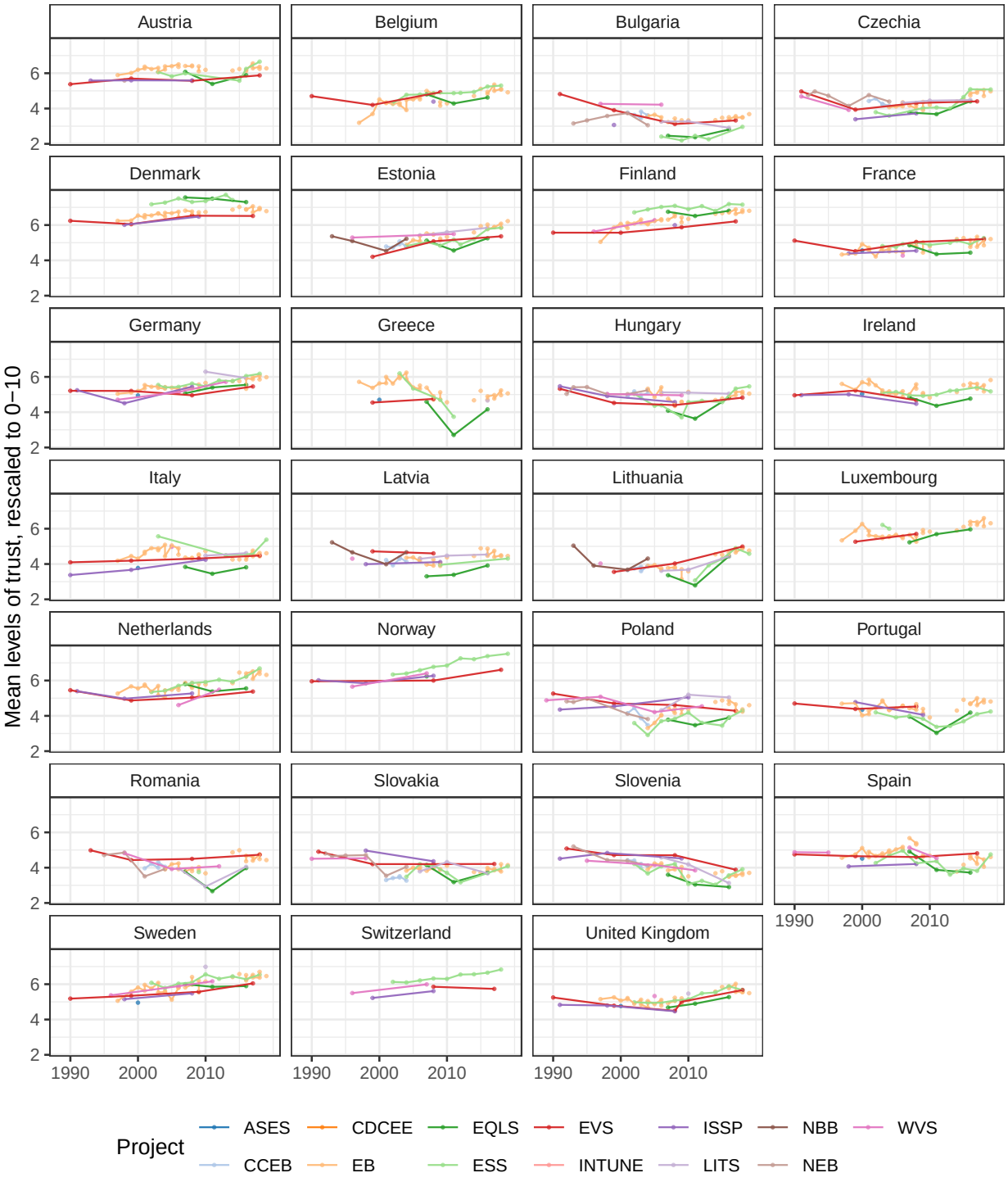

Figure 3: Raw means of trust in the justice system (rescaled to 0-10).

