Counterbalancing, Spatial Dependence, and Peer-Group Effects

ONLINE APPENDIX

In order to ensure the robustness of the results reported in the main article, we changed a variety of specifications and re-estimated all models again. All these additional models are reported below and can be replicated with our replication files. Here, we summarize the findings of all robustness checks, briefly describe the rationale behind them, and discuss the results we obtained. First, in the main article, we relied on a binary specification for the connectivity matrix of $\mathbf{W}y^{\text{Non-Democracy}}$. The rationale behind this operationalization was to capture non-democratic networks and peer groups. As an alternative, we also considered the absolute difference in countries' combined polity scale (polity2) of the Polity IV Project (Marshall and Jaggers 2013) as elements of the weighting matrix (again, in order to facilitate the interpretation, we re-scaled positive values of it so that higher values pertain to a shorter absolute difference in polity2 values). That is, such an operationalization captures the rationale we argued for, but also moves beyond this as we now test for the diffusion of counterbalancing policies via more similar regime types in general, not only non-democracies. Table A1, of which all models mirror the main article's model specifications apart from the replacement of $\mathbf{W}y^{\text{Non-Democracy}}$ by $\mathbf{W}y^{\text{Regime Similarity}}$, summarizes the findings we obtain when employing this specification. The results are basically identical to the ones in the main article. The only exception is $\mathbf{W}y^{\text{Regime Similarity}}$ that does not become insignificant in the m-STAR estimations (Models A4 and A5). However, the theoretical reasoning behind $\mathbf{W}y^{\text{Regime Similarity}}$ differs from the non-democracy peer group argument we made in the main text, and we leave a more thorough investigation to future studies why it is, generally speaking (as opposed to non-democracies only), regime type similarity that allows for the diffusion of counterbalancing policies.

TABLE A1. The Impact of and Spatial Dependence *on Effective Number of Military Organizations*

	Model A1	**Model A2**	**Model A3**	**Model A4**	**Model A5**
Constant	-0.5560	-0.4679	-0.6679	-0.7780	-0.7834
	(0.7951)	(0.7950)	(0.7954)	(0.7371)	(0.7372)
Lagged Dependent Variable	0.7361	0.7358	0.7363	0.7359	0.7359
	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***
Democracy	0.0005	0.0006	0.0005	0.0013	0.0013
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
Instability	0.0013	0.0013	0.0012	0.0013	0.0013
	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**
GDP per capita (ln)	-0.0148	-0.0128	-0.0172	-0.0100	-0.0102
	(0.0231)	(0.0231)	(0.0231)	(0.0232)	(0.0232)
Population (ln)	0.0721	0.0654	0.0806	0.0528	0.0534
	(0.0496)	(0.0496)	(0.0496)	(0.0506)	(0.0506)
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0001	-0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Total Wars	-0.0426	-0.0413	-0.0441	-0.0252	-0.0254
	(0.0272)	(0.0272)	(0.0272)	(0.0267)	(0.0267)
Military Centrality	-3.1719	-3.2624	-3.0454	-3.3795	-3.3606
	(2.1905)	(2.1902)	(2.1914)	(2.1930)	(2.1927)
$\mathbf{W}y^{\text{Coups All}}$: ρ	0.0104			0.0254	
	(0.0000)***			(0.0124)**	
$\mathbf{W}y^{\text{Coups Outcome}}$: ρ		0.0184			0.0242
		(0.0000)***			(0.0121)**
$\mathbf{W}y^{\text{Regime Similarity}}$: ρ			0.0012	0.2145	0.2143
			(0.0001)***	(0.0979)**	(0.0980)**
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * p < 0.10; ** p < 0.05; *** p < 0.01 (two-tailed).

Second, neither the single S-ML nor the m-STAR models require a temporally lagged spatial lag variable. In the main paper, however, we temporally lagged the spatial lags. The underlying assumption was that the diffusion effect needs time, i.e., counterbalancing policies flow through peer-group networks, but affect the target only in the next time period (one year afterwards). In order to test for a contemporaneous effect, we replaced Wy_{t-1} by Wy_t. Table A2 below summarizes our findings from these models (all other specifications are identical to those reported in the article). The table shows that when assuming a contemporaneous effect, all findings basically remain unchanged.

