

Arms versus Democratic Allies Supplementary Appendix

¹, Matthew DiGiuseppe¹, and Paul Poast²

¹Department of Political Science, University of Mississippi,
mrdigiuss@olemiss.edu

²Department of Political Science, University of Chicago,
paulpoast@uchicago.edu

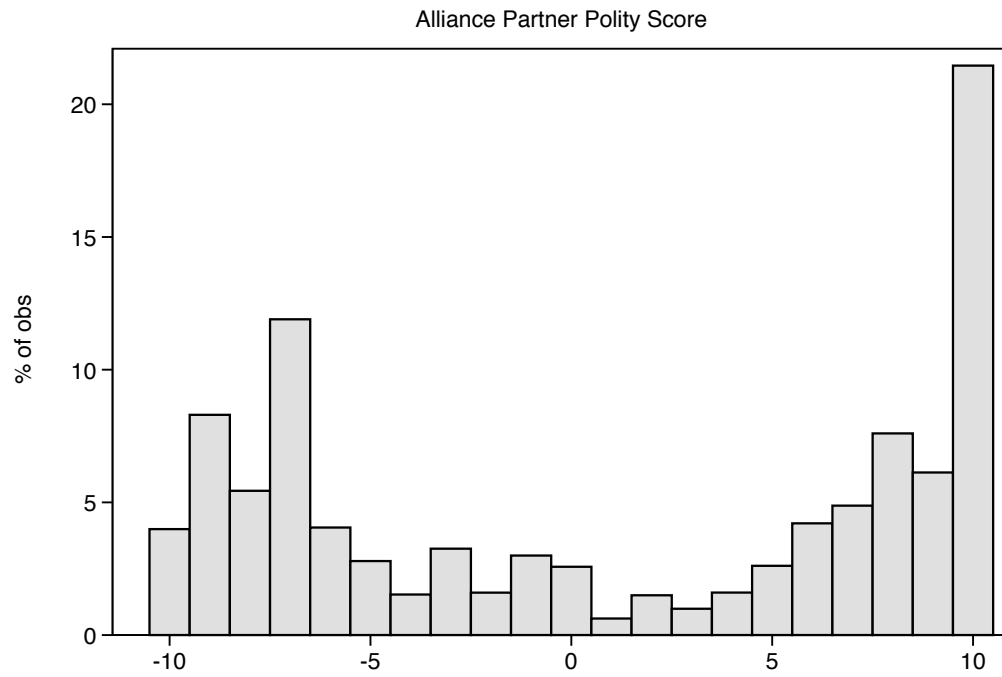


Figure A.1: Distribution of Polity2 score of all defense pact partners from 1950-2001.