4 Comparison of model results with and without modeled discrimination

The proposed analytical approach assumes that discriminations (equivalent to factor loadings) are constant across items; in other words, all items are weighted equally (Bürkner, 2021). This seems reasonable given the low number of items used to model political trust – we use three items, but not in all source surveys all three are available – also in light of the additional computational challenges that come with modeling discriminations (Bürkner, 2021). To examine the possible effect of modeling item discrimination, for two selected countries we estimated models with discrimination free to vary. We present the estimated political trust levels below.

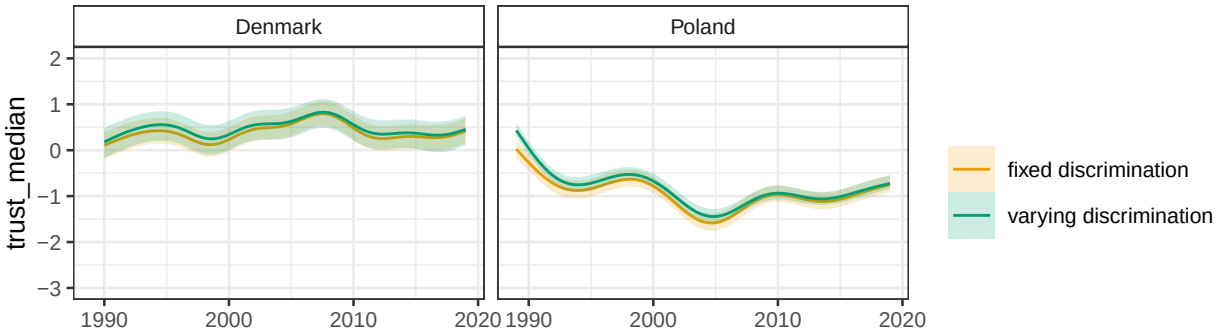

Figure 4: Estimated trends in political trust in models with fixed discrimination and with discrimination free to vary across projects and institutions. Posterior medians and 95% credible intervals.

5 Comparison to the Dynamic Comparative Public Opinion model

The Dynamic Comparative Public Opinion (DCPO, Solt, 2020) model is a pooled group item response theory model for modeling public opinion based on cross-national survey data (see Solt, 2020, for the mathematical details). In the DCPO model, data from all countries are analyzed together. By comparing estimates obtained with the modeling approach proposed in the present paper, and the one from DCPO, we demonstrate that analyzing data from different countries separately does not hurt cross-country comparability of results.

