

ESS party linking

Holger Döring and Paul Bederke

2023-08-28

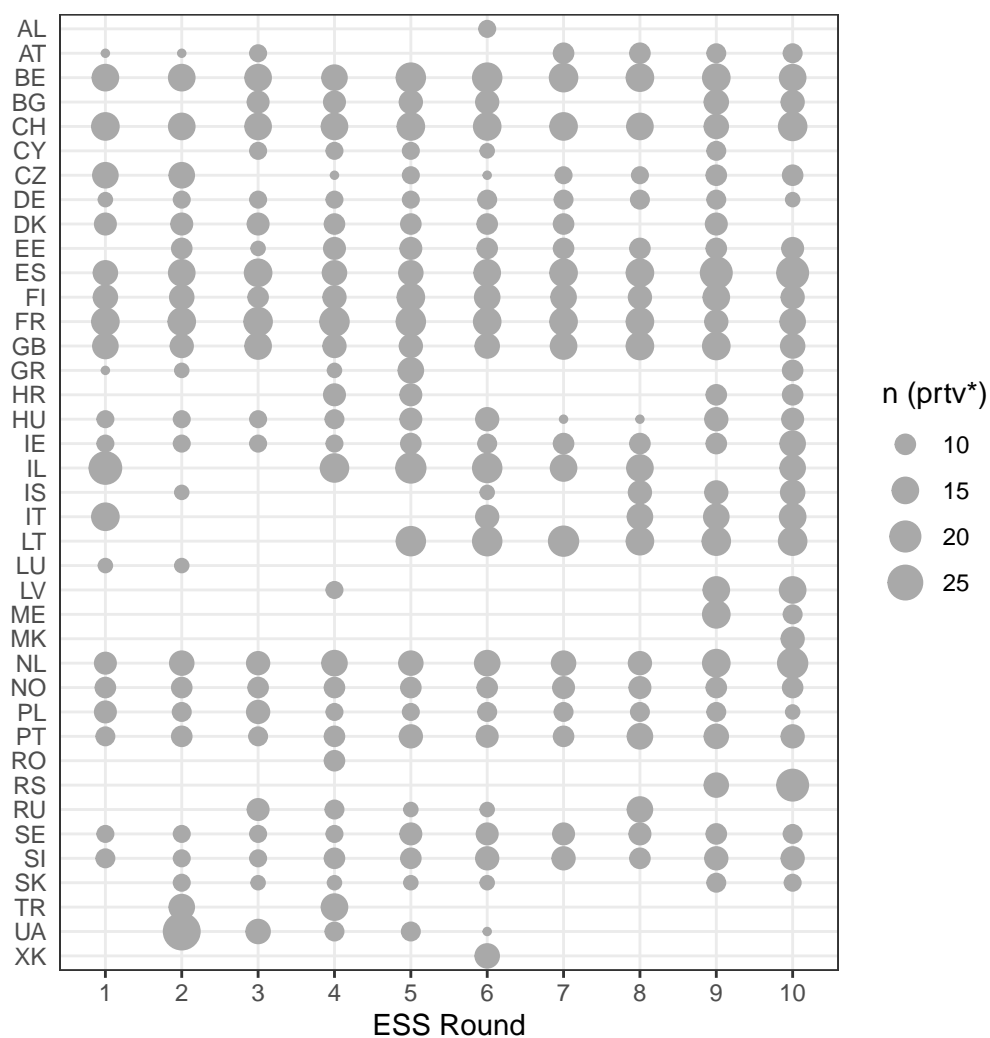
Table of contents

| | |
|--|-----------|
| ESS party linking | 3 |
| 1 ESS data sources | 4 |
| 1.1 ESS data sources | 4 |
| 1.2 ESS rounds | 5 |
| 1.3 Countries | 5 |
| 2 prt* party variables | 7 |
| 2.1 prt* variables | 7 |
| 2.2 ESS-9 example | 7 |
| 2.3 prt* ID differences | 8 |
| 2.4 prt*/prtc ID differences | 9 |
| 3 Party Facts harmonization | 10 |
| 3.1 ESS party IDs | 10 |
| 3.2 Parties per country | 10 |
| 4 CHES left-right validation | 12 |
| 4.1 CHES information | 12 |
| 4.2 CHES and ESS | 12 |
| 4.3 Country-year correlation | 13 |
| 4.4 Share covered | 15 |
| 5 ParlGov losers' consent | 17 |
| 5.1 Losers' consent models | 17 |
| 5.2 Variables | 17 |
| 5.3 Summary statistics | 18 |
| 5.4 Multi-level models (ML) | 19 |
| 5.4.1 Three ML models | 19 |
| 5.4.2 Effects plot ML-1 | 21 |
| 5.5 Linear effects (ML) | 22 |
| 5.6 Fixed effects model | 24 |
| 5.7 Share covered | 25 |

ESS party linking

Code and supplementary information for: Paul Bederke and Holger Döring. 2023. “Harmonizing and Linking Party Information: The ESS as an Example of Complex Data Linking.”

Note — pdf-version of notebook, see also html-version with Tidyverse-R code used to create content



1 ESS data sources

Information on ESS data sources used – see also section “ESS party data structure” in manuscript.

1.1 ESS data sources

ESS data sets from europeansocialsurvey.org/data

DOI references

- ESS Round 1 – https://doi.org/10.21338/ess1e06_6
- ESS Round 2 – https://doi.org/10.21338/ess2e03_6
- ESS Round 3 – https://doi.org/10.21338/ess3e03_7
- ESS Round 4 – https://doi.org/10.21338/ess4e04_5
- ESS Round 5 – https://doi.org/10.21338/ess5e03_4
- ESS Round 6 – https://doi.org/10.18712/ess6e02_5
- ESS Round 7 – https://doi.org/10.21338/ess7e02_2
- ESS Round 8 – https://doi.org/10.21338/ess8e02_2
- ESS Round 9 – https://doi.org/10.21338/ess9e03_1
- ESS Round 10 – https://doi.org/10.21338/ess10e03_1
- ESS Round 10 – https://doi.org/10.21338/ess10sce03_0 (self-completion)

Data files are imported into R with [readstata13](#)

| Round | ESS_file | hash |
|-------|---------------|----------------------------------|
| 1 | ESS1e06_6.dta | c61f508eb0f5b60e038be2d5793a9f4d |
| 2 | ESS2e03_6.dta | 1ddea926b393d16417856e1135b29d67 |
| 3 | ESS3e03_7.dta | f3922c40bf5f37d0d5f1f1553a180898 |
| 4 | ESS4e04_5.dta | f9455c929ace50fd3ab71a9ec9fd51a4 |
| 5 | ESS5e03_4.dta | 88c340e6a63d88bd7b1e42a2ded830de |
| 6 | ESS6e02_5.dta | eb508dfaec9f896851db7cc0de1cc1e9 |
| 7 | ESS7e02_2.dta | 0d413a5724618ff7ec373a48edbf5f0e |
| 8 | ESS8e02_2.dta | b1ab85d0a22aa17306e908095269e4dd |
| 9 | ESS9e03_1.dta | 536f541f23064fd0b46ed7fd8b1e932a |
| 10 | ESS10.dta | 533b89b4ebda6f58d5aef181b2c42c9b |

| Round | ESS_file | hash |
|-------|-------------|----------------------------------|
| 10 | ESS10SC.dta | 975db0389d844e25aa669c3d2da4f7ac |

Note — The ESS-10 is released with two data files, one for the standard face-to-face interviews and another file for countries with self-completion mode due to the COVID-19 restrictions.