Third, we also considered the natural logarithm of our dependent variable (and, hence, also for the spatial lags) to scale down the variance and reduce the effect of outliers. Table A3 reports our findings for this change in model specification (all other specifications described in the article remain unchanged, including the use of temporally lagged spatial lags). Two interesting findings emerge from Table A3. On one hand, some of the control variables now become statistically significant at conventional levels – independent from whether we look at the m-STAR models or the S-ML models. On the other hand, $\mathbf{W}y^{\text{Non-Democracy}}$ is now statistically significant throughout all models, and no longer becomes insignificant as soon as we employ the m-STAR estimation procedure. That said, our results for the other spatial lags do not depend on whether we use the "regular" dependent variable or a logged version of it.

Fourth, a valid concern might be that states do not learn from and/or emulate the counterbalancing behavior of other states, but instead set a level of counterbalancing in response to the perceived level of coup risk. In order to assess this possibility, we made two important changes. First, we took the data from Powell (2012; data available at: http://www.jonathanmpowell.com/determinants.html) on states' coup risk (the variable *couprisk1*, which is the predicted value of a model that has coup onset as the dependent variable and GDP per capita, GDP growth, and temporal controls as explanatory items) and incorporated this variable in our models as well. Second, we re-defined the spatial lags of all models as follows:

TABLE A2. The Impact of and Spatial Dependence *on Effective Number of Military Organizations*

	Model A6	**Model A7**	**Model A8**	**Model A9**	**Model A10**
Constant	-0.5872	-0.6258	-0.6212	-0.4860	-0.4892
	(0.7952)	(0.7953)	(0.7963)	(0.7300)	(0.7301)
Lagged Dependent Variable	0.7361	0.7362	0.7361	0.7351	0.7351
	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***
Democracy	0.0005	0.0005	0.0012	0.0017	0.0017
	(0.0014)	(0.0014)	(0.0014)	(0.0017)	(0.0017)
Instability	0.0012	0.0012	0.0012	0.0014	0.0014
	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**
GDP per capita (ln)	-0.0154	-0.0162	-0.0173	-0.0094	-0.0095
	(0.0231)	(0.0231)	(0.0231)	(0.0233)	(0.0233)
Population (ln)	0.0745	0.0775	0.0770	0.0532	0.0535
	(0.0496)	(0.0496)	(0.0496)	(0.0508)	(0.0508)
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Total Wars	-0.0430	-0.0435	-0.0424	-0.0264	-0.0265
	(0.0272)	(0.0272)	(0.0272)	(0.0268)	(0.0268)
Military Centrality	-3.1370	-3.0928	-3.0970	-3.5915	-3.5741
	(2.1907)	(2.1910)	(2.1937)	(2.2045)	(2.2042)
$\mathbf{W}y^{\text{Coups All}}$: ρ	0.0077			0.0265	
	(0.0000)***			(0.0123)**	
$\mathbf{W}y^{\text{Coups Outcome}}$: ρ		0.0039			0.0255
		(0.0000)***			(0.0121)**
$\mathbf{W}y^{\text{Non-Democracy}}$: ρ			0.0092	0.0129	0.0129
			(0.0000)***	(0.0119)	(0.0119)
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * p < 0.10; ** p < 0.05; *** p < 0.01 (two-tailed).

TABLE A3. The Impact of and Spatial Dependence *on Effective Number of Military Organizations (log)*

