

Supplementary Material: Two Sword Lengths Apart: Credible Commitment Problems and Physical Violence in Multi-party Elected National Legislatures

World Values Survey Details

Following Inglehart and Welzel (2003) I average the variables across individual participants within countries and survey waves. I only use the third through fifth survey waves. The surveys were taken in the following years: Wave 3: 1994–1998; Wave 4: 1999–2004; Wave 5: 2005–2007. The first two waves have very poor coverage. I used wave 3 for all years before 1998, wave 4 for all years between 1999 and 2004 and wave 5 onward.

Additional Independent Variables

The following variables were also included in the regression analyses to help contain omitted variable bias.

Gender is closely correlated with violence in society generally. Though there are many possible reasons for this that are beyond the scope of this paper, women tend to commit many fewer acts of violence than men (see Schwartz, Steffensmeier and Feldmeyer, 2009). Previous research has found that women’s participation in parliament has an impact on government decisions to go to war (Melandar, 2005). Perhaps if a larger proportion of legislators are women there will be less violence in the parliamentary chamber. To examine this possibility, I gathered data on the *percentage of women in parliament* per country-year from two sources. Data from 1997 and after was from the Inter-Parliamentary Union (2013). Data from before 1997 was from Schwartz, Steffensmeier and Feldmeyer (2009).

I included a countries’ *murder rate*, i.e. murders per 100,000 people, to measure a possible association between societal-level and legislative violence. The data was from United Nations (2013), which aggregated annual murder rates from a variety of national and international sources. The data is available

from 1995 through 2011.¹

To assess any effect of coalition compared to single-party governments I included the DPI *government fractionalization* variable. It is the probability that two randomly picked deputies in the government are from different parties. I used the fractionalization variable to create an indicator of *single-party* government. It is simply a dummy equaling one if fractionalization was zero, i.e. all governing legislators were from the same party. In general single party governments probably are better able to pass policies very close to their ideal preferences. This could heighten losers' losses and make them less likely to want to conform to non-violent legislative rules. However, all single party governments are not created equal. Some parties may act as umbrella parties that incorporate many different factions. Others are narrowly focused on a particular constituency.

I also included standard measures of the *effective number of parliamentary parties* by votes and by seats (see Laakso and Taagepera, 1979; Taagepera and Shugart, 1989). The data was taken from Carey and Hix (2011) before 2004 and from Gallagher (2012) afterwards. Both of these measures indicate how fragmented a parliamentary party system is. Higher scores indicate that there are more parties that win either votes or seats. Neither measure produced statistically significant results, so only the results for the effective number of parties by seats are shown below.

To examine whether or not national legislative losers may be dissuaded from legislative violence because there is a possibility of gaining power at a provincial-level, I include the *federalism* dummy variable from Carey and Hix (2011). I updated this from 2004 until the end of the observation period. In early models I also controlled for the government system type, i.e. if it had a presidential, parliamentary, or mixed assembly-elected presidential. This was from the DPI.

I include a number of other societal-level variables to help further defend against omitted variable bias. Conflict in more ethnically or economically divided societies may be generally more intense. These conflicts may spill over into legislatures where they precipitate violence between members. I include Alesina et al.'s (2003) *ethnic fractionalization* data to account for the fact that a legislature's composition in terms of its fractionalization is not only a function of political institutions, but also social divisions (Neto and Cox, 1997; Mozaffar, Scarritt and Galaich, 2003). The variable measures the probability that two randomly selected members of society will be from different ethnic groups. Higher values indicate more societal fractionalization. To capture similar possible effects from economic divisions, I include *Gini coefficients of economic inequality* from UNU-WIDER (2008).² Finally, as is common in cross-

¹Beyond truncating the sample somewhat, this data set unfortunately does not record Taiwan's murder rate separately from China's.

²Note, for country-years with missing data I assumed that the Gini Coefficient remained constant

country analyses, I also include *gross domestic product per capita*. This data is from the World Bank's International Development Indicators (2011) and is in thousands of United States dollars.

