

Web Appendix

This supplementary appendix shows additional analyses and robustness checks that were not included in the main text due to space limitations.

Appendix A Table A1 shows a list of countries included in the analysis. **Table A2** shows descriptive statistics of variables used in the analysis.

Appendix B shows the results of robustness checks. Broadly, the tables and figures of the robustness checks contain the following methodological issues: (1) Multinomial Probit Regression Estimator (**Table B-1, Figure B1**), (2) additional controls (fiscal expenditure and electoral systems (**Table B-2 Figure B2**), (3) alternative measures of election violence and electoral cheating (V-Dem, **Table B-3 Figure B3**), (4) a sample of developing countries (**Table B-4 Figure B-4**), (5) time dependence (**Table B-5 Figure B-5**), and (6) jackknife analyses (**Figure B-6**).

Appendix C presents the results of additional analyses to explore the causal mechanisms. Specifically, the tables report the relationship between malapportionment and post-electoral protests (**Table C-1**) and descriptive statistics for blatant electoral manipulation and malapportionment to show inflexibility of malapportionment as an electioneering strategy (**Table C-2**).

Appendix A

Table A1: List of Countries

Albania	Dominican Republic	Lesotho	Senegal
Algeria	Estonia	Liberia	Serbia
Angola	Finland	Lithuania	Sierra Leone
Argentina	France	Malawi	Singapore
Armenia	Gabon	Mali	Slovakia
Australia	Gambia	Mauritius	Slovenia
Austria	Georgia	Mexico	South Africa
Azerbaijan	Germany	Moldova	South Korea
Belarus	Ghana	Mongolia	Spain
Belgium	Greece	Morocco	Sri Lanka
Benin	Guinea-Bissau	Namibia	Sweden
Bolivia	Honduras	Nepal	Syria
Botswana	Hungary	Netherlands	Taiwan
Brazil	India	New Zealand	Tajikistan
Bulgaria	Indonesia	Nicaragua	Tanzania
Cameroon	Ireland	Norway	Thailand
Canada	Israel	Pakistan	Togo
Cape Verde	Italy	Panama	Torinidad Tobago
Chad	Jamaica	Paraguay	Uganda
Chile	Japan	Peru	UK
Costa Rica	Kazakhstan	Philippines	Ukraine
Croatia	Kenya	Poland	USA
Cyprus	Kuwait	Portugal	Zambia
Czech Republic	Latvia	Romania	
Denmark	Lebanon	Russia	

Table A2: Descriptive Statistics

Variable	Mean	Standard Deviation	N
Only Election Violence (binary, NELDA)	0.076	0.266	248
Only Election Cheating (binary, NELDA)	0.056	0.231	248
Both Election Violence and Cheating (NELDA)	0.10	0.301	248
Malapportionment	0.06	0.056	248
Victory Uncertainty	0.37	0.48	248
Executive Constraints	6.14	1.41	248
Physical Integrity Index (avg)	5.53	1.97	248
Executive Recruitment (avg)	7.22	1.61	248
Political Competition (avg)	8.50	2.31	248
Logged GDP Per Capita (lag)	8.92	1.44	248
Logged Population (lag)	15.37	2.97	248
Civil War (lag)	0.080	0.27	248
Demonstration (lag)	0.435	1.1	248
Leader's Tenure Length	5.06	5.15	248
Leader's Age	58.2	9.74	248
Popular Protests	0.146	0.354	246
Fiscal Expenditure (% of GDP)	29.56	10.63	228
Electoral Systems (Effective Electoral Threshold)	17.78	14.17	228
Both Violence and Cheating (V-Dem)	0.282	0.451	248

