Supporting Information for "When Prospective Leader Turnover Promotes Peace"

Contents

1 Theoretical Model

This section provides a simple formalization to illustrate dynamics from the paper's theory. It includes only the minimal features needed which are bargaining, costly war, peace costs, and uncertainty over the future magnitude of peace costs. For ease of presentation, I focus on war due to total peace costs exceeding total war costs and put aside wars due to high peace costs coupled with, say, first-strike advantages or asymmetric information.

1.1 Preliminaries

Actors A and B contest a continuously divisible resource R, with value 1, over two periods. Let A be the deterrer and B the challenger. In period 1, A can attack or contain.[1] Attack leads to war, a winner-take-all costly lottery. A wins with probability p and both actors pay per period costs, $c_A = c_B = c$. Cost equivalence between the actors is substantively unimportant but eases the presentation.[2] Containment allows the deterrer A to maintain the military balance but A must pay a cost d. Having A pay all of the peace costs is immaterial to the results. What matters for the argument is whether any bargain is preferable to war, not the precise form of that bargain. With containment, the actors bargain. A makes proposals, retaining x_t, leaving B with $1 - x_t$, where t indexes the period. B accepts or rejects the proposal. Acceptance yields payoffs in accordance with the bargain and rejection leads to war. To simplify the analysis I assume war payoffs are positive, which places restrictions on c conditional on p.

Play in period 2 depends on the period 1 choices, as shown in Figure A2. War in period 1 is game-ending, whether A initially attacks or B rejects the proposal. The war's outcome dictates period 2 payoffs. If A contained in period 1, then the costs of peace (d) can change between rounds by amount σ. A change in peace costs reflects a change in the challenger's leadership which affects how costly it is for the deterrer to contain them. Nature draws σ from a prescribed distribution function $F(\cdot)$ with mean zero and where $f(\cdot)$ is positive in the interval $(\Delta a, \Delta b)$ where $-d < a < 0 < b$ and $\Delta \in$ [0,1]. The Δ parameter serves as a proxy for uncertainty with the range in which the future costs could fall increasing in Δ.[3] Varying Δ provides a family of distributions with a common mean but differing higher moments. Both players observe the realized draw after round one and before round two. After observing σ, A can again attack or contain. Play from this point proceeds as in period 1.

The simulated results presented below are generated using a uniform distribution. Unimodal beta distributions produce substantively equivalent results. I leave to future research the task of delineating the full range of distributions, $F(\cdot)$, for which results generalize.

1.2 Analysis

I now characterize equilibrium behavior.

[1] An extension allowing A to tolerate B's expansion of power rather than containing it does not change the substantive results.

[2] Extensions allowing c to vary between players and/or discounting future payoffs do not change the substantive conclusions.

[3] I adopt an approach similar to that in Reed (2003).

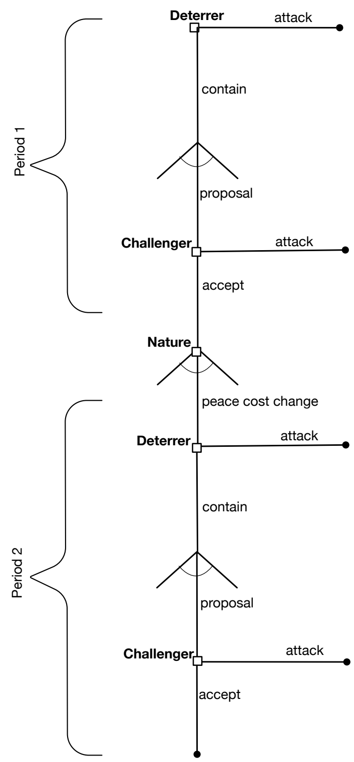

Figure A1: Bargaining with costly peace and uncertainty over the future.

One Period

Begin with a one period version of the interaction and thus no uncertainty over future peace costs. Solve via backward induction. To accept the proposal, B must receive its expected war payoff, which after containment is $1 - p - c$. A proposes x_1 such that B is indifferent between war and peace, or $x_1 = p + c$. B accepts if x_1 is less than or equal to this value and rejects otherwise. With acceptance, A's payoffs are as follows:

> **Attack:** $p - c$,
> **Contain:** $p + c - d$.