Details on Prior Correction of the Rare Logistic Regression Models

For prior correction (see King and Zeng, 2001) in the models with the full sample of elected multi-party legislatures I used the observed proportion of all observations with legislative violence up to 2010: i.e. 2.1 percent of observations up until 2010 had violence ($\tau = \frac{71}{3370} = 0.021$). There were 69 observed incidences of violence and 2654 country-years from 1990 through 2009 in the sample, so: $\tau = \frac{63}{2654} = 0.024$.

from the last year there is data for the country, unless the span was ten years or more. If this was the case they were treated as missing.

Table 1: Legislative Violence Rare Events Logistic Regression Results (Multi-Party Elected Legislature 1981-2009)

	B1	B2	B3	B4	B5	B6	B7	B8
(Intercept)	-2.85*** (0.20)	-1.23 (0.77)	-3.45 (4.33)	-1.46* (0.65)	-2.36** (0.85)	-1.83* (0.84)	-1.80* (0.76)	-1.77 (1.00)
Low Disproportionality	-1.31*** (0.34)	-1.67*** (0.35)	-2.17*** (0.62)	-1.11** (0.38)	-1.27* (0.53)	-1.53** (0.57)	-1.43*** (0.37)	-1.13** (0.37)
Dem. Age	-0.02** (0.01)	-0.02** (0.01)	-0.02 (0.01)	-0.02* (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.02** (0.01)	-0.02* (0.01)
Majority Size		-0.03*** (0.01)	-0.02 (0.01)	-0.02* (0.01)	-0.00 (0.01)	-0.02 (0.01)	-0.03* (0.01)	-0.02* (0.01)
Leg. Immunity		-0.37 (0.33)						
PR Electoral System		1.06* (0.51)						
Single Party Gov.		-0.53 (0.31)						
Self Expression			1.48 (3.44)					
Ethnic Frac.			0.81 (1.09)					
Perc. Women in Parl.				-0.02 (0.02)				
Murder Rate					0.01 (0.02)			
Federal						0.74 (0.60)	0.79* (0.39)	
Gov. Frac.						0.79 (0.82)		
No. of Parties by Seats							0.12 (0.07)	
GINI								0.01 (0.02)
GDP per Capita								0.00 (0.03)
AIC	443.72	425.38	215.80	370.34	191.36	176.05	367.64	353.38
BIC	460.95	465.48	244.39	398.19	215.19	204.71	401.24	386.08
Log Likelihood	-218.86	-205.69	-101.90	-180.17	-90.68	-82.02	-177.82	-170.69
Deviance	437.72	411.38	203.80	360.34	181.36	164.05	355.64	341.38
Num. obs.	2306	2274	866	2274	1960	931	2053	2005

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

Standard errors are in parentheses. All models use robust (WEAVE) standard errors.

