

Supplementary materials

Ecker, Alejandro and Thomas M. Meyer. Coalition bargaining duration in multiparty democracies. *British Journal of Political Science*.

The supplementary materials provide additional information on the distribution of the independent variables (Table S.1.) and the robustness of the empirical results to alternative parametric (Table S.2.) and semi-parametric (Table S.3.) model specifications. The section S.4 specifies the likelihood function as defined by Chiba, Martin, and Stevenson (2015). The final section S.5 provides a detailed description of the data collection process.

Table S.1. Descriptive statistics of covariates

Covariates	Minimum	Median	Mean	Maximum	Standard deviation	Percent of observations
Selection						
Median party						50.38
Status quo						0.03
Ideological range	0.00	51.96	48.77	97.85	20.49	
Seat share	0.002	0.486	0.486	1.000	0.168	
N (Potential governments)				684,935		
Duration						
Preference tangentiality	0.00	3.42	3.67	8.84	1.69	
Preference divergence	0.00	18.73	22.04	89.00	16.14	
Incumbency						29.70
Leadership tenure	0.003	1.192	1.974	11.60	2.100	
Controls – formation attempt level						
Number of parties	2.00	3.00	3.30	10.00	1.46	
Pre-electoral coalition						36.96
Time pressure	-199.00	-33.67	-43.04	0.00	38.05	
Lagged duration dependence	0.00	0.00	3.92	72.00	10.44	
Occurrence dependence						
1 st attempt						73.93
2 nd attempt						16.50
3 rd attempt						6.60
4 th attempt						2.64
5 th attempt						0.33
Controls – party-system level						
Post-election						64.03
Parliamentary complexity						
Type A						3.96
Type B						23.43
Type B*						4.62
Type C						8.91
Type D						24.42
Type E						34.65
Controls – country level						
Positive parliamentarism						73.27
Semi-presidentialism						13.53
Central Eastern Europe						56.44
First election after dem. transition						3.30
N (Formation attempts)				303		

Table S.2. Regression results – alternative parametric model specifications

Covariates	Weibull competing risks model with selection (Model 1)		Weibull with selection (Model 2)		Weibull competing risks (Model 3)		Weibull (Modell 4)	
	β	S.E.	β	S.E.	β	Cluster robust S.E.	β	Cluster robust S.E.
Selection								
Median party	0.703*	0.155	0.710*	0.155				
Status quo	2.587*	0.204	2.604*	0.202				
Ideological range	0.125*	0.035	0.126*	0.035				
Seat share	40.405*	4.765	40.434*	4.792				
Ideological range x seat share	-0.643*	0.119	-0.645*	0.119				
Seat share x seat share	-33.451*	4.057	-33.530*	4.057				
Ideological range x seat share ²	0.564*	0.096	0.567*	0.096				
Duration								
H1 Preference tangentiality (-)	-0.216*	0.060	-0.098*	0.043	-0.217*	0.058	-0.099*	0.045
H2 Preference divergence (+)	0.003	0.010	0.004	0.007	0.002	0.011	0.002	0.008
H3 Incumbency (-)	-1.070*	0.258	-0.689*	0.184	-1.021*	0.275	-0.617*	0.208
H4 Leadership tenure (-)	-0.118*	0.045	-0.099*	0.031	-0.120*	0.049	-0.100*	0.035
Controls – formation attempt level								
Number of parties (+)	0.437*	0.125	0.079	0.096	0.434*	0.126	0.077	0.101
Pre-electoral coalition (-)	-0.959*	0.224	-0.412*	0.158	-0.960*	0.235	-0.422*	0.180
Time pressure (-)	0.114	0.098	-0.058	0.062	0.107	0.093	-0.067	0.054
Lagged duration dependence	0.024	0.013	0.020*	0.009	0.024*	0.008	0.020*	0.006
Occurrence dependence								
1 st attempt	<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>	
2 nd attempt	-1.419*	0.345	-0.981*	0.250	-1.422*	0.335	-0.990*	0.213
3 rd attempt	-2.046*	0.470	-1.328*	0.346	-2.058*	0.487	-1.361*	0.326
4 th attempt	-2.881*	0.589	-1.612*	0.429	-2.948*	0.575	-1.692*	0.383
5 th attempt	-5.399*	1.279	-2.645*	0.905	-5.433*	0.827	-2.753*	0.472
Controls – party-system level								
Post-election (+)	1.630*	0.248	1.261*	0.179	1.656*	0.241	1.302*	0.191
Parliamentary complexity								
Type A	<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>	
Type B (+)	2.015*	0.512	1.040*	0.376	1.996*	0.500	1.019*	0.441

