**Supplementary materials**

for

**Institutional Effects on Government and Ministerial Durability: Evidence from Central and Eastern Europe**

**Robustness**

The robustness of our models was tested in several ways. First, we included the square of the risk score as a regressor in the model (link test) in order to test for nonlinearity in the specification of the determinants. Second, we conducted global tests of the proportional hazards assumption on which the Cox model is based, using Schoenfeld residuals. The results of both tests are reported at the bottom of Table 2 and 3 (the main text of the article) and Tables 5 to 10 in this Supplementary materials. None of them give reason to reject any of the models.

Third, we examined the robustness of our main findings from the analysis on non-electoral cabinet replacements by estimating cabinet durability as a pooled phenomenon, with only cabinets terminated because of regular elections being censored. The results are presented in Table 5 as hazard ratios. By running a reduced model (compare, Table 2, Model Ib), the likelihood of cabinet failure is significantly lower if the president has powers to discretionally dismiss cabinet and appoint ministers (exp(*B*) = 0.28, *p* < 0.000).

Table 5: Cabinet durability in post-communist countries (a pooled regression)

|  |  |
| --- | --- |
| *Determinants* | Model I |
| *Explanatory variable* |
| Popular elections of the president | 0.77(0.19) |
| Discretional dissolution of the cabinet | 0.69\*\*(0.09) |
| Discretional appointment of ministers | 1.71\*\*\*(0.26) |
| Dissolution of cabinets\*appointment of ministers | 0.28\*\*\*(0.12) |
|  |  |
| *Control variables: Cabinet- and parliament-specific factors* |
| Caretaker cabinet | 2.85\*\*(1.14) |
| Effective number of parties | 1.10\*\*\*(0.03) |
| Number of cabinets | 195 |
| Number of failures | 109 |
| Number of countries | 14 |
| Number of observations | 4079 |
| Log likelihood | –492.81 |
| Linktest hat2 | –0.04p = (0.86) |
| PH assumptions (global test) | 2.42 (6 df)p = (0.88) |

Note: \*\*\* *p* < 0.001, \*\* *p* < 0.01, \* *p* < 0.05, based on robust standard errors clustered by country.

Source: authors’ calculations.

Fourth, we estimated our models using a different specification of our explanatory variables. Comparative studies on presidents (e.g., Shugart & Carey, 1992) have shown that some constitutions grant the presidents more powers (both non-legislative and legislative ones) than the others. Latin American studies on ministerial terminations have proven that the probability of ministerial reshuffles is dependent on the legislative powers of the president. Presidents with executive decree power are less likely to engage in reshuffling because they do not need to negotiate with allies in the legislature in order to get their policies approved. However, presidents who can only use their veto power to change policy exhibit a higher likelihood of dismissing ministers as a bargaining tool in negotiations with the parliament (Martinez-Gallardo, 2014). Therefore, we assume that in post-communist countries, cabinet and ministerial terminations may depend on the presidential powers that include both the president’s legislative (i.e., veto and decree powers) and non-legislative powers (e.g., the powers to dismiss cabinet).

We examined the effects of the sub-types of semi-presidentialism on cabinet and ministerial duration. Many scholars discuss the effects of semi-presidentialism by differentiating between president-parliamentary and premier-presidential systems (Shugart & Carey, 1992). In the premier-presidential system, popularly elected presidents are empowered to nominate the PM for parliamentary confirmation but cannot dismiss the cabinet discretionally. In the president-parliamentary framework, cabinets can be dismissed by either the parliament or the president, restricting parliament’s ability to control cabinets. We used these sub-types and estimate their effects on non-electoral cabinet replacements (see the coding of individual semi-presidential countries in Table 1).[[1]](#footnote-1) The variable *Minority Cabinet* was excluded because it violated the proportionality hazards assumption. The results have shown that in president-parliamentary systems, non-electoral replacements of cabinets occurred significantly less often than in premier-presidential and parliamentary systems (exp(*B*) = 0.22, p < 0.000; Table 6). Although the distinction between two types of semi-presidentialism provides important insights to studying presidential politics and institutional choice, it does not allow disentangling and estimating the individual effects of specific institutional rules common to each of sub-types of semi-presidentiasm.

*Table 6*: Cabinet durability between elections (non-electoral cabinet replacements)

|  |  |
| --- | --- |
| *Determinants* |  |
| *Explanatory variable* |
| Premier-presidential framework | 0.69(0.17) |
| President-parliamentary framework | 0.22\*\*\*(0.08) |
| *Control variables: Cabinet- and parliament-specific factors* |
| Caretaker cabinet | 3.21\*\*\*(0.90) |
| Coalition | 1.55(0.50) |
| Maximum duration of the cabinet (at the time of appointment) | 0.99(0.19) |
| Cabinet fractionalization | 0.95(0.13) |
| PM’s party in government | 1.30(0.81) |
| Effective number of parties | 1.10\*\*\*(0.03) |
| Electoral Democracy Index | 0.42(0.30) |
| Number of cabinets | 195 |
| Number of failures | 90 |
| Number of countries | 14 |
| Number of observations | 3880 |
| Log likelihood | –402.81 |
| Linktest hat2 | –0.01p = (0.99) |
| PH assumptions (global test) | 5.46 (9 df)p = (0.79) |

Note: \*\*\* *p* < 0.001, \*\* *p* < 0.01, \* *p* < 0.05, based on robust standard errors clustered by country.