	Model A11	**Model A12**	**Model A13**	**Model A14**	**Model A15**
Constant	-1.6695	-1.6623	-1.8597	-1.5373	-1.5299
	(0.4611)***	(0.4587)***	(0.4530)***	(0.4648)***	(0.4647)***
Lagged Dependent Variable	0.4051	0.4050	0.4058	0.4043	0.4042
	(0.0063)***	(0.0063)***	(0.0063)***	(0.0063)***	(0.0063)***
Democracy	0.0004	0.0004	0.0004	0.0015	0.0015
	(0.0008)	(0.0008)	(0.0008)	(0.0010)	(0.0010)
Instability	0.0005	0.0005	0.0004	0.0006	0.0006
	(0.0003)	(0.0003)	(0.0003)	(0.0003)*	(0.0003)*
GDP per capita (ln)	-0.0132	-0.0130	-0.0167	-0.0119	-0.0118
	(0.0132)	(0.0132)	(0.0131)	(0.0132)	(0.0132)
Population (ln)	0.1078	0.1073	0.1220	0.0977	0.0972
	(0.0290)***	(0.0288)***	(0.0282)***	(0.0293)***	(0.0293)***
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Total Wars	-0.0445	-0.0443	-0.0475	-0.0420	-0.0418
	(0.0155)***	(0.0155)***	(0.0155)***	(0.0156)***	(0.0156)***
Military Centrality	0.4218	0.4215	0.6408	0.1541	0.1535
	(1.2513)	(1.2498)	(1.2480)	(1.2569)	(1.2566)
$\mathbf{W}y^{\text{Coups All}}$: ρ	0.0532			0.0509	
	(0.0242)**			(0.0235)**	
$\mathbf{W}y^{\text{Coups Outcome}}$: ρ		0.0526			0.0505
		(0.0195)***			(0.0224)**
$\mathbf{W}y^{\text{Non-Democracy}}$: ρ			0.0010	0.0464	0.0464
			(0.0002)***	(0.0223)**	(0.0223)**
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * p < 0.10; ** p < 0.05; *** p < 0.01 (two-tailed).

$$y_t = \phi y_{t-1} + X_t\beta + \rho W z_t + \varepsilon, \quad (1)$$

where y_t is the dependent variable, y_{t-1} signifies the temporally lagged dependent variable, X_t pertains to the set of control variables and the constant, ε is the error term, and Wz_t stands for the product of a row-standardized connectivity matrix (W) and the coup-risk item (z_t). The models based on these specifications then directly test whether the spatial clustering in counterbalancing is actually due to the spatial clustering in coup risk. Table A4 summarizes our findings for this robustness check (all other model specifications are identical to those discussed in the main paper, including the specification for the spatial lags' connectivity matrices). While the coefficients of the control variables remain virtually unchanged, all spatial lags' estimates are either insignificant or approximately 0. In addition, the country-level coup-risk item is also insignificant in any model of Table A4. Put differently, we are fairly confident to conclude that a country's level of counterbalancing is unlikely to be driven by its own coup risk, and the coup risk in other countries linked to the state in question is also not a major driver of its degree of counterbalancing as measured by the effective number of military organizations.

The variable *Coup Risk* is a predictor generated in a first-stage regression (the data are available at: http://www.jonathanmpowell.com/_determinants.html), which implies that we should correct the standard errors accordingly in the models of Table A4, since one would assume that there is no error in the generation of that predictor otherwise. Bootstrapping the standard errors is one way to address this problem. As the estimator code for the S-ML regression model does not offer a straightforward way to implement corrections for the standard errors, we decided to use S-OLS with bootstrapped standard errors (1,000 bootstrap replications). Note that the results produced by either the S-OLS or the S-ML do not differ substantively and, hence, we believe that our approach is justified. Table A5 below summarizes our results, which are basically identical to those in Table A4 and the main text.

TABLE A4. The Impact of and Spatial Dependence *on Effective Number of Military Organizations*

	Model A16	**Model A17**	**Model A18**	**Model A19**	**Model A20**
Constant	-0.6028	-0.6026	-0.6025	-0.5776	-0.5762
	(0.7986)	(0.7986)	(0.7986)	(0.7997)	(0.7998)
Lagged Dependent Variable	0.7354	0.7354	0.7354	0.7355	0.7355
	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***
Coup Risk	-0.1360	-0.1362	-0.1362	-0.1684	-0.1678
	(0.1525)	(0.1525)	(0.1525)	(0.1594)	(0.1592)
Democracy	0.0004	0.0004	0.0004	0.0004	0.0004
	(0.0014)	(0.0014)	(0.0014)	(0.0015)	(0.0015)
Instability	0.0011	0.0011	0.0011	0.0011	0.0011
	(0.0006)*	(0.0006)*	(0.0006)*	(0.0006)**	(0.0006)**
GDP per capita (ln)	-0.0198	-0.0198	-0.0198	-0.0196	-0.0196
	(0.0233)	(0.0233)	(0.0233)	(0.0233)	(0.0233)
Population (ln)	0.0781	0.0781	0.0781	0.0765	0.0764
	(0.0497)	(0.0497)	(0.0497)	(0.0497)	(0.0497)
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Total Wars	-0.0420	-0.0420	-0.0420	-0.0420	-0.0419
	(0.0273)	(0.0273)	(0.0273)	(0.0273)	(0.0273)
Military Centrality	-3.0723	-3.0724	-3.0723	-3.0878	-3.0894
	(2.1914)	(2.1914)	(2.1914)	(2.1919)	(2.1920)
$\mathbf{W}z^{\text{Coups All}}$: ρ	-0.0003			0.0954	
	(0.0003)			(0.1378)	
$\mathbf{W}z^{\text{Coups Outcome}}$: ρ		0.0001			0.0924
		(0.0003)			(0.1336)
$\mathbf{W}z^{\text{Non-Democracy}}$: ρ			-0.0004	-0.0173	-0.0165
			(0.0008)	(0.1699)	(0.1697)
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

