

# Multidisciplinary Approach to Civil Conflict: Political, Economic, and Social Determinants of Violence

Dissertation Defense  
of  
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# Introduction

Relevance and motivation behind studying civil conflict

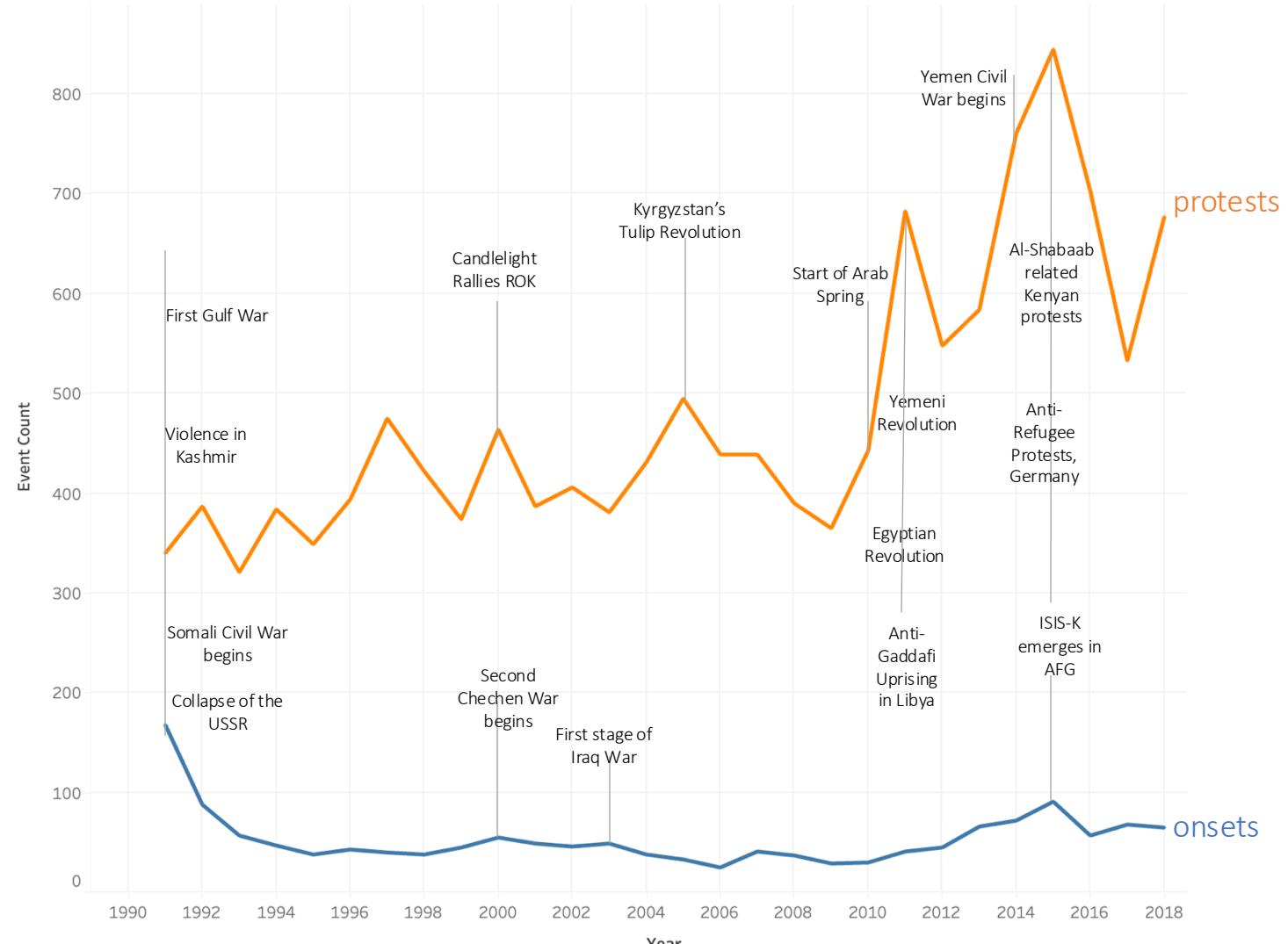
- Relevance of civil conflict in our daily lives
- Frequency of civil conflict compared to interstate wars
- Conflicting evidence from multiple literatures
- This necessitates a holistic approach to studying violence looking at political, social, economic, and endogenous vectors
- Robust framework, broad coverage, and empirically supported
- Leveraging increased data availability
- Policies to mitigate conflict
- Different drivers to mitigate different types of civil conflict (onset, severity, duration, and protest)
- This leads to re-examining how we built theory, and tailoring policies in heterogeneous country and regional contexts to be successful



# Background: Conflict Evidence from 1991 to 2018

Protests are more prevalent and increased over time, total high-level conflict onsets remain steady

- High and low-level conflict differ in behavior as seen by conflict onset vs. protest
- After the collapse of the USSR, conflict onset levels dropped significantly
- Onsets averaged 54 per year
- However, annual protests have doubled, averaging 479 per year
- Protests also exhibit high variation with a spike in 2015

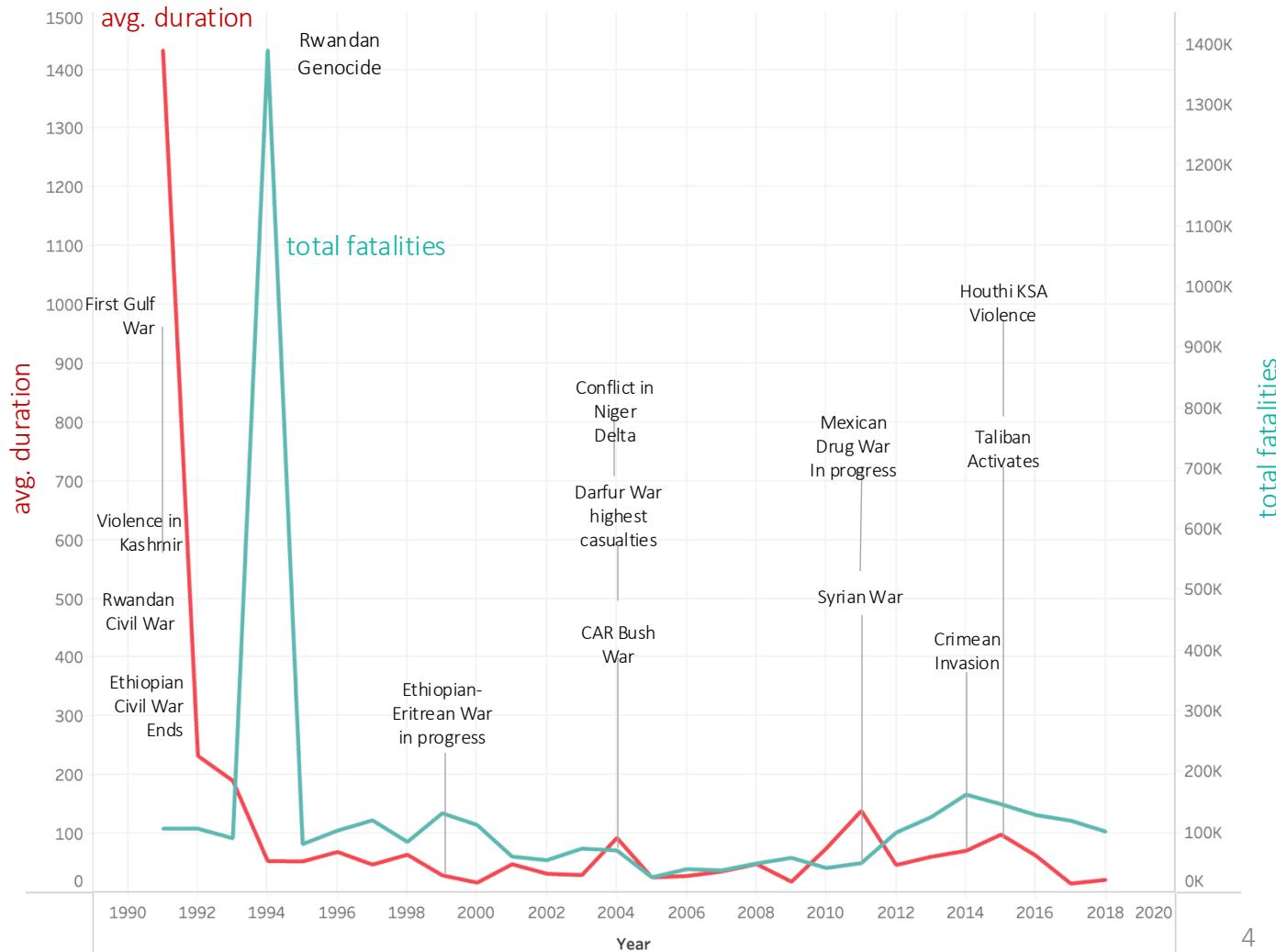




# Background: Conflict Evidence from 1991 to 2018

Average conflict duration significantly decreased after 1991, the most deadliest year was 1994

- Both duration and severity exhibit spikes, followed by relatively steady levels
- Consistent with the onset, the average duration significantly declines after 1991 perhaps due to the collapse of the USSR
- Total fatalities are the highest in 1994 (Rwandan genocide, 1.3 mln)
- Average total annual fatalities are 825
- Average annual duration days are 112





# Literature Review – Best Practice Civil Conflict Findings

Key political, social, and economic factors of civil conflict vary depending on the literature

## Grievance

Repression (Gurr, 1997,  
Regan & Norton, 2005)  
Income Inequality (FL,  
2003; Cederman, 2011)  
Large Populations (FL,  
2003)

## Greed

Regime Type (Hegre, 2001)  
Prior Violence (Collier &  
Sambanis, 2001; Cederman  
& Girardin, 2007)  
Economic development (CH,  
2004)

## State Capacity

State Capacity (Benson &  
Kugler, 1998)  
Gender Equality (Regan &  
Paskeviciute, 2003)

## Diffusion

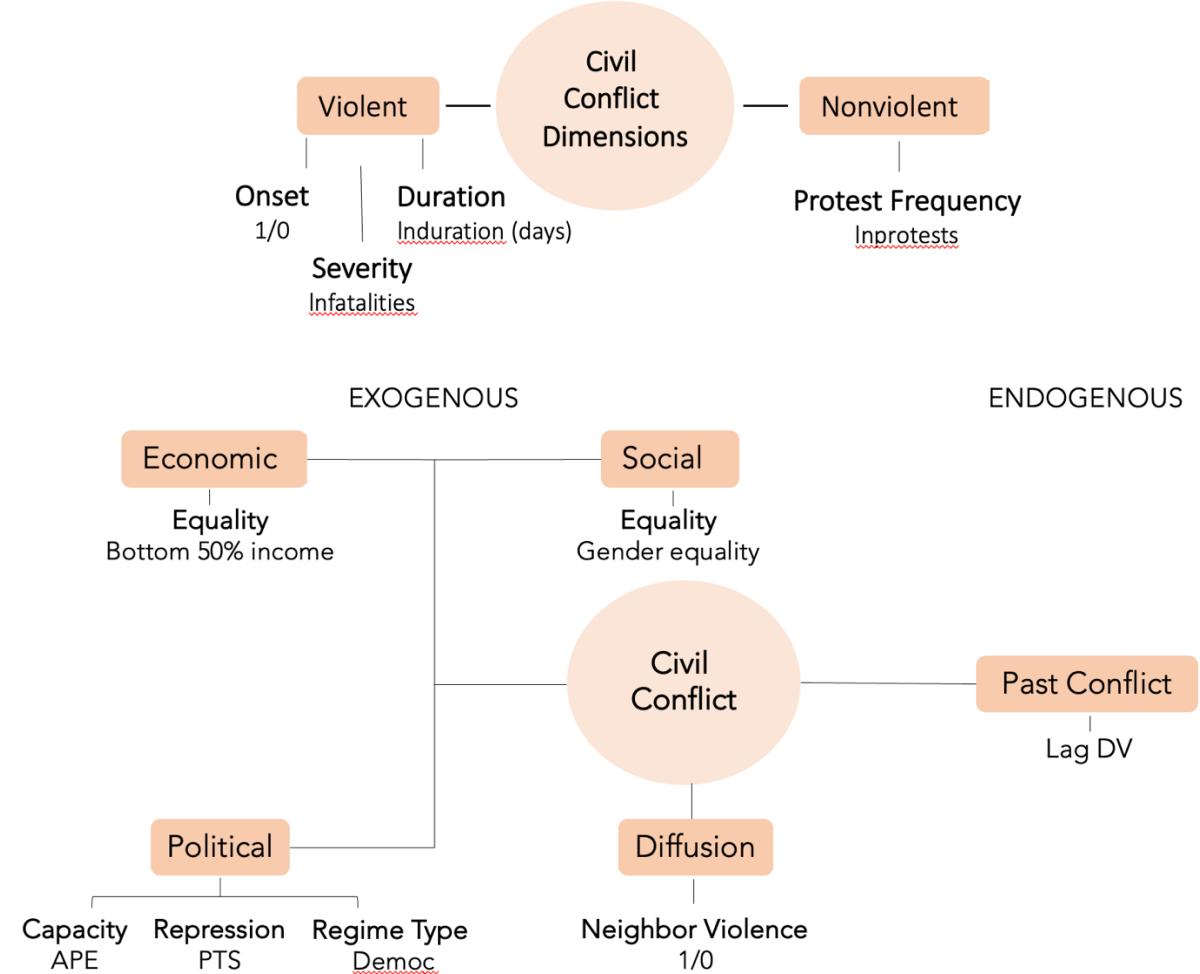
Neighbor Spillover  
(Gleditsch, 2002a, 2007)



# Civil Conflict Methodology and Research Questions

Unpacking Civil conflict dimensions into political, economic, social, and endogenous factors

- I. Does the endogenous prior history of violence impact the current conflict?
  - a) If so, how much does past conflict alone determine future conflict?
- II. What role do specific exogenous political, economic, and social factors have on civil conflict?
  - a) What are the effects when viewed separately?
  - b) What are the combined effects of these factors when viewed in the context of standard conflict controls?
  - c) How do specific exogenous factors influence conflict in the presence of endogenous past conflict histories?
- III. Do the same factors hold for different levels of conflict onset, severity, duration, and protest as different dependent variables?
- IV. Given the above, how do these factors change across different geographic regions?





# Civil Conflict Hypotheses

Detailed propositions for each conflict measure by multidisciplinary factor

- H1: Prior history of violence positively impacts the current level of conflict onset, severity, duration, and protest.
- H2: Political Capacity has a negative impact on the onset, severity, and duration of the conflict.
- H3: Political Repression has a positive impact on conflict onset & severity but a negative impact on protest frequency.
- H4: Democracy has a negative impact on conflict onset, duration, & severity but a positive effect on protest frequency.
- H5: Income and gender equality have a negative impact on conflict onset and severity.
- H6: Adjacent conflict positively impacts conflict onset, severity, and protest frequency but not the duration.