Source: authors’ calculations.

We also used Doyle and Elgie’s Presidential Power Index (2016) as an explanatory variable. This index is based on twenty-eight expert measures of constitutional powers of the presidents and provides both raw values (including confidence intervals) and a normalized score of the presidential power (Doyle & Elgie, 2016, p. 734-735). We used normalized scores of *prespow1* Index for measuring the general effect of presidential power (both its legislative and non-legislative components) on the cabinet and ministerial terminations.[[2]](#footnote-2) The variation of the Presidential Power Index in post-communist countries is presented in Table 1.

Using the presidential power as an explanatory variable and control variables from the original analyses, we conducted additional analyses of cabinet and ministerial terminations in post-communist countries. The results of the model on non-electoral cabinet replacements are presented in Table 7 as hazard ratios. The variable *Minority cabinet* was excluded because it violated the proportionality hazards assumptions. Confirming our results, the strength of presidential power (which strongly correlates with the presidential competences of discretional cabinet dismissal and ministerial appointments) is negatively related to the likelihood of non-electoral replacements of cabinets (exp(*B*) = 0.12, p< 0.05). The effect size of this measure (which combines both executive and non-executive competences of the president) is even more substantial compared to the effects of individual institutional rules examined in the article. The effects of control variables remained largely the same in the direction of the effect and the effect size.

*Table 7*: Cabinet durability between elections (non-electoral cabinet replacements)

|  |  |
| --- | --- |
| *Determinants* |  |
| *Explanatory variable* |
| Presidential power index (prespow1) | 0.12\*(0.12) |
| *Control variables: Cabinet- and parliament-specific factors* |
| Caretaker cabinet | 2.14(0.88) |
| Coalition | 1.51(0.41) |
| Maximum duration of the cabinet (at the time of appointment) | 0.96(0.18) |
| Cabinet fractionalization | 0.95(0.13) |
| PM’s party in government | 0.90(0.64) |
| Effective number of parties | 1.08\*\*\*(0.03) |
| Electoral Democracy Index | 0.56(0.38) |
| Number of cabinets | 192 |
| Number of failures | 88 |
| Number of countries | 14 |
| Number of observations | 3848 |
| Log likelihood | –394.20 |
| Linktest hat2 | 0.06p = (0.73) |
| PH assumptions (global test) | 5.00 (8 df)p = (0.76) |

Note: \*\*\* *p* < 0.001, \*\* *p* < 0.01, \* *p* < 0.05, based on robust standard errors clustered by country.

Source: authors’ calculations.

We also calculated the Cox regression model of ministerial durability using the Presidential Power Index (Doyle and Elgie 2016) and the same control variables as presented in the original model. The results in the form of hazard ratios are presented in Table 8. Confirming our findings, post-communist ministers remain in their positions longer under strong presidents (exp(*B*) = 0.21, p < 0.001). The effects of our control variables remain the same.

*Table 8*: Determinants of ministerial terminations in Central and Eastern European countries

|  |  |
| --- | --- |
| *Determinants* |  |
| *Explanatory variables: Institutional rules* |
| Presidential power index (prespow1) | 0.21\*\*\*(0.09) |
| *Control variables: Cabinet and parliament-specific factors* |
| Coalition | 0.72\*\*\*(0.05) |
| Majority cabinet | 1.24(0.18) |
| Minority cabinet | 1.23(0.19) |
| PM’s Party | 0.92(0.05) |
| Parliamentary fractionalization | 1.07\*\*\*(0.01) |
| *Control variables: Individual factors* |
| Portfolio of Foreign Affairs | 0.69\*\*(0.08) |
| Portfolio of Defence | 0.89(0.10) |
| Portfolio of Finance | 0.86(0.09) |
| Parliamentary/party experience | 0.70\*\*\*(0.04) |
| Age | 0.99(0.01) |
| Gender (females) | 1.00(0.09) |
| theta | 0.09\*\*\*(0.04) |
| Log likelihood | –11244.63 |
| No of groups | 14 |
| N of observations | 74336 |
| N of ministers | 1947 |
| N of failures | 1725 |
| Linktest hat2 | –0.24p = (0.10) |
| PH assumptions (global test) | 13.71 (12 df)p = (0.32) |

Notes: hazard ratios with standard errors (in parentheses) are reported. Standard errors of hazard ratios are conditional on theta, \*\*\* *p* < 0.001, \*\* *p* < 0.01, \* *p* < 0.05.

Source: authors’ own calculations.