Appendix B

Table B-1: Multinomial Probit Regression

1. From the “Non-Existence of Election Violence and Electoral Cheating” Category

Estimator Category	Multinomial Probit		
	To Only Election Violence	To Only Election Cheating	To Both Violence and Cheating
Malapportionment (MAL)	5.906 (4.173)	2.987 (4.088)	-8.444** (4.222)
Victory Uncertainty	3.960 (2.664)	6.124*** (2.064)	0.787 (1.478)
Executive Constraints	0.527 (0.410)	0.449* (0.260)	-0.307 (0.239)
Uncertainty*Constraints	-0.580 (0.433)	-0.884*** (0.322)	-0.0949 (0.269)
Physical Integrity Index	-0.383*** (0.124)	-0.259*** (0.0955)	-0.332** (0.138)
Executive Recruitment	0.0875 (0.182)	-0.0167 (0.234)	-0.148 (0.159)
Political Competition	-0.132 (0.159)	0.197 (0.181)	0.00205 (0.135)
Logged GDP per capita	-0.249 (0.174)	-0.313 (0.194)	-0.468*** (0.149)
Logged Population	0.112 (0.0919)	-0.0370 (0.0770)	-0.0898 (0.0640)
Civil War	-0.262 (0.578)	-11.22*** (1.228)	-0.552 (0.763)
Demonstration	-0.138 (0.156)	-0.315 (0.208)	0.330** (0.154)
Leader's Tenure	0.101** (0.0460)	0.0869* (0.0498)	0.0831* (0.0482)
Leader's Age	-0.00352 (0.0208)	-0.0142 (0.0282)	-0.000832 (0.0207)
Constant	-3.206 (3.319)	-1.904 (3.140)	7.815*** (2.228)
Number of Observations	248		
Number of Countries	98		
BIC	482.88		

Note: The baseline category is “no existence of both electoral violence and election cheating.” Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

2. From the “Only Election Violence” Category

Estimator Category	Multinomial Probit		
	To Non-Existence of Violence and Cheating	To Only Election Cheating	To Both Violence and Cheating
Malapportionment (MAL)	-5.906 (4.173)	-2.919 (3.625)	-14.35*** (4.394)
Victory Uncertainty	-3.960 (2.664)	2.163 (2.677)	-3.173 (2.546)
Executive Constraints	-0.527 (0.410)	-0.0783 (0.412)	-0.835* (0.426)
Uncertainty*Constraints	0.580 (0.433)	-0.304 (0.435)	0.485 (0.416)
Physical Integrity Index	0.383*** (0.124)	0.124 (0.137)	0.0506 (0.142)
Executive Recruitment	-0.0875 (0.182)	-0.104 (0.260)	-0.236 (0.213)
Political Competition	0.132 (0.159)	0.329* (0.200)	0.134 (0.179)
Logged GDP per capita	0.249 (0.174)	-0.0641 (0.228)	-0.219 (0.207)
Logged Population	-0.112 (0.0919)	-0.149 (0.101)	-0.202** (0.0937)
Civil War	0.262 (0.578)	-10.96*** (1.093)	-0.290 (0.836)
Demonstration	0.138 (0.156)	-0.178 (0.229)	0.468** (0.190)
Leader's Tenure	-0.101** (0.0460)	-0.0138 (0.0522)	-0.0176 (0.0528)
Leader's Age	0.00352 (0.0208)	-0.0106 (0.0299)	0.00269 (0.0256)
Constant	3.206 (3.319)	1.303 (4.173)	11.02*** (3.967)
Number of Observations	248		
Number of Countries	98		
BIC	482.88		

Note: The baseline category is “only election violence.” Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

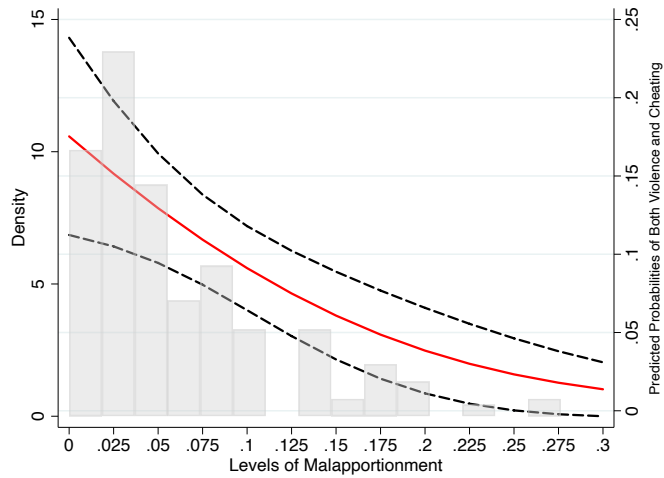
1. From the “Only Election Cheating” Category