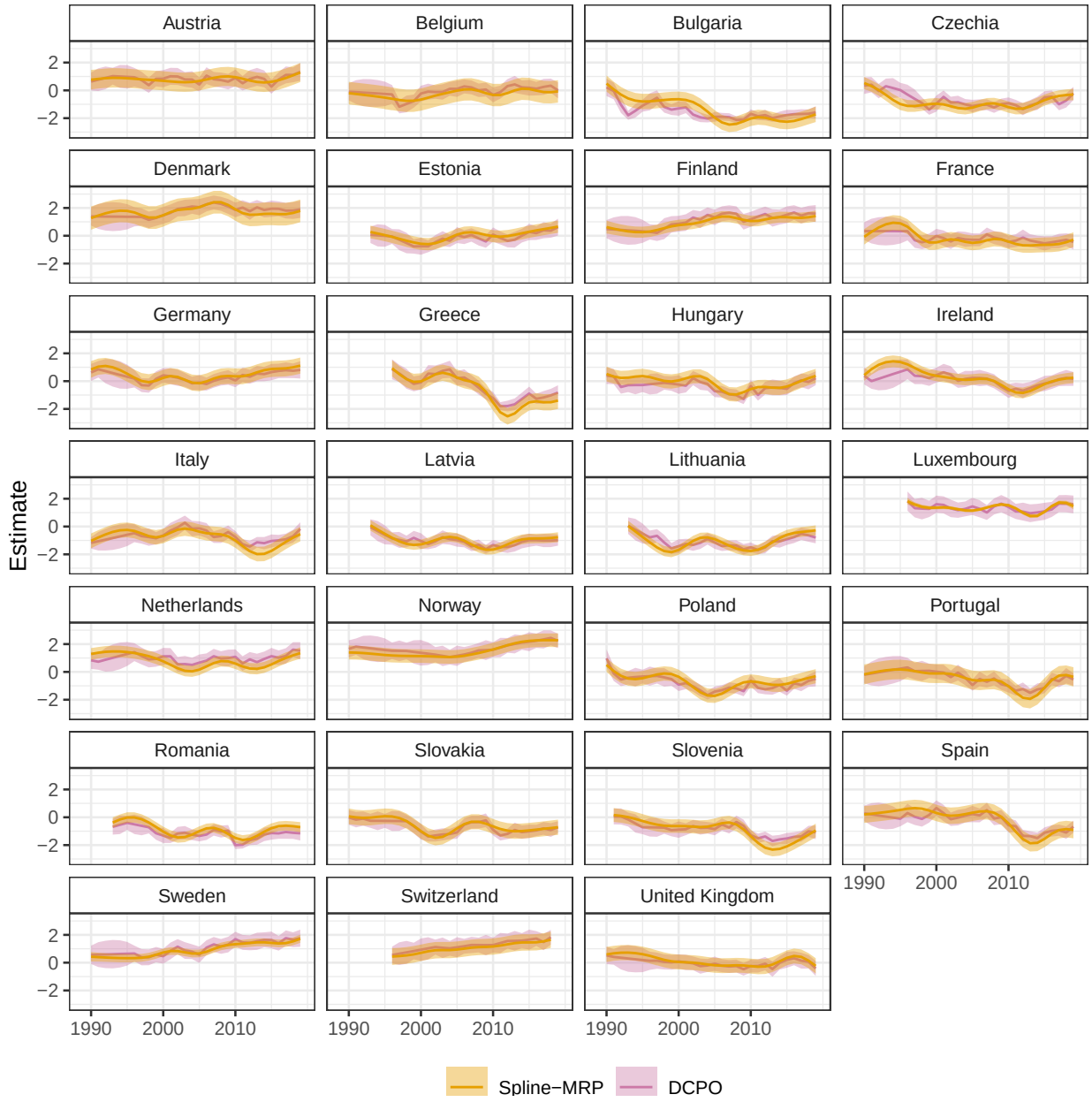

Figure 5: Estimated trends in political trust compared to the DCPO model by Solt (2020). Standardized values with +/- two standard deviations from posterior mean.

