National Leaders, Political Security, and the Formation of Military Coalitions

Supplementary Appendix

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In this appendix, we (1) provide proofs for the analysis of the formal model analyzed in the main text of the paper, (2) analyze an alternative specification based on a different conceptualization of the pool of side payments, (3) present descriptive statistics, and (4) conduct and discuss a series of robustness checks of the main empirical models.

Proofs for Main Theoretical Model

Proof of Proposition 1. To verify that the proposed strategies constitute the unique SPE, begin with P's acceptance constraint, which stipulates that it accept a coalition proposal iff s satisfies $u_P(\text{accept}) \geq u_P(\text{reject}) \Leftrightarrow p_{AP}\beta - c_P + s \geq p_A\beta$. Therefore, P accepts any proposal that satisfies $s \geq s_{AP}$, where $s_{AP} \equiv \max\{0, c_P - \beta(p_{AP} - p_A)\}$. If L wishes to induce P's acceptance, it meets this constraint at equality, proposing $s^* = s_{AP}$. Note that when $\beta < (S - c_P)/(p_{AP} - p_A) \equiv \underline{\beta}$, no coalitions can form in equilibrium, because $s_{AP} > S$. Further, when $\beta \geq c_P/(p_{AP} - p_A)$, $s_{AP} \leq 0$ and L is sure to form a coalition since doing so is costless. Assuming that s_{AP} is interior, L proposes a coalition that P is sure to accept when $u_L(\text{coalitional crisis}) > u_L(\text{bilateral crisis})$, where

$$u_L(\text{coalitional crisis}) = (p_{AP} - c_A + S - s) \times (p_{AP}\sigma(1) + (1 - p_{AP})\sigma(0))$$

and

$$u_L(\text{bilateral crisis}) = (p_A - c_A + S) \times (p_A \sigma(1) + (1 - p_A)\sigma(0)).$$

This inequality is satisfied when

$$\beta > \left(\frac{c_P}{p_{AP} - p_A}\right) - \left(\frac{S + p_A - c_A}{p_{AP} + \theta}\right) - 1 \equiv \beta_{AP}.$$

Otherwise, when $\beta \leq \beta_{AP}$, L acts unilaterally. (Rather than make a proposal she knows will be rejected, we assume that L acts unilaterally, given her indifference over the two terminal outcomes.)

Finally, we characterize L's choice over initiating a crisis or tolerating the status quo, given hers expectations about subsequent coalition building. When L will act unilaterally, she initiates a crisis when $u_L(\text{bilateral crisis}) > u_L(\text{no crisis})$, where $u_L(\text{no crisis}) = \sigma(q)(q + S)$; this inequality is satisfied when

$$c_L < p_A + S - \frac{\sigma(q)(q + S)}{p_A \sigma(1) + (1 - p_A)\sigma(0)} \equiv c_A^U.$$

Otherwise, when $c_A \geq c_A^U$, L tolerates the status quo. When L will build a coalition, she initiates a crisis when $u_L(\text{coalitional crisis}) > u_L(\text{no crisis})$, and this inequality is satisfied when

$$c_A < p_{AP} + S - c_P + \beta(p_{AP} - p_A) - \frac{\sigma(q)(q + S)}{p_{AP}\sigma(1) + (1 - p_{AP})\sigma(0)} \equiv c_A^{AP}.$$

Otherwise, when $c_A \geq c_A^{AP}$, L tolerates the status quo.

This completes the proof. Since each player's strategy is sequentially rational, the proposed equilibrium exists, and since one and only one action is taken at any set of parameter values, it is also unique. □

Proof of Proposition 2. To verify the claim that the coalition formation constraint becomes more difficult to satisfy as θ increases, note that the first partial derivative of β_{AP} with respect to θ is

$$\frac{\partial \beta_{AP}}{\partial \theta} = \frac{p_A - c_A + S}{(p_{AP} + \theta)^2},$$

which is positive as long as $c_A < p_A + S$, which is true by construction. □

Proof of Proposition 3. To verify the claim that the relationship between c_A^U and c_A^{AP} depends on the value of β, we begin by solving the inequality $c_A^U < c_A^{AP}$ for β, which yields

$$\beta > \left(\frac{c_P}{p_{AP} - p_A}\right) - \frac{\theta(q + S)(\theta + \omega + 1)}{(\theta + \omega)(p_A + \theta)(p_{AP} + \theta)} - 1 \equiv \beta^\dagger.$$