Estimator Category	Multinomial Probit		
	To Non-Existence of Violence and Cheating	To Only Election Violence	To Both Violence and Cheating
Malapportionment (MAL)	-3.850 (3.970)	2.015 (3.758)	-12.09*** (4.346)
Victory Uncertainty	-5.415*** (1.847)	-1.508 (2.532)	-4.754*** (1.678)
Executive Constraints	-0.416* (0.240)	0.0874 (0.398)	-0.737** (0.299)
Uncertainty*Constraints	0.782*** (0.292)	0.213 (0.416)	0.710** (0.303)
Physical Integrity Index	0.176** (0.0779)	-0.190 (0.117)	-0.112 (0.119)
Executive Recruitment	0.00697 (0.215)	0.0806 (0.240)	-0.168 (0.189)
Political Competition	-0.161 (0.159)	-0.278 (0.188)	-0.146 (0.151)
Logged GDP per capita	0.299 (0.195)	0.0456 (0.232)	-0.171 (0.216)
Logged Population	0.0671 (0.0725)	0.175* (0.0983)	-0.0314 (0.0782)
Demonstration	0.314* (0.182)	0.173 (0.210)	0.654*** (0.225)
Leader's Tenure	-0.0819* (0.0475)	0.0168 (0.0506)	-0.00293 (0.0577)
Leader's Age	0.0179 (0.0281)	0.0134 (0.0302)	0.0141 (0.0304)
Constant	1.418 (3.061)	-1.627 (4.078)	9.438*** (3.480)
Number of Observations	248		
Number of Countries	98		
BIC	469.09		

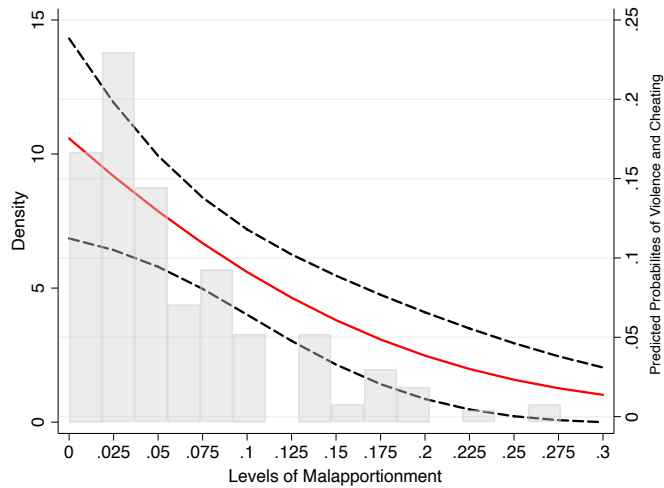
Note: The baseline category is “only election cheating.” Robust standard errors in parentheses. Since including the civil war variable does not achieve model convergence, it is not included in this model. ***<0.01, **<0.05, *<0.1.

Figure B1: Multinomial Logistic Regression

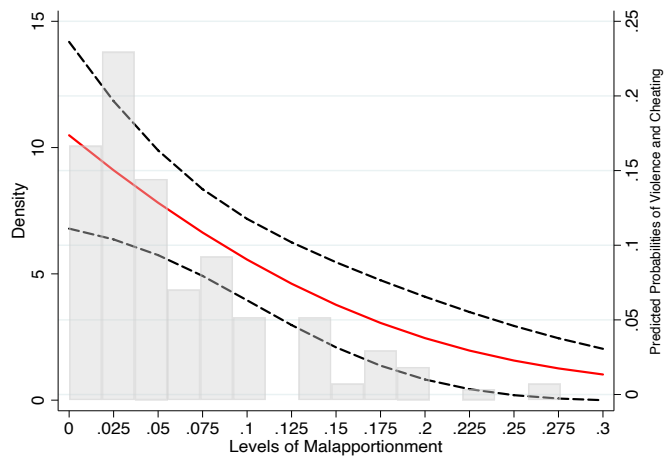
B1-1. Predicted Probabilities from Non-Existence of Violence and Cheating to Both Violence and Cheating



B1-2. Predicted Probabilities from Only Election Violence to Both Violence and Cheating



B1-3. Predicted Probabilities from Only Election Cheating to Both Violence and Cheating