Fourth, although a shared frailty model can account for country-specific risks of cabinet and ministerial durability, we also reassessed our models by excuding Russia and Ukraine from our sample. Some researchers argue that both countries are characterized by an extremely strong presidency (Shugart & Carey, 1992), which may affect our results. The results of additional regressions are below.

For the model on cabinet durability (Table 9), we excluded the variable *President Appoint Ministers* and the interaction between the presidential power to dismiss cabinets and to appoint ministers because no country in our reduced sample has applied such institutional rules. Second, we run a reduced model (compare, Model Ib) because the full model on the reduced sample with all control variables failed to converge. Using the explanatory variables only, the results remain the same in their effect size and the direction of the effects.

*Table 9:* **Cabinet durability between elections (non-electoral cabinet replacements)**

|  |  |
| --- | --- |
| *Determinants* | Model I |
| *Explanatory variables: Institutional Rules* |
| Popular elections of the president | 0.70(0.21) |
| Discretional dissolution of the cabinet | 0.86(0.16) |
| *Control variables* |
| Caretaker cabinet | 2.87\*\*(1.19) |
| Effective number of parties | 1.05(0.10) |
| Number of cabinets | 167 |
| Number of failures | 74 |
| Number of countries | 12 |
| Number of observations | 3356 |
| Log likelihood | –322.73 |
| Linktest hat2 | 0.45p = (0.50) |
| PH assumptions (global test) | 7.28 (4 df)p = (0.13) |

Note: ∗∗∗ p < .01, ∗∗ p < .05, ∗ p < .10, based on robust standard errors clustered by country.

Source: authors’ own calculations.

For the model on ministerial durability (Table 10), we excluded the variable *President Appoints Ministers* and the interaction between the presidential power to appoint ministers and to dismiss cabinets because there are no countries in our reduced sample that have such institutional rules. Moreover, we excluded the variable *Parliamentary Fractionalisation* because it violates proportionality assumptions essential for a Cox regression (Cox, 1972). Finally, we excluded the variable *Majority cabinet* because there are no Non-parliamentary cabinets in the sample, which served as a reference category in the previous survival models. The results of this additional regression on a reduced sample are also robust (see the bottom of the Table) and we found the effects comparable in their size and their direction to our initial models presented in the article.

*Table 10*: Determinants of ministerial terminations in Central and Eastern European countries (Russia and Ukraine are excluded)

|  |  |
| --- | --- |
| *Determinants* | Model I |
| *Explanatory variables: Institutional rules* |
| Popular elections of the president | 1.13(0.13) |
| Discretional dissolution of the cabinet | 0.67\*\*(0.09) |
| *Control variables: Cabinet and parliament-specific factors* |
| Coalition | 0.73\*\*\*(0.06) |
| Minority cabinet | 1.01(0.08) |
| PM’s Party | 0.87\*\*(0.05) |
| *Control variables: Individual factors* |
| Portfolio of Foreign Affairs | 0.69\*\*(0.09) |
| Portfolio of Defence | 0.91(0.11) |
| Portfolio of Finance | 0.85(0.10) |
| Parliamentary/party experience | 0.65\*\*\*(0.04) |
| Age | 1.00(0.01) |
| Gender (females) | 0.99(0.09) |
| theta | 0.09\*\*\*(0.04) |
| Log likelihood | –9074.95 |
| No of groups | 12 |
| N of observations | 60269 |
| N of ministers | 1609 |
| N of failures | 1435 |
| Linktest hat2 | –0.13p = (0.55) |
| PH assumptions (global test) | 12.81 (11 df)p = (0.31) |

Notes: hazard ratios with standard errors (in parentheses) are reported. Standard errors of hazard ratios are conditional on theta, \*\*\* *p* < 0.001, \*\* *p* < 0.01, \* *p* < 0.05.

Source: authors’ own calculations.

*Reference*:

Cox, D.R. (1972). Regression models and life‐tables. *Journal of the Royal Statistical Society: Series B (Methodological)* 34(2), 187-202.

Doyle, D. & Elgie, R. (2016). Maximizing the reliability of cross-national measures of presidential power. *British Journal of Political Science* 46(4), 731-741.

Martínez-Gallardo, C. (2014). Designing cabinets: Presidential politics and ministerial instability. *Journal of Politics in Latin America* 6(2), 3-38.

Shugart, M.S. & Carey, J.M. (1992). *Presidents and Assemblies: Constitutional Design and Electoral Dynamics*. Cambridge: Cambridge University Press.

1. New models of ministerial durability, which have used the types of semi-presidentialism as explanatory variables, were not possible to estamite because the variable *President-Parliamentary Framework* (1 if the framework is a president-parliamentary one) failed to fulfill the proportional hazards assumptions essential for a Cox regression (full results are not presented here). [↑](#footnote-ref-1)
2. We also calculated the models with prespow2 score; the results remain the same (full results are not reported here). Therefore, we report the Cox regression results based on the normalized prespow1 score. [↑](#footnote-ref-2)