# Empirical Models Specifications

Testing each of the four DVs: onset, log fatalities, log duration, and log protest

$$DV_{it} = \beta_0 + \beta_1 DV_{it-1} + \underbrace{\beta_2 APE_{it-1} + \beta_3 repression_{it-1} + \beta_4 democ_{it-1}}_{\text{political}} + \underbrace{\beta_5 incomeEquality_{it-1} + \beta_6 genderEquality_{it-1}}_{\text{socio-economic}} + \\ \underbrace{\beta_7 adjacentConflict_{it-1}}_{\text{diffusion}} + \underbrace{\beta_8 \log(GDPpc)_{it-1} + \beta_9 \log(GDPpcGrowth)_{it-1} + \beta_{10} exportsGDP_{it-1} + \beta_{11} \log(population)_{it-1} + \beta_{12} internet_{i-1t}}_{\text{controls}} + \epsilon_{it}$$

- Endogenous factor is a lag of each dependent variable
- Political variables include APE, repression, democracy
- Socio-economic variables are income and gender equality
- Diffusion is the presence of adjacent conflict
- The remaining variables are traditional controls from the literature



# Summary Statistics

Full variable set descriptive statistics

- 162 countries, 1991-2018 time period for 4,146 observations
- Fatalities, duration, and commodity exports are highly positively skewed as expected
- Protest and internet use are moderately positively skewed as expected
- APE, repression, democracy, economic equality, GDPpc, and population are relatively normally distributed
- Gender equality, adjacent conflict, and GDP growth are moderately negatively skewed

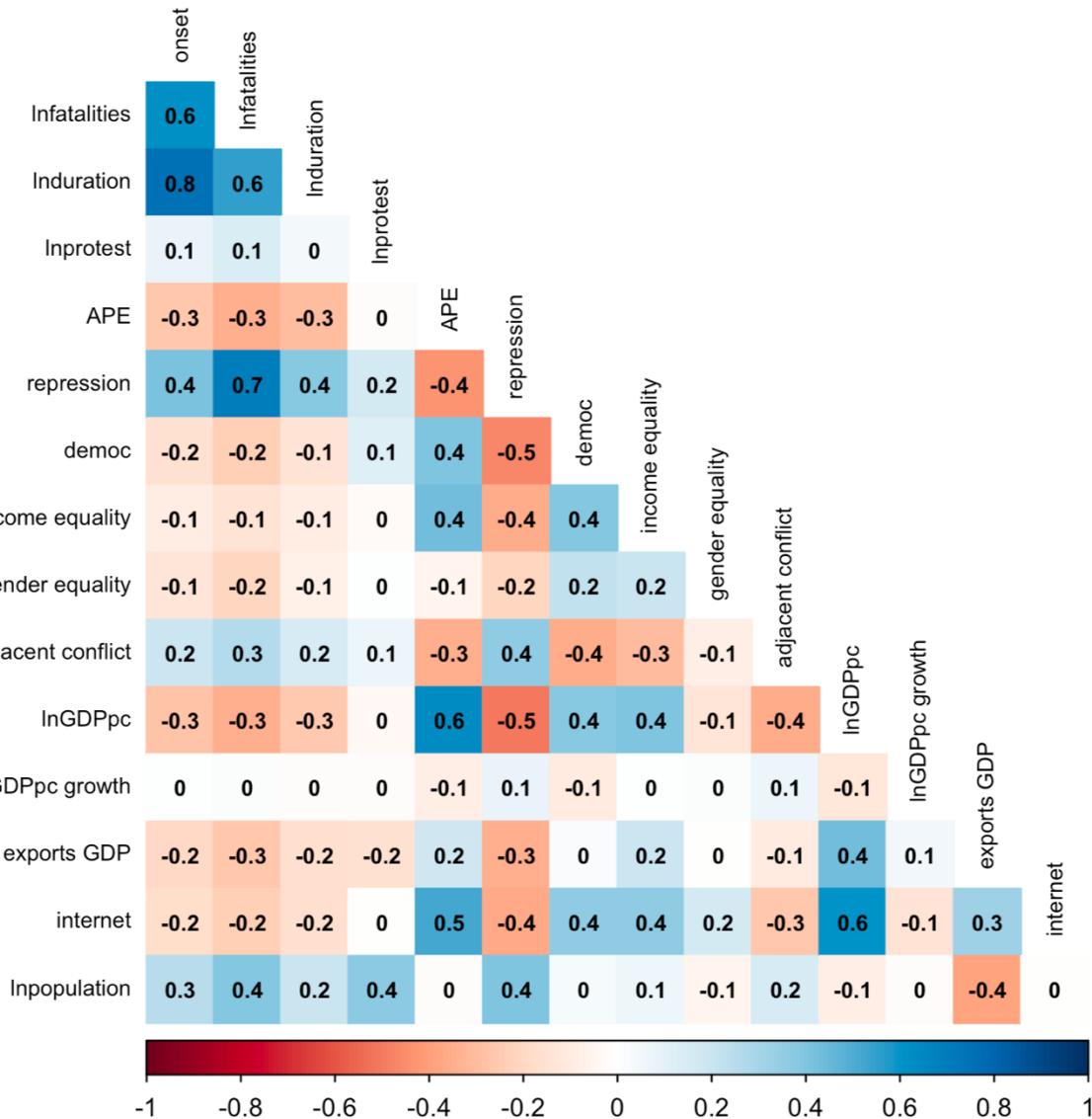
Statistic	N	Mean	St. Dev.	Min	Max
onset	4,536	0.2	0.4	0	1
lnfatalities	4,536	1.6	2.8	0.0	14.1
lnduration	4,536	0.5	1.7	0.0	10.2
lnprotest	4,536	0.9	0.9	0.0	5.0
APE	4,429	0.5	0.2	0.02	0.9
repression	4,536	2.6	1.2	1	5
democ	4,312	5.4	3.9	0	10
income equality	4,536	14.6	4.6	3.0	29.1
gender equality	4,536	70.6	21.5	8.7	109.1
adjacent conflict	4,536	0.7	0.4	0	1
lnGDPpc	4,536	9.1	1.2	6.1	11.7
lnGDPpc growth	4,535	1.0	1.0	-6.4	4.9
commodity exports	4,146	38.6	27.1	0.01	229.0
internet	4,426	20.7	27.7	0.0	99.7
lnpopulation	4,526	9.2	1.6	5.3	14.1



# Correlation Plot

Testing each of the four DVs: onset, fatalities, duration, and protest

- Fatalities, duration, and onset are strongly correlated
- The protest has nearly no relationship with the latter three DVs
- Repression is strongly positively related to the three DVs
- APE and GDP per capita are moderately negatively correlated with the three DVs
- Repression and development/democracy are strongly inversely related
- Mean VIF is 1.77, below the common threshold of 5 (no single variable exceeds 4)

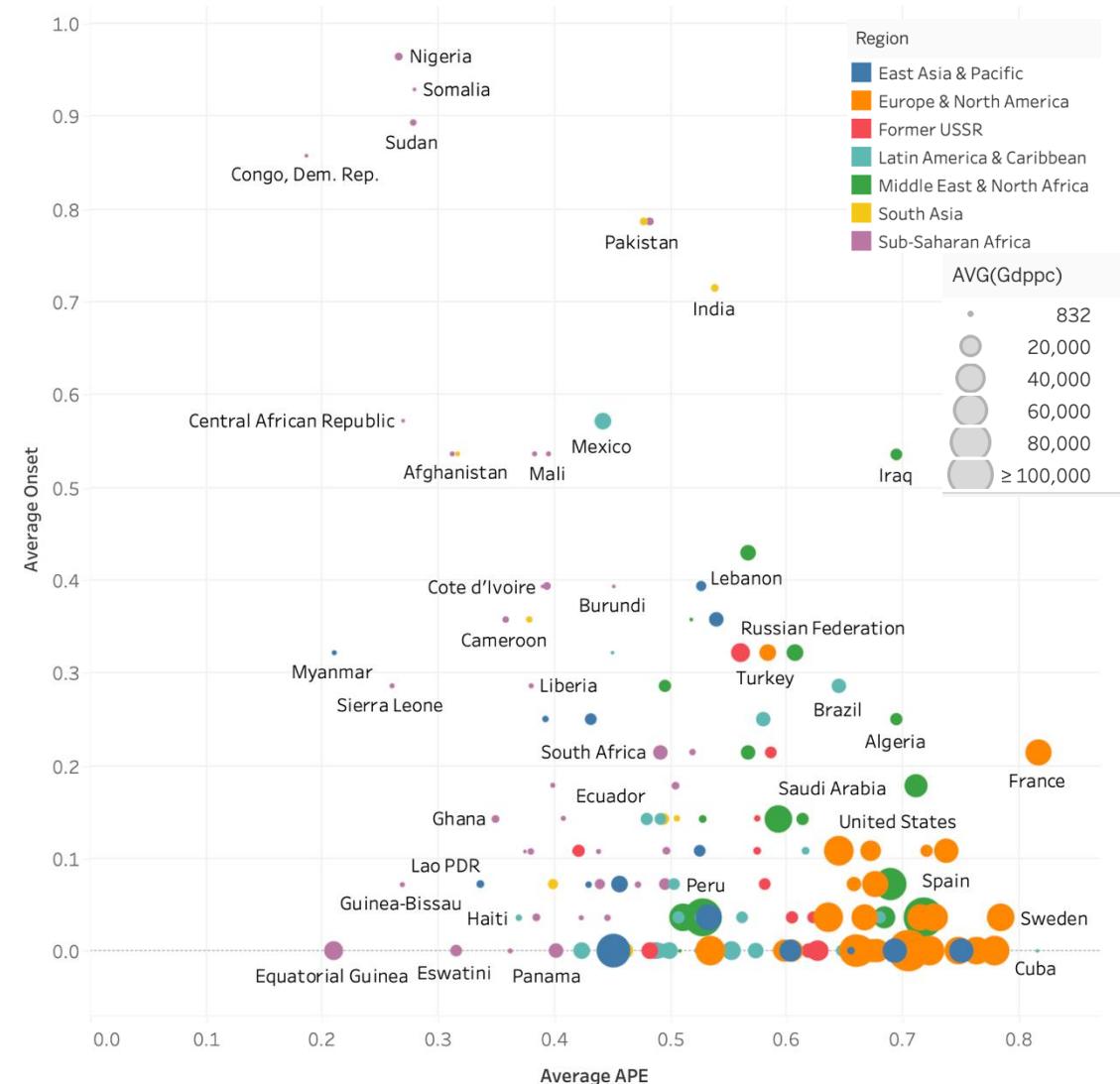




# Pairwise Scatterplot of Conflict Onset & Average APE

Civil Conflict Onset and Capacity are inversely related

- More economically developed states have higher levels of APE (Europe and N America, the Middle East, and the Pacific)
- Countries with lower levels of development have lower state capacity (Sub-Saharan Africa, South Asia)
- Least developed states such as Somalia, DRC, and Sudan have the highest onset levels, indicative of a negative relationship between APE and onset





# Results: Global Models



# Civil Conflict Onset is affected by state capacity and the past onset

Capacity and past conflict have similar magnitude impact

- (1) Endogenous prior conflict alone significantly increases the present onset probability
- (2) APE significantly negatively decreases the onset probability, whereas repression moderately increases it
- (3) Democracy has a negligible positive impact on the onset
- (4) Neighbor conflict can moderately increase the likelihood of the onset
- (5) Variable magnitudes decrease in the presence of controls
- (6) The full model specification has the highest R<sup>2</sup> and the lowest log likelihoods and AIC

VARIABLES	(1) AR(1)	(2) Poli	(3) Socio-Econ	(4) Diffusion	(5) All Controls	(6) Full
onset <sub>t-1</sub>	1.405*** (0.057)					0.718*** (0.072)
APE <sub>t-1</sub>		-1.298*** (0.200)	-1.652*** (0.213)	-1.562*** (0.214)	-1.011*** (0.264)	-0.741*** (0.274)
repression <sub>t-1</sub>		0.534*** (0.030)	0.506*** (0.030)	0.483*** (0.030)	0.310*** (0.038)	0.234*** (0.039)
democ <sub>t-1</sub>		0.013* (0.008)	0.017** (0.008)	0.025*** (0.008)	0.008 (0.009)	0.003 (0.009)
income equality <sub>t-1</sub>			0.013* (0.008)	0.016** (0.008)	-0.007 (0.010)	-0.008 (0.009)
gender equality <sub>t-1</sub>				-0.006*** (0.001)	-0.006*** (0.001)	-0.007*** (0.001)
adjacent conflict <sub>t-1</sub>					0.505*** (0.089)	0.379*** (0.097)
lnGDP pc <sub>t-1</sub>						-0.226*** (0.046)
lnGDP pc growth <sub>t-1</sub>						-0.047 (0.047)
exports GDP <sub>t-1</sub>						-0.001 (0.030)
internet <sub>t-1</sub>						0.003 (0.001)
lnpopulation <sub>t-1</sub>						0.003 (0.002)
Constant	-1.405*** (0.030)	-2.060*** (0.153)	-1.616*** (0.211)	-2.093*** (0.228)	-1.105** (0.475)	0.167*** (0.476)
Observations	4,374	4,074	4,074	4,074	3,710	3,710
Pseudo R <sup>2</sup>	0.170	0.200	0.207	0.218	0.240	0.272
AIC	2994	2687	2667	2633	2294	2198
Log Likelihood	-1495	-1339	-1328	-1309	-1135	-1086
AUC	0.720	0.809	0.811	0.821	0.836	0.851

Robust standard errors in parentheses

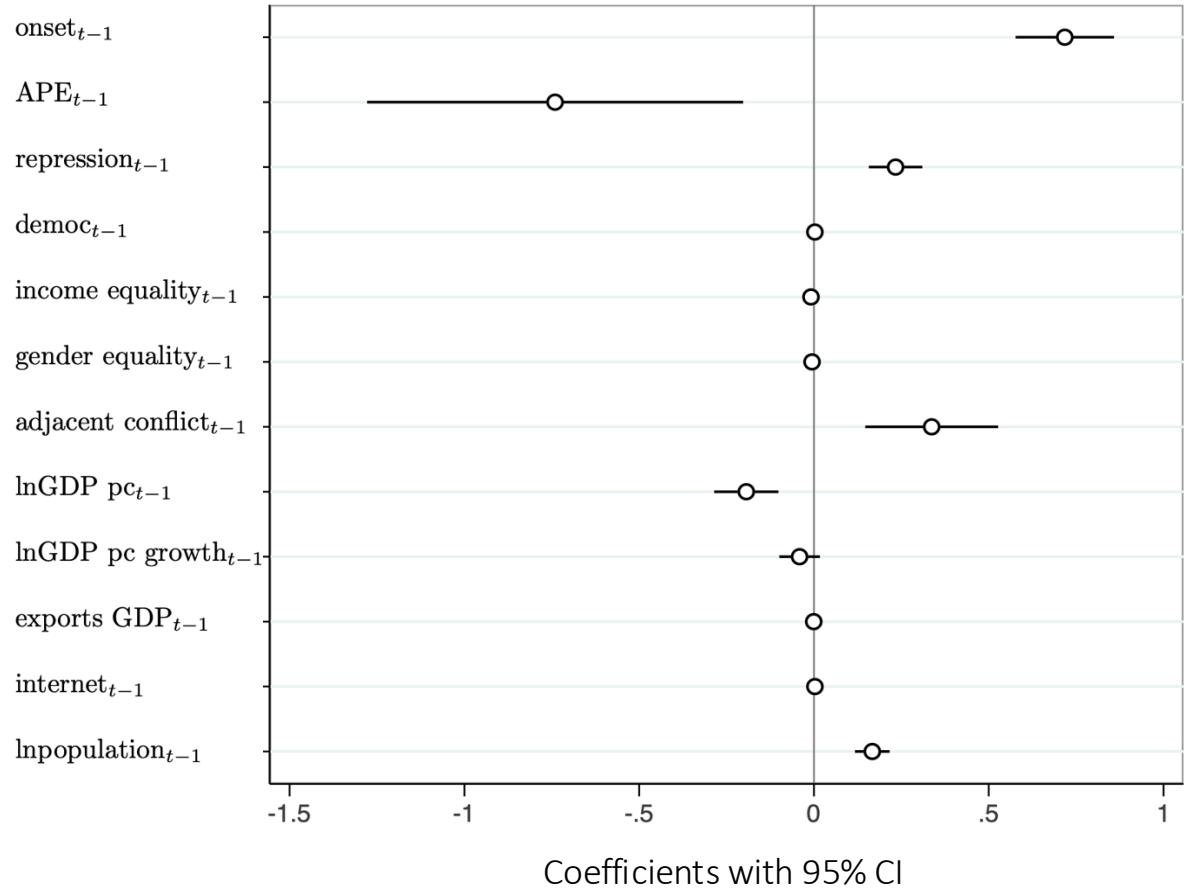
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Civil Conflict Onset is affected by state capacity and the past onset

Political factors have the highest combined impact on onset probability

- Political variables, such as APE and repression have the largest combined effect on the onset
- However endogenous past conflict has an equivalently strong effect on onset as APE alone
- While past conflict matters significantly, it is possible to mitigate future onset prior to its initiation through APE
- Increasing capacity, lowering repression, and securing borders from adjacent conflict can help mitigate future violence





# Civil Conflict Severity exhibits cyclical behavior

Past severity levels strongly impact future conflict severity

- (1) Conflict severity is largely a function of its past
- (2) APE and democracy have moderate negative effects, repression positively affects the severity
- (3) APE's effect diminishes once gender equality is present, gender equality potentially decreases conflict severity
- (5) Repression impact declines in the presence of controls

AR (1) model has a better fit than the full model

However, the Full model has the lowest bias (RMSE = 0.418)