The deterrer's equilibrium behavior in a single round interaction depends on the following relationship[4]:

> if $d \leq 2c \rightarrow$ contain $>$ attack.

If peace costs (d) are less than total war costs $(2c)$, peace prevails.

Two Period

Turning to the two-period game, I analyze the payoffs after A's initial choice between attacking and containing. We can immediately specify payoffs following attack. With attack in period 1,

[4]Assume that when indifferent the deterrer chooses contain over attack.

players receive their war payoffs in both rounds. This yields total expected payoffs to A and B of $2(p-c)$ and $2(1-p-c)$, respectively.

Payoffs after containment in period 1 are somewhat less straightforward. Start with A's period 2 decision if it contained in period 1. Attack in period 2 again yields $p-c$. If A contains in period 2, it must offer B its expected war payoff and pay containment costs. This leaves A with $p+c-(d+\sigma)$, reflecting the potential change in the challenger's leadership and thus in the deterrer's cost of containment.

Compare A's period 2 payoffs following period 1 containment to determine its optimal strategy in period 2. After simplification, its behavior depends on the following condition:

if $d+\sigma \leq 2c \rightarrow$ contain $>$ attack.

Again, if peace costs $(d+\sigma)$ are less than total war costs $(2c)$, peace prevails. A's choice relies on a cutpoint for the realized change in peace costs (σ). A attacks rather than contains if $\sigma > 2c-d \equiv q$. Thus, $F(q)$ is the probability of containment.

Moving backward to round 1, A must make an offer that leaves B indifferent between war and peace. B is indifferent in round 1 when $1-x_1+F(q)(1-x_2)+\Big(1-F(q)\Big)(1-p-c) = 2(1-p-c)$. The three quantities on the left hand side represent B's payoff to bargaining in round 1, the probability of peace in round 2 times the payoff to peace in round 2, and the probability of war in round 2 times the payoff to war. The right hand side is simply 2 times B's war payoff. Given $x_2 = p+c$, the previous equation yields $x_1 = p+c$.

Consequently, A's total expected payoff to containment in period 1 is $(x_1-d)+F(q)\Big(x_2 - d - \int_{\Delta a}^{q} \sigma f(\sigma)d\sigma\Big) + \Big(1-F(q)\Big)(p-c)$. The first quantity is A's bargaining payoff in period 1, the second is its expected payoff to containment in period 2 times the probability it contains in period 2, and the third quantity is its payoff to attack in period 2 times the probability it attacks in period 2. This reduces to $2p-d+F(q)\Big(2c-d-\int_{\Delta a}^{q} \sigma f(\sigma)d\sigma\Big)$. Compare the expected payoff to containment in period 1 to its payoff to attacking in period 1. With simple algebra, the central proposition of the paper follows, A attacks if

$$\underbrace{d-2c}_{\text{R1 gain to war over peace}} > \underbrace{F(q)\Big(2c-d-\int_{\Delta a}^{q} \sigma f(\sigma)d\sigma\Big)}_{\text{Probability R2 peace * R2 gain to peace over war}}, \tag{1}$$

and contains otherwise. Ri indicates round of play. Inequality 1, which is directly analogous to Inequality 1 in the manuscript, formalizes the idea expressed in the paper highlighting the two quantities that dictate the deterrer's choice between attacking and waiting out an unattractive peace today given uncertainty over the payoff to peace tomorrow.

1.3 Results

How does greater uncertainty alter behavior? A's choice between attack and contain depends on Inequality 1. Let Δ serve as a proxy for future uncertainty. As Δ increases, the bounds of the distribution governing the shift in peace costs expand outward and future uncertainty increases.