6 Comparison to models without weights

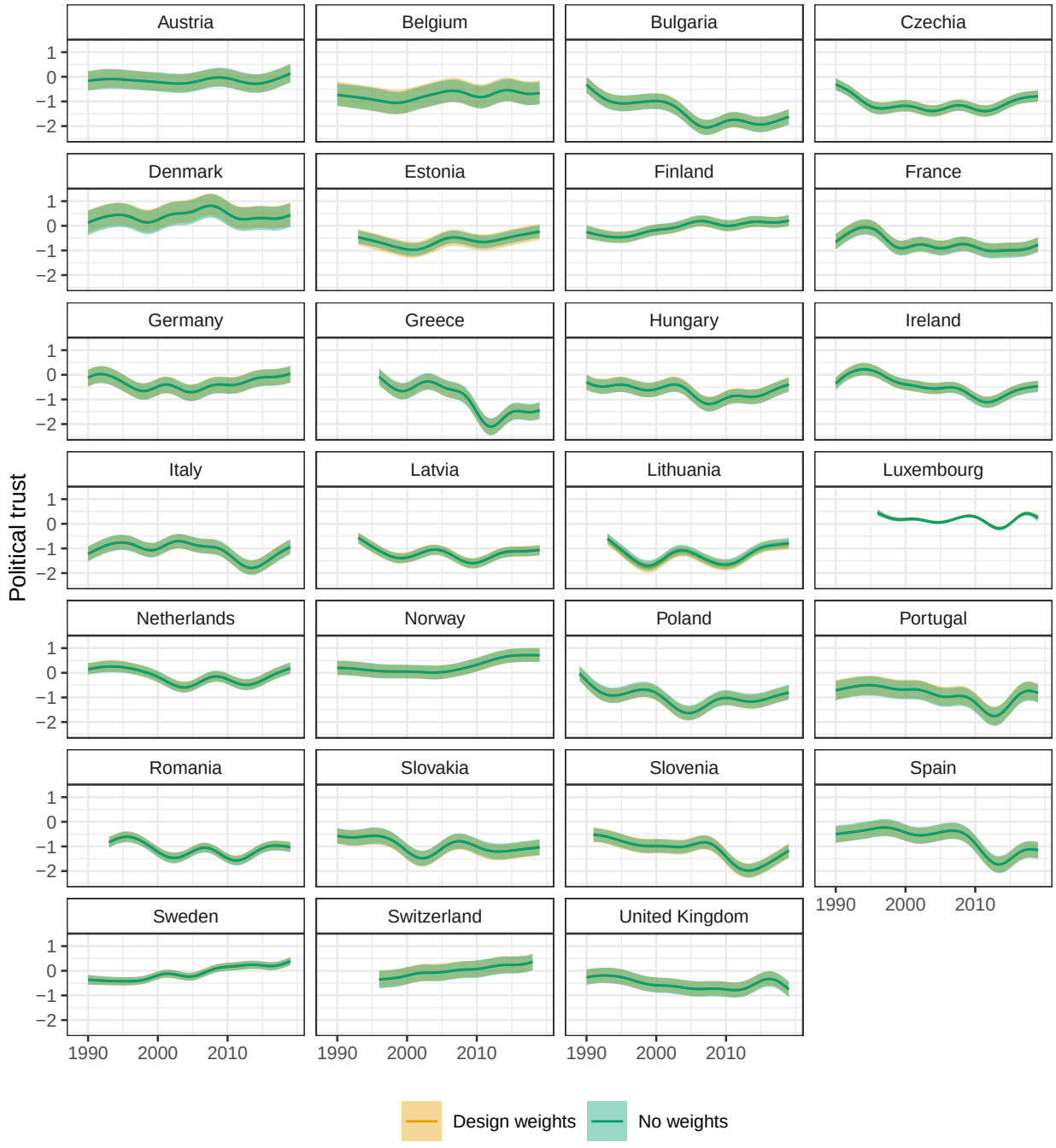

Figure 6: Estimated trends in political trust in models with design weights and without weights. Posterior medians and 95% credible intervals.