Therefore, $c_A^U < c_A^{AP}$ when $\beta > \beta^\dagger$, and $c_A^U \geq c_A^{AP}$ otherwise. Since coalitions only form when $\beta > \beta_{AP}$, we solve $\beta^\dagger > \beta_{AP}$, which algebra shows is true when $c_A < c_A^U$; this is the same threshold that ensures that L is willing to initiate a crisis without a coalition partner. Therefore, for any conditions under which L is willing to initiate a crisis, $\beta^\dagger > \beta_{AP}$, ensuring that conditions exist under which the promise of building a coalition can either encourage crisis initiation ($\beta > \beta^\dagger$) or discourage it ($\beta_{AP} < \beta \leq \beta^\dagger$). □

Proof of Proposition 4. To verify the claims over the relationship between θ, p_A, p_{AP}, and the crisis initiation constraints, we begin with the first partial derivative of c_A^U with respect to θ, which is

$$\frac{\partial c_A^U}{\partial \theta} = \frac{(q + S)\big(\theta^2 - p_A(\omega + \omega^2 + 2\omega\theta + \theta^2)\big)}{(\theta + \omega)^2(p_A + \theta)^2}$$

This expression is negative when $p_A > p_A^\dagger$, where

$$p_A^\dagger \equiv \frac{\theta^2}{\omega + \omega^2 + 2\omega\theta + \theta^2},$$

and weakly positive otherwise. Next, the first partial of c_A^{AP} with respect to θ is identical to $\partial c_A^U / \partial \theta$, but for the substitution of p_{AP} for p_A. Therefore, $\partial c_A^{AP} / \partial \theta$ is negative when $p_{AP} > p_{AP}^\dagger$, such that $p_{AP}^\dagger = p_A^\dagger$. □

Alternate Side Payment Specification

As an alternative to the specification of side payments presented in the main theoretical model, where S exists independently of the crisis outcome, we show in this section that the core theoretical claims are also consistent with an alternative in which S is produced only in the event that L's side wins the crisis. Under this new specification,

$$u_L(\eta_L, \alpha_L) = \begin{cases} (q) \times \sigma(q) & \text{if status quo} \\ (p_A(1+S) - c_A) \times (p_A\sigma(1) + (1-p_A)\sigma(0)) & \text{if bilateral crisis} \\ (p_{AP}(1+S-s) - c_A) \times (p_{AP}\sigma(1) + (1-p_{AP})\sigma(0)) & \text{if coalitional crisis,} \end{cases}$$

and the potential partner's as

$$u_P(\eta_P) = \begin{cases} q\beta & \text{if status quo} \\ p_A\beta & \text{if bilateral crisis} \\ p_{AP}(\beta + s) - c_P & \text{if coalitional crisis.} \end{cases}$$

To show that key results remain the same, we first characterize a similar Subgame Perfect Equilibrium (SPE), then show that the key comparative statics claims established in Propositions 2-4 remain substantively similar.

First, we look for an SPE in which L proposes a coalition based on $s^* = s_{AP}$ iff $\beta > \beta_{AP}$ and P accepts iff $s \geq s_{AP}$. As before, we solve P's acceptance constraint, $p_{AP}(\beta + s) - c_P \geq p_A\beta$, which results in a range of acceptable proposals

$$s \geq \max\left\{0, \frac{c_P}{p_{AP}} - \beta\left(1 - \frac{p_A}{p_{AP}}\right)\right\} \equiv s_{AP}.$$

Assuming s_{AP} is interior, L proposes a coalition when $u_L(\text{coalitional crisis}) > u_L(\text{bilateral crisis})$, or when

$$\beta > \frac{c_P}{p_{AP} - p_A} - \frac{(1+S)p_A - c_A}{p_{AP} + \theta} - (1+S) \equiv \beta_{AP}.$$

Since θ enters into the denominator of a negative term, β_{AP} rises in θ, as established in Proposition 2 in the main model. Therefore, the effects of β and θ on coalition formation remain the same in the alternative specification.