Changes in uncertainty (Δ) affect the RHS of Inequality 1 through the probability of peace in round 2, $F(q)$, and the expected value of that peace should it occur, $\int_{\Delta a}^{q} \sigma f(\sigma) d\sigma$. Consider the theoretically interesting case where peace is more costly than war in round one, which implies $d > 2c$ and thus $q < 0$ and the LHS of Inequality 1 is positive. Starting with the probability of round 2 containment, this quantity increases as it becomes more likely σ is less than q. Given that $f(\cdot)$ has mean 0, $F(q) = 0$ when the lower bound Δa is greater than q. There is no chance of containment in round 2. As uncertainty increases such that $\Delta a < q$, $F(q)$ turns positive and is increasing in greater uncertainty. The expected value of the round 2 containment costs is decreasing in Δ, which is immediate from $\int_{\Delta a}^{q} \sigma f(\sigma) d\sigma$ given that $a < 0$, $q < 0$, and $\Delta \geq 0$.

Put together, the gain from containment versus attack, given by the RHS, is increasing in Δ provided parameters are in the range in which $F(q) > 0$, and is constant at 0 otherwise. If uncertainty is sufficient that peace could be preferable to war in period two, the payoff of peace in period one is increasing with greater uncertainty; Inequality 1 becomes less likely to hold.

Now consider the case where containment is cheaper than war in period 1. That is, $d < 2c$ and thus $q > 0$ and the LHS of Inequality 1 is negative. Increasing Δ has no effect on whether Inequality 1 holds because it always does. The probability of period 2 peace, $F(q)$, is always positive. The quantity $\int_{\Delta a}^{q} \sigma f(\sigma) d\sigma$ is strictly less than q given $a < 0$. Since $q = 2c - d$, the RHS quantity in parentheses is always positive, hence the RHS is always positive. Inequality 1 never holds if containment is initially preferable to attack.

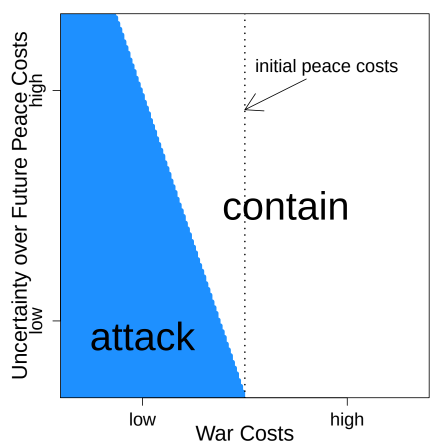

Figure A2: Deterrer's equilibrium behavior in round one. Vertical dotted line indicates initial war costs equal to initial peace costs.

Figure 3 plots the relationships with the following parameters. The static parameters are $p = 0.6, d = 0.37, a = -d, b = d$, and $F(\cdot) \sim U(\Delta a, \Delta b)$. For the figure, Δ varies from 0 to 1 and c varies from 0.14 to 0.23.

2 Summary Statistics

Table A1: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
War	0.01	0.09	0	1	5760
Turnover (3-levels)	0.70	0.84	0	2	5760
Turnover (continuous)	0.95	1.55	0	15	5748
Turnover (binary)	0.46	0.5	0	1	5760
High Mil. Spending	0.11	0.32	0	1	5760
Relative Capabilities	0.28	0.13	0.01	0.5	5727
Contiguity	0.84	0.37	0	1	5760
Alliance	0.39	0.49	0	1	5727
Target Regime Type	-2.42	6.89	-10	10	5412
Peace Years	9.55	16.01	0	107	5727

3 Robustness Tests

Table A2: Continuous Turnover Variable: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnovers	-0.78*	-0.99***	0.03	0.11	0.10	0.06
	(0.43)	(0.32)	(0.15)	(0.12)	(0.13)	(0.15)
High Mil. Spending					1.25***	1.27***
					(0.41)	(0.47)
Turnover*Mil. Spending					-1.13**	-1.30**
					(0.48)	(0.51)
Relative Capabilities		-1.43		-0.10	-0.39	0.30
		(2.52)		(1.27)	(1.17)	(1.24)
Contiguity		-1.00		-0.78*	-0.82**	-0.95***
		(0.70)		(0.41)	(0.35)	(0.36)
Alliance		0.81		-0.72*	-0.26	-0.16
		(0.56)		(0.43)	(0.32)	(0.37)
Target Regime Type						0.04*
						(0.02)
Peace Years		-1.11*		-0.37***	-0.29***	-0.26***
		(0.61)		(0.09)	(0.08)	(0.09)
Constant	-3.63***	-2.17**	-4.95***	-3.46***	-3.55***	-3.66***
	(0.31)	(1.01)	(0.24)	(0.52)	(0.49)	(0.52)
N	654	650	5094	5065	5715	5412