TABLE A5. The Impact of and Spatial Dependence *on Effective Number of Military Organizations* – S-OLS and Bootstrapped Standard Errors

	Model A21	**Model A22**	**Model A23**	**Model A24**	**Model A25**
Constant	-0.6440	-0.6440	-0.6957	-0.6483	-0.6482
	(0.7175)	(0.6833)	(0.7169)	(0.7569)	(0.7525)
Lagged Dependent Variable	0.7356	0.7356	0.7354	0.7356	0.7355
	(0.0204)***	(0.0202)***	(0.0203)***	(0.0209)***	(0.0206)***
Coup Risk	-0.2326	-0.2228	-0.1365	-0.2328	-0.2292
	(0.1940)	(0.2018)	(0.1668)	(0.2055)	(0.1954)
Democracy	0.0005	0.0005	0.0005	0.0006	0.0006
	(0.0015)	(0.0016)	(0.0021)	(0.0022)	(0.0023)
Instability	0.0012	0.0012	0.0011	0.0012	0.0012
	(0.0007)	(0.0008)	(0.0007)	(0.0008)	(0.0008)
GDP per capita (ln)	-0.0188	-0.0189	-0.0197	-0.0187	-0.0188
	(0.0303)	(0.0291)	(0.0304)	(0.0311)	(0.0298)
Population (ln)	0.0737	0.0737	0.0783	0.0738	0.0738
	(0.0468)	(0.0457)	(0.0464)*	(0.0488)	(0.0498)
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Total Wars	-0.0337	-0.0336	-0.0354	-0.0338	-0.0337
	(0.0270)	(0.0258)	(0.0265)	(0.0285)	(0.0291)
Military Centrality	-3.1351	-3.1335	-3.0846	-3.1445	-3.1424
	(2.0968)	(2.1350)	(2.3093)	(2.2770)	(2.2974)
$\mathbf{W}z^{\text{Coups All}}$: ρ	0.2840			0.2837	
	(0.2653)			(0.2822)	
$\mathbf{W}z^{\text{Coups Outcome}}$: ρ		0.2515			0.2512
		(0.2558)			(0.2531)
$\mathbf{W}z^{\text{Non-Democracy}}$: ρ			0.0373	0.0289	0.0272
			(0.4897)	(0.4975)	(0.4996)
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

We also estimated the m-STAR models while including both Wz_t and Wy_{t-1}. In other words, we take the models presented in the main article, but additionally include the spatial lags that are based on coup risk (see Table A4 above). This robustness check, which is summarized in Table A6, is a more conservative variant of Models A19 and A20 in Table A4. That said, our core result that counterbalancing diffuses among experiential peers does hold: the spatial lag's coefficients are positively signed and statistically significant at conventional levels.

Finally, we included a variable for the time elapsed since the last coup attempt (if any). Although this seems analogous to our inclusion of the unit-level *Democracy* item, note that the rationale behind such a coup-time counter is to ensure that our results are not a function of common shocks. However, this is captured by the year fixed effects already. Either way, we constructed a variable that counts the years since the last coup and include a logged version into our estimations. The rationale for taking the natural log is that there are likely to be decreasing returns with more time elapsed. Table A7 presents our findings. Not surprisingly, the variable is statistically insignificant in all models as the year dummies already control for "common temporal shocks" (Franzese and Hays 2007; 2008).