Type B* (+)	3.027*	0.687	1.336*	0.495	3.062*	0.630	1.387*	0.478
Type C (+)	3.849*	0.639	1.665*	0.464	3.878*	0.628	1.744*	0.507
Type D (+)	1.698*	0.548	0.930*	0.399	1.643*	0.550	0.837	0.468
Type E (+)	2.000*	0.566	1.238*	0.409	1.900*	0.525	1.087*	0.451
Controls – country level								
Positive parliamentarism (+)	-0.876*	0.317	-0.235	0.226	-0.872*	0.303	-0.237	0.215
Semi-presidentialism (+)	0.611*	0.302	0.469*	0.227	0.598	0.317	0.439	0.274
Central Eastern Europe (+)	1.374*	0.360	0.435	0.256	1.370*	0.372	0.435	0.276
First election after dem. transition	-1.761*	0.629	-0.780	0.421	-1.762*	0.631	-0.762*	0.322
Year fixed effects		yes		yes		yes		yes
Intercept	1.534	1.053	2.053*	0.740	1.340	0.939	1.755*	0.723
Log(shape parameter p)	-0.060	0.124	0.376*	0.105	-0.121*	0.047	0.231*	0.057
Shape parameter p	0.942		1.457		0.886		1.260	
Error correlation ρ	0.074	0.139	0.184	0.129				
Formation attempts (spells)		303		303		303		303
Successful attempts (events of interest)		213		213		213		213
Failed attempts (competing events)		90		90		90		90
Time at risk (in days)		5,120		5,120		5,120		5,120
Log-likelihood		-2,251.9		-2,148.5		-917.7		-815.3

Notes: All duration stage coefficient estimates are expressed in accelerated failure-time metric. Positive coefficients indicate factors which delay government formation, while negative coefficients are indicative of factors which expedite government formation. * $p < 0.05$.

Table S.3. Regression results – alternative semi-parametric model specifications

Covariates	Weibull competing risks model with selection (Model 1)		Fine and Gray (1999) competing risks (Model 5)		Cox proportional hazards (Model 6)	
	β	S.E.	β	Cluster robust S.E.	β	Cluster robust S.E.
Selection						
Median party	0.703*	0.155				
Status quo	2.587*	0.204				
Ideological range	0.125*	0.035				
Seat share	40.405*	4.765				
Ideological range x seat share	-0.643*	0.119				
Seat share x seat share	-33.451*	4.057				
Ideological range x seat share ²	0.564*	0.096				
Duration						
H1 Preference tangentiality (-)	-0.216*	0.060	0.184*	0.050	0.136*	0.054
H2 Preference divergence (+)	0.003	0.010	-0.002	0.009	-0.004	0.010
H3 Incumbency (-)	-1.070*	0.258	0.779*	0.199	0.797*	0.252
H4 Leadership tenure (-)	-0.118*	0.045	0.097*	0.038	0.130*	0.045
Controls – formation attempt level						
Number of parties (+)	0.437*	0.125	-0.348*	0.105	-0.059	0.124
Pre-electoral coalition (-)	-0.959*	0.224	0.723*	0.200	0.479*	0.223
Time pressure (-)	0.114	0.098	-0.061	0.078	0.101	0.071
Lagged duration dependence	0.024	0.013	-0.020*	0.009	-0.023*	0.008
Occurrence dependence						
1 st attempt	<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>	
2 nd attempt	-1.419*	0.345	1.162*	0.282	1.209*	0.265
3 rd attempt	-2.046*	0.470	1.626*	0.409	1.691*	0.417
4 th attempt	-2.881*	0.589	2.432*	0.505	2.108*	0.468
5 th attempt	-5.399*	1.279	4.569*	0.570	3.486*	0.580
Controls – party-system level						
Post-election (+)	1.630*	0.248	-1.382*	0.219	-1.670*	0.225
Parliamentary complexity						
Type A	<i>Reference category</i>		<i>Reference category</i>		<i>Reference category</i>	
Type B (+)	2.015*	0.512	-1.490*	0.404	-1.268*	0.524
Type B* (+)	3.027*	0.687	-2.339*	0.535	-1.783*	0.565

Type C (+)	3.849*	0.639	-3.051*	0.520	-2.250*	0.583
Type D (+)	1.698*	0.548	-1.189*	0.447	-1.131*	0.566
Type E (+)	2.000*	0.566	-1.460*	0.413	-1.542*	0.551
Controls – country level						
Positive parliamentarism (+)	-0.876*	0.317	0.675*	0.258	0.390	0.282
Semi-presidentialism (+)	0.611*	0.302	-0.531	0.276	-0.600	0.348
Central Eastern Europe (+)	1.374*	0.360	-1.092*	0.301	-0.494	0.345
First election after dem. transition	-1.761*	0.629	1.397*	0.495	1.045*	0.402
Year fixed effects		yes		yes		yes
Intercept	1.534	1.053				
Log(shape parameter p)	-0.060	0.124				
Shape parameter σ						
Shape parameter p	0.942					
Error correlation ρ	0.074	0.139				
Formation attempts (spells)		303		303		303
Successful attempts (events of interest)		213		213		213
Failed attempts (competing events)		90		90		90
Time at risk (in days)		5,120		5,120		5,120
Log-(pseudo)likelihood		-2,251.9		-1,026.7		-921.7

Notes: The duration stage coefficient estimates for Model 1 are expressed in accelerated failure time metric. Positive coefficients indicate factors which delay government formation, while negative coefficients are indicative of factors which expedite government formation. The coefficient estimates for Model 5 and Model 6 are parameterized in terms of (sub-) hazard rates. Here, negative coefficients delay formation, while positive coefficients expedite the government formation process. The Breslow method is used for ties in Model 6. * $p < 0.05$.