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Logistic regression with directed rivalrous dyad year as the unit of analysis. *Turnover* is the continuous count of adversary leader turnovers in the prior decade. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

Table A3: Binary Turnover Variable: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	-0.83	-1.06**	-0.45	-0.27	-0.30	-0.55
	(0.69)	(0.53)	(0.37)	(0.37)	(0.37)	(0.46)
High Mil. Spending					0.99**	0.96**
					(0.42)	(0.47)
Turnover*Mil. Spending					-0.82	-0.96
					(0.76)	(0.79)
Relative Capabilities		-1.38		-0.07	-0.37	0.30
		(2.56)		(1.26)	(1.16)	(1.23)
Contiguity		-0.88		-0.74*	-0.77**	-0.90**
		(0.63)		(0.42)	(0.36)	(0.36)
Alliance		0.76		-0.66	-0.22	-0.07
		(0.56)		(0.43)	(0.32)	(0.38)
Target Regime Type						0.06**
						(0.02)
Peace Years		-1.10*		-0.36***	-0.28***	-0.24***
		(0.61)		(0.09)	(0.08)	(0.09)
Constant	-3.70***	-2.34**	-4.74***	-3.32***	-3.41***	-3.43***
	(0.33)	(0.96)	(0.22)	(0.52)	(0.48)	(0.51)
N	654	650	5106	5077	5727	5412

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Logistic regression with directed rivalrous dyad year as the unit of analysis. *Turnover* is a binary indicator for whether the adversary had a leader turnover in prior decade. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

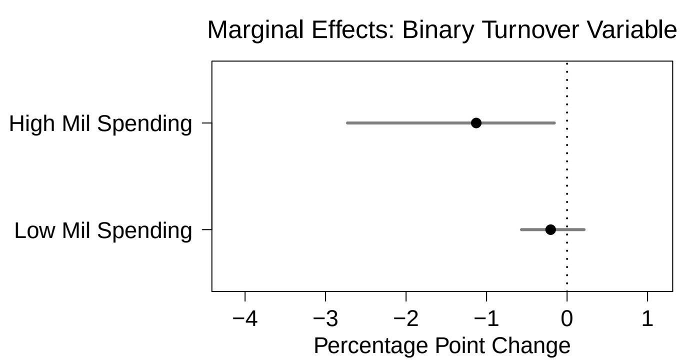

Figure A3: Marginal effect on the probability of war of an adversary having a leadership turnover in the past 10 years versus no turnover. Based on A3: Model 6.

Table A4: Varying Cut Points: High Military Spending

	High Mil. Spending				
	8%	9%	10%	11%	12%
Turnover	-0.64*	-1.00***	-1.05***	-0.92***	-0.94***
	(0.35)	(0.32)	(0.33)	(0.33)	(0.33)
Relative Capabilities	0.92	-0.54	-1.40	-1.88	-2.18
	(2.27)	(2.36)	(2.53)	(2.58)	(2.66)
Contiguity	-0.01	-0.72	-1.02	-1.05	-1.00
	(0.69)	(0.65)	(0.70)	(0.72)	(0.77)
Alliance Dummy	0.21	0.68	0.81	0.95	0.85
	(0.48)	(0.54)	(0.56)	(0.60)	(0.62)
Peace Years	-0.86*	-1.15*	-1.12*	-1.15*	-1.09*
	(0.50)	(0.65)	(0.61)	(0.62)	(0.59)
Constant	-3.55***	-2.70***	-2.15**	-2.04*	-1.82*
	(1.05)	(0.94)	(1.01)	(1.05)	(1.06)
N	870	767	650	553	485