1.2 ESS rounds

Summary of ESS rounds

- **n** – number of responses
- **n_countries** – number of countries in ESS round
- **inw_first** and **inw_last** – first and last interview

| essround | n | n_countries | inw_first | inw_last |
|----------|-------|-------------|-----------|----------|
| 1 | 42359 | 22 | 2002 | 2003 |
| 2 | 47537 | 25 | 2004 | 2006 |
| 3 | 43000 | 23 | 2006 | 2007 |
| 4 | 56752 | 29 | 2008 | 2010 |
| 5 | 52458 | 27 | 2010 | 2012 |
| 6 | 54673 | 29 | 2012 | 2013 |
| 7 | 40185 | 21 | 2014 | 2015 |
| 8 | 44387 | 23 | 2016 | 2017 |
| 9 | 49519 | 29 | 2018 | 2020 |
| 10 | 58810 | 30 | 2020 | 2022 |

1.3 Countries

| essround | n | countries |
|----------|----|--|
| 1 | 22 | AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, IE, IL, IT, LU, NL, NO, PL, PT, SE, SI |
| 2 | 25 | AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, LU, NL, NO, PL, PT, SE, SI, SK, TR, UA |
| 3 | 23 | AT, BE, BG, CH, CY, DE, DK, EE, ES, FI, FR, GB, HU, IE, NL, NO, PL, PT, RU, SE, SI, SK, UA |
| 4 | 29 | BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IL, LV, NL, NO, PL, PT, RO, RU, SE, SI, SK, TR, UA |

| essround | n | countries |
|----------|----|--|
| 5 | 27 | BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IL, LT, NL, NO, PL, PT, RU, SE, SI, SK, UA |
| 6 | 29 | AL, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, HU, IE, IL, IS, IT, LT, NL, NO, PL, PT, RU, SE, SI, SK, UA, XK |
| 7 | 21 | AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, HU, IE, IL, LT, NL, NO, PL, PT, SE, SI |
| 8 | 23 | AT, BE, CH, CZ, DE, EE, ES, FI, FR, GB, HU, IE, IL, IS, IT, LT, NL, NO, PL, PT, RU, SE, SI |
| 9 | 29 | AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, HR, HU, IE, IS, IT, LT, LV, ME, NL, NO, PL, PT, RS, SE, SI, SK |
| 10 | 30 | AT, BE, BG, CH, CZ, DE, EE, ES, FI, FR, GB, GR, HR, HU, IE, IL, IS, IT, LT, LV, ME, MK, NL, NO, PL, PT, RS, SE, SI, SK |

2 prt* party variables

Information on ESS party IDs from “party-voted-for” (prtc*) and “party-close-to” (prtc*) questions – see also section “ESS party data structure” in manuscript.

2.1 prt* variables

All ESS rounds include two types of survey questions with party information.

- **prtv*** — “Party voted for in last national election, [country]?”
- **prtc*** — “Which party feel closer to, [country]?”

| essround | n | n_countries | n_prtv | n_prtc |
|----------|-------|-------------|--------|--------|
| 1 | 42359 | 22 | 251 | 248 |
| 2 | 47537 | 25 | 281 | 274 |
| 3 | 43000 | 23 | 248 | 251 |
| 4 | 56752 | 29 | 309 | 296 |
| 5 | 52458 | 27 | 321 | 302 |
| 6 | 54673 | 29 | 331 | 331 |
| 7 | 40185 | 21 | 258 | 252 |
| 8 | 44387 | 23 | 283 | 271 |
| 9 | 49519 | 29 | 363 | 374 |
| 10 | 58810 | 30 | 380 | 390 |

2.2 ESS-9 example

We use the ESS-9 integrated file to describe the structure of the *prt** variables in ESS data files.

Each ESS round uses country level variables for the **prt*** variables (e.g. *prtvcat* — party-voted-for Austria ESS-9).

These **prt*** variables include the following elements:

- starting with **prt**

- indicating the type of *pvt* variable
 - **v** — “party-voted-for”
 - **c** — “party-close-to”
- two character **country** code
- electoral tier number for Germany and Lithuania (*pvt** only)

ESS-9 **pvt*** variables by country

Examples for the first four countries in ESS-9

| cntry | n | variables |
|-------|---|--------------------|
| AT | 2 | prtclcat, prtvtcat |
| BE | 2 | prtcldbe, prtvtdbe |
| BG | 2 | prtcldbg, prtvtdbg |
| CH | 2 | prtclgch, prtvtgch |
| CY | 2 | prtclbcy, prtvtbcy |

Germany and Lithuania include multiple *pvt** variables asking for voting decisions in each electoral tier. These variables include a number for the tier in the variable name.

We use the national tier (“*prtvede2*”, “*prtvblt1*”) as the primary “party-voted-for” variable.

| cntry | variable |
|-------|----------|
| DE | prtvede1 |
| DE | prtvede2 |
| LT | prtvblt1 |
| LT | prtvblt2 |
| LT | prtvblt3 |

2.3 *pvt** ID differences

ESS may use different IDs across ESS rounds

e.g. Netherlands *pvt** rounds 1–10

| essround | id_4 | id_5 | id_6 |
|----------|------------------|---------------|------------|
| 1 | List Pim Fortuyn | Democrats '66 | Green Left |
| 2 | List Pim Fortuyn | Democrats '66 | Green Left |
| 3 | List Pim Fortuyn | Democrats '66 | Green Left |

| essround | id_4 | id_5 | id_6 |
|----------|------|-----------------------------|-----------------------------|
| | 4 | List Pim Fortuyn | Democrats '66 |
| | 5 | Christian Democratic Appeal | Green Left |
| | 6 | Christian Democratic Appeal | Democrats '66 |
| | 7 | Socialist Party | Democrats '66 |
| | 8 | Socialist Party | Christian Democratic Appeal |
| | 9 | Socialist Party | Christian Democratic Appeal |
| | 10 | Socialist Party | Christian Democratic Appeal |

2.4 prt看*/prt看* ID differences

ESS party IDs may differ between the *prt看** and *prt看** variables.

