How Does Nation State Choose Their Rivalry?

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1. Introduction

What is the explicit threat signal that triggers a nation state engaging in a militarized interstate disputes? Apart from implicit system factors e.g., polarity and power distribution which can hardly observe the turning point across time for a country to perceive enough threats, regime change could be a more immediate threat to be identified. Meanwhile, it is less than enough for regime change to be the salient causal identification to explain where the militarized interstate disputes happen. For instance, when regime change both took place in Republic of China and Korean Peninsular, why the U.S. only engaged in the Korean War in a large scale instead of the Chinese Civil War.

Therefore, I argue that together, regime change and foreign policy similarity also matters in terms of why the militarized interstate disputes happen in one dyad rather than the others. The main hypothesis in this research is that when regime change happens in a dyad set—nation state i and nation state j—would more likely engage in a militarized interstate dispute if state i shares less foreign policy similarity with state j. With the two-way way fixed effect regression and difference-in-differences which controls heterogeneity across time and individual, the main hypothesis would pass the test if a dyad undergoes regime change, the probability of militarized interstate dispute onsets increase significantly on average, in comparison to dyads would have not undergone regime change, with

less similarity in foreign policy.

2.   Research Design

The causal identification of regime change's impact on the possibility of a militarized interstate dispute onset is addressed through the lens of non-directed analysis with dyad-year panel data. With that being said, in this research, directed relationship in a dyad—whether it involves the initiator or target of a militarized interstate dispute, regime change on either or both sides—is trivial. Since our unit of analysis is each dyad in each year and all research variables are non-directed and dyad-year, the causal effect of regime change on militarized interstate dispute onset is derived from variations among dyads instead of cross-sectional difference between nation state i or nation state j. For instance, it is trivial to discuss, in this research, that how regime change which happens in initiator states would differ its effects on militarized interstate dispute onsets from which happens in target states. I focus on studying regime change in dyads and its effects on dyad's possibility to encounter a militarized interstate dispute.

Regarding the time span of this research, I only include observations from 1945 to 2010. Firstly, I have most of the observations of dyad-year regime change in mentioned time span. (see A.1) Secondly, the structural factor, polarity and power structural, is controlled in the time span and all dyads will be placed into bipolar system. Last but not least, the overlapped availability for all research variables from various data sets is within the above time span.

2.1   Research Hypothesis

- $Hypothesis_1$: Regime change leads dyads to be more likely to experience militarized interstate disputes.

First research hypothesis intends to gauge whether regime change is accountable as treatment effect in explaining changes in militarized interstate dispute onsets after either or both nation states in a dyad encounter the treatment.

– $Hypothesis_2$: Regime change leads dyads that shares high degress of foreign policy similarity to be more likely to experience militarized interstate disputes.

Furthermore, I argue that foreign policy similarity may have positive influence on nation state's decision to engage in a militarized interstate dispute with the other nation state that encounters regime change. Regime change could be a threat to other state's national security interests. Thus, nation states in highly similar dyads, in terms of their foreign policy preference profile, have more incentives to address their perception of threats and end up engaging in a militarized interstate disputes.

2.2   Outcome Variable

Militarized interstate dispute is coded as a dummy variable in non-directed dyad-year data set to indicate the onset. It records whether there is a militarized interstate dispute for a dyad in the given year. CoW MID Project (V5.0) provides conflicts data in which one or more states threaten, display, or use force against one or more other states between 1816 and 2014.(Palmer et al., 2021)

2.3   Explanatory Variables

1. Regime change is a dummy and non-directed variable. In any year, dyads would be recognized to have regime change if for either or both nation states, the duration of current regime existence turns into 0 and restarts to accumulate. Polity IV Projects (2018) records duration of each regime's survival at the year level. (Marshall et al., 2019) Even though literature in democratic peace would argue that dyad's regime type (i.e., two democratic, two autocratic, democratic-autocratic and vice versa) matters in conflict study, such regime type consideration is excluded from our research since our analysis is only interested in non-directed results. (Raknerud & Hegre, 1997) To decide the treatment year, I choose the initial year of the first either or both regime change observed in a dyad as the treatment year.

2. Foreign policy similarity index is represented by Cohen's *kappa* which is a coefficient meansured by dyad's Alliance preference profiles and weighted by squared distances.

(Cohen, 1960; Häge, 2011) High Cohen's *kappa* indicates that the dyad has similar preference over choosing their Alliances and thus, they would have more similar foreign policy. Cohen's *kappa* coefficients range from −1 to 1 with 1 indicating identical foreign policy preference for a dyad.