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Varying Cut Points: Low Military Spending

	Low Mil. Spending				
	8%	9%	10%	11%	12%
Turnover	-0.11	-0.10	-0.12	-0.15	-0.15
	(0.24)	(0.23)	(0.23)	(0.23)	(0.23)
Relative Capabilities	-0.91	-0.09	-0.07	-0.09	-0.14
	(1.32)	(1.30)	(1.26)	(1.22)	(1.22)
Contiguity	-1.06**	-0.83**	-0.74*	-0.69*	-0.68*
	(0.43)	(0.42)	(0.41)	(0.41)	(0.41)
Alliance	-0.42	-0.63	-0.66	-0.68	-0.67
	(0.44)	(0.44)	(0.43)	(0.43)	(0.43)
Peace Years	-0.34***	-0.35***	-0.36***	-0.36***	-0.36***
	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)
Constant	-3.07***	-3.30***	-3.35***	-3.36***	-3.37***
	(0.52)	(0.53)	(0.53)	(0.52)	(0.52)
N	4857	4960	5077	5174	5242

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Logistic regression with directed rivalrous dyad year as the unit of analysis for dyads split by whether the initiator has high military spending (upper table) or low military spending (lower table) as a percentage of GDP. Models vary the cut point defining high vs. low for military spending. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

Table A5: OLS: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	-0.01**	-0.01***	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
High Mil. Spending					0.02**	0.01*
					(0.01)	(0.01)
Turnover*Mil Spending					-0.01**	-0.01**
					(0.00)	(0.00)
Relative Capabilites		-0.00		-0.00	-0.00	0.00
		(0.05)		(0.01)	(0.01)	(0.01)
Contiguity		-0.01		-0.01	-0.01*	-0.01*
		(0.02)		(0.00)	(0.00)	(0.00)
Alliance		0.01		-0.00*	-0.00	-0.00
		(0.01)		(0.00)	(0.00)	(0.00)
Target Regime Type						0.00**
						(0.00)
Peace Years		-0.00		-0.00***	-0.00***	-0.00**
		(0.00)		(0.00)	(0.00)	(0.00)
Constant	0.03***	0.03	0.01***	0.02***	0.02***	0.02***
	(0.01)	(0.02)	(0.00)	(0.01)	(0.01)	(0.01)
N	654	650	5106	5077	5727	5412

$^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$

Notes: OLS regression with directed rivalrous dyad year as the unit of analysis. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

Table A6: Penalized Logit Models: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	−0.70	−0.75*	−0.25	−0.12	−0.15	−0.33
	(0.48)	(0.45)	(0.21)	(0.21)	(0.21)	(0.22)
High Mil. Spending					1.08***	1.10***
					(0.37)	(0.41)
Turnover*Mil Spending					−0.74	−0.86
					(0.54)	(0.57)
Relative Capabilities		−0.39		−0.09	−0.35	0.28
		(2.18)		(1.21)	(1.09)	(1.15)
Contiguity		−0.64		−0.75**	−0.78**	−0.94***
		(0.66)		(0.37)	(0.33)	(0.34)
Alliance		0.60		−0.60	−0.19	−0.09
		(0.56)		(0.41)	(0.32)	(0.34)
Target Regime Type						0.06***
						(0.02)
Peace Years		−0.03		−0.31***	−0.24***	−0.10**
		(0.13)		(0.09)	(0.08)	(0.05)
Constant	−3.59***	−2.99***	−4.74***	−3.31***	−3.41***	−3.49***
	(0.32)	(1.00)	(0.20)	(0.48)	(0.44)	(0.46)
N	654	650	5,106	5,077	5,727	5,412

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Penalized (Firth) logistic regression with directed rivalrous dyad year as the unit of analysis. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