Examples from six countries in ESS-9

| cntry | essround | party_id | prt看_party | prt看_party |
|-------|----------|----------|--|--|
| BG | 9 | 2 | Balgarska sotsialisticheska partiya (BSP) | Dvizhenie za prava i svobodi (DPS) |
| FI | 9 | 10 | Green League | Independence Party |
| LT | 9 | 2 | Homeland Union - Lithuanian Christian Democrats (TS-LKD) | Lithuanian Peasant and Greens Union (LVZS) |
| PL | 9 | 3 | Nowoczesna | Platforma Obywatelska |
| PT | 9 | 17 | Votou em branco/ nulo | CDS-PP |
| SK | 9 | 5 | LS Naše Slovensko | Christian Democratic Movement (KDH) |

3 Party Facts harmonization

Information on Party Facts ESS party IDs harmonization – see also sections “Linking data sets with Party Facts” and “ESS party data structure” in manuscript.

3.1 ESS party IDs

Party Facts (PF) harmonizes ESS party IDs by creating a unique ESS party id (“*first_ess_id*”) for all ESS rounds. — see [PF GitHub](#) // *essprtv*

| pvt_variable | n_ess_parties | n_harmonized |
|--------------|---------------|--------------|
| pvtv | 3304 | 961 |
| pvtc | 2979 | 864 |

3.2 Parties per country

Number of ESS party IDs and harmonized IDs in ESS rounds by country (*pvtv* and *pvtc*)

| cntry | n_essrounds | n_ess_parties | n_harmonized |
|-------|-------------|---------------|--------------|
| AL | 1 | 17 | 17 |
| AT | 7 | 114 | 26 |
| BE | 10 | 305 | 48 |
| BG | 6 | 149 | 74 |
| CH | 10 | 302 | 55 |
| CY | 5 | 77 | 21 |
| CZ | 9 | 169 | 44 |
| DE | 10 | 245 | 31 |
| DK | 8 | 167 | 26 |
| EE | 9 | 172 | 45 |
| ES | 10 | 307 | 77 |
| FI | 10 | 258 | 48 |
| FR | 10 | 303 | 61 |
| GB | 10 | 274 | 42 |

| centry | n_essrounds | n_ess_parties | n_harmonized |
|--------|-------------|---------------|--------------|
| GR | 5 | 86 | 41 |
| HR | 4 | 101 | 52 |
| HU | 10 | 197 | 53 |
| IE | 10 | 185 | 37 |
| IL | 7 | 234 | 80 |
| IS | 5 | 97 | 36 |
| IT | 5 | 141 | 84 |
| LT | 6 | 412 | 151 |
| LU | 2 | 28 | 14 |
| LV | 3 | 74 | 43 |
| ME | 2 | 55 | 37 |
| MK | 1 | 26 | 26 |
| NL | 10 | 269 | 49 |
| NO | 10 | 202 | 24 |
| PL | 10 | 197 | 65 |
| PT | 10 | 208 | 51 |
| RO | 1 | 19 | 19 |
| RS | 2 | 80 | 60 |
| RU | 5 | 107 | 50 |
| SE | 10 | 189 | 23 |
| SI | 10 | 202 | 38 |
| SK | 7 | 106 | 34 |
| TR | 2 | 55 | 38 |
| UA | 5 | 128 | 79 |
| XK | 1 | 26 | 26 |

4 CHES left-right validation

ESS linking example – see also sections “Expert survey validation” and “Performance of Party Facts linking” in manuscript.

4.1 CHES information

[Chapel Hill Expert Survey](#) (CHES) series

| year | countries | parties |
|------|-----------|---------|
| 1999 | 14 | 142 |
| 2002 | 23 | 171 |
| 2006 | 24 | 188 |
| 2010 | 24 | 203 |
| 2014 | 28 | 245 |
| 2019 | 28 | 247 |

4.2 CHES and ESS

Number of countries and parties that are included in ESS and CHES for an ESS round.

| essround | year | countries_n | parties_n | ches_year | ches_parties_n |
|----------|------|-------------|-----------|-----------|----------------|
| 1 | 2002 | 18 | 196 | 2002 | 131 |
| 2 | 2004 | 18 | 190 | 2002 | 128 |
| 3 | 2006 | 18 | 191 | 2006 | 132 |
| 4 | 2008 | 21 | 215 | 2006 | 143 |
| 5 | 2010 | 20 | 241 | 2010 | 157 |
| 6 | 2012 | 20 | 239 | 2010 | 151 |
| 7 | 2014 | 18 | 216 | 2014 | 138 |
| 8 | 2016 | 18 | 216 | 2014 | 133 |
| 9 | 2018 | 24 | 299 | 2014 | 184 |
| 10 | 2020 | 23 | 284 | 2019 | 169 |

Overview country coverage ESS and CHES trend file

- **ess_cntry** — number of countries in ESS round
- **ches_cntry** — number of ESS round countries in CHES
- **ches_missing** — names of ESS round countries not in CHES

| essround | ess_cntry | ches_cntry | ches_missing |
|----------|-----------|------------|------------------------------------|
| 1 | 22 | 18 | CH, IL, LU, NO |
| 2 | 25 | 18 | CH, EE, IS, LU, NO, TR, UA |
| 3 | 23 | 18 | CH, CY, NO, RU, UA |
| 4 | 29 | 21 | CH, CY, HR, IL, NO, RU, TR, UA |
| 5 | 27 | 20 | CH, CY, HR, IL, NO, RU, UA |
| 6 | 29 | 20 | AL, CH, CY, IL, IS, NO, RU, UA, XK |
| 7 | 21 | 18 | CH, IL, NO |
| 8 | 23 | 18 | CH, IL, IS, NO, RU |
| 9 | 29 | 24 | CH, IS, ME, NO, RS |
| 10 | 30 | 23 | CH, IL, IS, ME, MK, NO, RS |

4.3 Country-year correlation

Country-year correlations for ESS and CHES left-right positions in each ESS round with at least 3 parties and 10 responses per party in a country.

ESS left-right party positions are calculated as mean values of **lrscale** variables for respondents that voted for the party (**prtv***).