7 Comparison to models with combined design and poststratification weights

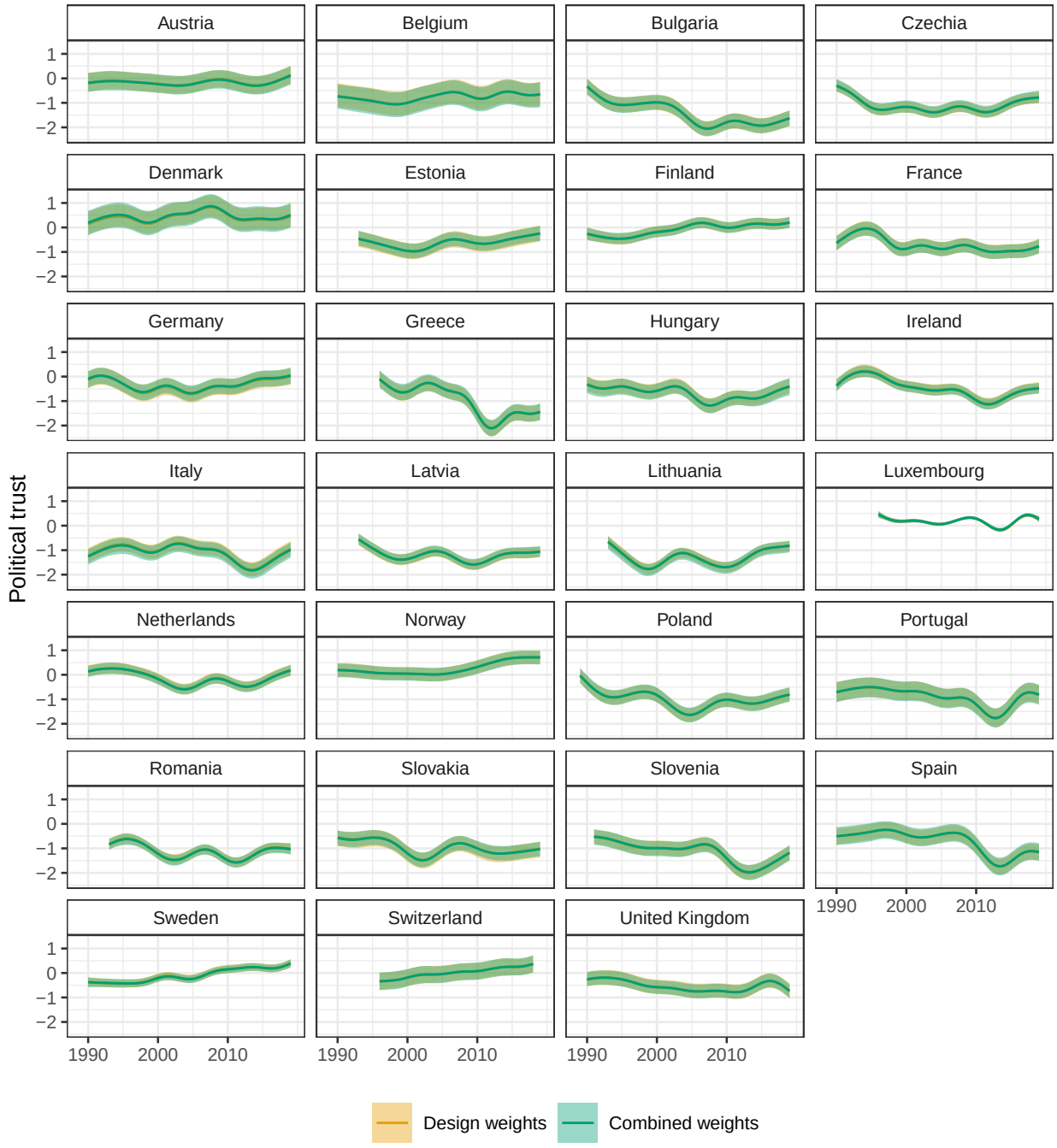

Figure 7: Estimated trends in political trust in models with design weights and with combined design and poststratification weights. Posterior medians and 95% credible intervals.