Table A.1: Democratic and Non-Democratic Ally Spending and Military Spending

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled	Country FE	Year FE	Inst. LDV	NATO	US
$\ln(\text{Military Exp.})_{t-1}$	0.90*	0.77*	0.91*	0.66*	0.90*	0.90*
	(0.010)	(0.018)	(0.0061)	(0.050)	(0.010)	(0.010)
Polity	-0.0024*	-0.0045*	-0.0016*	-0.0057*		
	(0.00072)	(0.0013)	(0.00065)	(0.0010)		
$\ln(\text{Def. Ally Mil. Spending})_{Dem}$	-0.0039*	-0.0038*	-0.0043*	-0.015*		
	(0.00089)	(0.0019)	(0.00074)	(0.0024)		
$\ln(\text{Def. Ally Mil. Spending})_{NonDem}$	0.0027*	0.0070*	0.0028*	0.013*	0.0040*	0.0038*
	(0.00097)	(0.0018)	(0.00094)	(0.0023)	(0.00095)	(0.0010)
$\ln(\text{Rival Mil. Exp.})$	0.0065*	0.013*	0.0057*	0.019*	0.0078*	0.0073*
	(0.0013)	(0.0025)	(0.0012)	(0.0027)	(0.0013)	(0.0013)
Interstate War	0.100*	0.10*	0.096*	0.20*	0.11*	0.11*
	(0.023)	(0.021)	(0.021)	(0.036)	(0.023)	(0.024)
Civil War	0.039*	0.067*	0.042*	0.080*	0.039*	0.039*
	(0.018)	(0.019)	(0.018)	(0.022)	(0.018)	(0.019)
$\ln(\text{GDP})$	0.097*	0.21*	0.096*	0.35*	0.092*	0.093*
	(0.011)	(0.019)	(0.0067)	(0.052)	(0.011)	(0.011)
Peacetime Coordination	0.023*	0.011	0.017*	0.058*	0.022*	0.022*
	(0.0057)	(0.0077)	(0.0048)	(0.011)	(0.0055)	(0.0056)
$\ln(\text{Def. Ally Mil. Spending})_{Dem,Non-Nato}$					-0.0060*	
					(0.00091)	
$\ln(\text{Def. Ally Mil. Spending})_{NATO}$					-0.00083	
					(0.00093)	
$\ln(\text{Def. Ally Mil. Spending})_{Dem,Non-US}$						-0.0030*
						(0.0013)
$\ln(\text{Def. Ally Mil. Spending})_{US}$						-0.0034*
						(0.0011)
Constant	-0.36*	-0.45*	-0.30*	-1.45*	-0.31*	-0.33*
	(0.059)	(0.17)	(0.045)	(0.23)	(0.056)	(0.058)
AR1	Yes	Yes	Yes	No	Yes	Yes
Observations	5889	5889	5889	5742	5919	5870
R^2	0.98	0.98	0.98	0.97	0.98	0.98

Panel corrected standard errors in parentheses (1-3, 5-6)

Robust standard errors in parentheses (4)

* $p < 0.05$

Table A.2: Alliances and Military Burden (Mil. Spending/GDP)

	(1)	(2)	(3)	(4)	(5)	(6)
	Pooled	Country FE	Year FE	Inst. LDV	NATO/Warsaw	US/USSR
Defense Alliance _{Dem}	-0.0543* (0.0109)	-0.0453* (0.0176)	-0.0554* (0.00956)	-0.140* (0.0401)	-0.0553* (0.0112)	-0.0294 (0.0161)
Defense Alliance _{NonDem}	0.0310* (0.00984)	0.0487* (0.0187)	0.0335* (0.0100)	0.0945* (0.0299)	0.0236* (0.0104)	0.0248* (0.0105)
ln(Military Burden) _{t-1}	0.911* (0.00967)	0.783* (0.0179)	0.913* (0.00601)	0.764* (0.0699)	0.907* (0.0100)	0.906* (0.0101)
Polity	-0.00214* (0.000689)	-0.00423* (0.00128)	-0.00159* (0.000628)	-0.00496* (0.00146)	-0.00252* (0.000695)	-0.00189* (0.000718)
ln(Rival Mil. Exp.)	0.00567* (0.00131)	0.0130* (0.00251)	0.00501* (0.00114)	0.0129* (0.00368)	0.00666* (0.00139)	0.00674* (0.00140)
Interstate War	0.114* (0.0237)	0.121* (0.0225)	0.110* (0.0216)	0.161* (0.0402)	0.114* (0.0236)	0.117* (0.0238)
Civil War	0.0572* (0.0184)	0.0825* (0.0196)	0.0602* (0.0180)	0.0766* (0.0228)	0.0596* (0.0185)	0.0604* (0.0186)
ln(GDP)	-0.00238 (0.00365)	-0.0326* (0.0109)	-0.000111 (0.00279)	0.00606 (0.00472)	-0.00611 (0.00403)	-0.00354 (0.00378)
Peacetime Coordination	0.0230* (0.00528)	0.0105 (0.00748)	0.0189* (0.00479)	0.0471* (0.0151)	0.0188* (0.00519)	0.0171* (0.00535)
NATO					0.0651* (0.0142)	
Warsaw					0.0633* (0.0253)	
US Ally						-0.0239 (0.0161)
USSR Ally						0.0731* (0.0223)
Constant	-0.335* (0.0567)	-0.303 (0.175)	-0.286* (0.0446)	-0.993* (0.311)	-0.317* (0.0565)	-0.344* (0.0571)
AR1	Yes	Yes	Yes	No	Yes	Yes
Observations	5889	5889	5889	5742	5889	5889
R ²	0.958	0.965	0.959	0.898	0.958	0.959