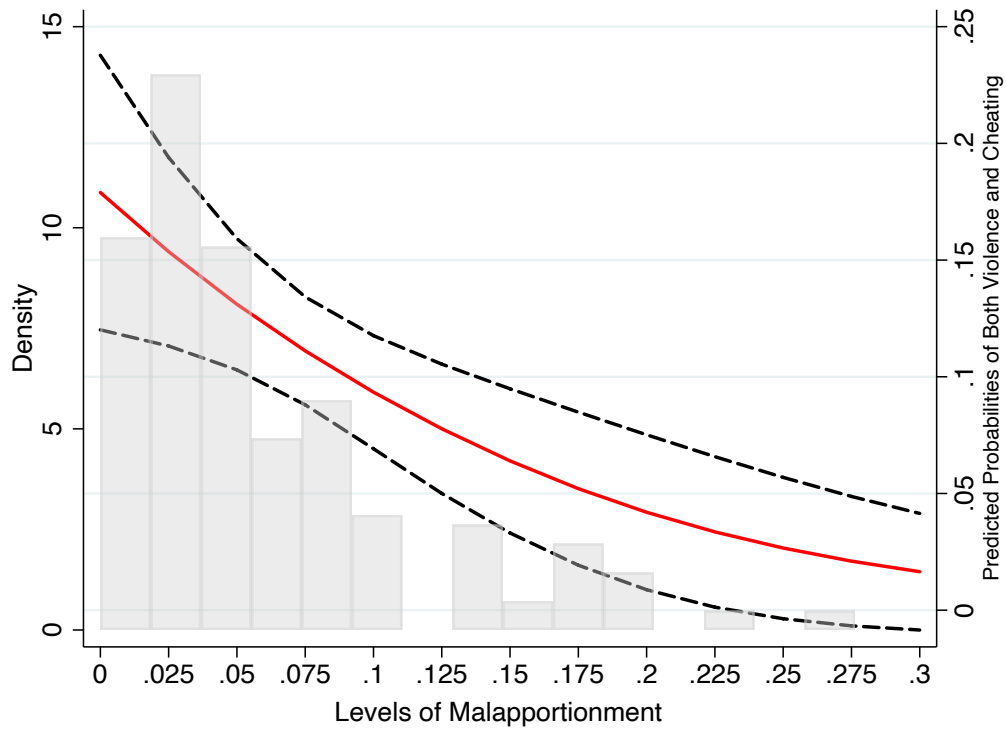
Note: The black, dotted lines represent the 95% confidence intervals. The red, straight line stands for the predicted values of electoral cheating.

Table B2: Additional Controls – Fiscal Expenditure and Electoral Systems

Estimation Method	Model B2
Dependent Variable	RE-Logit Electoral Violence
Malapportionment (MAL)	-17.58*** (6.184)
Victory Uncertainty	-2.108 (1.908)
Executive Constraints	-0.845** (0.379)
Uncertainty*Constraints	0.535 (0.431)
Physical Integrity Index	-0.511* (0.303)
Executive Recruitment	-0.0417 (0.323)
Political Competition	-0.150 (0.220)
Logged GDP per capita	-0.666*** (0.214)
Logged Population	-0.111 (0.0855)
Civil War	-1.740 (1.149)
Demonstration	0.781*** (0.278)
Leader's Tenure	0.0953 (0.115)
Leader's Age	0.0190 (0.0418)
Effective Electoral Threshold	0.0169 (0.0198)
Fiscal Expenditure	0.0407 (0.0375)
Constant	8.980*** (3.424)
Number of Observations	228
Number of Countries	92
Year Dummies	Yes
BIC	220.76

Note: Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

Figure B2: Additional Controls – Fiscal Expenditure and Electoral Systems



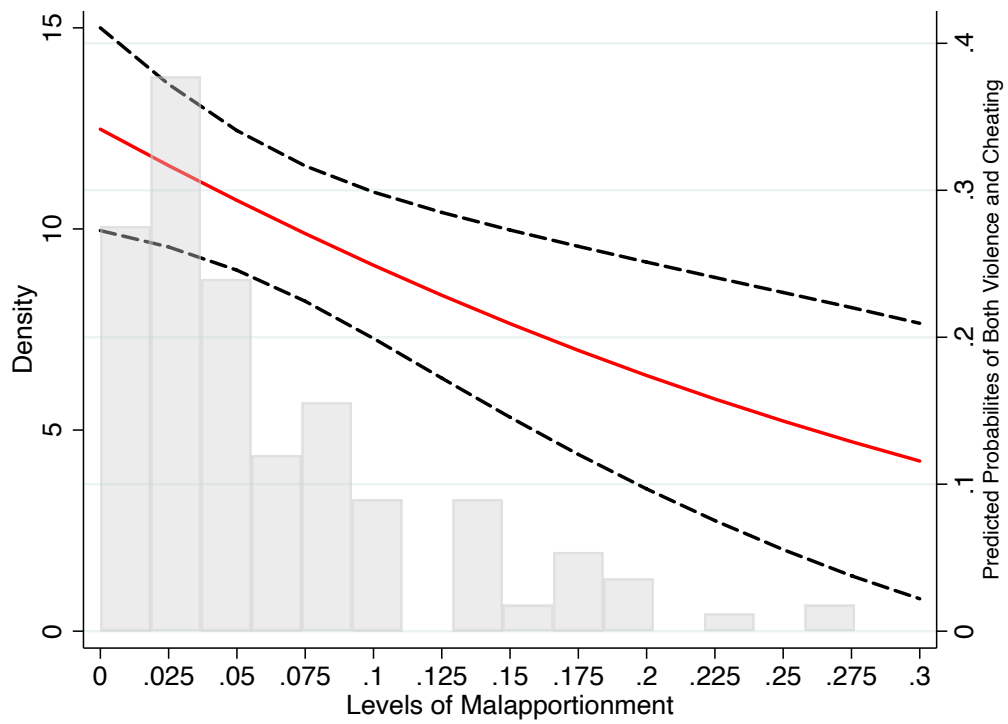
Note: The black, dotted lines represent the 95% confidence intervals. The red, straight line stands for the predicted probabilities of election violence and cheating.