8 Levels of political trust by country: overall and by sex, age, and education

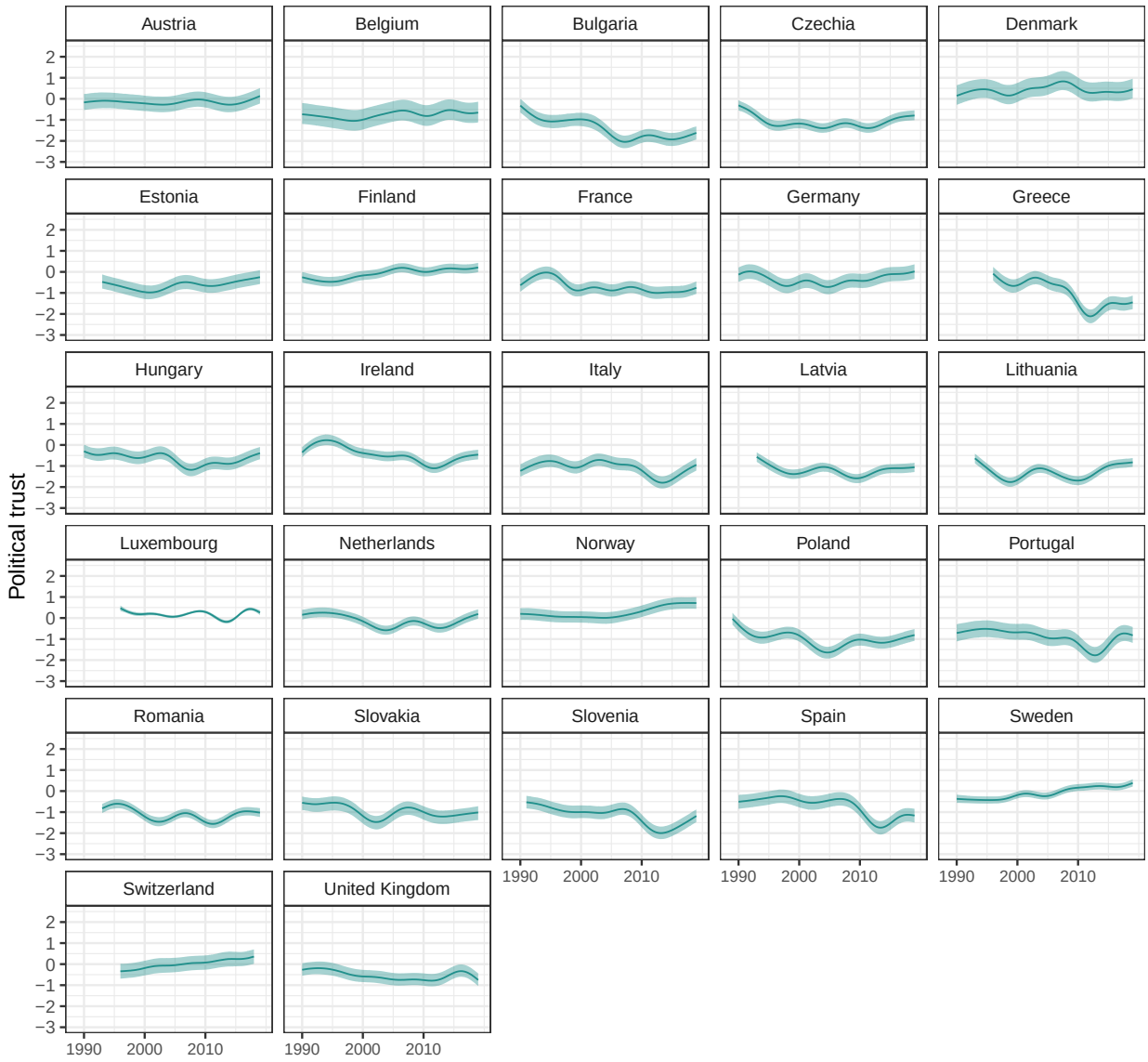

Figure 8: Estimated overall levels of political trust, poststratified by sex, age, and education. Estimates and 95% credible intervals.

Figure 9: Estimated levels of political trust by sex, poststratified by age and education. Estimates and 95% credible intervals.