- **lrscale** — self-placement on left right scale // ESS rounds
 - **prtv*** — “party-voted-for” in last national election // ESS rounds
 - **ches_lr** — left-right party position // CHES trend file
- **lrgen** — “position of the party in YEAR in terms of its overall ideological stance.”
// CHES trendfile

The table summarizes the country-year correlations by providing 0%, 10%, 25%, 50%, 75%, and 100% quantiles. The results are visualized in Figure 4.1.

| ess_year | p0 | p10 | p25 | p50 | p75 | p100 |
|----------|-------|------|------|------|------|------|
| 2002 | 0.82 | 0.87 | 0.94 | 0.95 | 0.99 | 1.00 |
| 2004 | 0.77 | 0.83 | 0.87 | 0.91 | 0.99 | 1.00 |
| 2006 | 0.63 | 0.86 | 0.89 | 0.93 | 0.98 | 1.00 |
| 2008 | -0.35 | 0.79 | 0.90 | 0.94 | 0.98 | 1.00 |

| ess_year | p0 | p10 | p25 | p50 | p75 | p100 |
|----------|------|------|------|------|------|------|
| 2010 | 0.45 | 0.78 | 0.91 | 0.96 | 0.97 | 0.99 |
| 2012 | 0.55 | 0.76 | 0.92 | 0.96 | 0.99 | 1.00 |
| 2014 | 0.73 | 0.83 | 0.88 | 0.91 | 0.95 | 0.98 |
| 2016 | 0.77 | 0.87 | 0.90 | 0.92 | 0.95 | 1.00 |
| 2018 | 0.26 | 0.81 | 0.90 | 0.93 | 0.98 | 1.00 |
| 2020 | 0.35 | 0.56 | 0.82 | 0.93 | 0.98 | 0.99 |

Lowest country-year correlation (-0.35) for ESS Romania 2008.

| cntry | year | prtv | prtv_party | lr_n | lr_mean | ches_year | ches_lr |
|-------|------|-----------|----------------|------|---------|-----------|---------|
| RO | 2008 | RO-4-1-v | PD-L | 517 | 6.95 | 2006 | NA |
| RO | 2008 | RO-4-12-v | Other: PIN | 14 | 5.25 | 2006 | NA |
| RO | 2008 | RO-4-2-v | Alianta PSD-PC | 449 | 3.52 | 2006 | NA |
| RO | 2008 | RO-4-3-v | PNL | 165 | 7.06 | 2006 | 6.7 |
| RO | 2008 | RO-4-4-v | PRM | 31 | 4.54 | 2006 | 7.0 |
| RO | 2008 | RO-4-5-v | UDMR | 67 | 5.94 | 2006 | 6.0 |
| RO | 2008 | RO-4-6-v | PNG-CD | 15 | 6.75 | 2006 | NA |
| RO | 2008 | RO-4-9-v | PNTCD | 32 | 5.62 | 2006 | NA |

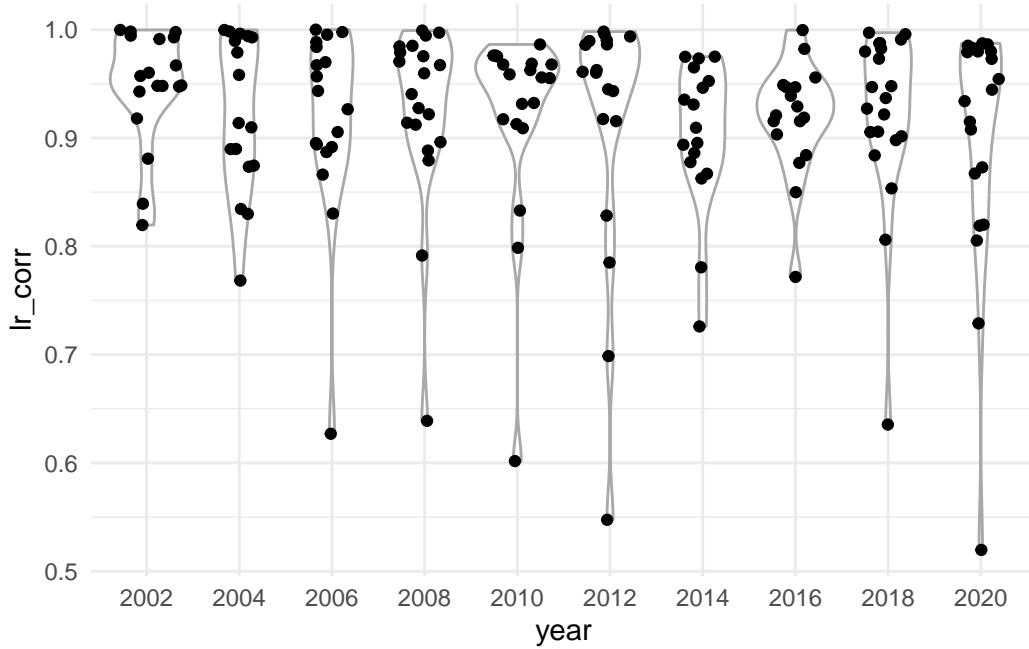


Figure 4.1: Violin plot for country wise correlations (< 0.5 removed)

4.4 Share covered

We calculate the share of matches for the “party-voted-for” (*prtv*) question. Excluded from the calculation are instances of *other*, *independent*, and *technical* (see [Party Facts codebook](#)).

The table summarizes the share of party matches across all countries and ESS rounds.

| quantile | share_match |
|----------|-------------|
| 0% | 11.4 |
| 10% | 54.6 |
| 25% | 87.7 |
| 50% | 98.4 |
| 75% | 99.9 |
| 100% | 100.0 |

The share of matched parties is weighted by the number of “party-voted-for” responses and is calculated for each country in every ESS round.

The next table summarizes the country level share of party matches for ESS rounds with data set matches.