2.4 Control Variables

1. Strategic rivalry. A dummy variable indicates dyad's strategic rivalry relationship. It is defined according to the density of previous conflicts history. (Thompson & Dreyer, 2012)

2. Alliance. CoW Formal Alliances (V4.1) data set defines four levels of Alliance relationships, i.e., defense pact, neutrality, non-aggression treaty, entente agreement. (Gibler, 2009) If a dyad includes any one of the four levels of Alliance relationship, the dyad would be regarded as having at least entente level of Alliance relationship.

3. Major Power power. A dummy variable indicates at least one Major Power power is included in a dyad. CoW State System Membership (V2016) data set defines Major Power power from 1816 to 2016.

4. Distance. The minimum distance between nation states on Jan. 1 of the year, in kilometers. (Schvitz et al., 2021)

5. Trade. Sum of import amount (millions of current USD) between dyads. Then, calculate the Z-score of dyad's amount of import in each given year. Data from CoW Trade (V4.0). (Barbieri et al., 2009)

6. Economic Development. Aggregate of dyad's GDP per capita. (log-transformed in 2011 USD) Then, calculate the Z-score of the aggregate in each given year. (Anders et al., 2020)

7. National military capability. Dyad's difference in national military capability. The national capability ratio is calculated by obtaining the ratio of one nation state's Composite Index of National Capability Score compared to all the other nation

states in the system. (Singer, 1988) Then, calculate the Z-score of that difference in each given year. Data from CoW National Material Capabilities (V6.0).

2.5 Statistical Model

$$MID_{(i,j)t} = \alpha_i + \alpha_j + \lambda_t + \beta X_{(i,j)t} + \beta_1 T_{1(i,j)t} + \beta_2 x_{2(i,j)t} + \delta(T_{1(i,j)t} \times x_{2(i,j)t}) + \epsilon_{(i,j)t}$$

The causal identification from this research focus on examining and interpreting β_1 as for treatment variable, regime change, and δ as for interactive effect that foreign policy similarity has on treatment effect. More specifically, the causal identification will be derived from:

$$\delta = E\{y_i|x_i, T_i = 1\} - E\{y_i|x_i, T_i = 0\}$$

which is the average treatment effect (ATT) from the difference in the likelihood of a regime change dyad engaging in a militarized interstate dispute compared to what it would have been if it had not undergone the treatment. Indeed, dyadic fixed effects α_i and α_j from states i and j and time fixed effect λ_t will be taken into account by the regression model.

3. Statistical Analysis

The effect size and minimum detected effect indicates that research has enough samples to continue the research. (see table A1 and figure A2) There are 1,000 unique dyads and 724,492 observations.

Since regime change is orthogonal to time, research data has staggered entry of the treatment. Cross-sectional difference among dyads may related to the timing of regime change. The cross-sectional test results in table A2 confirm such endogeneity issue. However, the cross-sectional endogeneity issue will be resolved by Two-way Fixed Effect regression as cross-sectional fixed effect being controlled.

3.1 Parallel Trend Analysis

From figure 1, we can observe a clear pattern in average change of possibility of militarized interstate disputes, and the mean change is significantly different in pre-treatment
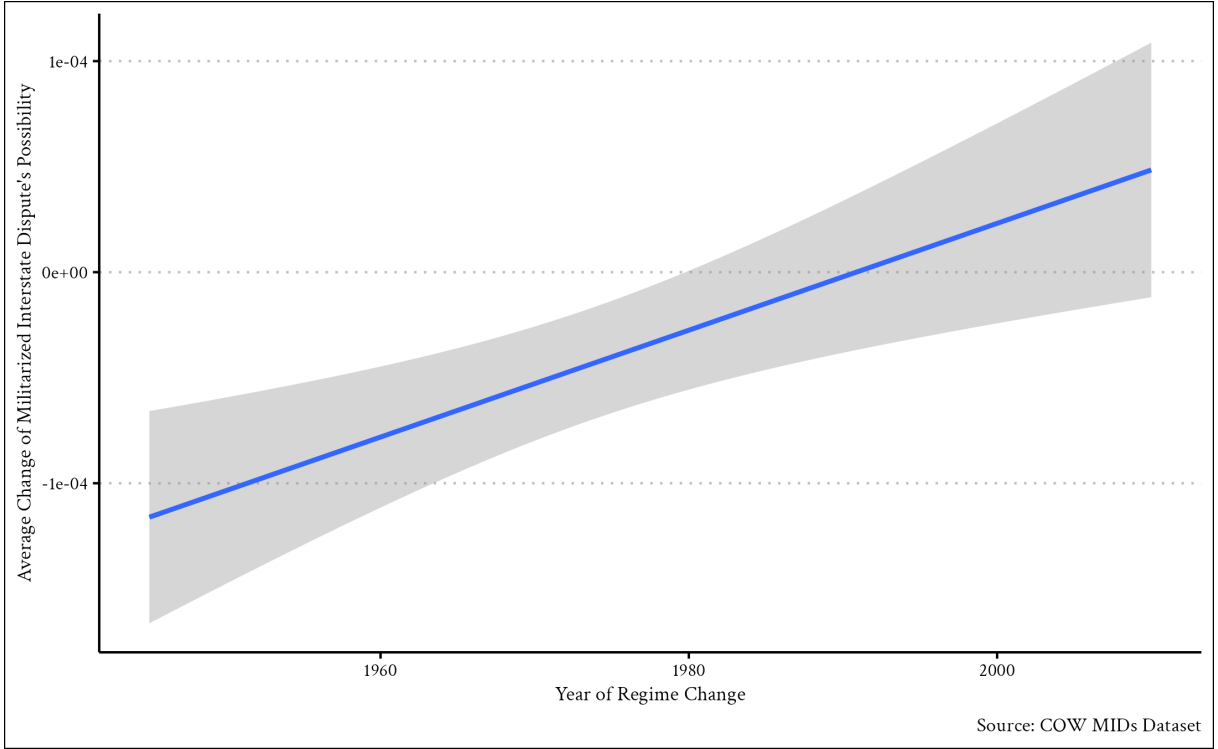
Figure 1: Parallel Trend With Regime Change as Treatment Effect