VARIABLES	(1) AR(1)	(2) Poli	(3) Socio-Econ	(4) Diffusion	(5) All Controls	(6) Full
lnfatalities <sub>t-1</sub>	0.585*** (0.0382)					0.502*** (0.0405)
APE <sub>t-1</sub>		-0.109*** (0.0212)	-0.0980*** (0.0222)	-0.0979*** (0.0221)	-0.0725*** (0.0237)	-0.0499** (0.0214)
repression <sub>t-1</sub>		0.104*** (0.0212)	0.104*** (0.0207)	0.104*** (0.0207)	0.0809*** (0.0204)	0.0265 (0.0168)
democ <sub>t-1</sub>		-0.120*** (0.0264)	-0.117*** (0.0257)	-0.116*** (0.0255)	-0.101*** (0.0278)	-0.0611*** (0.0232)
income equality <sub>t-1</sub>			0.0664* (0.0346)	0.0660* (0.0340)	0.0382 (0.0359)	0.0520 (0.0349)
gender equality <sub>t-1</sub>			-0.212*** (0.0437)	-0.209*** (0.0434)	-0.151*** (0.0440)	-0.172*** (0.0487)
adjacent conflict <sub>t-1</sub>				0.0105 (0.00939)	0.00251 (0.00960)	-0.00147 (0.00873)
lnGDP pc <sub>t-1</sub>					-0.0789 (0.0618)	0.0139 (0.0558)
lnGDP pc growth <sub>t-1</sub>					-0.0230** (0.00892)	-0.0201** (0.00865)
exports GDP <sub>t-1</sub>					0.0383 (0.0246)	0.0531** (0.0225)
internet <sub>t-1</sub>					0.0236 (0.0148)	0.0117 (0.0135)
lnpopulation <sub>t-1</sub>					-0.141 (0.103)	0.0154 (0.0750)
Constant	-0.168** (0.0809)	-0.171 (0.127)	-0.0401 (0.128)	-0.0478 (0.128)	0.291 (0.258)	0.00801 (0.191)
Observations	4,374	4,074	4,074	4,074	3,710	3,710
R <sup>2</sup>	0.791	0.601	0.603	0.604	0.591	0.774
RMSE	0.431	0.431	0.430	0.430	0.420	0.418
Number of Countries	162	153	153	153	149	149

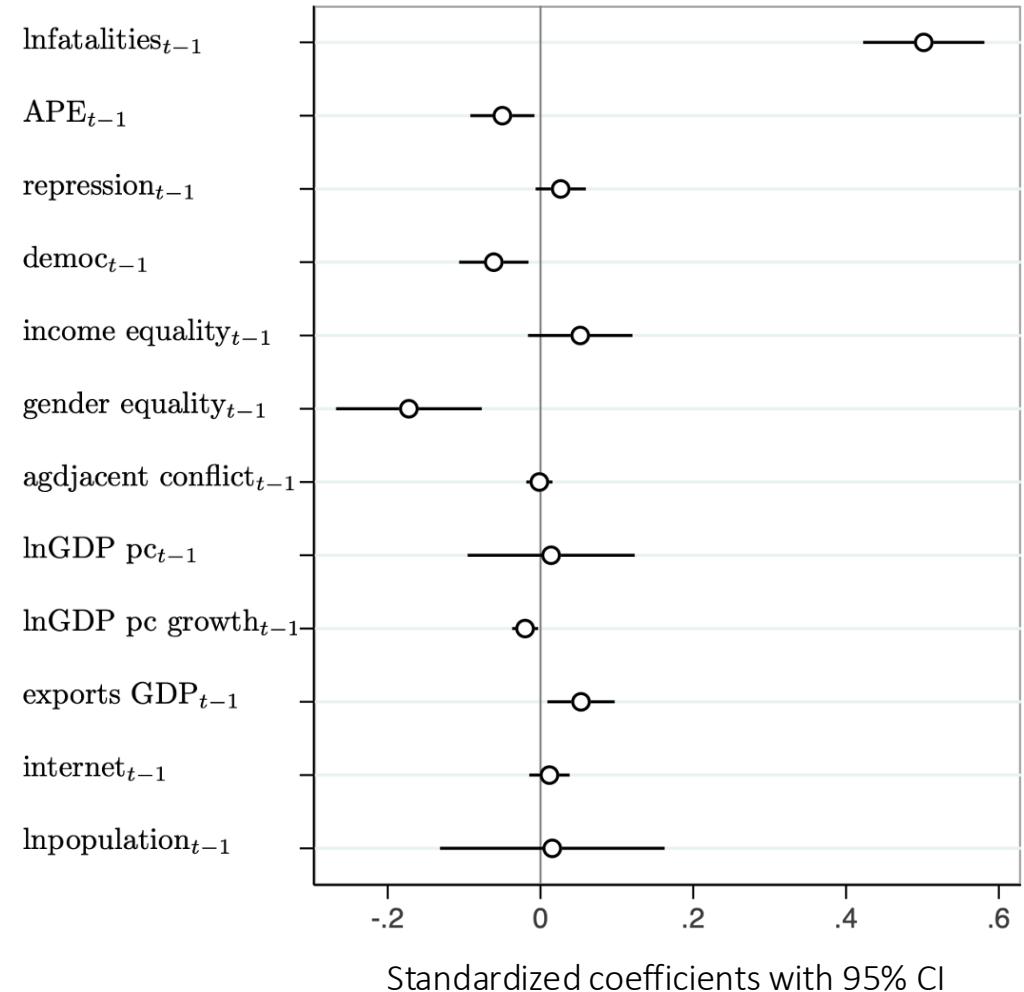
Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Civil Conflict Severity exhibits cyclical behavior

While political, social, and economic variables matter, their effect is trivial compared to endogenous past severity

- Once violence is in progress, strengthening capacity is not as effective as prior to conflict initiation as seen from prior fatalities coefficient
- While political factors (APE, democracy) can potentially reduce the severity, the effect is negligible
- However, increasing gender equality can moderately reduce violence severity.





# Civil Conflict Duration is negatively affected by population size

Conflict sustains in smaller-sized less democratic states

(1) Prior duration can moderately increase the present conflict duration

(2) Democracy and capacity moderately decrease duration, and repression slightly increases the duration

(3) Political variables are consistent in models 3 & 4

(5) Population substantially decreases the duration, APE and repression lose significance

(6) Past duration effects diminish in the presence of population

Model 1 has the highest R<sup>2</sup>

Full model 6 has the lowest bias (RMSE = 0.663)

VARIABLES	(1) AR(1)	(2) Poli	(3) Socio-Econ	(4) Diffusion	(5) All Controls	(6) Full
Induration <sub>t-1</sub>	0.187*** (0.0424)					0.0883** (0.0427)
APE <sub>t-1</sub>		-0.143*** (0.0378)	-0.137*** (0.0382)	-0.136*** (0.0380)	-0.0370 (0.0404)	-0.0393 (0.0387)
repression <sub>t-1</sub>		0.0735*** (0.0258)	0.0719*** (0.0256)	0.0725*** (0.0256)	0.0496* (0.0267)	0.0481* (0.0258)
democ <sub>t-1</sub>		-0.183*** (0.0381)	-0.184*** (0.0371)	-0.182*** (0.0370)	-0.138*** (0.0382)	-0.125*** (0.0362)
income equality <sub>t-1</sub>			0.0426 (0.0542)	0.0425 (0.0532)	0.0639 (0.0579)	0.0603 (0.0557)
gender equality <sub>t-1</sub>			-0.101 (0.0847)	-0.0944 (0.0821)	-0.0749 (0.103)	-0.0623 (0.102)
adjacent conflict <sub>t-1</sub>				0.0271* (0.0161)	0.0273 (0.0184)	0.0253 (0.0183)
lnGDP pc <sub>t-1</sub>					-0.185* (0.109)	-0.150 (0.0974)
lnGDP pc growth <sub>t-1</sub>					0.00732 (0.0149)	0.00961 (0.0148)
exports GDP <sub>t-1</sub>					-0.00910 (0.0388)	0.00170 (0.0371)
internet <sub>t-1</sub>					0.0846*** (0.0283)	0.0724*** (0.0272)
lnpopulation <sub>t-1</sub>					-0.873*** (0.215)	-0.699*** (0.210)
Constant	-0.0683 (0.209)	0.0180 (0.0600)	0.0811 (0.0733)	0.0674 (0.0722)	1.950*** (0.462)	1.564*** (0.441)
Observations	4,374	4,074	4,074	4,074	3,710	3,710
R <sup>2</sup>	0.412	0.320	0.321	0.322	0.338	0.379
RMSE	0.702	0.697	0.697	0.697	0.663	0.663
Number of Countries	162	153	153	153	149	149

Standard errors in parentheses

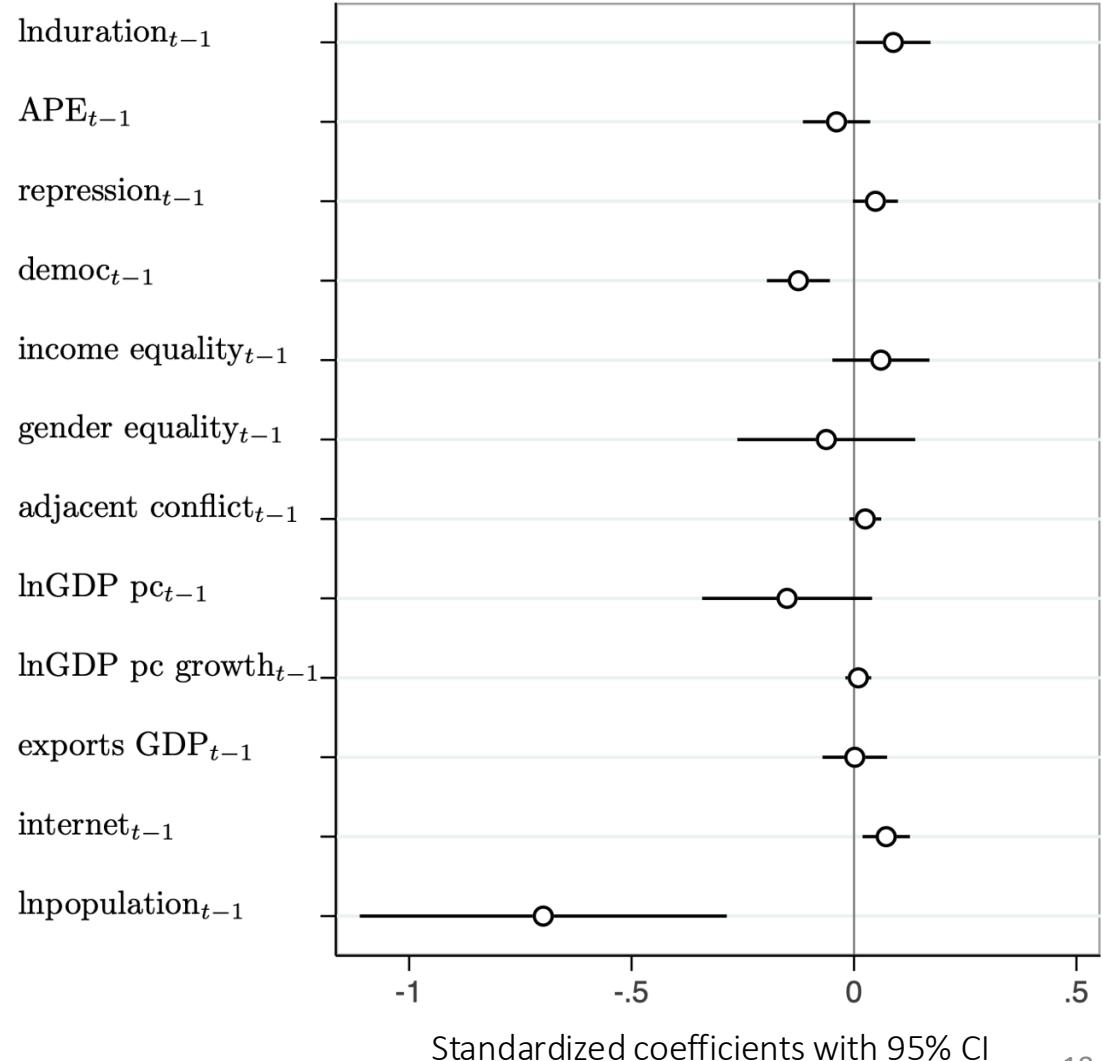
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Civil Conflict Duration is negatively affected by population size

Conflict sustains in smaller-sized less democratic states

- Unlike for the two previous DVs, capacity has no impact on conflict duration
- Larger states are associated with shorter violence, perhaps due to additional resources required to sustain violence
- States with higher democracy are less prone to protracted conflicts, perhaps due to more advanced conflict mediation mechanisms from institutions and social norms
- Unlike onset and severity, endogenous past duration has little impact on the current duration levels





# Protest Frequency is driven by the population size

Unlike duration, protest is positively impacted by population

- (1) Endogenous past protest moderately increases the current protest frequency
  - (2) No other political factors, but APE, impact protests
  - (5) Population substantially increases protest frequency, income equality can moderately increase protests
  - (6) Repression can slightly decrease the protest count, neighbor violence can slightly increase protests
- The Full model has the best fit ( $R^2$ ) but a higher bias (RMSE)

VARIABLES	(1) AR(1)	(2) Poli	(3) Socio-Econ	(4) Diffusion	(5) All Controls	(6) Full
lnprotest <sub>t-1</sub>	0.280*** (0.0416)					0.277*** (0.0426)
APE <sub>t-1</sub>		0.0692** (0.0308)	0.0586* (0.0316)	0.0596* (0.0316)	-0.00992 (0.0325)	-0.00154 (0.0265)
repression <sub>t-1</sub>		-0.0365 (0.0252)	-0.0386 (0.0251)	-0.0393 (0.0251)	-0.0442 (0.0269)	-0.0541** (0.0243)
democ <sub>t-1</sub>		0.0510 (0.0414)	0.0442 (0.0416)	0.0461 (0.0415)	-0.00512 (0.0417)	-0.0168 (0.0333)
income equality <sub>t-1</sub>			0.0833* (0.0482)	0.0844* (0.0476)	0.101** (0.0503)	0.0596 (0.0411)
gender equality <sub>t-1</sub>			0.0744 (0.0601)	0.0795 (0.0600)	-0.124 (0.0930)	-0.112 (0.0719)
adjacent conflict <sub>t-1</sub>				0.0348* (0.0203)	0.0501** (0.0218)	0.0511** (0.0205)
lnGDP pc <sub>t-1</sub>					-0.0114 (0.100)	0.0102 (0.0803)
lnGDP pc growth <sub>t-1</sub>					0.0109 (0.0144)	0.00353 (0.0137)
exports GDP <sub>t-1</sub>					0.0529 (0.0506)	0.0388 (0.0398)
internet <sub>t-1</sub>					0.0211 (0.0316)	0.0198 (0.0255)
lnpopulation <sub>t-1</sub>					1.180*** (0.260)	0.868*** (0.205)
Constant	0.405 (0.284)	-1.063*** (0.0518)	-1.091*** (0.0600)	-1.112*** (0.0603)	-3.369*** (0.551)	-2.493*** (0.449)
Observations	4,374	4,074	4,074	4,074	3,710	3,710
R <sup>2</sup>	0.482	0.318	0.311	0.321	0.328	0.487
RMSE	0.701	0.713	0.713	0.713	0.715	0.715
Number of Countries	162	153	153	153	149	149