| cntry | min | median | max | ess_rounds |
|-------|------|--------|-------|------------|
| HR | 11.4 | 28.8 | 46.1 | 2 |
| HU | 13.8 | 48.3 | 99.3 | 10 |
| RO | 20.4 | 20.4 | 20.4 | 1 |
| BG | 34.0 | 61.5 | 99.1 | 6 |
| BE | 44.0 | 92.7 | 97.7 | 10 |
| PL | 45.8 | 93.1 | 99.5 | 10 |
| LV | 50.6 | 53.9 | 93.1 | 3 |
| DE | 51.0 | 56.8 | 71.1 | 10 |
| PT | 57.9 | 98.4 | 99.9 | 10 |
| FR | 66.8 | 87.8 | 93.8 | 10 |
| LT | 71.9 | 93.2 | 97.0 | 6 |
| EE | 75.3 | 99.4 | 99.9 | 8 |
| CZ | 76.3 | 100.0 | 100.0 | 9 |
| IT | 76.7 | 94.1 | 95.8 | 5 |
| ES | 77.5 | 99.0 | 100.0 | 10 |
| AT | 90.8 | 96.6 | 100.0 | 7 |
| SI | 91.3 | 97.3 | 100.0 | 10 |
| NL | 92.1 | 99.7 | 100.0 | 10 |
| GR | 96.0 | 99.2 | 100.0 | 5 |
| SK | 97.2 | 100.0 | 100.0 | 7 |

| centry | min | median | max | ess_rounds |
|--------|-------|--------|-------|------------|
| GB | 98.0 | 98.6 | 99.5 | 10 |
| IE | 98.3 | 99.8 | 100.0 | 10 |
| FI | 98.4 | 99.3 | 99.7 | 10 |
| SE | 100.0 | 100.0 | 100.0 | 10 |
| DK | 100.0 | 100.0 | 100.0 | 8 |
| CY | 100.0 | 100.0 | 100.0 | 1 |

5 ParlGov losers' consent

ESS linking example – see also sections “Party-voted-for in government” and “Performance of Party Facts linking” in manuscript.

5.1 Losers' consent models

Satisfaction with democracy by those that voted for parties in government vs. opposition. For a book length discussion and empirical assessment of European democracies see Anderson et.al. (2005) – esp. model page 104. A replication and extension to other regions is provided by Farrer and Zingher (2019, 525)

- Anderson, Christopher, ed. 2005. Losers' Consent: Elections and Democratic Legitimacy. Oxford; New York: Oxford University Press.
- Farrer, Benjamin, and Joshua N Zingher. 2019. “A Global Analysis of How Losing an Election Affects Voter Satisfaction with Democracy.” *International Political Science Review* 40(4): 518–34. — doi: [10.1093/poq/nfad003](https://doi.org/10.1093/poq/nfad003)

5.2 Variables

Variables used in **losers' consent** models and context information

- **stfdem** — How satisfied with the way democracy works in country?
 - 0 // Extremely dissatisfied — 10 // Extremely satisfied
- **cabinet** — “party-voted-for” (*prtv*) in government after election
 - ParlGov based calculation
 - excluding caretaker governments
- **lrscale** — Placement on left right scale
 - 0 // Left — 10 // Right
- **gndr** — Gender
- **agea** — Age of respondent, calculated

- **eduyrs** — Years of full-time education completed
- *ESS identifiers*
 - cntry — Country
 - essround — ESS round
 - pspwght — Post-stratification weight // see [ESS survey weights](#)
 - inw_date — Date of interview // various ESS inw* variables
- *Party information*
 - prtv — Party voted for in last national election // aggregated ESS IDs
 - prtv_name — Party voted for in last national election // party name
 - first_ess_id — unique ESS party ID used in Party Facts

5.3 Summary statistics

Table 5.1: Data summary

| | |
|------------------------|-----------------------|
| Name | select(ess_lm, -idno) |
| Number of rows | 433599 |
| Number of columns | 14 |
| Column type frequency: | |
| character | 3 |
| Date | 1 |
| factor | 4 |
| numeric | 6 |
| Group variables | None |

Variable type: character

| skim_variable | n_missing | complete_rate | min | max | empty | n_unique | whitespace |
|---------------|-----------|---------------|-----|-----|-------|----------|------------|
| cntry | 0 | 1.00 | 2 | 2 | 0 | 32 | 0 |
| prtv | 171780 | 0.60 | 8 | 14 | 0 | 2704 | 0 |
| prtc | 240202 | 0.45 | 8 | 10 | 0 | 2642 | 0 |

Variable type: Date

| skim_variable | n_missing | complete_rate | min | max | median | n_unique |
|---------------|-----------|---------------|------------|------------|------------|----------|
| inw_date | 912 | 1.00 | 2002-01-14 | 2022-09-02 | 2011-06-03 | 4827 |

Variable type: factor

| skim_variable | n_missing | complete_rate | ordered | n_unique | top_counts |
|---------------|-----------|---------------|---------|----------|--|
| gndr | 331 | 1.00 | FALSE | 2 | Fem: 231527, Mal: 201741, No : 0 |
| prtv_party | 171780 | 0.60 | FALSE | 888 | Lab: 6580, Con: 6077, Chr: 5660, Soc: 4972 |
| prtc_party | 240202 | 0.45 | FALSE | 900 | Lab: 4949, Con: 4578, Chr: 4290, Soc: 3484 |
| cabinet | 209306 | 0.52 | FALSE | 2 | Yes: 121092, No: 103201 |

Variable type: numeric

| skim_variable | n_missing | complete_rate | mean | sd | p0 | p25 | p50 | p75 | p100 | hist |
|---------------|-----------|---------------|-------|-------|----|------|-------|-------|--------|------|
| essround | 0 | 1.00 | 5.39 | 2.80 | 1 | 3.0 | 5.00 | 8.00 | 10.00 | |
| pspwght | 0 | 1.00 | 1.01 | 0.52 | 0 | 0.7 | 0.93 | 1.18 | 6.85 | |
| agea | 2155 | 1.00 | 48.49 | 18.62 | 13 | 33.0 | 48.00 | 63.00 | 123.00 | |
| eduyrs | 5075 | 0.99 | 12.43 | 4.13 | 0 | 10.0 | 12.00 | 15.00 | 65.00 | |
| lrscalc | 55413 | 0.87 | 5.13 | 2.23 | 0 | 4.0 | 5.00 | 7.00 | 10.00 | |
| stfdem | 15516 | 0.96 | 5.28 | 2.51 | 0 | 4.0 | 5.00 | 7.00 | 10.00 | |

5.4 Multi-level models (ML)

Model variables preparation

- removing outliers *age* (99% quantile)
- selecting only variables used in models
- removing incomplete observations
- centering of continuous variables (*age*, *education*, *left-right*)

5.4.1 Three ML models

Multi-level models with quadric terms and interactions. Structure of models:

- Model 1 (ML-1) — ESS-Round/country and country
- Model 2 (ML-2) — ESS-Round and country