periods between dyads with regime change and dyads without regime change. (results see Appendix A.4) Given the violation of parallel trend assumption, the identification in causing the difference-in-differences—differences between treatment and control group in terms of changes due to regime change—can hardly be distinguished.

Even though parallel trend assumption is violated, we can still look into how the causal identification is "approximately" correct instead of "exactly" correct. (Rambachan & Roth, 2023) By extrapolating pre-existing difference which violates parallel trend, Rambachan & Roth (2023) suggest that allow the ATT to deviate non-linearly from pre-existing trend and impose a restriction M to limit the deviation within a confidence interval. Robustness can still be generated by conducting sensitivity analysis of ATT to conclude how bad the post-treatment violation of parallel trends can be.

3.2 Two-Way Fixed Effects Model

From table 1, I only include key explanatory variables in model 1 and the standard error is clustered by controlling nation state i, nation state j and time. Later in model 2, I add all the control variables into the regression model with individual standard error that is clustered by dyads and time. Model 3 has the same formula as model 2 but using model

Dependent Variable:	Militarized Interstate Dispute Onset			
Model:	(1)	(2)	(3)	(4)
Variables				
Regime Change	-0.0001	-0.0003	-0.0003	0.0012
	(0.0004)	(0.0004)	(0.0004)	(0.0020)
Foreign Policy Similarity	0.0090***	0.0060	-0.0088**	-0.0064
	(0.0021)	(0.0077)	(0.0043)	(0.0047)
Regime Change ×				
Foreign Policy Similarity	0.0030	0.0022	0.0029	-0.0166
	(0.0025)	(0.0019)	(0.0021)	(0.0103)
Strategic Rivalry		0.1566***	0.1850***	0.1911***
		(0.0226)	(0.0163)	(0.0181)
Alliance		-0.0065	0.0098**	0.0073
		(0.0086)	(0.0049)	(0.0053)
Major Power		0.0066**	-0.0034	-0.0035
		(0.0033)	(0.0105)	(0.0105)
Distance		1.12×10^{-5}	$-2.09 \times 10^{-6***}$	$-1.96 \times 10^{-6***}$
		(1.65×10^{-5})	(3.63×10^{-7})	(3.65×10^{-7})
$Distance^2$		-5.65×10^{-10}	$9.34 \times 10^{-11***}$	$8.52 \times 10^{-11***}$
		(7.2×10^{-10})	(1.86×10^{-11})	(1.85×10^{-11})
Trade		-0.0002	-0.0002	-0.0002
		(0.0016)	(0.0011)	(0.0011)
Economic Development		-0.0030***	-0.0011	-0.0011
		(0.0008)	(0.0010)	(0.0010)
National Military Capability		-0.0008	-0.0054***	-0.0056***
		(0.0014)	(0.0011)	(0.0011)
Regime Change ×				
Strategic Rivalry				-0.0294
				(0.0248)
Regime Change ×				
Alliance				0.0201*
				(0.0108)
Regime Change ×				
Distance				-7.65×10^{-7}
				(4.94×10^{-7})
Regime Change ×				
$Distance^2$				$4.75 \times 10^{-11*}$
				(2.61×10^{-11})
Regime Change ×				
National Military Capability				0.0006
				(0.0005)
Fixed-effects				
ccode1	Yes		Yes	Yes
ccode2	Yes		Yes	Yes
year	Yes	Yes	Yes	Yes
id		Yes		
Fit statistics				
Observations	583,166	448,180	448,180	448,180
R^2	0.02226	0.16284	0.08000	0.08035
Within R^2	0.00112	7 0.01236	0.05915	0.05950

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

1's standard error. For model 4, I include interactive terms between treatment variale and control variables that have statistical significance from model 4.