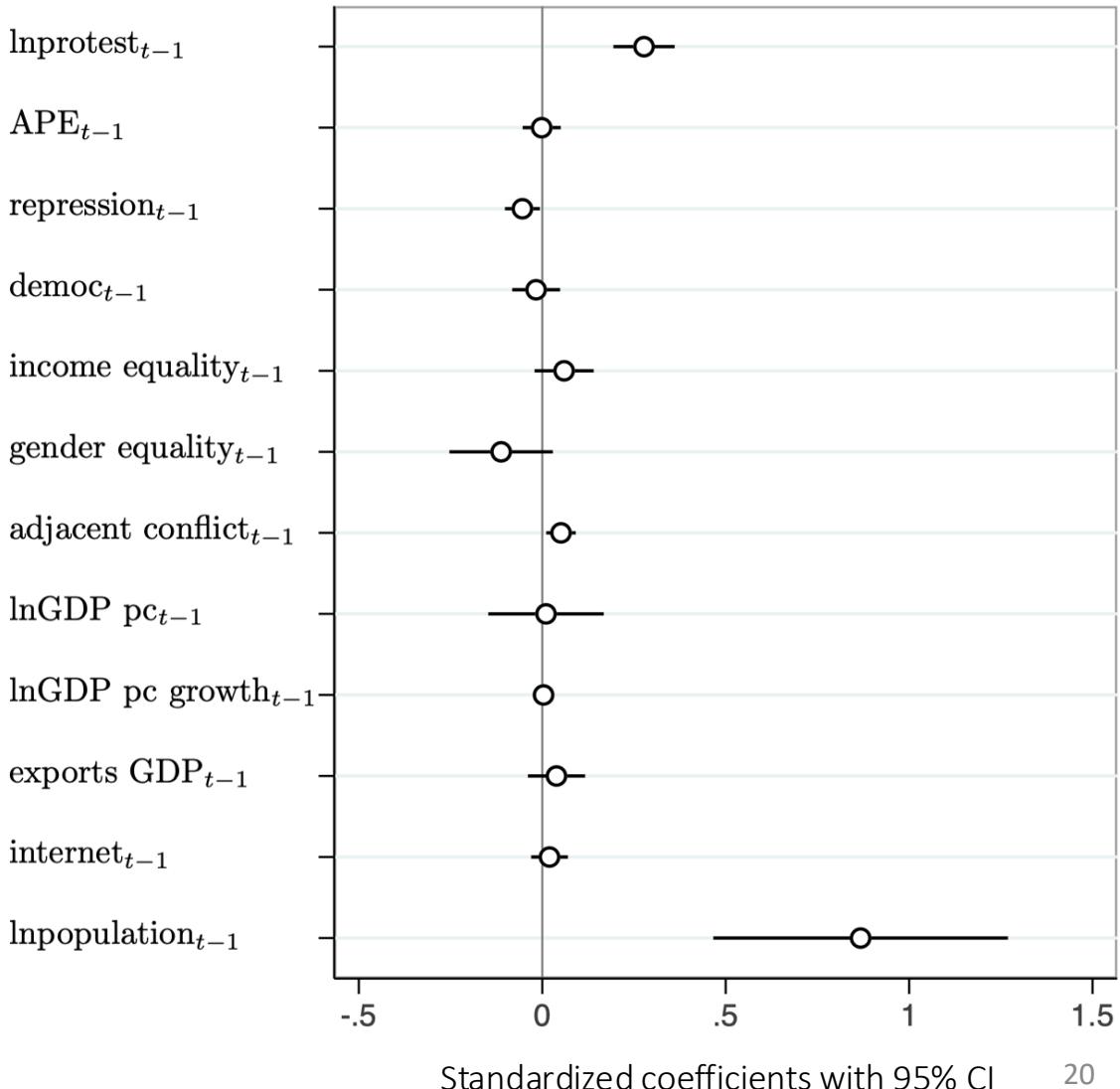
Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Protest Frequency is driven by the population size

Unlike duration, protest is positively impacted by population

- While political variables mattered for violent conflict, they have negligible impact on nonviolent protest
- The population is the driving force of mobilization
- States with prior protest history are more prone to future protests
- As hypothesized, repression can pacify protests, though the impact is small
- The results differ significantly from violent conflict's

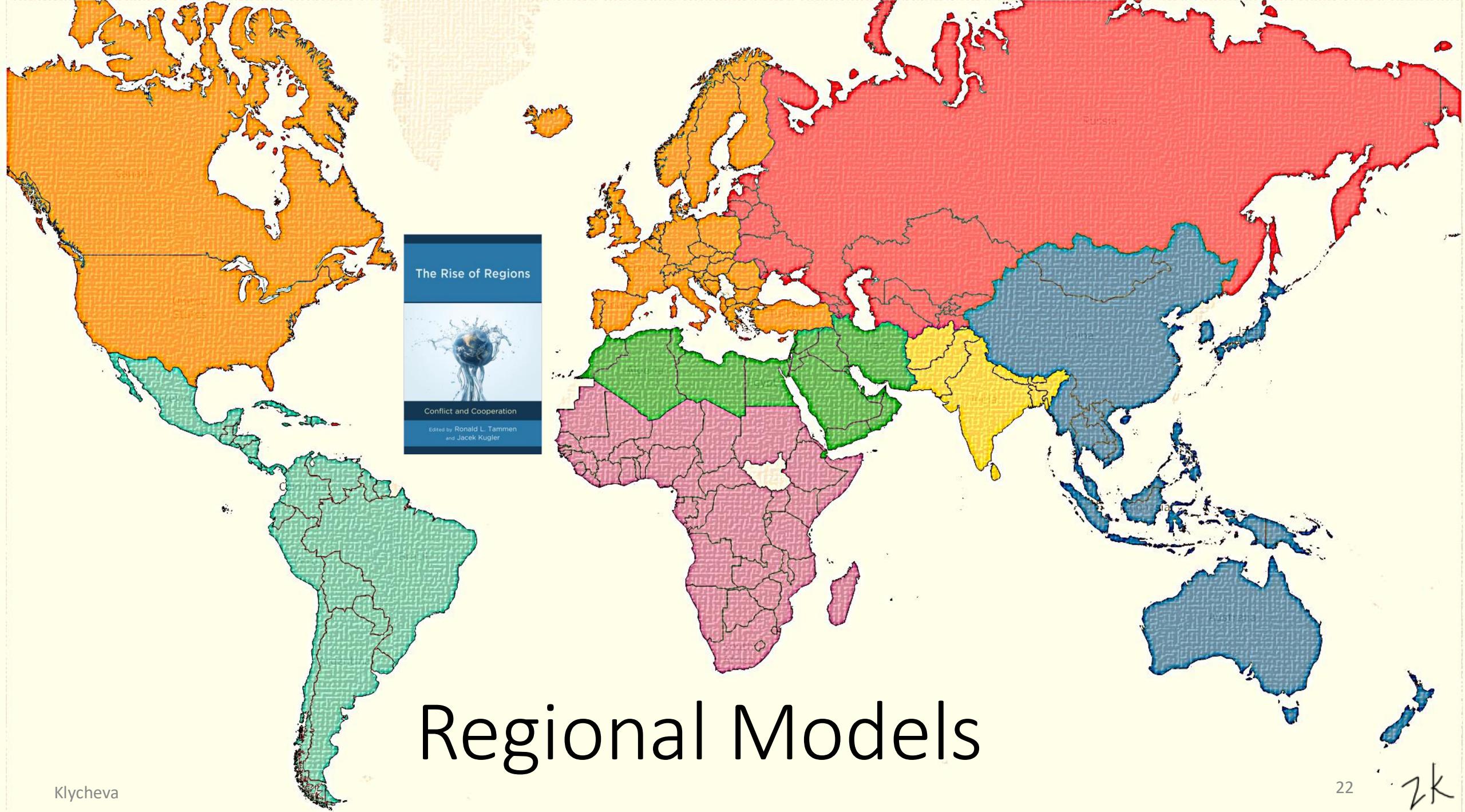




# Summary of the Global Civil Conflict Model Results

Critical variable coefficient magnitudes across the four conflict measures

Variable Name	Onset of Violence	Log Fatalities	Log Duration	Log Protest	Comments
Lag DV	high (+)	high (+)	low (+)	medium (+)	Significant across all
APE <sub>t-1</sub>	high (-)	low (-)			Key for Onset
Repression <sub>t-1</sub>	medium (+)			low (-)	Worsens new conflict, aids protest
Democracy <sub>t-1</sub>		low (-)	medium (-)		Aids severity and duration
Adjacent Conflict <sub>t-1</sub>	medium (+)			low (+)	Crucial for onset prevention
Log Population <sub>t-1</sub>	medium (+)		high (-)	high (+)	Increases Onset and Protest, decreases Duration
Gender Equality <sub>t-1</sub>	low (-)	medium (-)			Important for Severity
Pseudo/ R2	0.272	0.774	0.379	0.487	Severity is best, Onset is worst
AUC/RMSE	0.851	0.418	0.663	0.715	Severity has the lowest bias





# Initial exploration into the regional Civil Conflict Onset heterogeneity

Civil conflict onset via regional full model specifications: multidisciplinary vectors across regions

VARIABLES	GLOBAL	Europe & North America	LA & Caribbean	Former USSR	ME & North Africa	Sub-Saharan Africa	South Asia	East Asia & the Pacific
onset <sub>t-1</sub>	high (+)					high (+)	high (+)	high (+)
APE <sub>t-1</sub>	high (-)					high (-)		
repression <sub>t-1</sub>	medium (+)		medium (+)	high (+)	medium (+)	medium (+)		
democracy <sub>t-1</sub>								
income equality <sub>t-1</sub>								medium (-)
gender equality <sub>t-1</sub>	low (-)	low (-)		low (-)	low (-)	low (-)		
adjacent conflict <sub>t-1</sub>	medium (+)					medium (+)		
population <sub>t-1</sub>	medium (+)	medium (+)	high (+)			medium (+)	medium (+)	
Sample	3,710	818	582	339	418	1,030	152	371
Pseudo R <sup>2</sup>	0.272	0.217	0.291	0.247	0.158	0.314	0.332	0.195



# Initial exploration into the regional Civil Conflict Severity heterogeneity

Civil conflict severity via regional full model specifications: multidisciplinary vectors across regions

VARIABLES	GLOBAL	Europe & North America	LA & Caribbean	Former USSR	ME & North Africa	Sub-Saharan Africa	South Asia	East Asia & the Pacific
severity <sub>t-1</sub>	high (+)	medium (+)	high (+)	medium (+)	medium (+)	high (+)	high (+)	high (+)
APE <sub>t-1</sub>	low (-)					medium (-)		
repression <sub>t-1</sub>		low (-)		medium (+)				
democracy <sub>t-1</sub>	low (-)	medium (-)		medium (-)				
income equality <sub>t-1</sub>		medium (-)				medium (+)		
gender equality <sub>t-1</sub>	medium (-)					highest (-)		
adjacent conflict <sub>t-1</sub>								
population <sub>t-1</sub>								
Sample	3,710	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.774	0.700	0.757	0.575	0.783	0.740	0.903	0.879



# Initial exploration into the regional Civil Conflict Duration heterogeneity

Civil conflict duration via regional full model specifications: multidisciplinary vectors across regions

VARIABLES	GLOBAL	Europe & North America	LA & Caribbean	Former USSR	ME & North Africa	Sub-Saharan Africa	South Asia	East Asia & the Pacific
duration <sub>t-1</sub>	low (+)							medium (+)
APE <sub>t-1</sub>								
repression <sub>t-1</sub>			medium (+)			low (+)		
democracy <sub>t-1</sub>	medium (-)					medium (-)		medium (-)
income equality <sub>t-1</sub>								
gender equality <sub>t-1</sub>		medium (+)				high (-)		
adjacent conflict <sub>t-1</sub>		low (+)						
population <sub>t-1</sub>	high (-)				high (-)	high (-)		
Sample	3,710	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.379	0.194	0.284	0.162	0.174	0.460	0.392	0.269



# Initial exploration into regional Protest Frequency heterogeneity

Nonviolent protests via regional full model specifications: multidisciplinary vectors across regions

VARIABLES	GLOBAL	Europe & North America	LA & Caribbean	Former USSR	ME & North Africa	Sub-Saharan Africa	South Asia	East Asia & the Pacific
protest <sub>t-1</sub>	medium (+)	medium (+)	medium (+)	medium (+)	medium (+)	medium (+)		medium (+)
APE <sub>t-1</sub>			medium (-)	medium (+)				
repression <sub>t-1</sub>	low (-)		medium (-)			low (-)		
democracy <sub>t-1</sub>			medium (-)					medium (-)
income equality <sub>t-1</sub>			medium (+)					
gender equality <sub>t-1</sub>			high (+)					
adjacent conflict <sub>t-1</sub>	low (+)		medium (+)					
population <sub>t-1</sub>	high (+)					high (+)	highest (+)	
Sample	3,710	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.487	0.620	0.399	0.280	0.464	0.374	0.534	0.611



# Summary of the Findings

Building a global civil conflict framework considering regional heterogeneity

- Different measures and levels of conflict yield distinct results
- Endogenous past conflict significantly matters for severity, onset, and protests
- State capacity, reduced repression, adjacent conflict, and population are essential for the onset
- States with prior violence history and low gender equality are more prone to violence escalation
- Low democracy states with smaller populations are more likely to lengthy violence
- Population size and past protests largely impact current protests
- Conflict coping mechanisms differ significantly across regional contexts, especially between post-materialistic and traditional societies
- E.g., gender equality can significantly increase nonviolent protests in Western societies, but can serve as a high-level conflict coping mechanism in Sub-Saharan Africa



# Policy Recommendations

Tailored policy-making at different stages and levels of violence considering regional contexts

- Comparing endogenous and exogenous factors across onset, severity, and duration revealed that conflict prevention is often critical prior to its happening
- Increasing state capacity, lowering repression, and enhancing border control due to spillover are essential before violence occurs
- However, once a conflict is in progress, increasing capacity is ineffective for conflict de-escalation
- Fewer levers exist to reduce conflict duration, however low-democracy states with smaller populations are especially prone to lengthy conflicts
- While states with large populations and past protest history should be aware of future protest escalation
- Policy narratives should be customized to regional conflict contexts, as ‘one size fits all’ will not work
- i.e. S-S Africa should increase gender equality and traditional societies, such as the Former USSR, should not use coercion to reduce violence



# Limitations/ Next Steps

Expanding dataset, estimation techniques and exploring nonlinear relationships

- Refine conflict measures
- Expand upon levels of analysis (new subnational datasets)
- Expand upon modeling techniques
- Focus on a regional case study, e.g. FSU
- Expand the sample size
- Explore nonlinear relationships, interactive effects



# Final Thoughts

- The more I did, the more confused I got
- And it felt as if I did not learn anything
- Throughout this journey, the most frequent question I was asked, was "WHEN?!"
- After long arguments with Dr. Kugler, I still did everything the opposite
- And Mark told me I could blame it on him
- I have been constantly called 'lazy' by guess who
- At least I got to run a marathon under Dr. Feng's guidance and he was always nice to me

THANK YOU, ALL!  
I REALLY HOPE WE DON'T HAVE TO DO THIS AGAIN ☺

# Appendix

# Variable operationalization, Political variables

## Political Capacity – Absolute Political Extraction (APE), ranges 0-1

All societies – General Sample (Model 1) (ape1):

$$\ln\left(\frac{\text{Tax}}{\text{GDP}}\right) = \alpha + \beta_1 \ln\left(\frac{\text{Mining}}{\text{GDP}}\right) + \beta_2 \ln\left(\frac{\text{Exports}}{\text{GDP}}\right) + \beta_3 \ln\left(\frac{\text{Social Contributions}}{\text{GDP}}\right) + \beta_4 \ln(\text{GDP per capita}) \\ + \beta_5 (\text{Economically Active Population}) + \beta_6 (\text{Education}) + \beta_7 (\text{OECD}) + \beta_8 (\text{Inclusion Dummy}) + \varepsilon$$

Figure 6: Political Extraction Efficiency Calculation

$$\text{APE} = \text{political extraction efficiency} \times \text{life expectancy}^9$$

Figure 7: APE Calculation

## Democracy, Polity V dataset, ranges 0-10

Authority Coding	Scale Weight
<i>Competitiveness of Executive Recruitment (XRCOMP):</i>	
(3) Election	+2
(2) Transitional	+1
<i>Openness of Executive Recruitment (XROOPEN):</i> only if XRCOMP is Election (3) or Transitional (2)	
(3) Dual/election	+1
(4) Election	+1
<i>Constraint on Chief Executive (XCONST):</i>	
(7) Executive parity or subordination	+4
(6) Intermediate category	+3
(5) Substantial limitations	+2
(4) Intermediate category	+1
<i>Competitiveness of Political Participation (PARCOMP):</i>	
(5) Competitive	+3
(4) Transitional	+2
(3) Factional	+1

## Political Repression, Political Terror Scale (PTS), 1-5

- Level 1 Countries under a secure rule of law, people are not imprisoned for their views, and torture is rare or exceptional. Political murders are extremely rare.
- Level 2 There is a limited amount of imprisonment for nonviolent political activity. However, few persons are affected, torture and beatings are exceptional. Political murder is rare.
- Level 3 There is extensive political imprisonment, or a recent history of such imprisonment. Execution or other political murders and brutality may be common. Unlimited detention, with or without a trial, for political views is accepted.
- Level 4 Civil and political rights violations have expanded to large numbers of the population. Murders, disappearances, and torture are a common part of life. In spite of its generality, on this level terror affects primarily those who interest themselves in politics or ideas.
- Level 5 The terrors of Level 4 have been extended to the whole population. The leaders of these societies place no limits on the means or thoroughness with which they pursue personal or ideological goals.