Panel corrected standard errors in parentheses (Models 1-3, 5-6)

Robust standard errors in parentheses (4)

* $p < 0.05$

Table A.3: Military Burden (Mil. Spending/GDP) and Alliance Ties: Accounting for Endogeneity

	β	SE
<i>ln(Military Burden)</i>		
Defense Alliance _{Dem}	-0.055*	(0.013)
Defense Alliance _{NonDem}	0.034*	(0.012)
ln(Military Burden) _{t-1}	0.92*	(0.011)
Polity	-0.0019*	(0.00062)
ln(Rival Mil. Exp.)	0.0047*	(0.0013)
Interstate War	0.10*	(0.019)
Civil War	0.053*	(0.021)
ln(GDP)	-0.0025	(0.0029)
Peacetime Coordination	0.019*	(0.0057)
Constant	-0.29*	(0.055)
<i>Defense Alliance_{Dem}</i>		
ln(Military Burden) _{t-1}	-0.12*	(0.038)
Polity	0.024*	(0.0047)
ln(Rival Mil. Exp.)	0.0040	(0.0083)
Interstate War	0.17	(0.20)
ln(GDP)	0.018	(0.020)
<i>DefensewithDem</i> _{t-1}	3.54*	(0.072)
<i>DefensewithNonDem</i> _{t-1}	0.62*	(0.068)
Constant	-2.81*	(0.28)
<i>Defense Alliance_{NonDem}</i>		
ln(Military Burden) _{t-1}	0.11*	(0.047)
Polity	-0.0057	(0.0058)
ln(Rival Mil. Exp.)	0.0027	(0.010)
Interstate War	0.017	(0.15)
ln(GDP)	-0.030	(0.024)
<i>DefensewithDem</i> _{t-1}	0.38*	(0.091)
<i>DefensewithNonDem</i> _{t-1}	4.11*	(0.088)
Constant	-1.35*	(0.29)
ρ_{12}	0.034	(0.032)
ρ_{13}	0.023	(0.042)
ρ_{23}	0.58*	(0.14)
Observations	5948	