Moving back up the tree, L's crisis initiation constraints are also similar. When she will act unilaterally, she initiates a crisis when

$$c_A < p_A(1 + S) - \frac{q\theta(1 + \omega + \theta)}{(\omega + \theta)(p_A + \theta)} \equiv c_A^U,$$

and when she will build a coalition, she initiates a crisis when

$$c_A < p_{AP}(1 + S + \beta) - p_A\beta - c_P - \frac{q\theta(1 + \omega + \theta)}{(\omega + \theta)(p_{AP} + \theta)} \equiv c_A^{AP}.$$

Consistent with Proposition 4, each constraint increases through low values of p_A or p_{AP}, respectively, then decreases when it passes the same threshold identified in the proposition ($p_A^\dagger, p_{AP}^\dagger$). Finally, following Proposition 3, the relationship between the crisis initiation constraints again depends on the value of β, such that $c_A^U < c_A^{AP}$ when

$$\beta > \left(\frac{c_P}{p_{AP} - p_A}\right) - \frac{q\theta(1 + \omega + \theta)}{(\omega + \theta)(p_A + \theta)(p_{AP} + \theta)} - (1 + S),$$

and $c_A^U \geq c_A^{AP}$ otherwise. Therefore, the SPE and its comparative statics are substantively similar across side payment specifications, leading to a set of empirical implications isomorphic to those analyzed in the main body of the paper.

Descriptive Statistics

Descriptive statistics for all variables used in the empirical analyses, including both ideal point (Strezhnev and Voeten 2013) and affinity-based (Gartzke 2010) measures of preference similarity, can be found in Table A1. We also include summary statistics for the indicator $Autocracy_A$ and the 21-point scale $Polity2_A$ (Marshall and Jaggers 2009), which are used in supplementary analyses.

Table A1. Descriptive statistics.

[Table A1 about here]

Robustness Checks

In this section, we provide supplemental analyses based on an alternate measure of preference similarity (an affinity score calculated on UNGA voting profiles) and discuss in greater depth the interactions between of regime type, job insecurity, and preference diversity in the key empirical results.

Measuring Preference Similarity

Table A2 presents measures foreign policy preference similarity with affinity scores based on the S statistic (Signorino and Ritter 1999) calculated on patterns of voting in the UN General Assembly (Gartzke 2010), lagged by one year. As noted in the text, the results of interest are generally consistent with those based on UNGA ideal points from Strezhnev and Voeten (2013), but for voting affinity between target and potential partner, which may be attributable to the relatively restricted variation in the affinity scores compared to ideal points. The measures are highly correlated ($\rho = -0.89$ for PT dyads and -0.89 for AP dyads), but as shown in Table A1 above affinity is fit to a shorter range than the difference in ideal points.

Table A2. Empirical models of coalition formation in crises using UNGA affinity scores, 1951-1999

[Table A2 about here]

Job Insecurity, Regime Type, and Preference Divergence

While our main empirical models control for regime type, which may affect both the desirability of coalitions and job insecurity, it remains possible that autocratic leaders are systematically both more secure in office *and* more variable in their preferences, such that they tend not to form coalitions simply because they have few viable partners. To the extent that democratic countries exhibit more foreign policy consensus or that autocratic foreign policies are more often guided by the idiosyncratic preferences of individuals, this alternative is worth exploring.