- Model 3 (ML-3) — country

Visualization of results in Figure 5.1 and Figure 5.2 – see variable information in Section 5.3

| | ML-1 | ML-2 | ML-3 |
|------------------------------------|---------------------|---------------------|---------------------|
| (Intercept) | 5.782 (0.169) | 5.790 (0.184) | 5.775 (0.172) |
| gnrFemale | -0.182 (0.009) | -0.178 (0.010) | -0.179 (0.010) |
| cabinetNo | -0.637 (0.010) | -0.645 (0.010) | -0.640 (0.010) |
| eduyrs_c | 0.048 (0.002) | 0.045 (0.002) | 0.048 (0.002) |
| poly(agea_c, 2)1 | 23.624 (3.151) | 21.075 (3.192) | 25.719 (3.189) |
| poly(agea_c, 2)2 | 30.470 (2.913) | 30.403 (2.957) | 31.438 (2.967) |
| poly(lrscale_c, 2)1 | 103.697 (3.333) | 105.407 (3.204) | 108.606 (3.208) |
| poly(lrscale_c, 2)2 | 35.905 (3.116) | 39.358 (3.149) | 40.284 (3.160) |
| cabinetNo × eduyrs_c | 0.013 (0.003) | 0.014 (0.003) | 0.015 (0.003) |
| cabinetNo × poly(agea_c, 2)1 | -4.329 (4.620) | -2.065 (4.675) | -3.641 (4.691) |
| cabinetNo × poly(agea_c, 2)2 | 13.465 (4.284) | 14.204 (4.350) | 13.904 (4.366) |
| cabinetNo × poly(lrscale_c, 2)1 | -22.081 (4.862) | -23.826 (4.494) | -26.594 (4.496) |
| cabinetNo × poly(lrscale_c, 2)2 | -108.724 (4.367) | -113.550 (4.397) | -113.758 (4.413) |
| SD (Intercept cntry) | 0.931 | 0.965 | 0.970 |
| SD (Observations) | 2.106 | 2.142 | 2.150 |
| SD (Intercept essround_cntrycntry) | 0.500 | | |
| SD (Intercept essround) | | 0.219 | |
| :—:—:—: | —:—:—: | —:—:—: | —:—:—: |
| Num.Obs. | 205611 | 205611 | 205611 |
| R2 Marg. | 0.040 | 0.040 | 0.041 |
| R2 Cond. | 0.233 | 0.209 | 0.203 |
| AIC | 918254.1 | 924409.6 | 925869.4 |
| BIC | 918417.9 | 924573.3 | 926022.9 |
| ICC | 0.2 | 0.2 | 0.2 |

| | ML-1 | ML-2 | ML-3 |
|------|------|------|------|
| RMSE | 2.13 | 2.16 | 2.17 |

Analysis of variance (ANOVA) models and refitting with Maximum Likelihood instead of Restricted Maximum Likelihood.

| term | npar | AIC | BIC | logLik | deviance | statistic | df | p.value |
|------|------|----------|----------|-----------|----------|-----------|----|---------|
| ml1 | 16 | 918249.0 | 918412.7 | -459108.5 | 918217.0 | 7617.436 | 1 | 0 |
| ml2 | 16 | 924404.7 | 924568.4 | -462186.3 | 924372.7 | 0.000 | 0 | |
| ml3 | 15 | 925864.4 | 926017.9 | -462917.2 | 925834.4 | | | |

5.4.2 Effects plot ML-1

Effects plot Multi-Level Model 1 (ML-1, see Section 5.4.1)

see Figure 5.1 and Figure 5.2

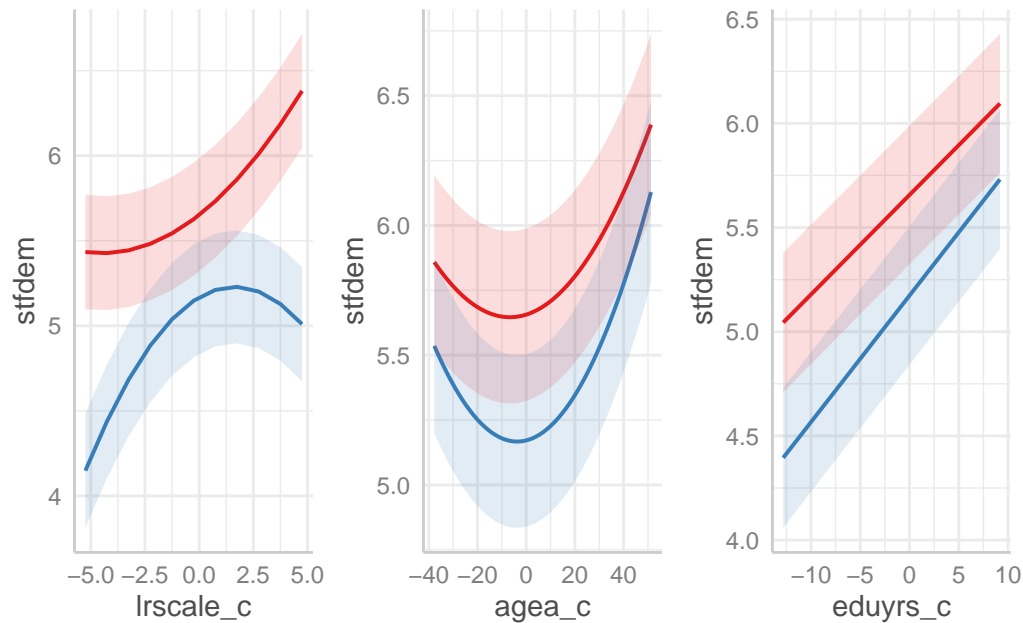


Figure 5.1: Effects plot (95% CIs) — Satisfaction with democracy

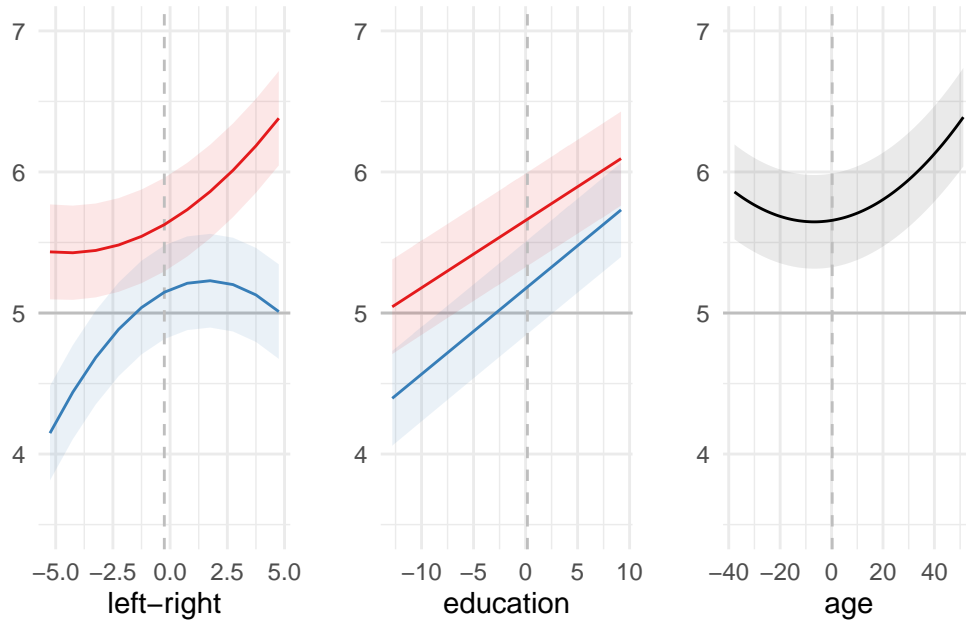


Figure 5.2: Effects plot (95% CIs) — Satisfaction with democracy // Article version

5.5 Linear effects (ML)

Multi-level model with linear terms and no interactions.