Robust standard errors in parentheses

* $p < 0.05$

Table A.4: Alternative Specifications of the Three-Stage Model

	Year FE		NATO		US/USSR	
	β	SE	β	SE	β	SE
<i>ln(Military Expenditure)</i>						
ln(Military Exp.) _{t-1}	0.92*	(0.012)	0.91*	(0.012)	0.91*	(0.012)
Polity	-0.0015*	(0.00063)	-0.0024*	(0.00069)	-0.0018**	(0.00062)
ln(Rival Mil. Exp.)	0.0049*	(0.0013)	0.0056*	(0.0013)	0.0060*	(0.0014)
Interstate War	0.085*	(0.019)	0.091*	(0.019)	0.094*	(0.019)
Civil War	0.040*	(0.020)	0.031	(0.020)	0.034	(0.021)
ln(GDP)	0.084*	(0.012)	0.084*	(0.012)	0.086*	(0.012)
Peacetime Coordination	0.014*	(0.0059)	0.019*	(0.0057)	0.015**	(0.0056)
Defense Alliance _{Dem}	-0.067*	(0.013)	-0.070*	(0.013)	-0.049**	(0.016)
Defense Alliance _{NonDem}	0.039**	(0.013)	0.035**	(0.013)	0.033*	(0.013)
NATO			0.028*	(0.012)		
US Ally					-0.013	(0.016)
USSR Ally					0.050**	(0.016)
Constant	-0.25*	(0.061)	-0.29*	(0.055)	-0.30*	(0.057)
<i>Defense Alliance_{Dem}</i>						
ln(Military Expenditure)	-0.15*	(0.039)	-0.15*	(0.038)	-0.15*	(0.038)
Polity	0.024*	(0.0047)	0.024*	(0.0047)	0.024*	(0.0047)
ln(Rival Mil. Exp.)	0.00086	(0.0083)	0.00098	(0.0083)	0.00076	(0.0083)
Interstate War	0.49*	(0.20)	0.49*	(0.20)	0.49*	(0.20)
ln(GDP)	0.17*	(0.047)	0.18*	(0.046)	0.17*	(0.047)
<i>DefensewithDem</i> _{t-1}	3.51*	(0.073)	3.51*	(0.073)	3.51*	(0.073)
<i>DefensewithNonDem</i> _{t-1}	0.64*	(0.069)	0.64*	(0.069)	0.64*	(0.068)
Constant	-2.95*	(0.27)	-2.96*	(0.27)	-2.94*	(0.27)
<i>Defense Alliance_{NonDem}</i>						
ln(Military Expenditure)	0.078	(0.047)	0.085	(0.046)	0.082	(0.046)
Polity	-0.0087	(0.0055)	-0.0085	(0.0056)	-0.0086	(0.0056)
ln(Rival Mil. Exp.)	0.0049	(0.0097)	0.0045	(0.0097)	0.0046	(0.0097)
Interstate War	0.052	(0.14)	0.048	(0.14)	0.049	(0.14)
ln(GDP)	-0.12*	(0.051)	-0.12*	(0.050)	-0.12*	(0.051)
<i>DefensewithDem</i> _{t-1}	0.34*	(0.088)	0.34*	(0.088)	0.34*	(0.088)
<i>DefensewithNonDem</i> _{t-1}	4.05*	(0.087)	4.04*	(0.087)	4.04*	(0.087)
Constant	-1.28*	(0.28)	-1.25*	(0.28)	-1.26*	(0.28)
ρ_{12}	0.100*	(0.029)	0.10*	(0.029)	0.095**	(0.030)
ρ_{13}	0.013	(0.046)	-0.0031	(0.044)	0.0023	(0.045)
ρ_{23}	0.60*	(0.13)	0.60*	(0.13)	0.60*	(0.13)
Observations	6113		6113		6113	

Standard errors in parentheses, * $p < 0.05$

Table A.5: Simultaneous Models of Alliances and Military Spending

	(1)		(2)	
	Defense Alliance	Alliance _{Dem}	Defense Alliance	Alliance _{NonDem}
	ln(Mil. Exp)	Alliance	ln(Mil. Exp)	Alliance
Defense Alliance _{Dem}	-0.00660*			
	(0.00242)			
Defense Alliance _{NonDem}			0.0000847	
			(0.00122)	
ln(Military Exp.) _{t-1}	0.920*		0.922*	
	(0.00422)		(0.00428)	
ln(Military Exp.)		-0.0296		0.155*
		(0.0282)		(0.0563)
Polity	-0.00262*	0.0221*	-0.00310*	-0.00511
	(0.000615)	(0.00372)	(0.000608)	(0.00757)
ln(Rival Mil. Exp.)	0.00526*	0.00153	0.00503*	0.00922
	(0.00104)	(0.00687)	(0.00107)	(0.0137)
Interstate War	0.0859*	-0.0943	0.0863*	0.0275
	(0.0215)	(0.142)	(0.0222)	(0.302)
Civil War	0.0303*		0.0334*	
	(0.0149)		(0.0154)	
ln(GDP)	0.0782*	0.121*	0.0752*	-0.0886
	(0.00508)	(0.0335)	(0.00512)	(0.0670)
Peacetime Coordination	0.0238*		0.0209*	
	(0.00471)		(0.00518)	
Time since last ally _{Dem}		-0.604*		
		(0.0175)		
Time since last ally _{Dem} ²		0.0321*		
		(0.00130)		
Time since last ally _{Dem} ³		-0.000485*		
		(0.0000248)		
Time since last ally _{NonDem}				-0.827*
				(0.0390)
Time since last ally _{NonDem} ²				0.0493*
				(0.00304)
Time since last ally _{NonDem} ³				-0.000839*
				(0.0000628)
Constant	-0.276*	0.122	-0.255*	1.556*
	(0.0316)	(0.205)	(0.0316)	(0.409)
Observations	5889	5889	5889	5889
R ²	0.980		0.980	

