# *Supplementary Appendix:*

# Dyadic Clustering in International Relations

Jacob Carlson, Trevor Incerti, and P.M. Aronow

# A Appendix

## Contents



### Statistical Programming Suite

The statistical programming suite for DCR estimation is currently available. To access the source code for the `dcr` command for Stata (version 15 or higher), clone its GitHub repository:

```
git clone git@github.com:jscarlson/stata-dcr.git
```

To access the `dcr` package for R, run:

```
devtools::install_github("jscarlson/dcr")
```

# Supplementary Figures and Tables

## Table A.1: Dyadic Data Summary Statistics, Study Level

| Study | Observations | Data Start Year | Data End Year | Number of Unique Dyads |
|---|---|---|---|---|
| Arel-Bundock (2017) | 3971 | 2012 | 2012 | 2161 |
| Bermeo (2017) | 20275 | 1973 | 1988 | 1614 |
| Bermeo and Leblang (2015) | 33116 | 1993 | 2008 | 3129 |
| Carter and Poast (2020) | 40002 | 1948 | 2011 | 560 |
| Colgan (2014) | 213454 | 1949 | 1999 | 37310 |
| Colgan and Weeks (2015) | 804434 | 1951 | 2000 | 28410 |
| Copelovitch and Putnam (2014) | 101 | 1926 | 1986 | 92 |
| Dietrich (2016) | 10605 | 2006 | 2011 | 2417 |
| Efrat and Newman (2016) | 13818 | 1996 | 2012 | 2574 |
| Fang, Johnson, and Leeds (2014) | 585467 | 1816 | 2000 | 21133 |
| Goemans and Schultz (2017) | 153370 | 1958 | 1998 | 102 |
| Horowitz and Stam (2014) | 113992 | 1875 | 2000 | 27079 |
| Kinne (2018) | 253296 | 1981 | 2010 | 10909 |
| McDonald (2015) | 525114 | 1817 | 2000 | 13938 |
| Powell (2015) | 433 | 1948 | 2006 | 40 |
| Pratt (2018) | 1177 | 2002 | 2012 | 108 |
| Renshon (2016) | 1237676 | 1818 | 2001 | 39389 |
| Schneider and Tobin (2020) | 4760 | 1976 | 2009 | 756 |
| Shelef (2016) | 344 | 1945 | 1995 | 155 |
| Sommerer and Tallberg (2019) | 37989 | 1971 | 2009 | 2080 |
| Weisiger (2016) | 36322 | 1823 | 2001 | 81 |
| Weisiger and Yarhi-Milo (2015) | 1187663 | 1816 | 2000 | 33255 |

Note: summary statistics for each study computed using data from a representative (usually the first) reanalyzed model, as analytic samples and data often vary by model.

## Table A.2: Primary Results, Study Level

| Study | Subfield | Secondary Subfield | Primary Relationship Tested | KEVs | Sig.→Sig. | Sig.→Insig. | Insig.→Sig. | Insig.→Insig. | Avg. SER |
|---|---|---|---|---|---|---|---|---|---|
| Arel-Bundock (2017) | IPE | International finance | Treaty shopping and domestic tax rates | 6 | 0.833 | 0.167 | 0 | 0 | 2.739 |
| Bermeo (2017) | IPE | Foreign aid | (Donor spillovers and) foreign aid | 173 | 0.445 | 0.249 | 0 | 0.306 | 2.187 |
| Bermeo and Leblang (2015) | IPE | Foreign aid | (Immigration and) foreign aid | 29 | 0.655 | 0.207 | 0 | 0.138 | 2.2 |
| Carter and Poast (2020) | IPE | Trade | Physical barriers and legal trade flows | 8 | 0 | 0.375 | 0.5 | 0.125 | 1.099 |
| Colgan (2014) | IOs/International Law | IO efficacy | IO membership and member behavior | 9 | 0.111 | 0.889 | 0 | 0 | 3.269 |
| Colgan and Weeks (2015) | Security | Conflict | (Revolution and) likelihood of conflict | 24 | 1 | 0 | 0 | 0 | 1.526 |
| Copelovitch and Putnam (2014) | IOs/International Law | IO efficacy | Rational design theory/international agreement formation | 45 | 0.422 | 0.111 | 0.111 | 0.356 | 0.898 |
| Dietrich (2016) | IPE | Foreign aid | Variety of capitalism and foreign aid delivery method | 36 | 0.194 | 0.139 | 0 | 0.667 | 1.511 |
| Efrat and Newman (2016) | IOs/International Law | IO efficacy | Likelihood of defering to another country's laws | 4 | 0.5 | 0.5 | 0 | 0 | 4.158 |
| Fang, Johnson, and Leeds (2014) | Security | Conflict | (Alliances and) likelihood of conflict | 1 | 0 | 1 | 0 | 0 | 1.691 |
| Goemans and Schultz (2017) | Security | Conflict | Ethnic politics and territorial claims | 170 | 0.394 | 0.041 | 0.088 | 0.476 | 0.955 |
| Horowitz and Stam (2014) | Security | Conflict | (Leader military experience) and likelihood of conflict | 3 | 0.333 | 0 | 0 | 0.667 | 1.895 |
| Kinne (2018) | Security | Alliance formation | Determinants of defense cooperation agreements | 6 | 0.833 | 0 | 0 | 0.167 | 1.301 |
| McDonald (2015) | Security | Conflict | (Democracy and) likelihood of conflict | 41 | 0.488 | 0.195 | 0 | 0.317 | 1.432 |
| Powell (2015) | Security | Conflict | (Islamic law and) likelihood of conflict | 16 | 0.188 | 0 | 0.062 | 0.75 | 0.908 |
| Pratt (2018) | IOs/International Law | IO efficacy | Likelihood of defering to another IO | 18 | 0.389 | 0.222 | 0.111 | 0.278 | 1.426 |
| Renshon (2016) | Security | Conflict | (International status and) likelihood of conflict | 20 | 0.9 | 0.05 | 0 | 0.05 | 1.291 |
| Schneider and Tobin (2020) | IPE | International finance | Domestic spillovers and international bailout | 18 | 0.333 | 0 | 0.056 | 0.611 | 0.999 |
| Shelef (2016) | Security | Conflict | (Type of territorial dispute and) likelihood of conflict | 9 | 0.889 | 0 | 0 | 0.111 | 1.071 |
| Sommerer and Tallberg (2019) | IOs/International Law | IO design | IO connectivity and convergence of governance rules | 15 | 0.2 | 0 | 0 | 0.8 | 1.212 |
| Weisiger (2016) | Security | Conflict | Determinants of conflict duration | 28 | 0.143 | 0.607 | 0 | 0.25 | 3.268 |
| Weisiger and Yarhi-Milo (2015) | Security | Conflict | (Past actions and) likelihood of conflict | 12 | 0.75 | 0.167 | 0.083 | 0 | 1.311 |
| Average-of-Averages (= ISFW) | | | | | 0.455 | 0.224 | 0.046 | 0.276 | 1.743 |