# Variable operationalization, remaining variables

- Income equality – Bottom 50% of population pre-tax income share, 2.96% - 29.11%
- Gender equality – Female Labor force participation (LFP)/ Male LFP \* 100%, 8.73% - 109.12%
- Adjacent conflict – 1/0, if one of the adjacent countries was at war at a given year
- Economic development – GDP per capita, PPP constant 2017 Intl \$
- Economic growth – GDP per capita growth rate, %
- Commodity exports – exports % share of GDP, 0% - 229%
- Internet use – percent of the population with the access to internet, 0% - 100%
- Population – population size in thousands

# Initial exploration into the regional Civil Conflict Onset heterogeneity

VARIABLES	(1) Europe & N America	(2) LA & Caribb	(3) Former USSR	(4) ME & N Africa	(5) Sub-S Africa	(6) South Asia	(7) East Asia & Pacific
onset <sub>t-1</sub>	0.096 (0.339)	-0.208 (0.240)	0.299 (0.351)	0.216 (0.193)	0.775*** (0.115)	0.477* (0.271)	0.605** (0.237)
APE <sub>t-1</sub>	3.104* (1.586)	-1.151 (0.974)	-2.169 (1.484)	-0.330 (0.880)	-1.278** (0.538)	0.520 (2.007)	-0.904 (1.103)
repression <sub>t-1</sub>	-0.091 (0.169)	0.285** (0.130)	0.587*** (0.211)	0.383*** (0.112)	0.252*** (0.063)	-0.348 (0.255)	0.143 (0.155)
democ <sub>t-1</sub>	-0.109* (0.065)	-0.013 (0.040)	0.048 (0.042)	0.032 (0.044)	0.005 (0.018)	-0.030 (0.063)	0.047 (0.041)
income equality <sub>t-1</sub>	-0.028 (0.044)	-0.033 (0.062)	-0.007 (0.051)	0.054 (0.037)	-0.003 (0.023)	0.081 (0.127)	-0.104** (0.052)
gender equality <sub>t-1</sub>	-0.017** (0.009)	-0.009 (0.012)	-0.034** (0.017)	-0.014** (0.006)	-0.013*** (0.004)	-0.005 (0.010)	0.002 (0.012)
adjacent conflict <sub>t-1</sub>	0.364* (0.210)	0.362 (0.246)	-0.500 (0.438)	0.398 (0.418)	0.503** (0.246)		-0.025 (0.349)
lnGDP pc <sub>t-1</sub>	-0.197 (0.311)	0.139 (0.206)	0.185 (0.330)	-0.058 (0.145)	-0.117 (0.105)	1.034 (0.656)	-0.078 (0.193)
lnGDP pc growth <sub>t-1</sub>	0.004 (0.076)	-0.089 (0.080)	-0.256 (0.158)	0.145* (0.082)	0.020 (0.050)	-0.438* (0.224)	0.017 (0.117)
exports GDP <sub>t-1</sub>	-0.006 (0.010)	0.016** (0.007)	-0.016 (0.010)	0.003 (0.005)	-0.005 (0.005)	-0.024 (0.032)	-0.000 (0.004)
internet <sub>t-1</sub>	0.001 (0.005)	-0.009 (0.006)	-0.010 (0.008)	0.007** (0.004)	-0.009 (0.008)	-0.082* (0.045)	-0.002 (0.007)
lnpopulation <sub>t-1</sub>	0.233** (0.101)	0.595*** (0.132)	0.044 (0.133)	-0.103 (0.118)	0.312*** (0.057)	0.378** (0.166)	0.158* (0.094)
Constant	-1.172 (2.929)	-8.260*** (2.062)	0.218 (2.167)	-1.555 (2.018)	-2.468** (1.028)	-11.742* (6.143)	-1.193 (2.163)
Observations	818	582	339	418	1,030	152	371
AIC	217.1	277.8	152.7	335.8	802.8	157.6	233.7
Log Lik	-95.53	-125.9	-63.34	-154.9	-388.4	-66.79	-103.9
AUC	0.850	0.876	0.862	0.777	0.857	0.865	0.817
Pseudo R <sup>2</sup>	0.217	0.291	0.247	0.158	0.314	0.332	0.195

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Initial exploration into the regional Civil Conflict Severity heterogeneity

VARIABLES	(1) Europe & N America	(2) LA & Caribb	(3) Former USSR	(4) ME & N Africa	(5) Sub-S Africa	(6) South Asia	(7) East Asia & Pacific
lnfatalities <sub>t-1</sub>	0.237*** (0.0731)	0.494*** (0.0580)	0.315*** (0.0741)	0.393*** (0.0669)	0.490*** (0.0511)	0.839*** (0.0588)	0.599*** (0.0627)
APE <sub>t-1</sub>	0.0104 (0.0308)	0.00373 (0.0471)	-0.0651 (0.0781)	0.0897 (0.0595)	-0.159*** (0.0506)	-0.0921 (0.111)	-0.0345 (0.0487)
repression <sub>t-1</sub>	-0.0603** (0.0275)	0.0331 (0.0325)	0.152*** (0.0464)	0.0594 (0.0422)	0.0260 (0.0359)	-0.0361 (0.0507)	0.0596 (0.0500)
democ <sub>t-1</sub>	-0.144** (0.0640)	-0.109 (0.0697)	-0.193** (0.0938)	-0.0530 (0.108)	-0.0372 (0.0422)	-0.0498 (0.0577)	-0.0450 (0.0522)
income equality <sub>t-1</sub>	-0.113*** (0.0422)	-0.0815 (0.108)	-0.00384 (0.0964)	0.0736 (0.180)	0.213*** (0.0752)	-0.0932 (0.210)	0.0206 (0.0675)
gender equality <sub>t-1</sub>	-0.122 (0.0917)	-0.0226 (0.142)	-0.355 (0.277)	0.197 (0.232)	-0.848*** (0.151)	0.232 (0.286)	0.327 (0.251)
adjacent conflict <sub>t-1</sub>	0.0120 (0.0108)	-0.0334 (0.0239)	0.0690 (0.0655)	-0.0347* (0.0206)	-0.0106 (0.0205)		0.0539 (0.0437)
lnGDP pc <sub>t-1</sub>	-0.114 (0.125)	-0.325 (0.324)	0.0539 (0.218)	0.118 (0.152)	0.296 (0.192)	-0.378 (0.368)	0.186 (0.165)
lnGDP pc growth <sub>t-1</sub>	-0.00106 (0.00977)	-0.0551*** (0.0197)	-0.133*** (0.0408)	0.0357 (0.0225)	-0.0183 (0.0169)	-0.0443 (0.0383)	-0.00730 (0.0239)
exports GDP <sub>t-1</sub>	0.0363 (0.0435)	0.0613 (0.0704)	0.0654 (0.0708)	-0.00832 (0.0602)	-0.0126 (0.0762)	0.310* (0.165)	0.0928* (0.0514)
internet <sub>t-1</sub>	0.0145 (0.0231)	0.0304 (0.0592)	-0.0735 (0.0700)	0.0195 (0.0509)	0.150 (0.0922)	0.217 (0.260)	-0.000629 (0.0495)
lnpopulation <sub>t-1</sub>	-1.316 (0.929)	-0.0668 (0.561)	-0.798 (0.908)	-0.0731 (0.218)	-0.0362 (0.243)	0.297 (0.988)	-1.013 (0.620)
Constant	2.897 (2.079)	-0.0249 (0.524)	-0.205 (0.748)	-0.291 (0.415)	-0.0745 (0.415)	0.0321 (3.416)	2.763 (1.915)
Observations	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.700	0.757	0.575	0.783	0.740	0.903	0.879
RMSE	0.224	0.359	0.455	0.439	0.542	0.337	0.343
Number of Countries	31	23	14	18	42	6	15

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Initial exploration into the regional Civil Conflict Duration heterogeneity

VARIABLES	(1) Europe & N America	(2) LA & Caribb	(3) Former USSR	(4) ME & N Africa	(5) Sub-S Africa	(6) South Asia	(7) East Asia & Pacific
Induration <sub>t-1</sub>	-0.0555 (0.0847)	-0.0487 (0.0858)	0.0533 (0.0980)	0.0852 (0.0738)	0.0857* (0.0505)	-0.00746 (0.104)	0.190*** (0.0698)
APE <sub>t-1</sub>	-0.00190 (0.0454)	-0.0351 (0.0922)	-0.0986 (0.0822)	-0.0491 (0.0848)	-0.0686 (0.0805)	-0.0545 (0.214)	0.0939 (0.0947)
repression <sub>t-1</sub>	-0.0101 (0.0165)	0.166** (0.0744)	0.00260 (0.0513)	0.0975 (0.0653)	0.0930** (0.0469)	-0.209 (0.128)	-0.00964 (0.0741)
democ <sub>t-1</sub>	-0.0684 (0.0712)	0.124 (0.128)	-0.0858 (0.100)	-0.212 (0.158)	-0.140** (0.0664)	-0.137 (0.164)	-0.216** (0.0969)
income equality <sub>t-1</sub>	0.00737 (0.0634)	-0.0774 (0.421)	0.225* (0.133)	-0.0812 (0.263)	0.00446 (0.0971)	0.314 (0.487)	-0.0354 (0.0851)
gender equality <sub>t-1</sub>	0.221** (0.107)	0.181 (0.325)	-0.213 (0.344)	0.490 (0.397)	-0.873*** (0.194)	0.210 (0.617)	-0.112 (0.387)
adjacent conflict <sub>t-1</sub>	0.0181** (0.00798)	0.0229 (0.0610)	0.144 (0.101)	0.0387 (0.0409)	0.0238 (0.0336)		0.00266 (0.0717)
lnGDP pc <sub>t-1</sub>	0.745** (0.336)	-1.472** (0.717)	0.332 (0.238)	-0.264 (0.410)	0.187 (0.197)	-0.505 (0.523)	-0.107 (0.334)
ld GDP pc growth <sub>t-1</sub>	0.000560 (0.00708)	-0.0791 (0.0490)	-0.128** (0.0578)	0.0484 (0.0323)	0.0624** (0.0295)	-0.192 (0.164)	0.0149 (0.0343)
exports GDP <sub>t-1</sub>	-0.0964 (0.0741)	0.342** (0.162)	0.0474 (0.0697)	0.0182 (0.117)	-0.0141 (0.110)	-0.0455 (0.390)	-0.134 (0.0903)
internet <sub>t-1</sub>	-0.113** (0.0534)	0.399** (0.172)	-0.201** (0.101)	0.178** (0.0756)	0.204 (0.131)	-0.0950 (0.665)	0.109 (0.0804)
lnpopulation <sub>t-1</sub>	-1.162 (1.081)	-0.750 (0.795)	-0.0167 (0.783)	-1.053** (0.440)	-0.751** (0.375)	-0.344 (2.394)	-2.067 (1.375)
Constant	1.060 (2.271)	3.813** (1.532)	0.275 (0.710)	-2.441*** (0.896)	-1.563** (0.715)	2.702 (7.993)	5.831 (4.333)
Observations	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.194	0.284	0.162	0.174	0.460	0.392	0.269
RMSE	0.184	0.496	0.621	1.003	0.589	1.003	0.589
Number of Countries	31	23	14	18	42	6	15

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Initial exploration into the regional Protest Frequency heterogeneity

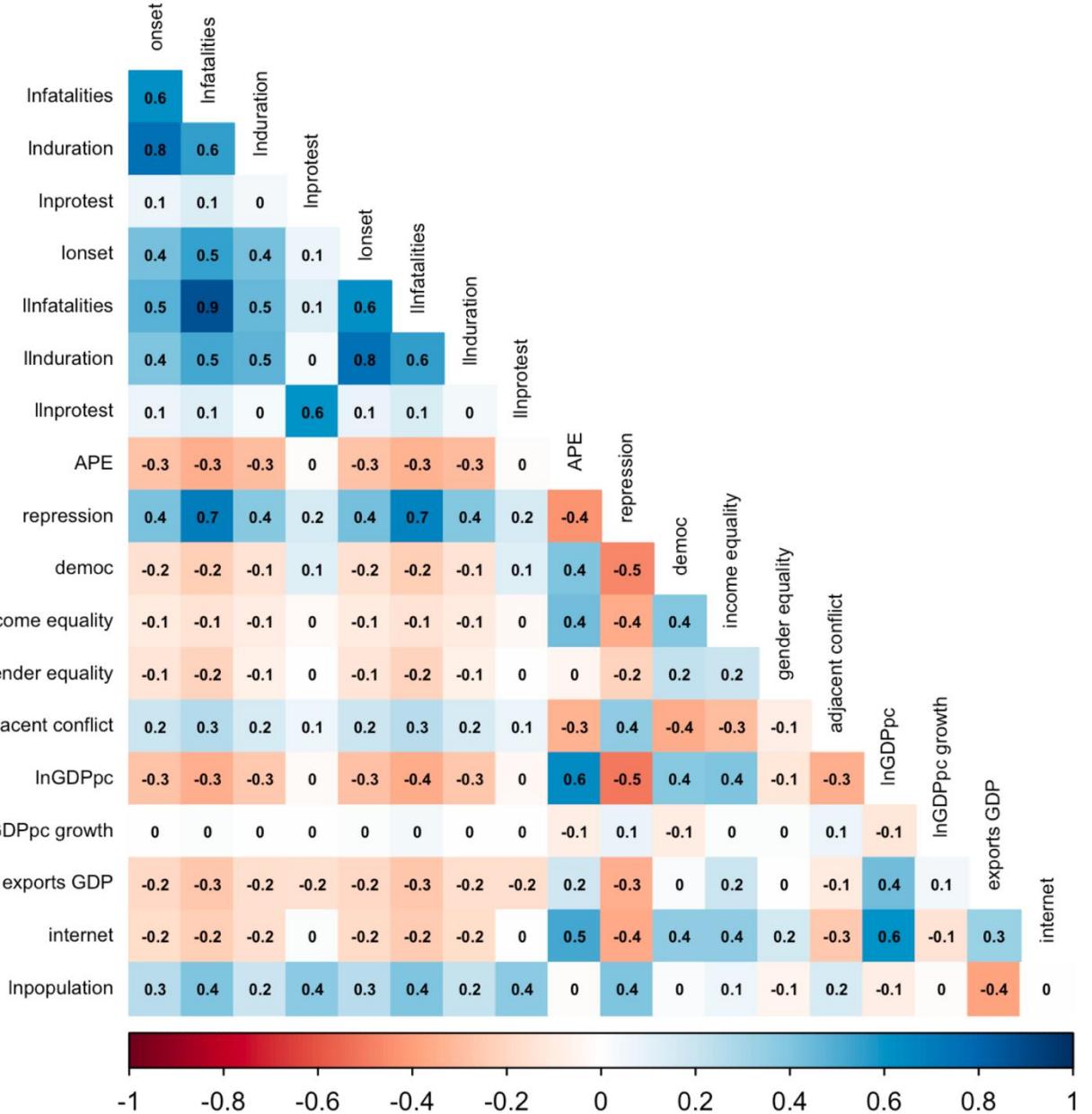
VARIABLES	(1) Europe & N America	(2) LA & Caribb	(3) Former USSR	(4) ME & N Africa	(5) Sub-S Africa	(6) South Asia	(7) East Asia & Pacific
lnprotest <sub>t-1</sub>	0.227*** (0.0553)	0.169*** (0.0588)	0.247*** (0.0702)	0.328*** (0.0713)	0.226*** (0.0484)	-0.0271 (0.0993)	0.369*** (0.0635)
APE <sub>t-1</sub>	0.0552 (0.114)	-0.141** (0.0602)	0.273** (0.111)	-0.00416 (0.0862)	-0.0790 (0.0557)	-0.216 (0.164)	-0.0446 (0.0971)
repression <sub>t-1</sub>	-0.133** (0.0660)	-0.0986 (0.0642)	-0.0128 (0.0849)	-0.0119 (0.0656)	-0.0920** (0.0360)	-0.0206 (0.102)	0.0303 (0.0778)
democ <sub>t-1</sub>	-0.327** (0.131)	0.0441 (0.0787)	0.0325 (0.131)	0.302* (0.166)	0.0411 (0.0537)	-0.0189 (0.108)	-0.179** (0.0837)
income equality <sub>t-1</sub>	0.273** (0.132)	-0.0846 (0.198)	0.212* (0.114)	-0.109 (0.250)	0.145* (0.0758)	-0.522 (0.354)	0.117 (0.117)
gender equality <sub>t-1</sub>	0.526*** (0.169)	0.0815 (0.177)	-0.248 (0.465)	0.276 (0.365)	-0.208 (0.131)	-0.187 (0.437)	0.546 (0.389)
adjacent conflict <sub>t-1</sub>	0.162*** (0.0381)	-0.0417 (0.0449)	0.189 (0.150)	-0.0671 (0.0572)	-0.0462 (0.0398)		0.104* (0.0547)
lnGDP pc <sub>t-1</sub>	0.970*** (0.346)	-0.982** (0.473)	-0.498** (0.247)	0.416 (0.287)	0.562*** (0.162)	-1.015* (0.557)	0.731** (0.318)
lnGDP pc growth <sub>t-1</sub>	-0.0139 (0.0304)	0.0157 (0.0278)	0.0216 (0.0635)	0.0322 (0.0303)	0.00837 (0.0254)	-0.0368 (0.0939)	-0.0116 (0.0505)
exports GDP <sub>t-1</sub>	-0.165** (0.0715)	-0.0185 (0.116)	0.0386 (0.108)	0.0924 (0.106)	-0.270*** (0.0846)	0.430 (0.323)	0.165* (0.0842)
internet <sub>t-1</sub>	-0.00976 (0.0580)	-0.0277 (0.0980)	-0.0432 (0.0770)	0.184** (0.0933)	-0.175* (0.103)	0.276 (0.487)	-0.0549 (0.0920)
lnpopulation <sub>t-1</sub>	-1.239 (1.050)	0.637 (0.603)	-0.401 (1.337)	-0.234 (0.560)	1.158*** (0.295)	4.152** (1.619)	-0.369 (1.204)
Constant	0.278 (2.480)	1.202 (0.801)	0.0601 (0.972)	-1.064 (1.056)	1.652*** (0.576)	-11.64** (5.406)	1.590 (3.722)
Observations	818	582	339	418	1,030	152	371
R <sup>2</sup>	0.620	0.399	0.280	0.464	0.374	0.534	0.611
RMSE	0.691	0.678	0.828	0.648	0.735	0.706	0.629
Number of Countries	31	23	14	18	42	6	15