Table B3: Alternative Measures of Election Violence and Electoral Cheating (V-Dem)

Estimator	Model B3
Dependent Variable	Logit
	Both Violence and Cheating (V-Dem)
Malapportionment (MAL)	-23.94** (10.70)
Victory Uncertainty	-2.504 (3.836)
Executive Constraints	-1.024 (0.655)
Uncertainty*Constraints	0.466 (0.686)
Physical Integrity Index	0.131 (0.316)
Executive Recruitment	-0.246 (0.357)
Political Competition	-0.143 (0.301)
Logged GDP per capita	-3.900*** (1.077)
Logged Population	1.185*** (0.336)
Civil War	-4.445* (2.453)
Demonstration	0.127 (0.296)
Leader's Tenure	-0.0105 (0.1000)
Leader's Age	-0.0484 (0.0493)
Constant	25.54*** (7.468)
Number of Observations	248
Number of Countries	98
Year Dummies	Yes
BIC	193.36

Note: Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

Figure B3: Alternative Measures of Election Violence and Electoral Cheating (V-Dem)



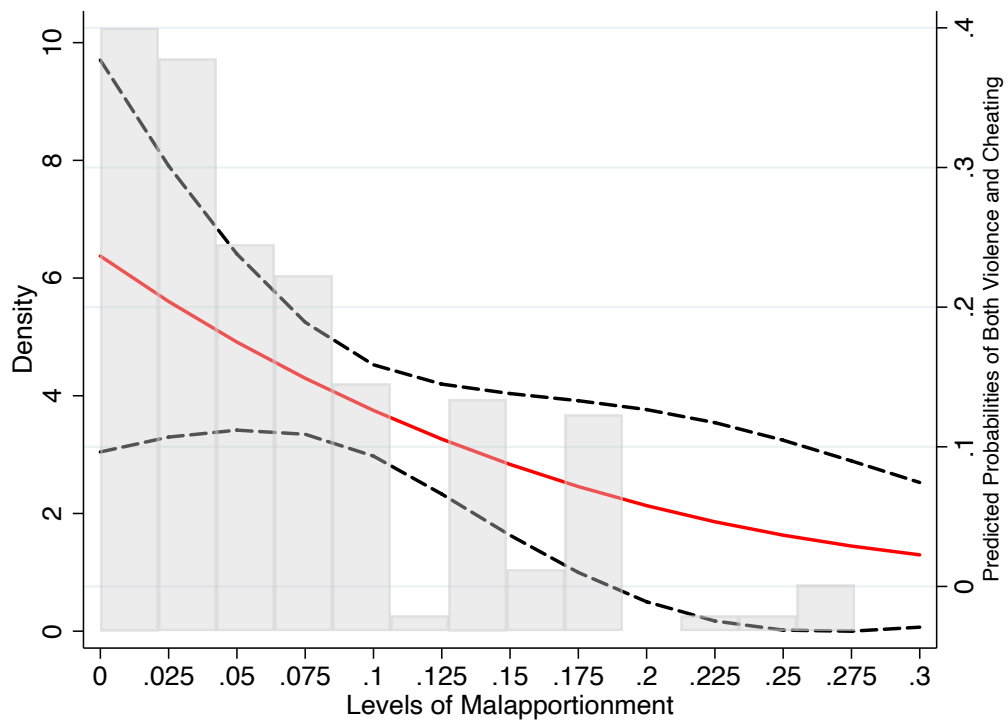
Note: The black, dotted lines represent the 95% confidence intervals. The red, straight line stands for the predicted values of electoral violence.