S.4. Likelihood function

In line with Chiba, Martin and Stevenson (2015) we apply the following likelihood function for the observed duration of an individual government formation attempt:

$$\mathcal{L} = \prod_{i=1}^n \prod_{j=1}^{M_i} \{Pr(T_i > t_i^0, Y_i = j)^{r_j} Pr(T_i = t_i, Y_i = j)^{(1-r_i)}\}^{c_{ij}}$$

where for a given formation opportunity $i = 1, \dots, n$ coalition j forms out of M_i possible coalitions. Y_i indicates the government formation outcome while T_i denotes the outcome of the duration process, while the censoring variable c_{ij} differentiates between formed (1) and not formed (0) potential coalitions and the right-censoring indicator r_i designates right-censored observations. See Chiba, Martin and Stevenson (2015) and the replication data for further information.

S.5. Collecting data on individual formation attempts in European parliamentary democracies

We define a formation attempt as a publically known and noted attempt to form a new government after the termination of the previous government, either by parliamentary elections or by non-electoral replacement. A new formation attempt is coded each time we observe *i*) any change in the party composition (party composition rule) or *ii*) any change in the formateur or informateur (in/formateur rule). We exclude non-partisan caretaker governments that were formed on purely technical grounds.

The *party composition rule* indicates that a new attempt starts if a party drops out and/or another party enters the negotiations. Moreover, these decisions have to be public, that is, private/secret talks are not counted as formation attempts. There may be simultaneous negotiations of different sets of parties for the purpose of forming alternative coalitions. These negotiations are counted as separate formation attempts.

The *in/formateur rule* indicates that a new formation attempt is given when one in/formateur replaces another. If a formateur or informateur is nominated without actual negotiations, this likewise constitutes a formation attempt, but only if this attempt is clearly linked to a set of prospective government parties. However, if an informateur is replaced by a formateur who then succeeds in forming the government, we do not count this as a new bargaining round, provided that the formateur indeed forms the coalition suggested by the preceding informateur. In contrast, we count a new bargaining round if the informateur's proposed coalition failed to materialize but the formateur then succeeded with a new party composition. When freestyle bargaining precedes the formal nomination of the formateur or

informateur, we include the time period prior to the nomination for the duration of the formation attempt.

Based on these definitional criteria, the data collection proceeds in three subsequent steps. Yet, there are some minor differences in how the process was carried out in Western and Central Eastern Europe. Step one is to identify all formation attempts during a formation process. For Western Europe, we rely on the data set assembled by country experts in the edited volume on coalition governments in Western Europe (Müller and Strøm 2000). Comparable data from 2000 onwards are collected in-house on the basis of *Keesing's World News Archive*, the *EJPR Yearbooks*, and the *Lexis-Nexis* database. For Central Eastern Europe, all formation attempts during the entire period of observation are identified using a data set assembled by country experts on coalition politics in Central Eastern Europe, which is closely modeled upon the data set in Western Europe (Müller and Strøm 2000).

The two subsequent steps in the data collection then are (2) to identify all parliamentary parties involved in each formation attempt and (3) to determine the duration and outcome (successful or failed) of each attempt. In Central Eastern Europe, both steps are likewise carried out by country experts on coalition politics, who rely on extensive content analyses of national media reports—mostly daily and weekly newspapers—during government formation periods to retrieve all the required information. For Western Europe, country experts unfortunately provide only information on the number of successful and failed formation attempts (1). Taking this information as a starting point, research assistants then collect the additional information on party composition and bargaining duration on the basis of several complementary data sources including *Keesing's World News Archive*, the *EJPR Yearbooks*, and most importantly national media reports obtained via the *Lexis-Nexis* database. In this context, all data are cross-validated using information obtained via at least two independent data sources. Whenever conflicting information is found, we take special care to assure the validity of the data, not least by restricting the start of the observation period to the 1980s where manifold reliable electronic data sources are available.

References

- Chiba, Daina, Lanny W. Martin, and Randolph T. Stevenson. 2015. A Copula Approach to the Problem of Selection Bias in Models of Government Survival. *Political Analysis* 23 (1): 42-58.
- Müller, Wolfgang C., and Kaare Strøm (eds.). 2000. *Coalition Governments in Western Europe*. Oxford: Oxford University Press.