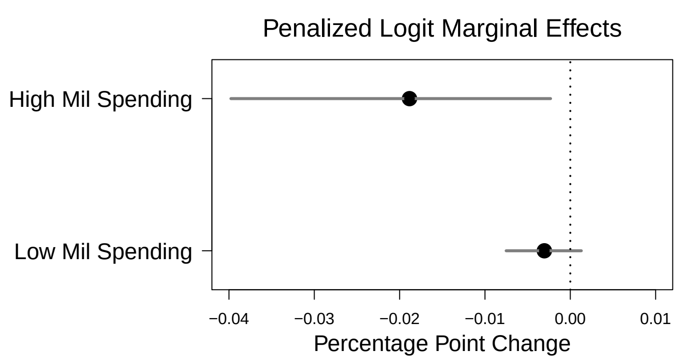

Figure A4: Marginal effect on the probability of war of an adversary having two leadership turnovers in the past 10 years versus no turnover. Based on A6: Model 6.

Table A7: Additional Controls: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	-0.84*	-2.21***	-0.26	-0.18	-0.13	-0.28
	(0.44)	(0.53)	(0.22)	(0.26)	(0.22)	(0.26)
High Mil. Spending					0.80**	0.83*
					(0.40)	(0.45)
Turnover*Mil. Spending					-0.81*	-0.94*
					(0.49)	(0.51)
Relative Capabilities		-1.17		0.09	-0.59	-0.04
		(4.04)		(1.36)	(1.13)	(1.27)
Contiguity		-1.71**		-0.59	-0.52	-0.68*
		(0.80)		(0.42)	(0.37)	(0.37)
Alliance		1.63**		-0.56	-0.29	-0.05
		(0.81)		(0.47)	(0.32)	(0.38)
Target Regime Type		0.14**		0.03		0.05**
		(0.06)		(0.03)		(0.02)
Rivals		0.06		0.32***	0.33***	0.30***
		(0.36)		(0.09)	(0.08)	(0.08)
Peace Years		-0.85		-0.35***	-0.30***	-0.26***
		(0.62)		(0.10)	(0.08)	(0.09)
Constant	-3.63***	-2.00	-4.76***	-4.06***	-4.16***	-4.11***
	(0.31)	(1.81)	(0.22)	(0.58)	(0.51)	(0.56)
N	654	610	5106	4802	5727	5412

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Logistic regression with directed rivalrous dyad year as the unit of analysis. *Rivals* indicates number of rivals initiating state has in that year. *Target Regime Type* indicates the targeted state's polity score. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown.

Table A8: Fewer Controls: Turnover, Military Spending, and War

	High Mil. Spending		Low Mil. Spending		Interacted	
	(1)	(2)	(3)	(4)	(5)	(6)
Turnover	-0.81*	-1.02***	-0.20	-0.12	-0.37	-0.32
	(0.42)	(0.32)	(0.22)	(0.23)	(0.25)	(0.27)
High Mil. Spending					0.95**	1.06**
					(0.46)	(0.46)
Turnover*Mil. Spending					-0.73	-1.02*
					(0.52)	(0.54)
Relative Capabilities	-1.04		-0.28		0.37	
	(2.61)		(1.29)		(1.21)	
Contiguity		-0.96		-0.74*		-0.91**
		(0.75)		(0.42)		(0.36)
Alliance		0.79		-0.66		-0.03
		(0.56)		(0.42)		(0.37)
Target Regime Type					0.06***	0.06**
					(0.02)	(0.02)
Peace Years	-0.99	-1.10*	-0.36***	-0.36***	-0.23***	-0.24***
	(0.61)	(0.62)	(0.09)	(0.09)	(0.09)	(0.09)
Constant	-2.94***	-2.66***	-4.01***	-3.37***	-4.21***	-3.38***
	(0.81)	(0.84)	(0.47)	(0.38)	(0.43)	(0.38)
N	650	650	5077	5077	5412	5412

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Notes: Logistic regression with directed rivalrous dyad year as the unit of analysis. Models drop controls that might already be subsumed in the military spending variable (*Relative Capabilities*) or affect inclusion in a sample of rivalrous dyads (*Contiguity* and *Alliance*). Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown. Marginal effects simulated from Model 5 continue to support the main hypothesis; shifting from zero to two leader turnovers when military spending is high produces a substantively and statistically significant reduction in the probability of war.