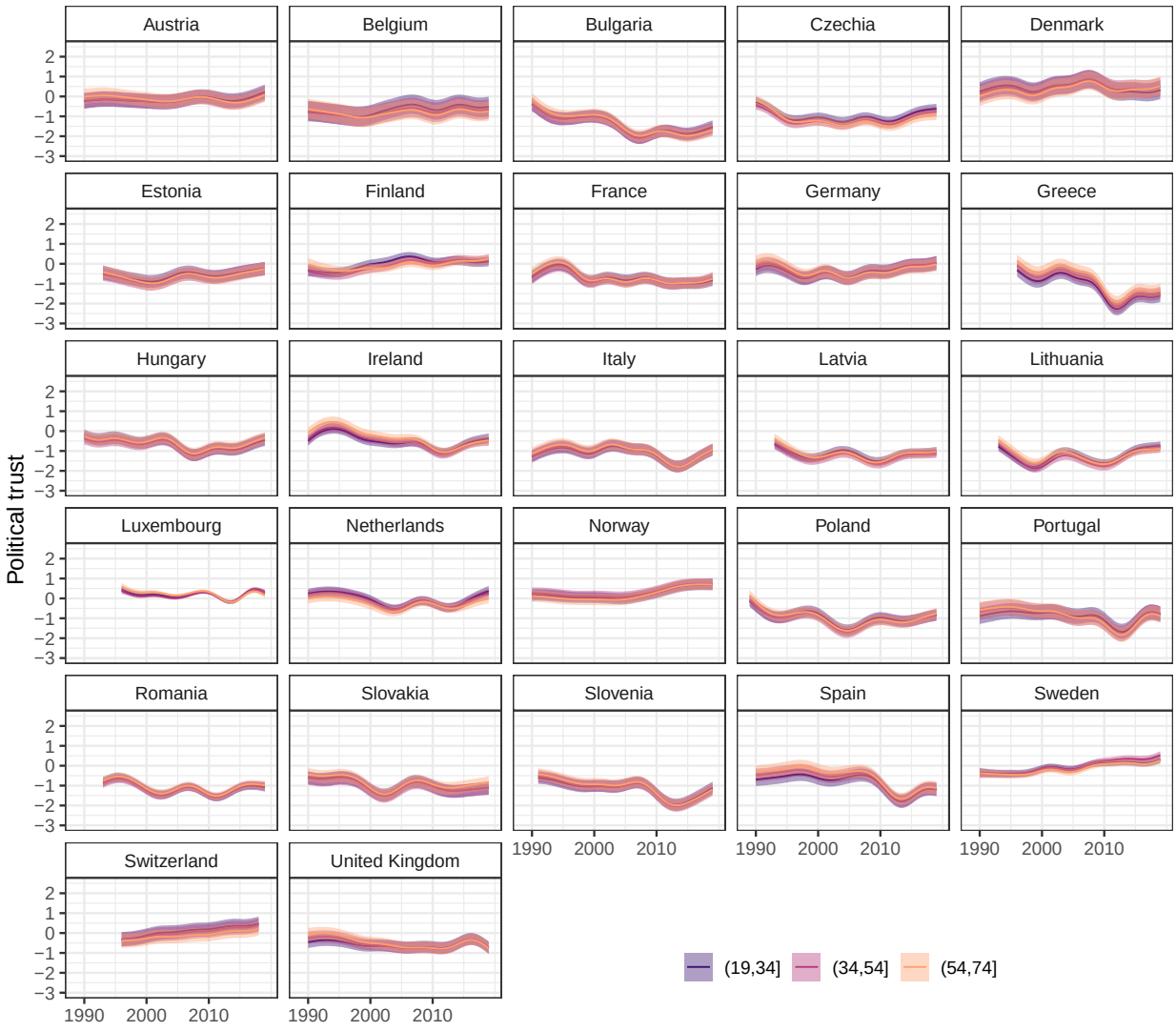

Figure 10: Estimated levels of political trust by age group, poststratified by sex and education. Estimates and 95% credible intervals.