TABLE A6. The Impact of and Spatial Dependence *on Effective Number of Military Organizations* – Four Spatial Lags in m-STAR Estimations

	Model A26	**Model A27**
Constant	-0.3908	-0.4003
	(0.7352)	(0.7350)
Lagged Dependent Variable	0.7344	0.7343
	(0.0110)***	(0.0110)***
Democracy	0.0018	0.0017
	(0.0017)	(0.0017)
Instability	0.0014	0.0014
	(0.0006)**	(0.0006)**
GDP per capita (ln)	-0.0093	-0.0094
	(0.0233)	(0.0233)
Population (ln)	0.0458	0.0467
	(0.0513)	(0.0512)
Fuel Exports (in % of Exports)	-0.0002	-0.0002
	(0.0004)	(0.0004)
Total Wars	-0.0228	-0.0232
	(0.0270)	(0.0270)
Military Centrality	-3.7038	-3.6792
	(2.2058)	(2.2054)
$\mathbf{W}y^{\text{Coups All}}$: ρ	0.0336	
	(0.151)**	
$\mathbf{W}y^{\text{Coups Outcome}}$: ρ		0.0320
		(0.0148)**
$\mathbf{W}y^{\text{Non-Democracy}}$: ρ	0.0167	0.0169
	(0.0133)	(0.0133)
$\mathbf{W}z^{\text{Coups All}}$: ρ	-0.1535	
	(0.1800)	
$\mathbf{W}z^{\text{Coups Outcome}}$: ρ		-0.1408
		(0.1716)
$\mathbf{W}z^{\text{Non-Democracy}}$: ρ	-0.0751	-0.0773
	(0.2027)	(0.2023)
Observations	3,497	3,497
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

TABLE A7. The Impact of and Spatial Dependence *on Effective Number of Military Organizations*

	Model A28	**Model A29**	**Model A30**	**Model A31**	**Model A32**
Constant	-0.4454	-0.5088	-0.6530	-0.1894	-0.2047
	(0.7950)	(0.7951)	(0.7955)	(0.8125)	(0.8123)
Lagged Dependent Variable	0.7354	0.7356	0.7361	0.7341	0.7341
	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***	(0.0110)***
Time Since Last Coup (ln)	0.0070	0.0053	0.0015	0.0117	0.0110
	(0.0076)	(0.0076)	(0.0076)	(0.0086)	(0.0085)
Democracy	0.0005	0.0005	0.0006	0.0017	0.0017
	(0.0014)	(0.0014)	(0.0014)	(0.0017)	(0.0017)
Instability	0.0012	0.0012	0.0012	0.0014	0.0013
	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**	(0.0006)**
GDP per capita (ln)	-0.0148	-0.0156	-0.0174	-0.0111	-0.0112
	(0.0232)	(0.0232)	(0.0232)	(0.0233)	(0.0233)
Population (ln)	0.0638	0.0686	0.0795	0.0436	0.0448
	(0.0496)	(0.0496)	(0.0496)	(0.0513)	(0.0512)
Fuel Exports (in % of Exports)	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Total Wars	-0.0399	-0.0410	-0.0436	-0.0355	-0.0357
	(0.0272)	(0.0272)	(0.0272)	(0.0273)	(0.0273)
Military Centrality	-3.2382	-3.1720	-3.0670	-3.6499	-3.6252
	(2.1904)	(2.1908)	(2.1919)	(2.2042)*	(2.2040)*
$\mathbf{W}y^{\text{Coups All}}$: ρ	0.0197			0.0348	
	(0.0000)***			(0.0139)**	
$\mathbf{W}y^{\text{Coups Outcome}}$: ρ		0.0137			0.0328
		(0.0001)***			(0.0136)**
$\mathbf{W}y^{\text{Non-Democracy}}$: ρ			0.0018	0.0146	0.0147
			(0.0000)***	(0.0119)	(0.0119)
Observations	3,497	3,497	3,497	3,497	3,497
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes

Note: Table entries are coefficients; standard errors in parentheses; country and year fixed effects included, but omitted from presentation; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).