Table A9: Undirected Dyads and War Onset

	War Onset	
	(1)	(2)
High Mil. Spend & No Turnover	1.05***	1.00***
	(0.32)	(0.35)
Relative Capabilities		-0.43
		(1.19)
Contiguity		-0.78**
		(0.34)
Alliance		-0.26
		(0.30)
Peace Years		-0.28***
		(0.09)
Constant	-4.31***	-2.90***
	(0.20)	(0.47)
N	2968	2944

$^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$

Notes: Logistic regression with undirected rivalrous dyad year as the unit of analysis. Standard errors in parentheses are clustered on the dyad. Results for higher order *Peace Years* are not shown. War onset, rather than unidirectional initiation, is the outcome variable. *High Mil. Spend & No Turnover* is the main explanatory variable. It is a binary measure equal to 1 if either state has high military spending (over 10% of GDP) and faces a rival which had no leader coalition turnover in the prior decade. The measure captures whether either country is locked in a costly peace with little chance of a future change.

Turnover in democratic vs. non-democratic targets. As Figure A5 shows, the relationship between uncertainty due to potential leader turnover and peace holds across democratic and non-democratic targets. The relationship is particularly clear for non-democratic targets given that none of the 163 observations with high military spending and any turnover in the prior decade ended in war.

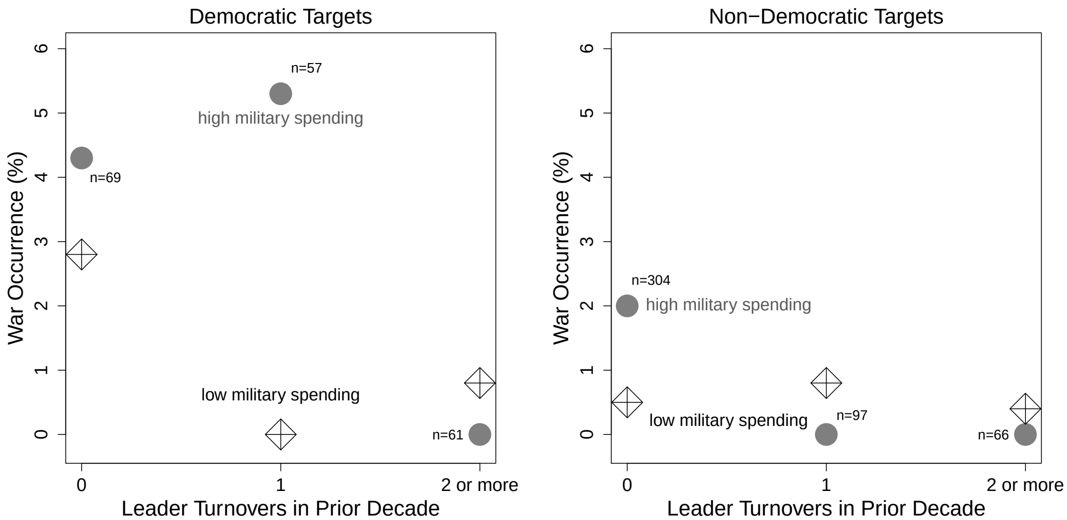

Figure A5: Descriptive plots of military spending, leader turnover, and war. Average war occurrence by military spending and adversary leader turnover where 0, 1, and '2 or more' indicates the target's number of CHISOLS in the prior decade with number of observations labeled for each average. Split by democratic (left) and non-democratic (right) targets.

4 Relationship between Past Turnover and Future Turnover

Past leadership turnover is an empirically useful proxy for expected future turnover. The left panel below plots the observed probability of turnover in year t given the number of turnovers (using the main three-level coding from the manuscript) in the decade prior to t. The right panel shows a similar result, plotting predicted probabilities generated from a bivariate logistic regression. Vertical bars indicate 95% confidence intervals.