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Correlation Plot

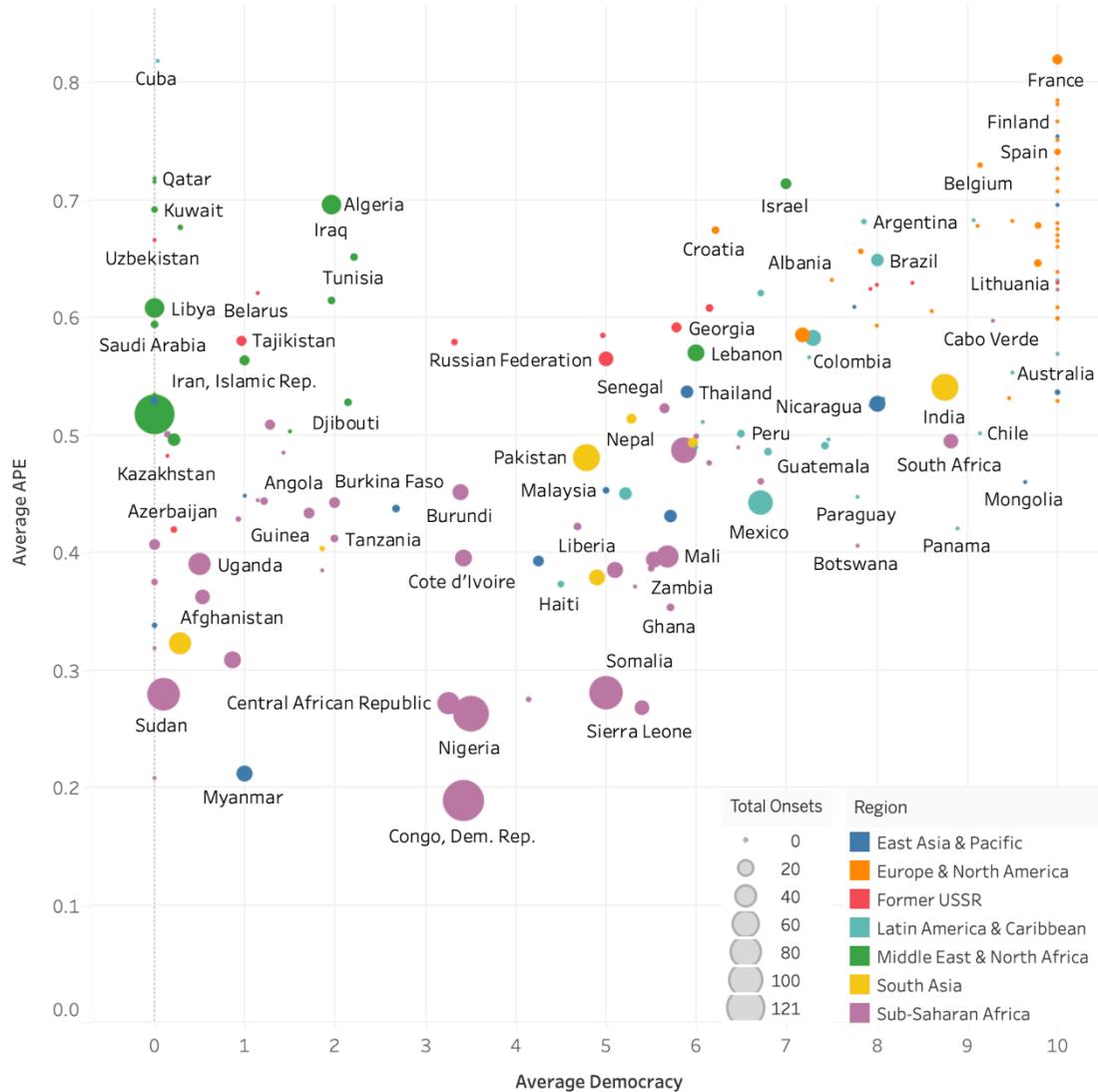
Full variable set correlation plot, including the lags of dependent variables



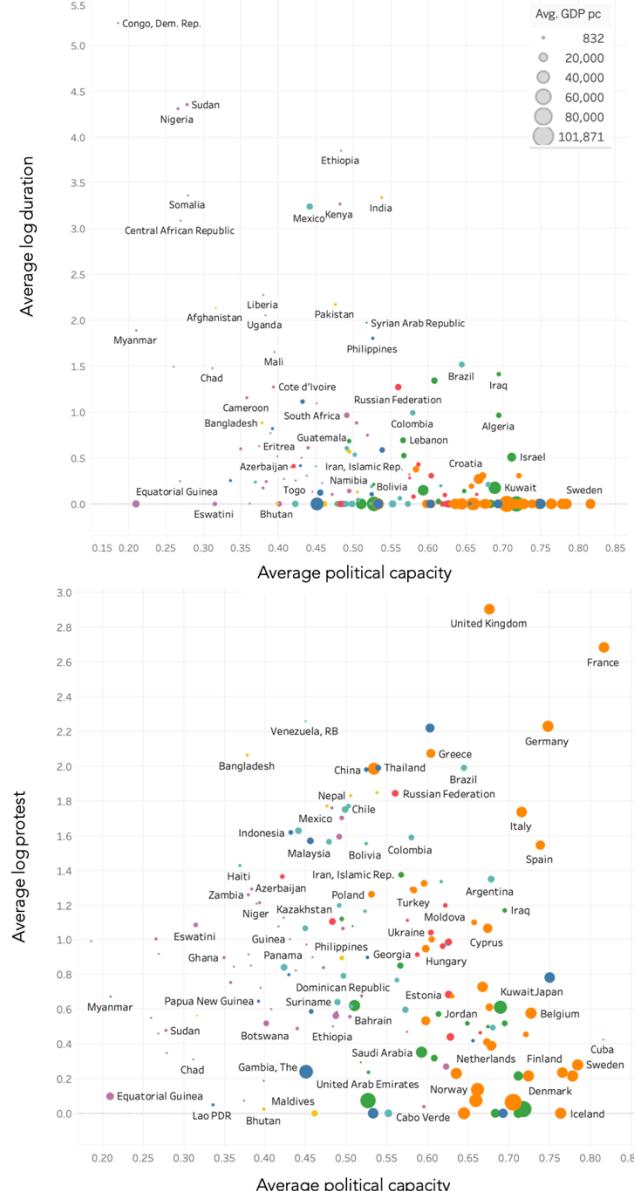
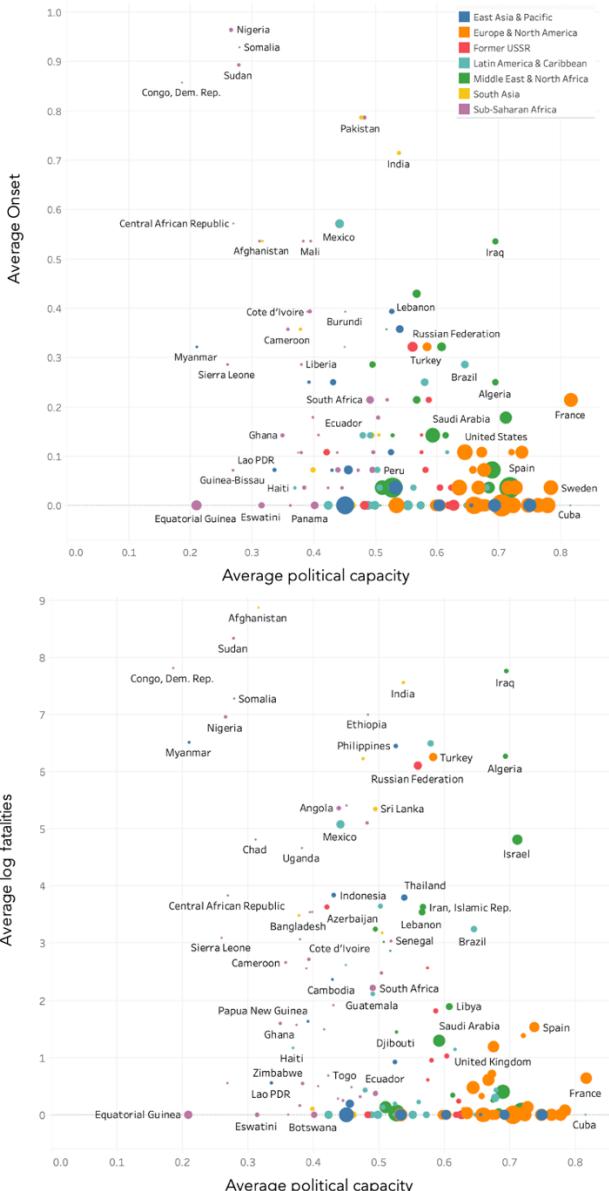


# Pairwise Scatterplot of APE and Democracy by Onset count

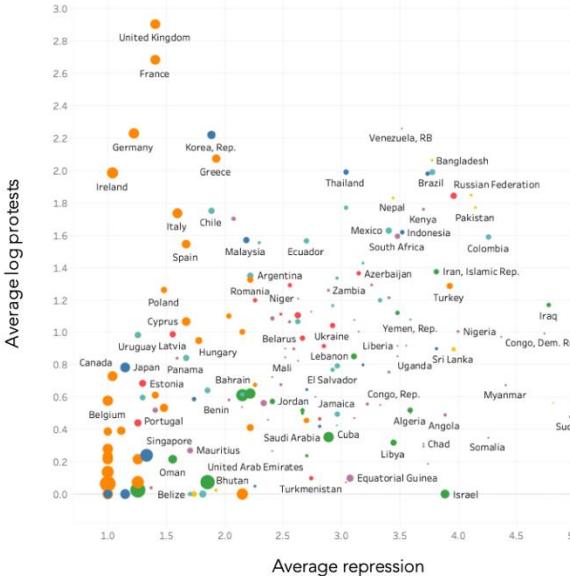
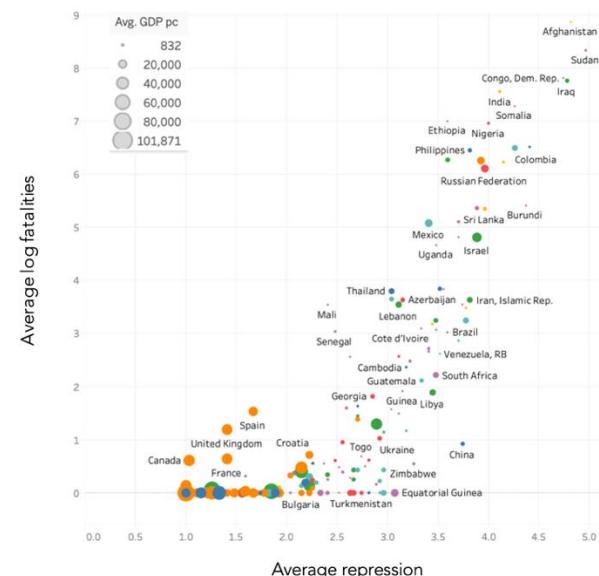
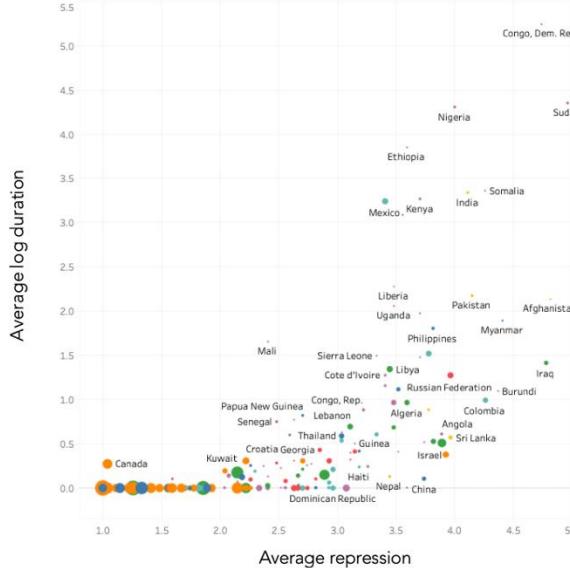
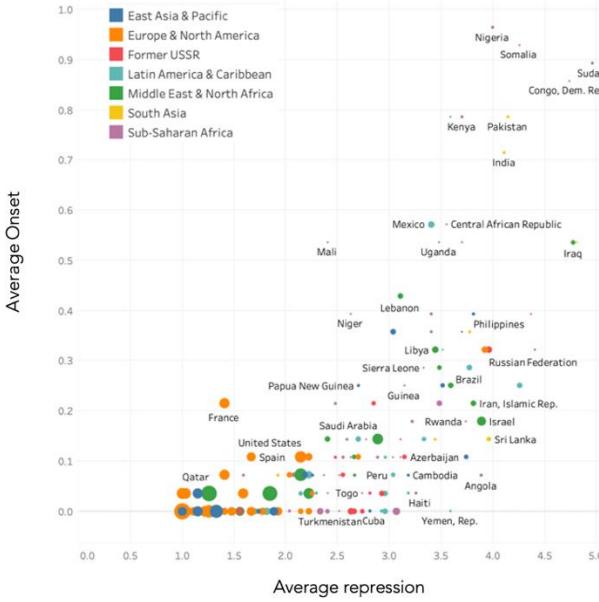
- Hegre (2001) stated that semi-democracies are most prone to violence
- While highly democratic or autocratic states, on average, have fewer onsets, this is only partially true
- States with the lowest APE have the highest onset count (SS Africa)
- Western societies with the highest APE experience nearly no violence
- Further exploration of the nonlinear relationship should be performed