Table B4: Developing Countries

Estimator Dependent Variable	Model B4 RE-Logit Both Violence and Cheating
Malapportionment (MAL)	-16.65* (8.831)
Victory Uncertainty	-2.779 (3.202)
Executive Constraints	-0.909 (1.677)
Uncertainty*Constraints	0.581 (0.753)
Physical Integrity Index	-0.412 (0.332)
Executive Recruitment	-0.106 (0.712)
Political Competition	-0.0236 (0.512)
Logged GDP per capita	-0.504 (0.750)
Logged Population	-0.142 (0.107)
Civil War	-1.577 (1.272)
Demonstration	0.846** (0.382)
Leader's Tenure	0.111 (0.113)
Leader's Age	0.00752 (0.0812)
Constant	10.07** (4.066)
Number of Observations	179
Number of Countries	80
Year Dummies	Yes
BIC	208.09

Note: Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

Figure B4: Developing Countries



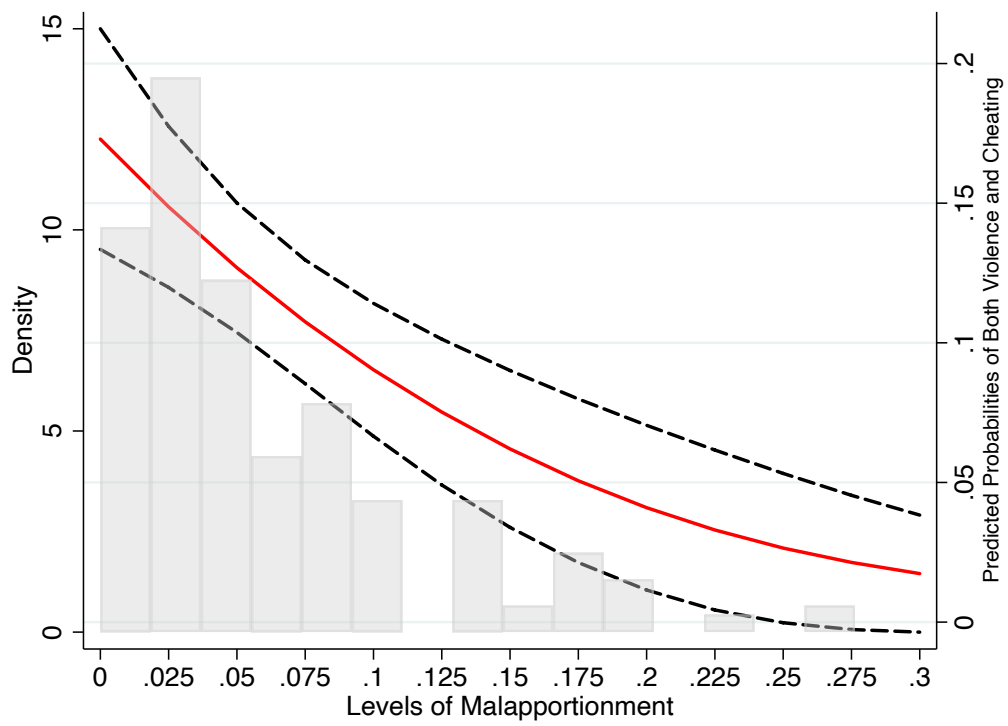
Note: The black, dotted lines represent the 95% confidence intervals. The red, straight line stands for the predicted probabilities electoral violence.

Table B5: Time Dependence

Estimator	Model B5
Dependent Variable	RE-Logit
	Both Violence and Cheating
Malapportionment (MAL)	-19.26*** (5.869)
Victory Uncertainty	-3.021 (2.625)
Executive Constraints	-0.961** (0.482)
Uncertainty*Constraints	0.589 (0.582)
Physical Integrity Index	-0.449* (0.258)
Executive Recruitment	-0.0302 (0.342)
Political Competition	-0.0588 (0.185)
Logged GDP per capita	-0.627* (0.348)
Logged Population	-0.204* (0.113)
Civil War	-1.604 (1.302)
Demonstration	0.949*** (0.296)
Leader's Tenure	0.141* (0.0747)
Leader's Age	0.0252 (0.0503)
Time Lapse	0.791 (0.526)
Time Lapse^2	-0.253* (0.132)
Time Lapse^3	0.0147** (0.00723)
Constant	10.84*** (3.802)
Number of Observations	248
Number of Countries	98
Year Dummies	Yes
BIC	226.95