Firstly, the Two-way fixed effect models gain more robustness from using clustered standard error that controls fixed effect of nation state i, nation state j and time. Key explanatory variable, foreign policy similarity, gains statistical significance and reduce its standard error. Control variable such as strategic rivalry, alliance, distance, national military capability also become significant in model 4.

However, key causal identifications, regime change and interaction between regime change and foreign policy similarity, do not have statistical significance in any model. Regime change may have negative bias and regime change $\times$ foreign policy similarity may have positive bias from cross-sectional endogeneity and violations of parallel trend. Neither hypothesis reject the null and two-way fixed effect regression results fail to identify any casual relationship between regime change and militarized interstate dispute onsets. It indicates that regime change may expose dyads with more possibility of military interstate disputes and when regime change takes place, dyads that share less similarity in foreign policy may have more possibility to suffer military interstate disputes.

3.3 Event Study and Difference-in-Differences

To further examine the causal identification of key explanatory variables, I examine the leads and lags up to 10 periods for each key explanatory variable through event study. From the event study plots, we are able to further validate a violation of parallel trends. For instance figure 2, the ATT of regime change has significant change before leads 5 and the ATT of regime change $\times$ foreign policy similarity has a obvious turn between leads 10 and leads 5 from figure 3. Moreover, figure 3, I place the threshold at leads 1 in lieu of a observed jump from leads 1 to lags 0. It indicates a unknown shock that results in such jump. Therefore, the event study results are unable to derive a robust ATT from both key explanatory variables for causal identification in lags.

In terms of sensitivity test, from figure 4 and figure 5 we observe an acceptable deviation to capture causal trends from pre-existing trends at the level of restriction $\overline{M}$ vary across 0. As the restriction increases and the confidence level gets larger, the ATT of key
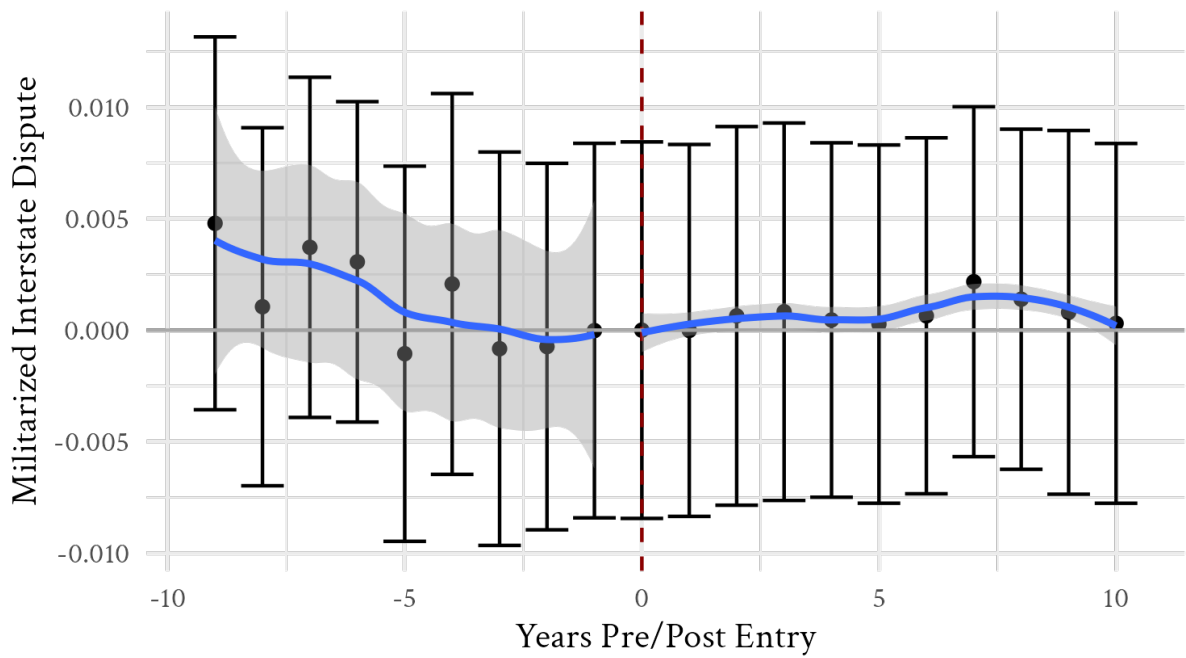
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Correlates of War (CoW) Militarized Interstate Dispute (MID) project. (V5.0)