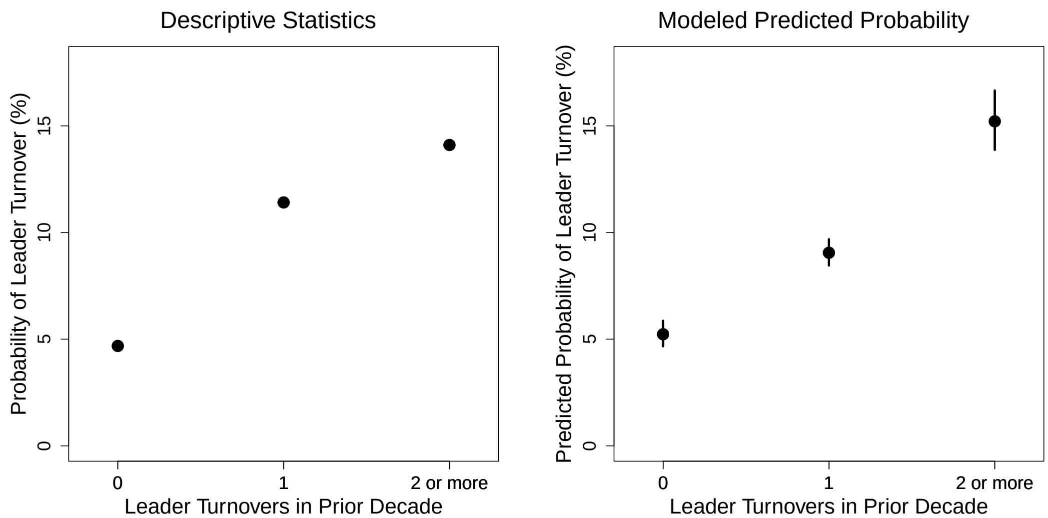

Figure A6: Past turnover and future turnover.

5 Relationship between Peace Costs and War Costs

The manuscript contends that a decline in peace costs does not lead to a corresponding decline in war costs. To systematically evaluate the contention, I analyze the relationship between the intensity of military spending before a war and the intensity of fatalities in a war. Each bilateral war post-1816 is the unit of analysis. Using bilateral wars is appropriate because a) a war had to occur in order to have fatality data and b) bilateral wars offer an intuitive context in which to average across the belligerents spending and fatality levels.

As in the manuscript, the intensity of military spending measure reflects military expenditures as a percentage of GDP. The method follows Fordham and Walker (2005) and Fearon (2018) with underlying data coming from CINC (Singer, 1987) and GDP estimates from Gleditsch (2002). Fatality intensity measures battle deaths per capita for each belligerent with population estimates coming from CINC (Singer, 1987) and battle death data from Sarkees and Wayman (2010). For each war, I calculate the average military spending as a percentage of GDP and average battle deaths per capita for the two belligerents.

Overall, there is a slight negative relationship between the two variables (correlation of -0.14). The scatter plot below (with bivariate regression line) makes this evident. Peace costs and war costs do not tightly follow one another.

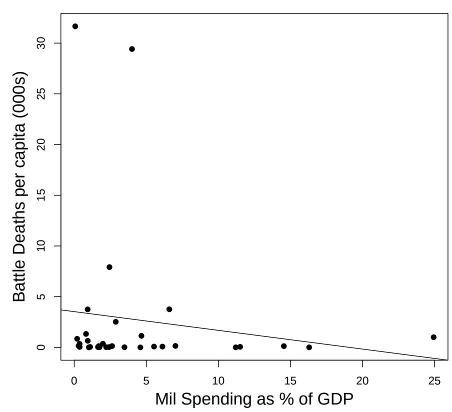

Figure A7: Arms spending and battle deaths.

I also evaluate the relationship between wartime capital, as opposed to human, costs and peacetime costs. To do so, I analyze the relationship between military spending as a percentage of GDP in the year preceding a war and the growth in military spending as a percentage of GDP during the war. I find that states with higher pre-war military spending saw smaller increases (and sometimes decreases) in their military spending during war. In contrast, states with lower pre-war spending saw the largest wartime increases in military budgets. As noted in the manuscript, the two variables have a slightly negative correlation (-0.11). While relatively unsophisticated, this analysis offers some further evidence that costs during peacetime are not a perfect proxy for costs during wartime and the two should be treated as analytically distinct.

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