Visualization of results in Figure 5.3 (standardized coefficients) and Figure 5.4 (effects) – see variable information in Section 5.3

| effect | group | term | estimate | std.error | statistic |
|----------|------------------------|-----------------|----------|-----------|-----------|
| fixed | | (Intercept) | 5.775 | 0.170 | 33.996 |
| fixed | | cabinetNo | -0.636 | 0.010 | -64.341 |
| fixed | | gndrFemale | -0.178 | 0.009 | -18.849 |
| fixed | | eduyrs_c | 0.051 | 0.001 | 37.025 |
| fixed | | agea_c | 0.002 | 0.000 | 6.679 |
| fixed | | lrscale_c | 0.094 | 0.002 | 44.172 |
| ran_pars | essround_centry:centry | sd__(Intercept) | 0.503 | | |
| ran_pars | centry | sd__(Intercept) | 0.934 | | |
| ran_pars | Residual | sd__Observation | 2.112 | | |

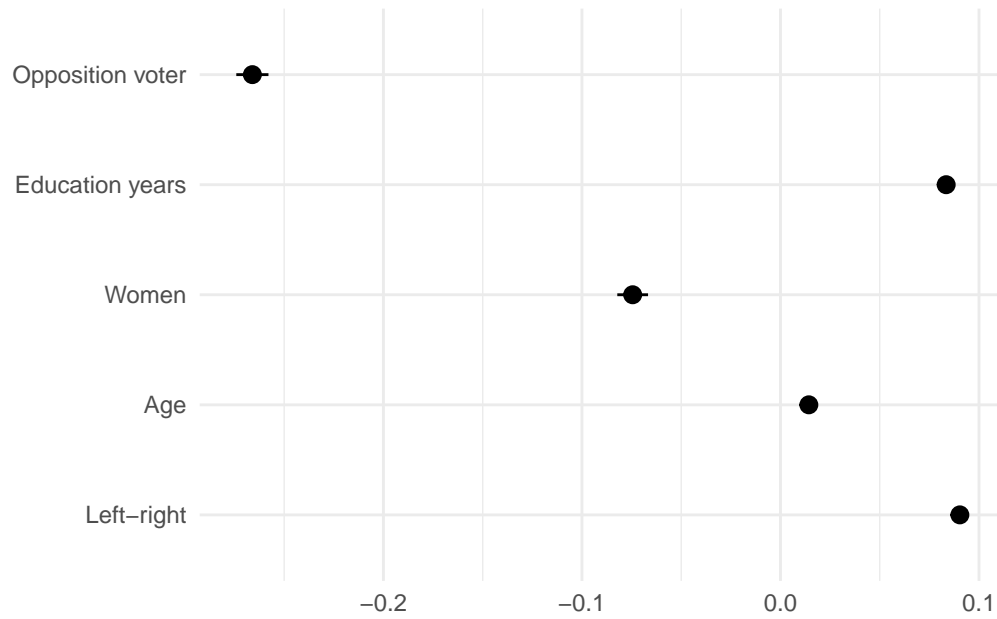


Figure 5.3: Standardized coefficients (95% CIs)– Linear effects model

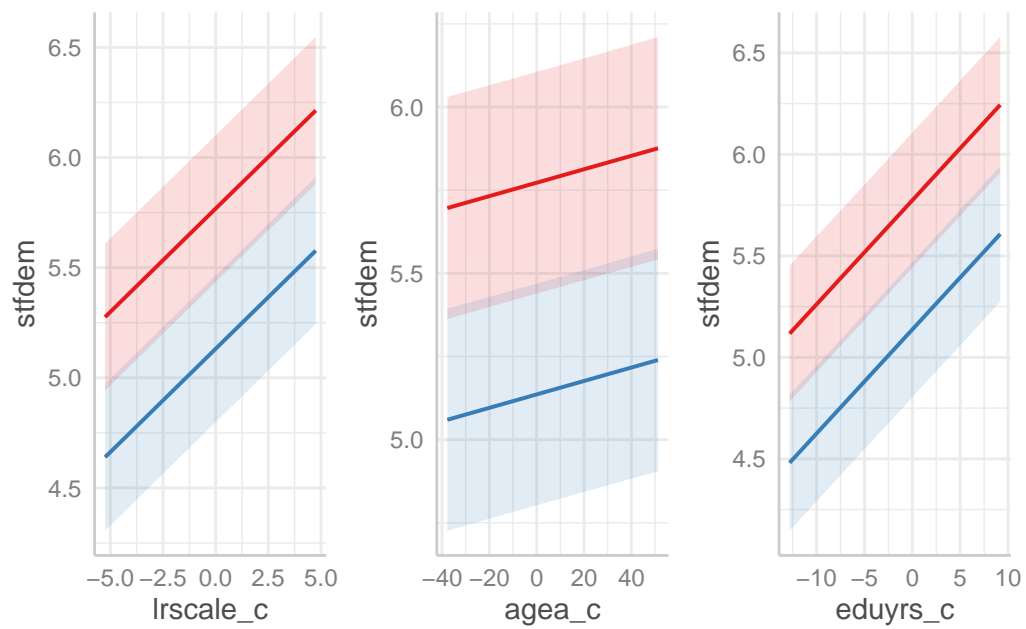


Figure 5.4: Linear effects plot (95% CIs) — Satisfaction with democracy

5.6 Fixed effects model

Fixed effects model with quadric terms and interactions.