Figure 2: Leads and Lags for Regime Change

Correlates of War (CoW) Militarized Interstate Dispute (MID) project. (V5.0)

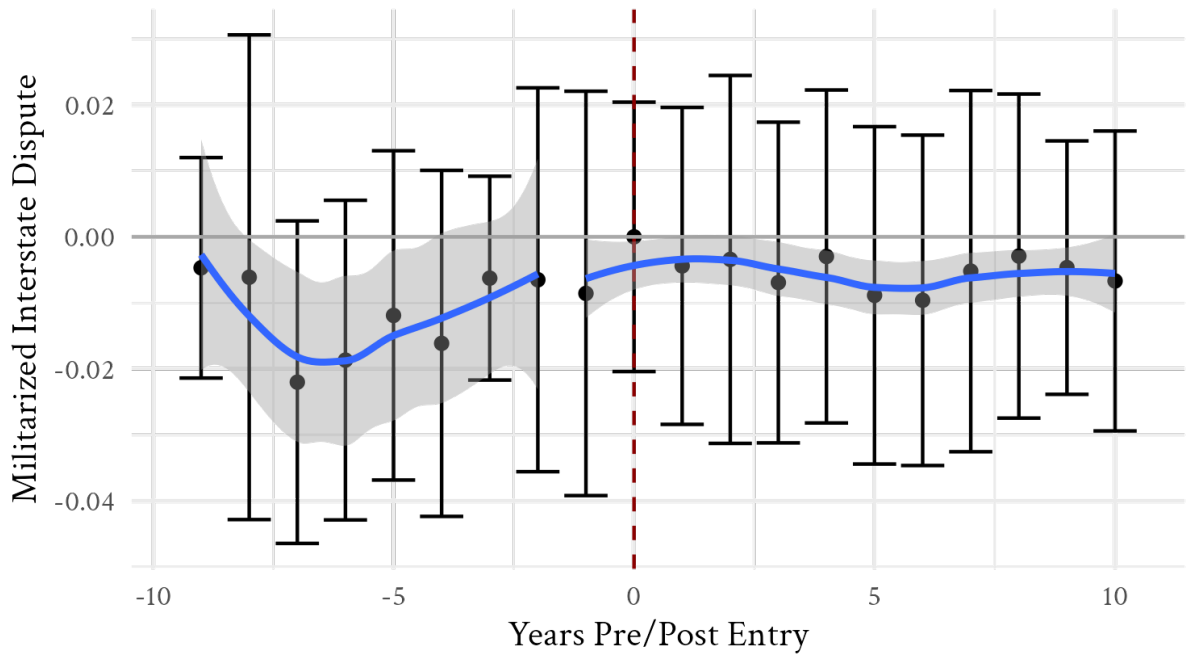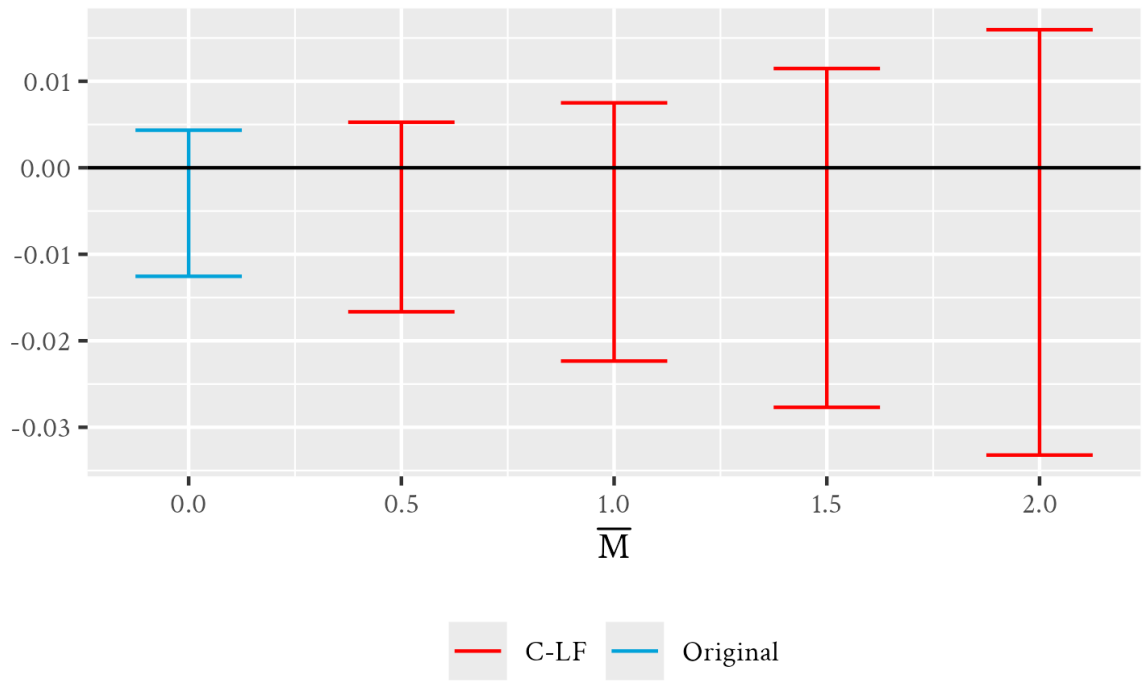Figure 3: Leads and Lags for Regime Change × Foreign Policy Similarity