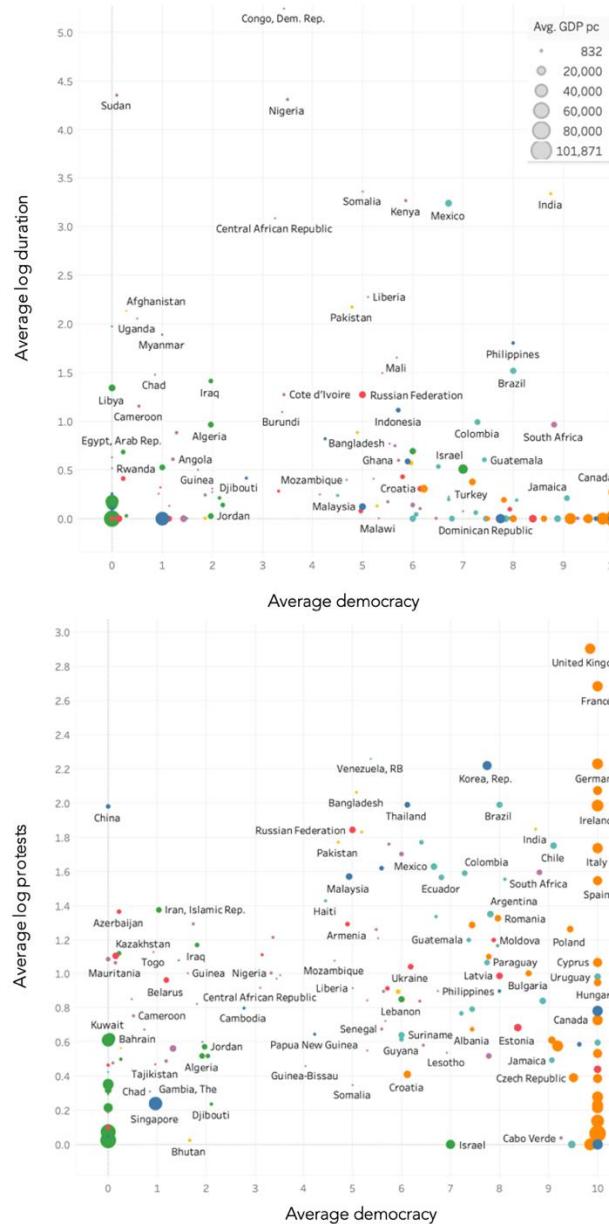
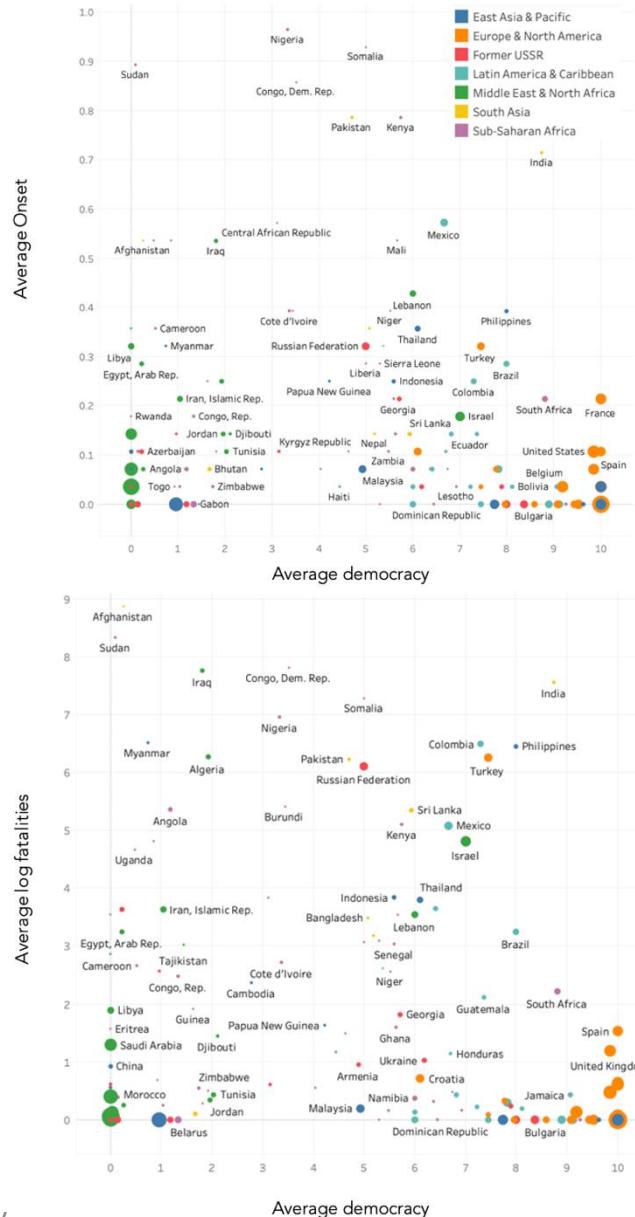
# Scatterplots of DVs and average political capacity



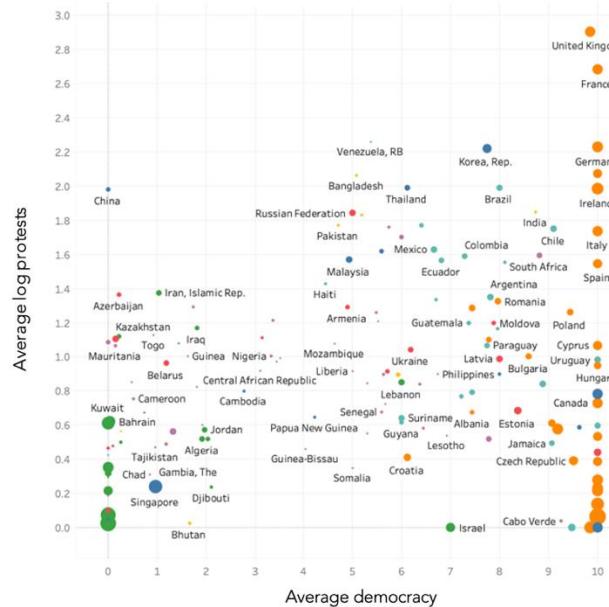
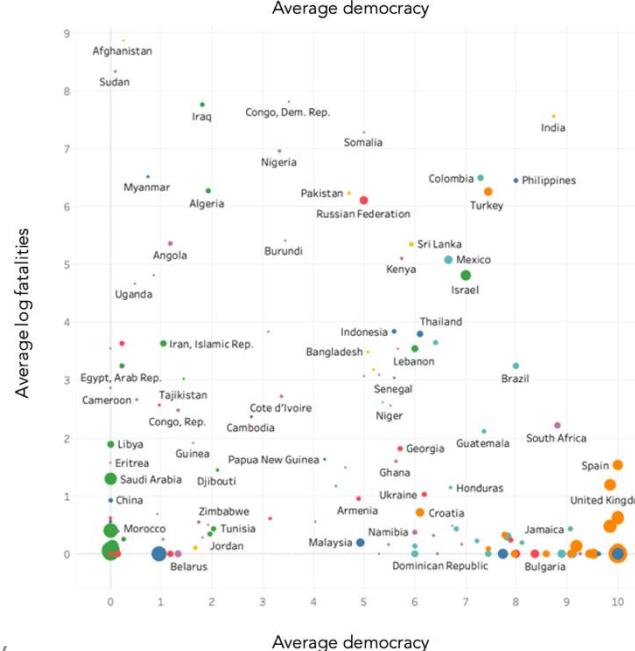
# Scatterplots of DVs and average political repression



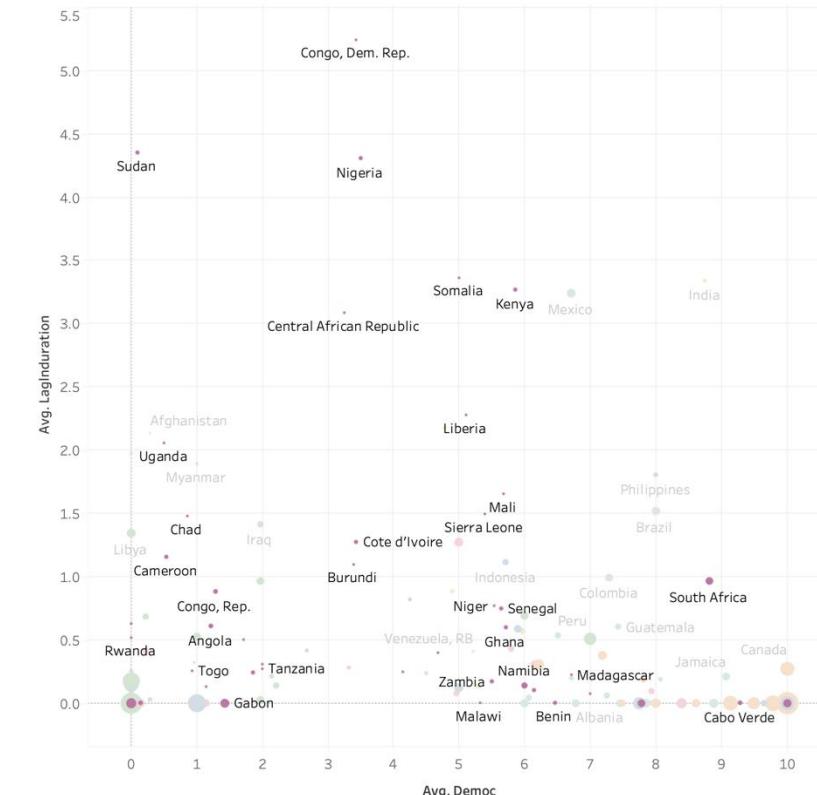
# Scatterplots of DVs and average democracy



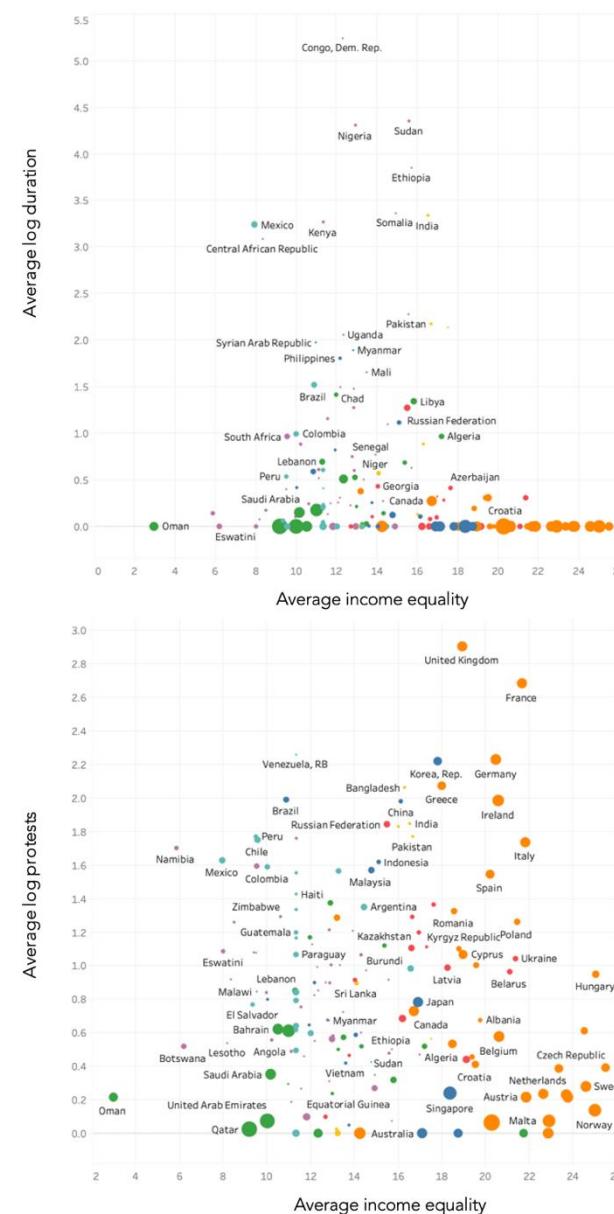
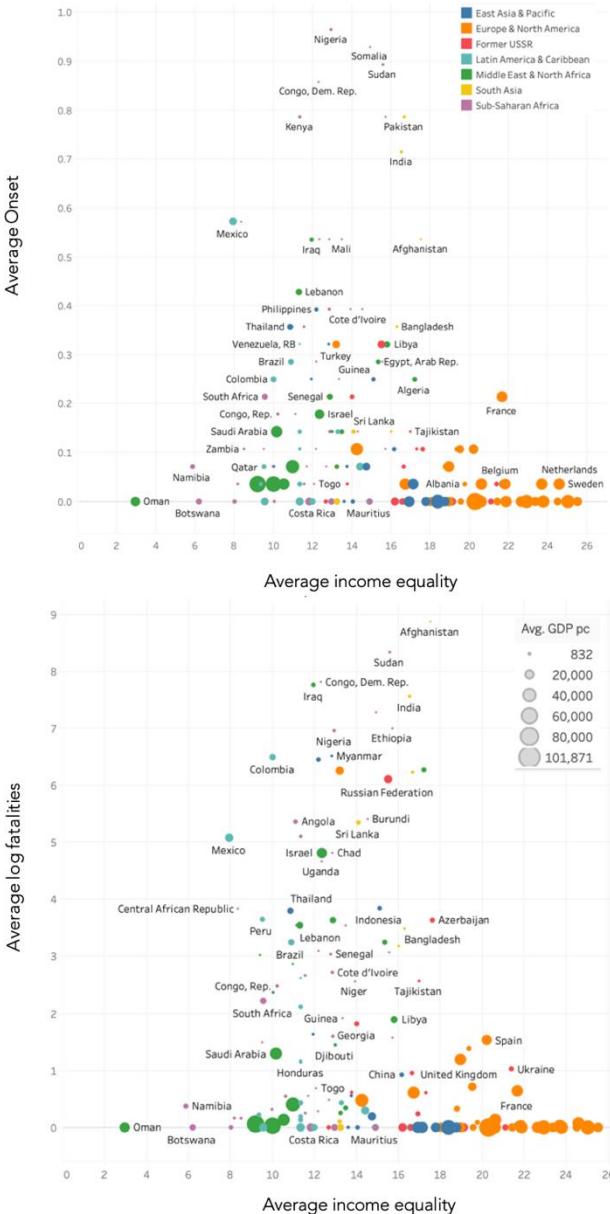
Democracy and Conflict Duration in Sub-Saharan Africa