Visualization of results in Figure 5.5 and variable information in Section 5.3

| term | estimate | std.error | statistic | p.value | conf.low | conf.high |
|-----------------------|----------|-----------|-----------|---------|----------|-----------|
| (Intercept) | 6.407 | 0.037 | 173.718 | 0.000 | 6.335 | 6.479 |
| gndrFemale | -0.178 | 0.011 | -16.569 | 0.000 | -0.199 | -0.157 |
| cabinetNo | -0.645 | 0.011 | -58.835 | 0.000 | -0.667 | -0.624 |
| eduyrs_c | 0.045 | 0.002 | 21.591 | 0.000 | 0.041 | 0.050 |
| agea_c | 21.004 | 3.505 | 5.993 | 0.000 | 14.135 | 27.874 |
| agea_c^2 | 30.381 | 3.306 | 9.190 | 0.000 | 23.901 | 36.860 |
| lrscalc_c | 105.418 | 3.903 | 27.011 | 0.000 | 97.769 | 113.068 |
| lrscalc_c^2 | 39.400 | 4.134 | 9.531 | 0.000 | 31.297 | 47.502 |
| cabinetNo:eduyrs_c | 0.014 | 0.003 | 4.744 | 0.000 | 0.008 | 0.020 |
| cabinetNo:agea_c | -2.033 | 5.236 | -0.388 | 0.698 | -12.295 | 8.229 |
| cabinetNo:agea_c^2 | 14.216 | 4.958 | 2.867 | 0.004 | 4.499 | 23.933 |
| cabinetNo:lrscalc_c | -23.832 | 5.585 | -4.267 | 0.000 | -34.779 | -12.885 |
| cabinetNo:lrscalc_c^2 | -113.566 | 5.823 | -19.502 | 0.000 | -124.979 | -102.153 |

Fixed effects for countries (“*cnty*”) and ESS rounds (“*essround*”) not shown.

| r.squared | adj.r.squared | statistic | p.value | df.residual | nobs | se_type |
|-----------|---------------|-----------|---------|-------------|--------|---------|
| 0.18 | 0.18 | 756.54 | 0 | 205558 | 205611 | HC2 |

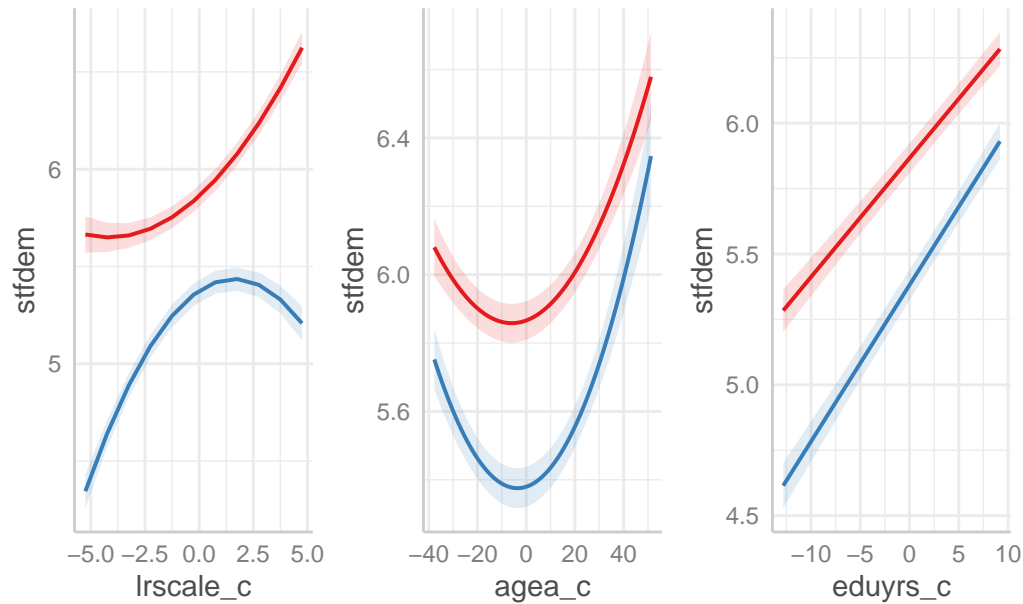


Figure 5.5: Fixed effects model (95% CIs) — Satisfaction with democracy

5.7 Share covered

We calculate the share of matches for the “party-voted-for” (*prtv*) question. Excluded from the calculation are instances of *other*, *independent*, and *technical* (see [Party Facts codebook](#)).

The table summarizes the share of party matches across all countries and ESS rounds.

| quantile | share_match |
|----------|-------------|
| 0% | 11.4 |
| 10% | 65.4 |
| 25% | 81.9 |
| 50% | 95.8 |
| 75% | 99.2 |
| 100% | 100.0 |

The share of matched parties is weighted by the number of “party-voted-for” responses and is calculated for each country in every ESS round.

The next table summarizes the country level share of party matches for ESS rounds with data set matches.

| cntry | min | median | max | ess_rounds |
|-------|------|--------|-------|------------|
| HR | 11.4 | 73.0 | 100.0 | 4 |
| HU | 13.8 | 47.6 | 95.5 | 10 |
| RO | 18.0 | 18.0 | 18.0 | 1 |
| BG | 34.0 | 60.2 | 99.1 | 5 |
| LV | 37.1 | 68.6 | 100.0 | 2 |
| PL | 37.4 | 90.1 | 98.2 | 9 |
| BE | 46.8 | 80.1 | 92.0 | 10 |
| PT | 57.7 | 92.2 | 99.6 | 10 |
| IL | 58.7 | 71.8 | 78.7 | 6 |
| FR | 65.0 | 80.8 | 83.7 | 10 |
| CH | 74.3 | 91.0 | 99.9 | 10 |
| CZ | 74.3 | 100.0 | 100.0 | 9 |
| TR | 75.2 | 82.4 | 89.6 | 2 |
| GB | 76.5 | 81.9 | 90.8 | 10 |
| IT | 76.7 | 94.1 | 96.5 | 5 |
| DE | 77.5 | 89.2 | 92.4 | 9 |
| EE | 80.0 | 95.8 | 100.0 | 8 |
| ES | 80.1 | 98.3 | 99.7 | 9 |
| LT | 81.2 | 93.3 | 96.4 | 6 |
| SI | 85.9 | 95.8 | 100.0 | 10 |
| AT | 91.5 | 98.7 | 99.6 | 6 |
| FI | 91.8 | 93.0 | 94.5 | 10 |
| NL | 92.1 | 99.7 | 100.0 | 10 |
| SK | 94.7 | 100.0 | 100.0 | 7 |
| GR | 96.0 | 96.8 | 99.2 | 5 |
| IS | 96.0 | 98.7 | 100.0 | 5 |
| NO | 96.6 | 98.7 | 99.5 | 10 |
| SE | 96.7 | 99.8 | 100.0 | 9 |
| IE | 97.1 | 98.9 | 100.0 | 10 |
| DK | 97.6 | 98.8 | 99.4 | 8 |
| CY | 98.5 | 99.5 | 100.0 | 5 |
| LU | 99.1 | 99.6 | 100.0 | 2 |