Table A3. Correlation matrix of regime type and preference divergence in AP and TP dyads

[Table A3 about here]

If this alternative explanation drives our results, despite the current strategy of controlling for A's democracy and preference divergence between both AP and PT dyads, we should expect to see autocratic leaders faced with a pool of on average less attractive partners than democratic leaders; in other words, increasing levels of democracy should be correlated with decreasing divergence in preferences in AP dyads and increasing divergence in preferences in PT dyads. To assess this possibility, we present a correlation matrix in Table A3, which shows that both increasing democracy on the 21-point Polity scale and an indicator for democracy are correlated weakly with both measures of preference divergence. The strongest correlation, $\rho = 0.32$ between $Democracy_A$ and $Divergence_{AP}$ is in the wrong direction and nonetheless quite weak, while there is no correlation to speak of ($\rho = 0.09$) between $Democracy_A$ and $Divergence_{TP}$. Patterns are similar for the Polity2 index as well. Therefore, democratic leaders do not appear uniquely advantaged over less democratic in choosing from a pool of states with systematically similar preferences.

This rules out the possibility that autocratic leaders find it more difficult to find potential partners with whom they share similar preferences, which is sufficient to rule out the alternative explanation. However, it remains true that autocratic leaders are, on average, more secure in office than democratic leaders. Figure A1 plots histograms of $Job\ Insecurity_L$ for the leaders of democratic and nondemocratic regimes (the contrast is substantively similar with pure autocracies in the latter category). As expected, democratic leaders have a higher mean probability of losing office, ($0.20 > 0.16$), though the difference between their medians is smaller ($0.16 - 0.14 = 0.02$) thanks to a few observations with very insecure leaders.

Figure A1. Histograms with means of $Job\ Insecurity_L$ for democracies and nondemocracies

While levels of job insecurity do not appear radically different across regime types in the sample of crises, perhaps due to common incentives to avoid conflict if possible when highly insecure (Chiozza and Goemans 2011), Figure A1 suggests that results relying on higher levels of job security will clearly be based on democratic states. However, the lack of observations of very insecure leaders in nondemocracies makes it impossible to judge whether a similar pattern would obtain for those leaders as well. These limitations in mind, we split our sample into democracies and nondemocracies and re-estimate our original empirical models in Models 1 and 2 of Table A4.[1]

Table A4. Empirical models of coalition formation in crises by regime type, 1951-1999

[Table A4 about here]

Several results merit attention in Table A4. First, while our predictions about the mean and variance effects of $Job\ Insecurity_L$ are recovered for democracies, they are of weaker statistical significance, and no such relationships are discernible among the sample of nondemocratic states. On the other hand, the effects of both preference divergence variables emerge as expected among nondemocracies, while they fail to achieve statistical significance among democracies. Third, the effects of control variables are often inconsistent across samples, with $Major\ Power_A$ dropping out of the nondemocracy sample due to collinearity. In light of these inconsistencies, we hesitate to draw any inferences regarding differences across regime types when it comes to political security and preference divergence; the full sample is larger, and thus more informative, while any variables that correlate with regime type may suffer sampling bias due to the splitting of the sample. Further, the number of nonzero outcomes in each model is quite low in each case (33 and 40, compared to 81 in the full model), rendering consistent coefficient estimates still more difficult to draw.

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[1]Results are not appreciably different when Model 2 includes only pure autocracies.

As a further check on the link between job insecurity and regime type, we also estimate a standard probit (Model 3 in Table A4) that drops both *Job Insecurity* variables in favor of the simple indicators of regime type, $Democracy_L$ and $Democracy_P$.[2] While both preference divergence variables retain the expected signs and statistical significance, A's regime type has no discernible effect on the probability of coalition formation, suggesting that it is indeed political security, not domestic institutions themselves, that condition the observed relationships. Democracies themselves are no more willing to form coalitions than nondemocracies, but politically insecure leaders in both types of states *do* appear more likely to build coalitions than more secure leaders. To summarize, we can rule out the alternative explanation that links regime type to the availability of a pool of cheap partners. Further, a deeper analysis of the role of regime type—splitting the sample into democracies and nondemocracies, dropping job insecurity variables— shows that regime type is less important than job insecurity itself for explaining coalition formation in these data, with the caveat that inconsistencies across regime type subsamples necessarily limit the strength of conclusions we can draw about regime type itself.

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[2]We also estimated a heteroskedastic probit where $Democracy_L$ appears in the variance equation, its effect was insignificant on both variance and mean.

References

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