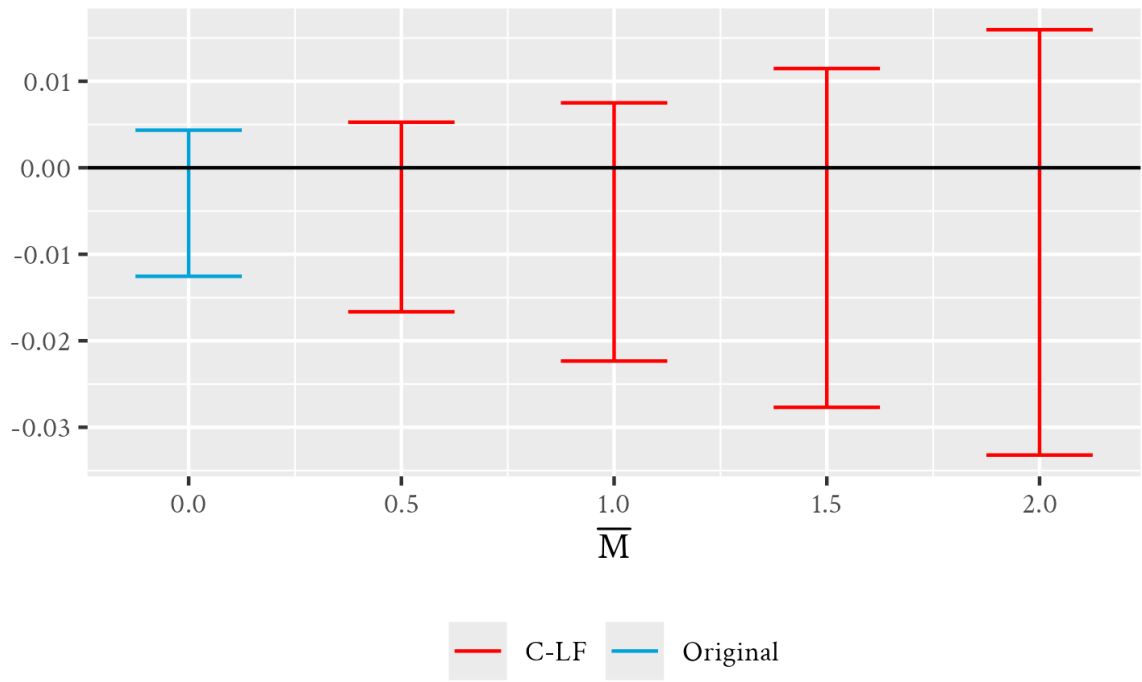Figure 4: Sensitivity Plot With Relative Magnitudes for Regime Change

Figure 5: Sensitivity Plot With Relative Magnitudes for Regime Change × Foreign Policy Similarity

explanatory variables increase more in negative side than in positive side. It also exposes a issue that it is hard to distinguish the direction of bias from parallel trend and cross-sectional endogeneity. Even though the negative is captured more than at positive side, there is no confidence to infer any causal relationship from the similarity test. (see A.5 for ATT's confidence interval)

xw

4. Conclusions

Even though there is no robust causal inference from this research, the conclusion can still be drawn from that there may exist a causal relationship that dyads with regime change may have greater possibility to encounter less possibility of militarized interstate dispute onsets, because from the sensitivity test result shows that negative ATT is captured more in the confidence interval. Same rationale applied to a possible case exists when dyads that share less similarity in foreign policy are more likely to engage in a militarized interstate dispute due to regime change.