## Table A.3: Reanalysis for Models without (C)RSEs

| Study | KEVs | Sig.→Sig. | Sig.→Insig. | Insig.→Sig. | Insig.→Insig. | Avg. SER |
|---|---|---|---|---|---|---|
| Kinne (2018) | 4 | 0.75 | 0.00 | 0.00 | 0.25 | 1.03 |
| Copelovitch and Putnam (2014) | 45 | 0.42 | 0.11 | 0.11 | 0.36 | 0.90 |
| Fang, Johnson, and Leeds (2014) | 1 | 0.00 | 1.00 | 0.00 | 0.00 | 1.69 |

Note: repeated dyad CRSEs computed as comparison to DCRSEs.

## Table A.4: Reanalysis for Models with Fixed Effects for both Dyad Members

| Study | KEVs | Sig.→Sig. | Sig.→Insig. | Insig.→Sig. | Insig.→Insig. | Avg. SER |
|---|---|---|---|---|---|---|
| Carter and Poast (2020) | 8 | 0.00 | 0.38 | 0.50 | 0.12 | 1.10 |
| Shelef (2016) | 9 | 0.89 | 0.00 | 0.00 | 0.11 | 1.07 |
| Bermeo and Leblang (2015) | 1 | 1.00 | 0.00 | 0.00 | 0.00 | 2.13 |

## Table A.5: Small-Sample Corrected Results, Various Levels of Aggregation

| Aggregation | Category | Studies | KEVs | SER[a] | Sig.→Sig.[b] | Sig.→Insig.[b] | Insig.→Sig.[b] | Insig.→Insig.[b] |
|---|---|---|---|---|---|---|---|---|
| Year | 2014 | 4 | 58 | 1.94 | 0.21 | 0.51 | 0.02 | 0.26 |
| | 2015 | 5 | 122 | 1.48 | 0.62 | 0.11 | 0.03 | 0.24 |
| | 2016 | 5 | 97 | 2.27 | 0.50 | 0.28 | 0.00 | 0.22 |
| | 2017 | 3 | 349 | 1.97 | 0.55 | 0.15 | 0.03 | 0.27 |
| | 2018 | 2 | 24 | 1.38 | 0.58 | 0.14 | 0.06 | 0.22 |
| | 2019 | 1 | 15 | 1.23 | 0.20 | 0.00 | 0.00 | 0.80 |
| | 2020 | 2 | 26 | 1.01 | 0.11 | 0.19 | 0.33 | 0.37 |
| Subfield | IOs/International Law | 5 | 91 | 2.21 | 0.31 | 0.36 | 0.04 | 0.29 |
| | IPE | 6 | 270 | 1.78 | 0.39 | 0.19 | 0.11 | 0.31 |
| | Security | 11 | 330 | 1.52 | 0.53 | 0.20 | 0.02 | 0.26 |
| All | All | 22 | 691 | 1.75 | 0.44 | 0.23 | 0.05 | 0.28 |

Note: this reanalysis applies a small-sample correction to the final estimates of DCRSEs. This correction is equivalent to multiplying the final estimates of standard error by $\sqrt{N/(N-1)}$, where $N$ is the number of unique dyad members in the analytic sample. Correspondingly, when computing $p$-values, the test statistic is compared to a t-distribution with degrees-of-freedom $= N - 1$. For the purposes of producing a true apples-to-apples comparison, original standard error estimates of reanalyzed studies are similarly treated with a small-sample correction that is equivalent to multiplying the final estimates of standard error by $\sqrt{N_c/(N_c-1)}$, where $N_c$ is the number of unique clusters in the analytic sample; the test statistic is likewise compared to a t-distribution with degrees-of-freedom $= N_c - 1$.

[a] "SER" denotes an ISFW average of SERs for a given level of aggregation.

[b] "Sig.→Sig.," "Sig.→Insig.," "Insig.→Sig.," and "Insig.→Insig." denote ISFW proportions of $p$-values that change significance levels in these respective ways for a given level of aggregation.