Standard errors in parentheses, * $p < 0.05$

This analysis employs the CDSIMEQ STATA program developed by Omar Keshk (Keshk, Pollins, and Reuveny 2004). We employ cubic polynomials indicating the time since the state was last in either a democratic or non-democratic alliance in the alliance ties stage to aid identification and convergence of the model.

Table A.6: Alliances and Military Spending: Threat Environment

	(1)	(2)	(3)	(4)
	OLS	Country FE	Year FE	Inst. LDV
$\ln(\text{Military Exp.})_{t-1}$	0.909* (0.00956)	0.777* (0.0174)	0.912* (0.00594)	0.633* (0.0659)
Polity	-0.00298* (0.000742)	-0.00544* (0.00133)	-0.00233* (0.000635)	-0.0112* (0.00205)
Defense Alliance _{Dem}	-0.0452* (0.0107)	-0.0459* (0.0172)	-0.0483* (0.00960)	-0.211* (0.0393)
Defense Alliance _{NonDem}	0.0134 (0.0103)	0.0487* (0.0190)	0.0212 (0.0109)	0.158* (0.0347)
Threat Environment	0.103* (0.0373)	0.0402 (0.0566)	0.0767* (0.0327)	-0.0490 (0.0518)
Interstate War	0.110* (0.0234)	0.108* (0.0218)	0.105* (0.0211)	0.265* (0.0496)
Civil War	0.0433* (0.0179)	0.0744* (0.0190)	0.0473* (0.0179)	0.115* (0.0268)
$\ln(\text{GDP})$	0.0965* (0.0109)	0.198* (0.0184)	0.0948* (0.00659)	0.394* (0.0707)
Peacetime Coordination	0.0252* (0.00590)	0.0123 (0.00741)	0.0190* (0.00494)	0.0718* (0.0143)
Constant	-0.393* (0.0624)	-0.258 (0.177)	-0.339* (0.0472)	-1.631* (0.298)
Observations	5889	5889	5889	5742
R^2	0.980	0.981	0.982	0.965

Panel corrected standard errors in parentheses (Models 1-3)

Robust standard errors in parentheses (Model 5)

In Model 4, $\ln(\text{Military Exp.})_{t-1}$ is instrumented with two lags of $\ln(\text{GDP})$ and Threat Environment.

See Leeds and Savun (2007) for a discussion of the threat environment variable.

* $p < 0.05$

Table A.7: Excluding NATO & Warsaw Pact States from Variable Construction

	Excluding NATO/Warsaw
$\ln(\text{Military Exp.})_{t-1}$	0.903* (0.0100)
Polity	-0.00250* (0.000694)
Non-NATO/WARSAW _{Dem}	-0.0556* (0.0103)
Non-NATO/WARSAW _{NonDem}	0.0136 (0.00898)
$\ln(\text{Rival Mil. Exp.})$	0.00662* (0.00128)
Interstate War	0.0995* (0.0229)
Civil War	0.0361* (0.0180)
$\ln(\text{GDP})$	0.0963* (0.0107)
Peacetime Coordination	0.0283* (0.00573)
Constant	-0.342* (0.0573)
Observations	5889
R^2	0.981