Note: Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

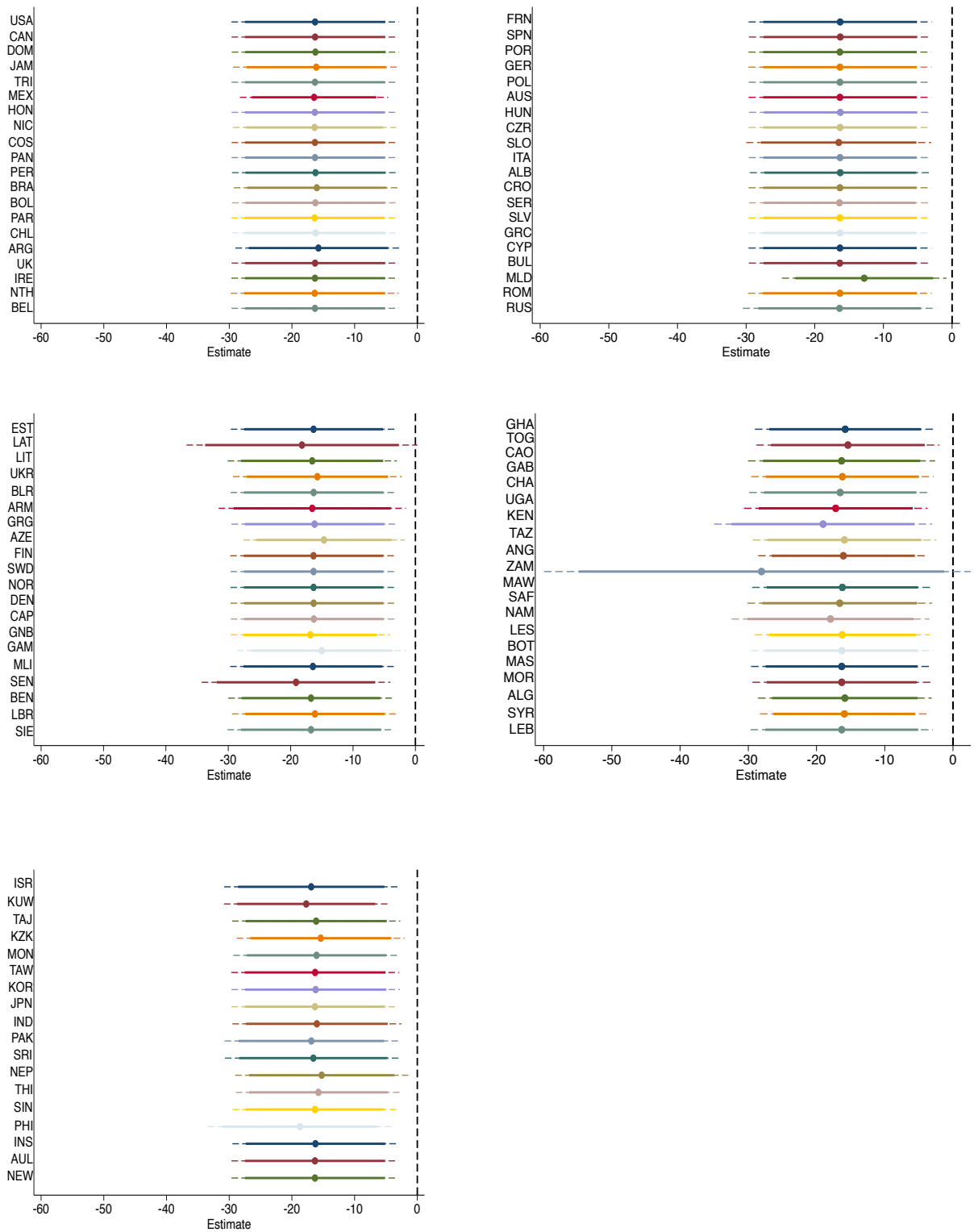
Figure B5: Time Dependence



Note: The black, dotted lines represent the 95% confidence intervals. The red, straight line stands for the predicted probabilities of election violence.