The reason why this study fails to identify a clear causal relationship is that fundamental pre-assumptions is violated and unable to be addressed. The sensitivity test does not address the issue that parallel trend assumption is violated. What's more, the cross-sectional endogeneity is also causing bias to ATT. A robust conclusion that can be infered from this research is that the ATT of regime change and of regime change × foreign policy similarity is likely to be negative regardless of parallel trends being violated.

The problem of heterogeneity and endogeneity may result from loss of information in lieu of dyadic unit. Nation state i and nation state j may contain rich information, e.g., less indicators for differences among dyads and more indicators for differences among nation states, about their decision to engage in militarized interstate disputes. Moreover, in this case, unit specific trend analysis can be used to examine endogeneity problems if parallel trend is violated.

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A. Appendix

A.1   Time Span

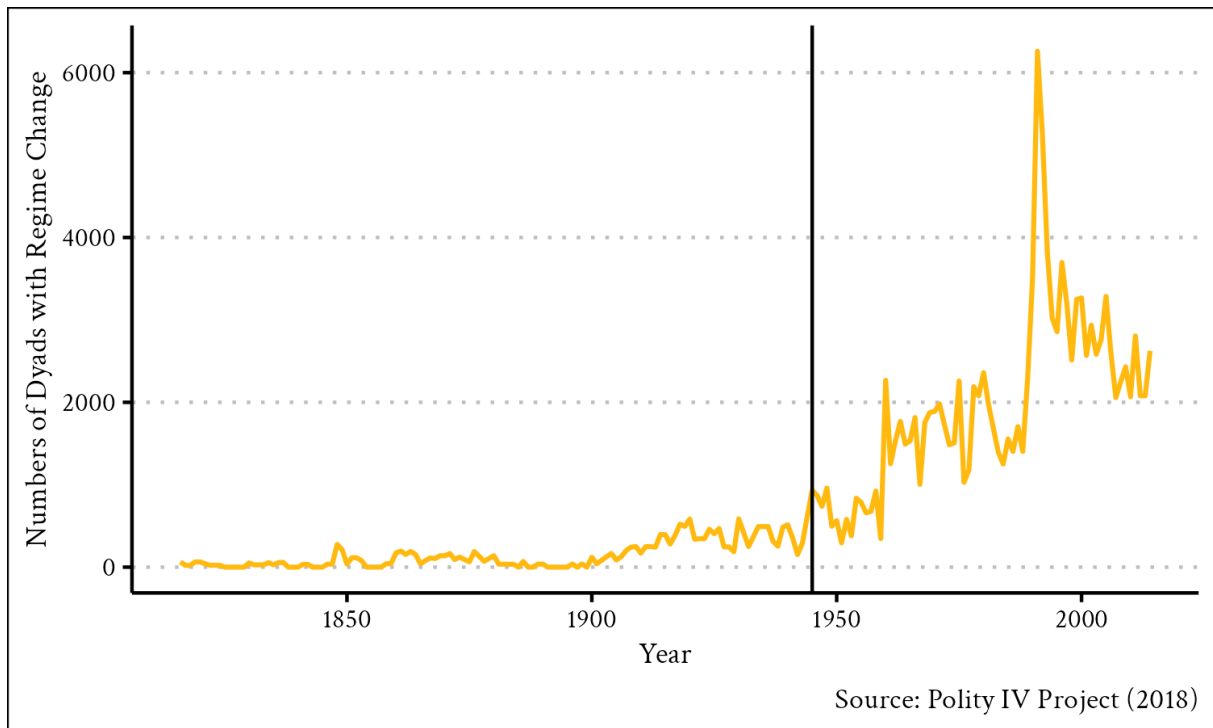From A1 we can see that Major Powerity of the dyad-year regime change happened after 1940s.

Figure A1: Numbers of Dyads with Regime Change, from 1816 to 2014.

A.2   Effect Size

The estimated effect size is 0.08% and the minimum detected effect is 0.0065. The data sample will be sufficient to detect the anticipated impact.

Table A1: Effect Size F-Test

| Dependent Variable: | MID onset |
Model:	(1)
Variables	
Regime Change	-8.81×10^{-5}
	(0.0004)
Fixed-effects	
Year	Yes
State i	Yes
State j	Yes
Fit statistics	
Observations	583,166
R^2	0.02116
Within R^2	3.36×10^{-7}