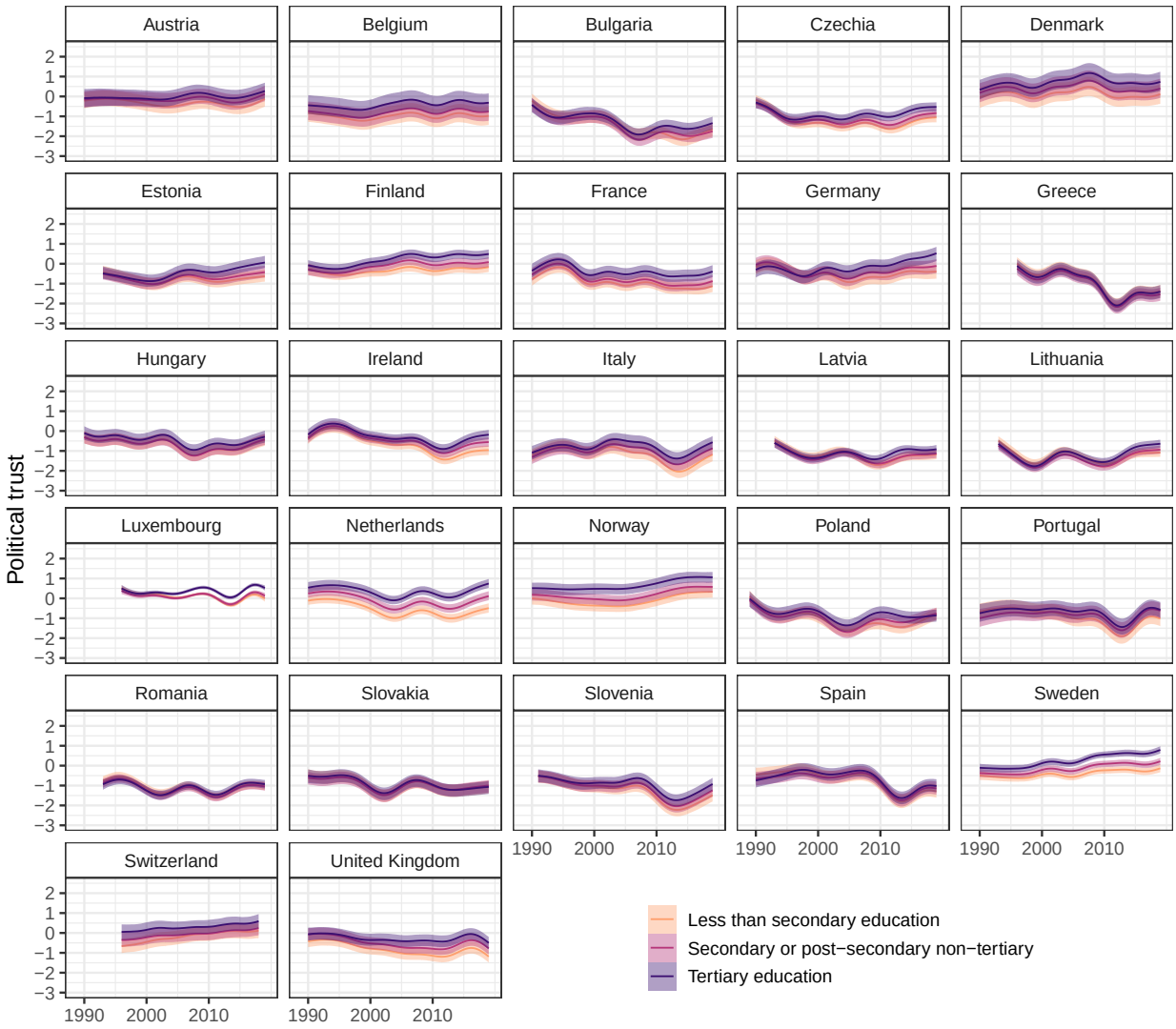

Figure 11: Estimated levels of political trust by education, poststratified by age and sex. Estimates and 95% credible intervals.

9 Software

The analysis is performed in R (R Core Team, 2018) with the `brms` package (Bürkner, 2017), which provides a user-friendly and flexible interface to the probabilistic programming language Stan (Carpenter et al., 2017). Additionally, we used the following R packages: `tidyverse` (Wickham et al., 2019) for manipulating data, `countrycode` (Arel-Bundock et al., 2018) for switching between country codes, `knitr` (Xie, 2020) for creating reproducible documents, `kableExtra` (Zhu, 2019) for creating complex tables, `ggplot2` (Wickham, 2016) for making plots, `patchwork` (Pedersen, 2020) for combining plots, and `ggrepel` (Slowikowski, 2020) for labeling plots. The harmonization work additionally relied on the packages `haven` for reading in data stored in SPSS formats, `labelled` (Larmarange, 2020) and `sjlabelled` (Lüdecke, 2020) for manipulating labelled data, `questionr` (Barnier et al., 2018) for processing survey data, and `rio` (Chan et al., 2018) for importing and exporting data from/to different formats. Color palettes come from the `viridis` (Garnier, 2018) and `ggthemes` (Arnold, 2021) packages. Demographic data from the Eurostat were downloaded via the `eurostat` package (Lahti et al., 2017), while data from IPUMS International were processed using the `ipumsr` package (Ellis and Burk, 2019).

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