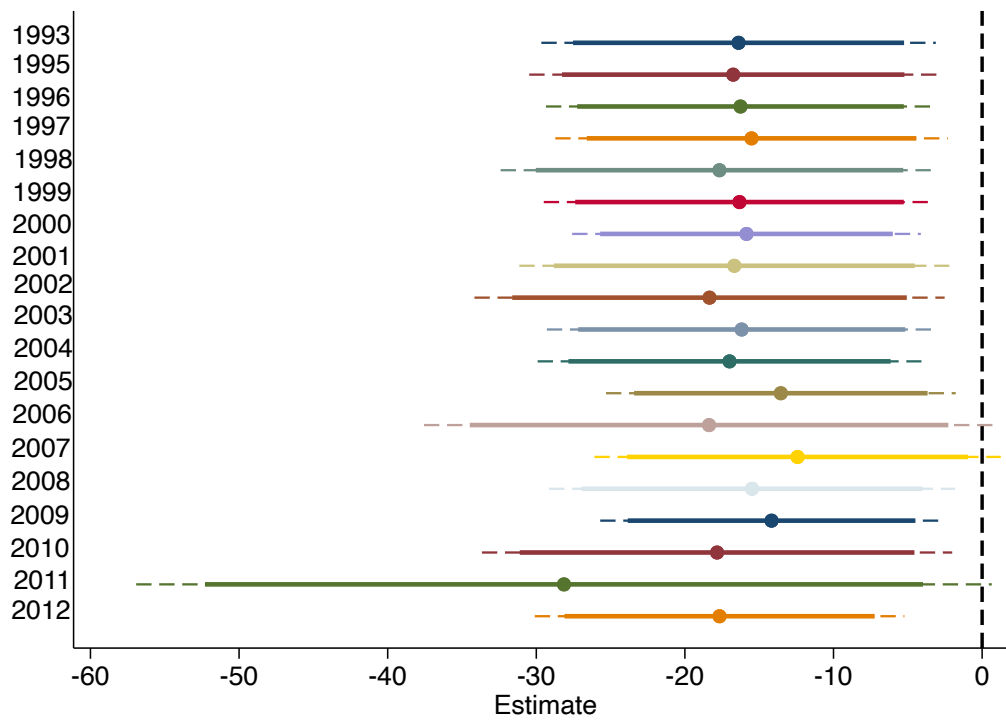
Figure B6: Jackknife Analyses

a. By Country



Note: The dots stand for point estimates of the malapportionment variable. The vertical axis shows a country dropped from analysis. The dashed lines represent the 95 percent confidence intervals, whereas the straight lines represent the 90% confidence intervals.

b. By Year



Note: The dots stand for point estimates of the malapportionment variable. The vertical axis shows a year dropped from analysis. The dashed lines represent the 95 percent confidence intervals, whereas the straight lines represent the 90% confidence intervals. The dataset does not have any 1994 election years and thus the jackknife analysis is not run for that year.

Appendix C

Table C-1: Malapportionment, Blatant Electoral Fraud, and Popular Protests

Estimation Method	Model C1
Dependent Variable	RE-Logit Post-Electoral Protests
Malapportionment (MAL)	3.587 (4.283)
Physical Integrity Index	-0.206 (0.130)
Victory Uncertainty	1.106 (1.824)
Executive Constraints	-0.0455 (0.269)
Uncertainty*Constraints	-0.163 (0.308)
Logged GDP per capita	-0.167* (0.0900)
Logged Population	-0.717*** (0.192)
Leader's Tenure	0.0187 (0.0514)
Leader's Age	-0.00365 (0.0227)
Civil War	0.812 (1.076)
Constant	7.482** (3.184)
Number of Observations	246
Number of Countries	97
BIC	213.79

Note: Robust standard errors in parentheses. ***<0.01, **<0.05, *<0.1.

Table C-2: Between- and Within-Unit Variances of Electoral Manipulation

Electioneering Strategy		Mean	SD	Correlation of Variation (SD/Mean)	Observations
Election Violence	Overall	0.177	0.38	2.13	Country-Election Year = 248
	Between Country		0.38	2.13	Country = 98
	Within Country		0.2	1.12	Time Series (Average) = 2.53
Election Cheating	Overall	0.157	0.364	2.31	Country-Election Year = 248
	Between Country		0.4	2.54	Country = 98
	Within Country		0.185	1.18	Time Series (Average) = 2.53
Malapportionment	Overall	0.06	0.05	0.83	Country-Election Year = 248
	Between Country		0.06	1.00	Country = 98
	Within Country		0.006	0.1	Time Series (Average) = 2.53