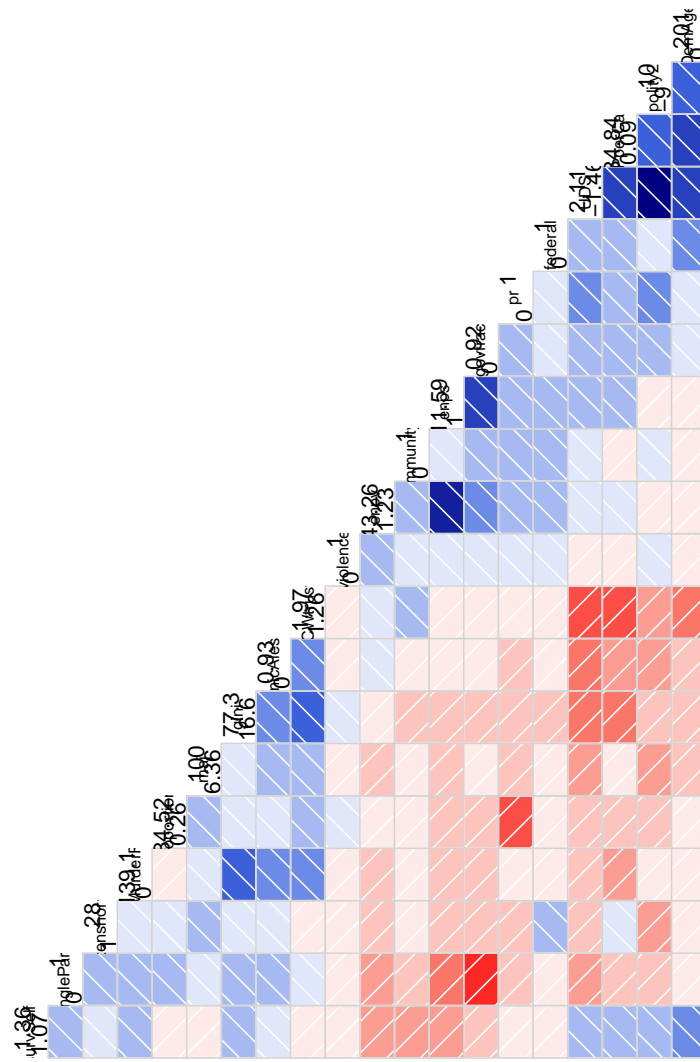
Table 2: Variable Summary

Variable	Description	Source
Disprop	Gallagher Index of Electoral Disproportionality	Gallagher (2012) & Carey and Hix (2011)
ENPS	Effective number of parties by seats	Gallagher (2012) & Carey and Hix (2011)
ENPV	Effective number of parties by votes	Gallagher (2012) & Carey and Hix (2011)
Ethnic Fractionalization	Probability two randomly selected members of society are from the same ethnic group	Alesina et al. (2003)
Federal	Whether a country has a federal system or not	Carey and Hix (2011), updated from 2003 by the author
GDP/Capita	GDP per capita in thousands of US dollars	World Bank (2011)
Gov. Fractionalization	Probability that two members of the Government will be from different parties	Beck et al. (2001)
Gini	Gini Coefficient of income inequality	UNU-WIDER (2008)
Immunity	Whether a legislators are immune from arrest and/or criminal prosecution or not	Fish and Kroening (2009)
LEIC	Legislative Indices of Electoral Competitiveness. Includes both the existence of a legislature and its level of electoral competitiveness.	Beck et al. (2001)
Majority	Percentage of legislature controlled by governing parties	Beck et al. (2001)
Murder Rate	Murders per 100,000 population	United Nations (2013)
Polity	Polity IV Score	Marshall and Jaggers (2009)
PR	Whether a country uses a proportional representation electoral system or a plurality system	Beck et al. (2001)
Self Expression	WVS self-expression indicator averaged across country-survey waves	World Values Survey Association (2009)
System	Government system (parliamentary, presidential, or mixed)	Beck et al. (2001)
Tenshort	Tenure of the shortest serving veto player	Beck et al. (2001)
Trust	Average of WVS responses where 1 = most people can be trusted and 2 = you can't be too careful	World Values Survey Association (2009)
UDS	Posterior Mean Unified Democracy Score	Pemstein, Meserve and Melton (2010)
Violence	Incidences of violence between legislators in the national parliamentary chamber	author
Perc. Women in Parl.	Percentage of parliamentary seats held by women	Paxton, Green and Hughes (2008) & Inter-Parliamentary Union (2013)

Please contact the author for detailed summary statistics.

All of the data from Beck et al. (2001) was updated through 2010.

Figure 1: Correlation Matrix for Variables Included in the Analysis (Multi-Party Elected Legislatures)



Redder squares indicate stronger negative bi-variate correlations.
 Bluer squares indicate stronger positive bi-variate correlations.
 Numbers in the diagonal squares indicate the minimum and maximum observed values of the variables in the sample.

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