Clustered (year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Two-sample t test power calculation
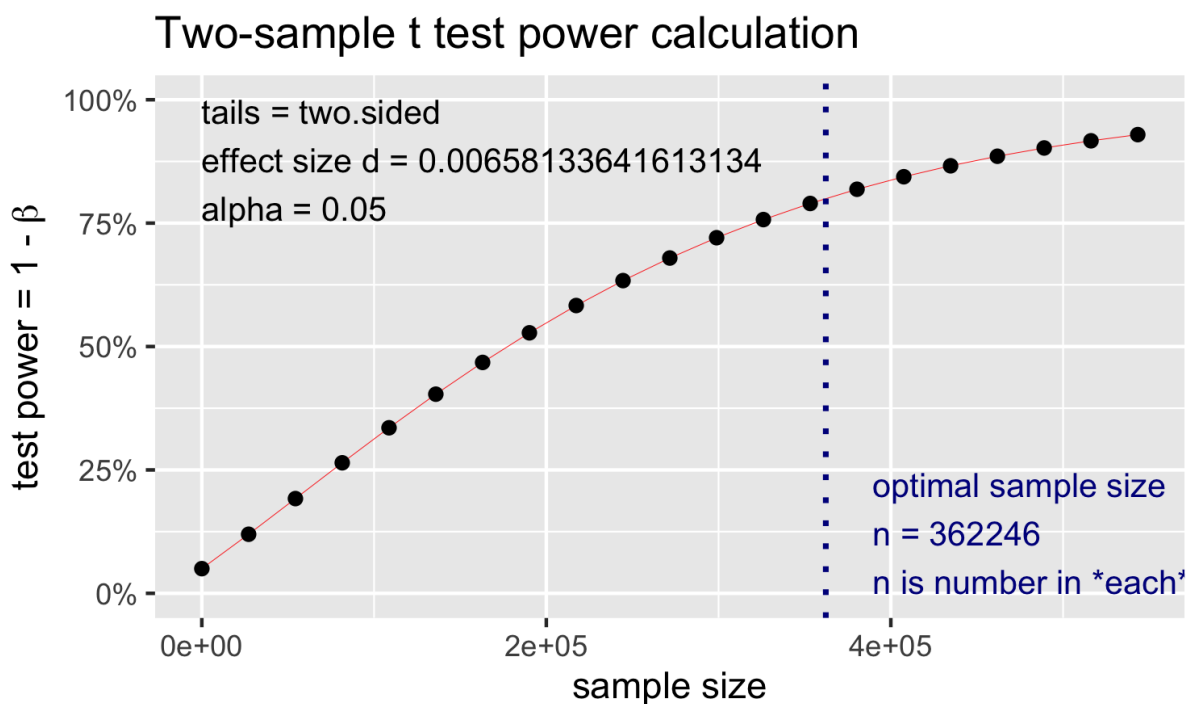

Figure A2

A.3 Cross-sectional Endogeneity Test

Table A2: Cross-sectional Endogeneity Test

Dependent Variable:	Entry Year					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Constant	1,941.6***	1,971.2***	1,974.6***	1,974.1***	1,974.2***	1,973.7
	(1.388)	(0.1488)	(0.1437)	(0.1398)	(0.1399)	(0.1360
Economic Development	1.823***					
	(0.0801)					
Trade		-0.0004***				
		(5.03×10^{-5})				
National Military Capability			-102.2***			
			(5.631)			
Major Power Power				-7.341***		
				(0.5695)		
Alliance					-9.103***	
					(0.6209)	
Strategic Rivalry						-16.03*
						(2.642
Fit statistics						
Observations	16,646	13,781	17,118	17,118	17,118	17,118
R^2	0.03019	0.00436	0.01887	0.00962	0.01240	0.0021
Adjusted R^2	0.03013	0.00428	0.01881	0.00956	0.01235	0.0020

IID standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.4 Parallel Trends Analysis

Table A3: Parallel Trend F-Test

Dependent Variable:	treatyr
Model:	(1)
Variables	
Constant	1,973.7***
	(0.1359)
avg_mid	255.7***
	(76.82)
Fit statistics	
Observations	17,109
R^2	0.00065
Adjusted R^2	0.00059

IID standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

A.5   Event Study

	lb	ub	method	Delta	Mbar
1	-0.02	0.01	C-LF	DeltaRM	0.50
2	-0.02	0.01	C-LF	DeltaRM	1.00
3	-0.03	0.01	C-LF	DeltaRM	1.50
4	-0.03	0.02	C-LF	DeltaRM	2.00

Table A4: Sensitivity Table With Relative Magnitudes for Regime Change

	lb	ub	method	Delta	Mbar
1	-0.02	0.04	C-LF	DeltaRM	0.50
2	-0.04	0.06	C-LF	DeltaRM	1.00
3	-0.06	0.08	C-LF	DeltaRM	1.50
4	-0.08	0.10	C-LF	DeltaRM	2.00

Table A5: Sensitivity Table With Relative Magnitudes for Regime Change × Foreign Policy Similarity