Standard errors in parentheses

* $p < 0.05$

Table A.8: Alliances and Military Spending: 5-Year Unit of Analysis

	(1)	(2)
	No LDV	LDV
Polity	-0.0230*	-0.0110*
	(0.00434)	(0.00322)
Defense Alliance _{Dem}	-0.241*	-0.195*
	(0.0922)	(0.0653)
Defense Alliance _{NonDem}	0.172*	0.0799
	(0.0723)	(0.0482)
ln(Rival Mil. Exp.)	0.0514*	0.0155*
	(0.00594)	(0.00463)
Interstate War	0.188*	0.169*
	(0.0494)	(0.0554)
Civil War	0.182*	0.0590
	(0.0429)	(0.0361)
ln(GDP)	1.025*	0.292*
	(0.0274)	(0.0584)
Peacetime Coordination	0.0660*	0.0589*
	(0.0318)	(0.0251)
ln(Military Exp.) _{t-1}		0.717*
		(0.0539)
Constant	-4.161*	-1.074*
	(0.298)	(0.314)
Observations	1275	1108
R ²	0.795	0.935

Standard errors in parentheses

* $p < 0.05$

This analysis reports the results of a specification similar to those reported in Table 2 of the manuscript except using 5-year intervals instead of the yearly unit of analysis. The test helps demonstrate that our results are not the results of an upward drift in military expenditure or the product of interpolated datapoint in the military expenditure data.

Table A.9: Any Alliance Type and Military Spending

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	Country FE	Year FE	Inst. LDV
$\ln(\text{Military Exp.})_{t-1}$	0.907*** (0.00995)	0.904*** (0.00999)	0.771*** (0.0176)	0.908*** (0.00605)	0.671*** (0.0491)
Any Alliance	-0.00703 (0.0111)				
Any Alliance _{Dem}		-0.0438*** (0.00901)	-0.0406** (0.0154)	-0.0418*** (0.00907)	-0.175*** (0.0280)
Any Alliance _{NoDem}		0.0111 (0.00958)	0.0229 (0.0166)	0.0137 (0.00968)	0.0959*** (0.0197)
Polity	-0.00330*** (0.000671)	-0.00269*** (0.000685)	-0.00485*** (0.00129)	-0.00212*** (0.000624)	-0.00714*** (0.00121)
$\ln(\text{Rival Mil. Exp.})$	0.00591*** (0.00129)	0.00627*** (0.00128)	0.0125*** (0.00250)	0.00542*** (0.00115)	0.0174*** (0.00263)
Interstate War	0.0977*** (0.0224)	0.0988*** (0.0230)	0.104*** (0.0214)	0.0954*** (0.0211)	0.190*** (0.0355)
Civil War	0.0406* (0.0177)	0.0351 (0.0180)	0.0670*** (0.0188)	0.0394* (0.0179)	0.0688** (0.0218)
$\ln(\text{GDP})$	0.0912*** (0.0107)	0.0961*** (0.0107)	0.204*** (0.0189)	0.0936*** (0.00653)	0.340*** (0.0513)
Peacetime Coordination	0.0269*** (0.00553)	0.0272*** (0.00553)	0.0197** (0.00723)	0.0217*** (0.00478)	0.0734*** (0.0126)
Constant	-0.327*** (0.0577)	-0.343*** (0.0574)	-0.412* (0.172)	-0.287*** (0.0443)	-1.367*** (0.217)
Observations	5889	5889	5889	5889	5742
R^2	0.981	0.981	0.981	0.982	0.970

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

References

Leeds, B. A. and Savun, B. 2007. Terminating alliances: Why do states abrogate agreements? *Journal of Politics*, 69(4):1118–1132.