Duration of Violence and Democ



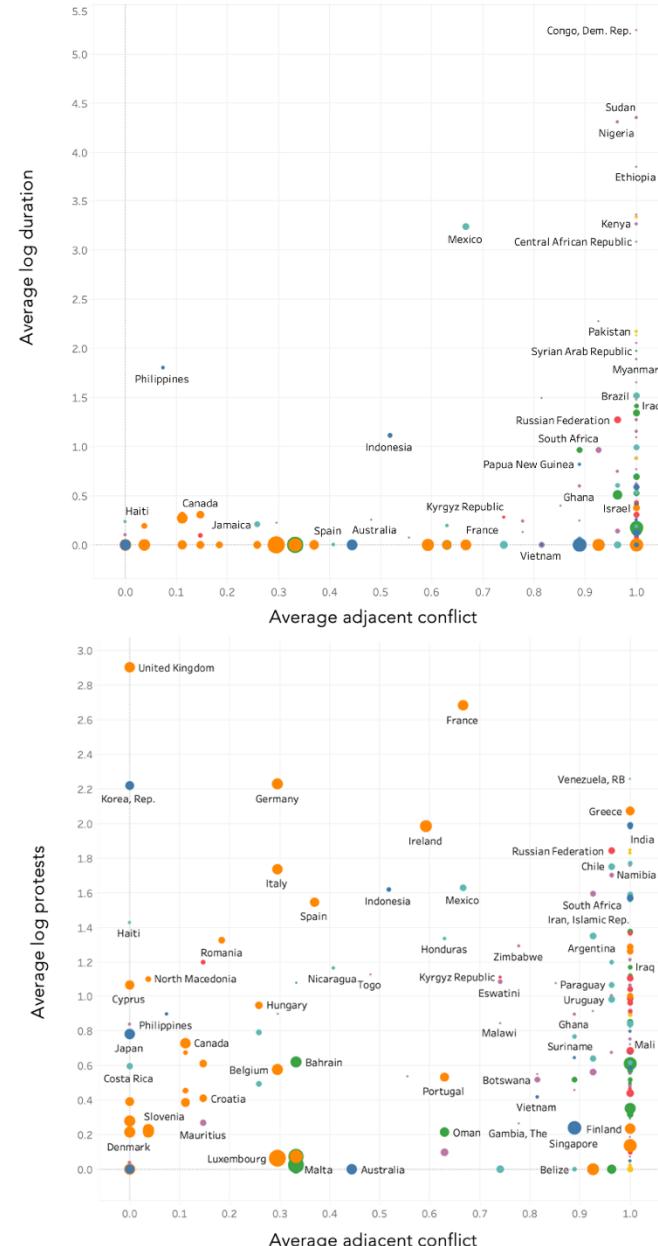
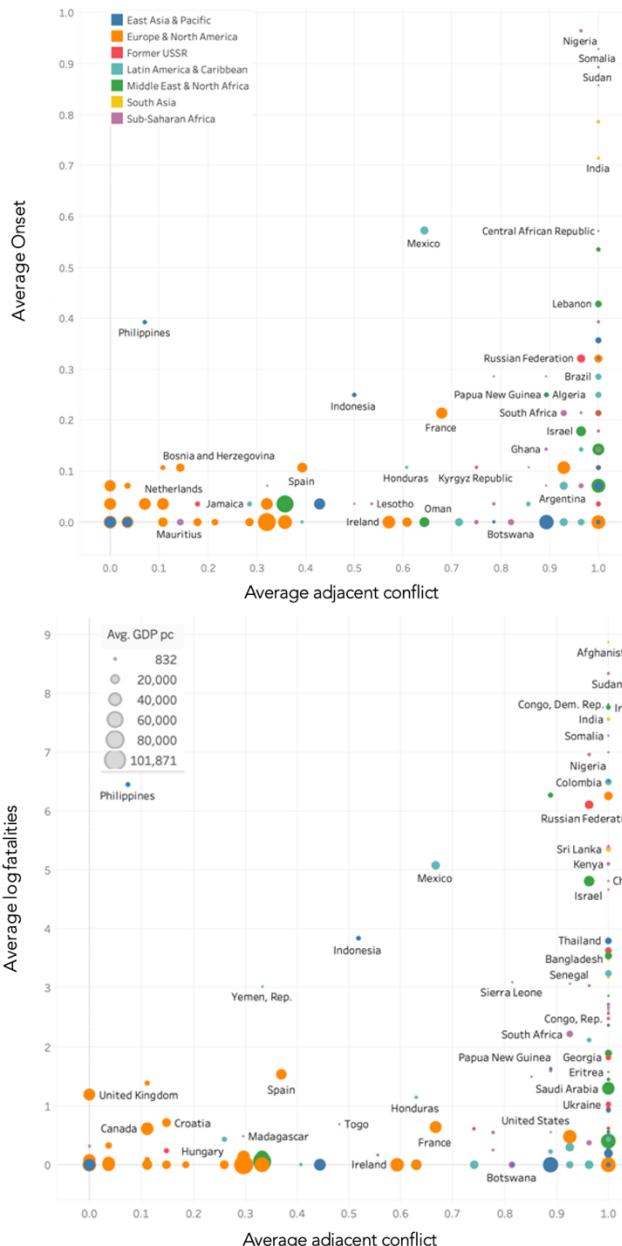
# Scatterplots of DVs and average income equality



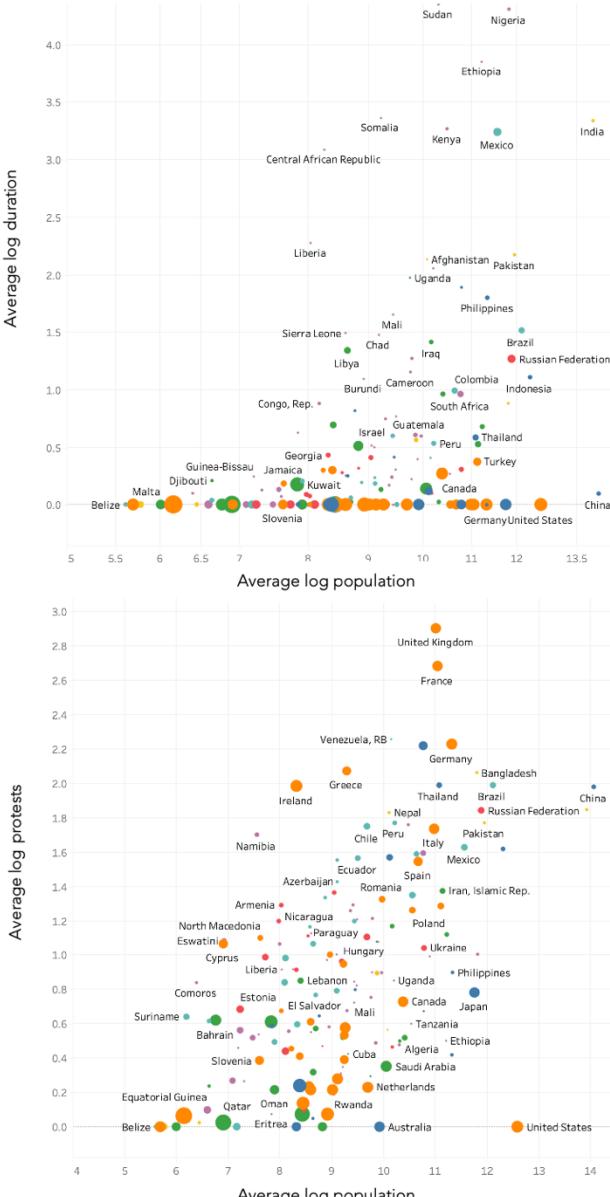
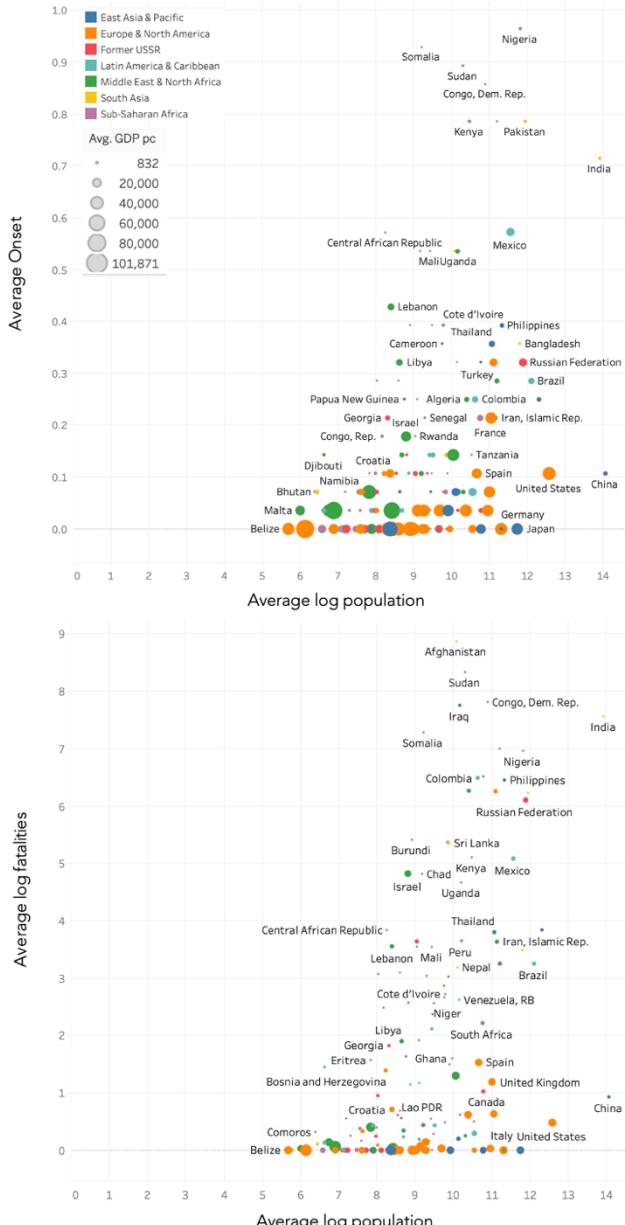
# Scatterplots of DVs and average gender equality



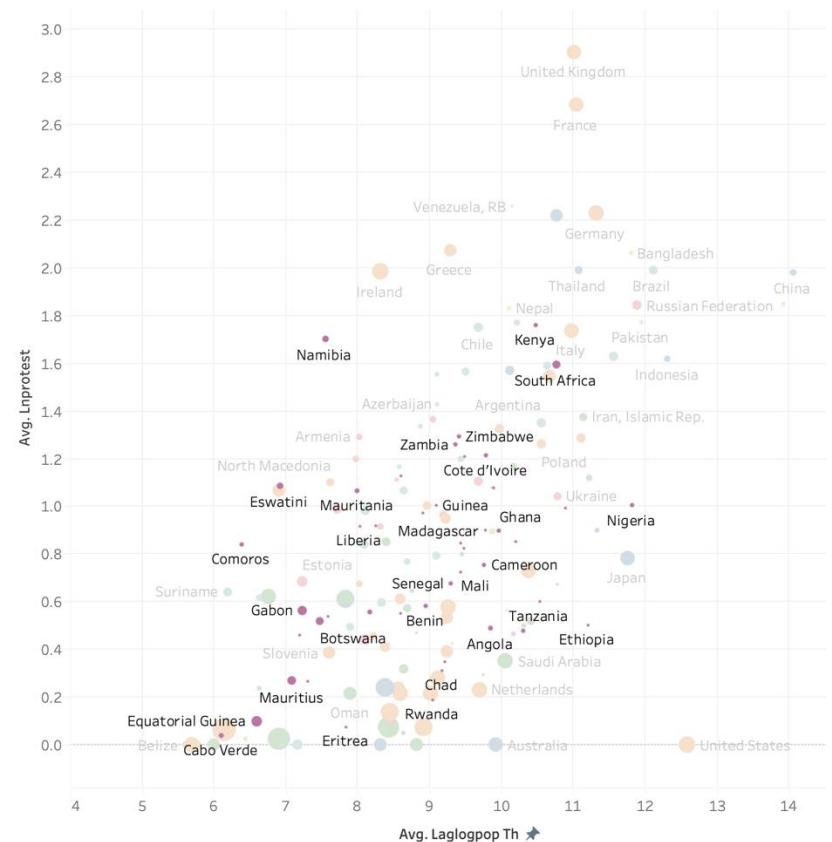
# Scatterplots of DVs and average adjacent conflict



# Scatterplots of DVs and average log population



# Population and Protests in Sub-Saharan Africa



# Civil Conflict Onset Global Model Diagnostics

	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	Std. err.
fixed6	.5205661	.7558687	-.2353026	.0109678
laglndeaths	-.7314008	-.466687	-.2647138	.3079205
lagape	.1288417	.1817949	-.0529532	.0254624
lagpts	-.0352951	.0072819	-.042577	.0141101
lagdemoc	.0215219	.0052526	.0162692	.0163074
lagbottom50	-.0103102	-.0041504	-.0061599	.0065617
laglaborfo~e	.0387513	.0731832	-.0344319	.0673144
lagadjacent	-.0094207	-.0712775	.0618568	.1219972
lagloggdppc	-.0343523	-.0158372	-.0185151	.0123065
lagloggdpp~h	.005977	.0013055	.0046715	.0021902
lagexports~p	.0009241	.0006608	.0002633	.0011304
laginternet	-.0574272	.1231126	-.1805399	.1808759

b = Consistent under H0 and Ha; obtained from `xtreg`.  
 B = Inconsistent under Ha, efficient under H0; obtained from `xtreg`.

Test of H0: Difference in coefficients not systematic

```
chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          = 511.80
Prob > chi2 = 0.0000
```

Hausman Test for Fixed and Random Effects

Wooldridge test for autocorrelation in panel data  
 H0: no first-order autocorrelation

```
F( 1,      148) =     274.513
Prob > F =     0.0000
```

Serial Correlation Test results for Fatalities global model

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of z2lndeaths

H0: Constant variance

```
chi2(1) = 514.08
Prob > chi2 = 0.0000
```

Heteroscedasticity Test results for Fatalities global model

# Civil Conflict Severity Global Model Diagnostics

	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b) fixed6	(B) . .	Difference	Std. err.
laglnDeaths	.5205661	.7558687	-.2353026	.0109678
lagape	-.7314008	-.466687	-.2647138	.3079205
lagpts	.1288417	.1817949	-.0529532	.0254624
lagdemoc	-.0352951	.0072819	-.042577	.0141101
lagbottom50	.0215219	.0052526	.0162692	.0163074
laglaborfoe	-.0103102	-.0041504	-.0061599	.0065617
lagadjacent	.0387513	.0731832	-.0344319	.0673144
lagloggdppc	-.0094207	-.0712775	.0618568	.1219972
lagloggdpph	-.0343523	-.0158372	-.0185151	.0123065
lagexportspp	.005977	.0013055	.0046715	.0021902
laginternet	.0009241	.0006608	.0002633	.0011304
laglogpop_th	-.0574272	.1231126	-.1805399	.1808759

b = Consistent under H<sub>0</sub> and H<sub>a</sub>; obtained from xtreg.

B = Inconsistent under H<sub>a</sub>, efficient under H<sub>0</sub>; obtained from xtreg.

Test of H<sub>0</sub>: Difference in coefficients not systematic

```
chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
           = 511.80
Prob > chi2 = 0.0000
```

Figure iii: Hausman Test for Fixed and Random Effects

Wooldridge test for autocorrelation in panel data  
H<sub>0</sub>: no first-order autocorrelation

```
F( 1,      148) =     274.513
Prob > F =     0.0000
```

Figure iv: Serial Correlation Test results for Fatalities global model

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of z2lnDeaths

H<sub>0</sub>: Constant variance

```
chi2(1) = 514.08
Prob > chi2 = 0.0000
```

Figure v: Heteroscedasticity Test results for Fatalities global model

# Civil Conflict Duration Global Model Diagnostics

```
. hausman fixeddd ., sigmamore
```

	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b) fixeddd	(B) . .	Difference	Std. err.
laglndurat~n	.094419	.293147	-.198728	.0077524
lagape	-.3331521	-1.349319	1.016167	.2937831
lagpts	.0973985	.1682514	-.0708529	.0250766
lagdemoc	-.0337636	.0095387	-.0433023	.0135629
lagbottom50	.0246417	.0076832	.0169585	.0156383
laglaborfo~e	-.0007392	-.0019507	.0012115	.0062936
lagadjacen~t	.0777904	-.0228515	.1006419	.0645853
lagloggdppc	-.1875275	-.053046	-.1344815	.1166907
lagloggdpp~h	.031155	-.0164468	.0476018	.0117418
lagexports~p	.000606	.0008623	-.0002562	.0020985
laginternet	.0028502	.001758	.0010922	.0010856
laglogpop_th	-.3878902	.0950858	-.482976	.174467

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

```
chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
           = 689.25
Prob > chi2 = 0.0000
```

Figure vi: Hausman Test for Fixed and Random Effects

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

```
F( 1,      148) =    188.348
Prob > F =    0.0000
```

Figure vii: Serial Correlation Test results for Duration global model

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of z2lnduration

H0: Constant variance

```
chi2(1) = 4293.13
Prob > chi2 = 0.0000
```

Figure viii: Heteroscedasticity Test results for Duration global model

# Protest Frequency Global Model Diagnostics

hausman fixedp1 ., sigmamore				
	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	Std. err.
z2lagape	-.0063807	.006195	-.0125757	.0157236
z2lagpts	-.0382811	.0023018	-.0405829	.0074788
z2lagdemoc	-.0106769	.0630172	-.0736941	.0190716
z2lagbott~50	.0597866	.005793	.0539936	.030892
z2laglabor~e	-.0112055	.0267105	-.037916	.0739126
z2lagadjac~t	.0426267	.051822	-.0091952	.0078814
z2lagloggd~c	.0983308	-.0034213	.101752	.0751842
z2lagloggd~h	-.0113198	-.0117398	.00042	.0028899
z2lagexpor~p	.0402567	.0353958	.0048609	.0212142
z2laginter~t	.0006784	.0214381	-.0207597	.0135217
z2laglogpo~h	.589535	.4157201	.1738149	.1673635

b = Consistent under H0 and Ha; obtained from **xtreg**.

B = Inconsistent under Ha, efficient under H0; obtained from **xtreg**.

Test of H0: Difference in coefficients not systematic

```
chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          = 82.67
Prob > chi2 = 0.0000
```

Figure ix: Hausman Test for Fixed and Random Effects

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F( 1,    148) =   366.996
Prob > F = 0.0000
```

Figure x: Serial Correlation Test results for Protest global model

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Assumption: Normal error terms

Variable: Fitted values of **z2lnprotest**

H0: Constant variance

```
chi2(1) = 150.16
Prob > chi2 = 0.0000
```

Figure xi: Heteroscedasticity Test results for Protest global model

# VIF Diagnostics for Onset, Severity, Duration and Protest Models

Variable	VIF	1/VIF									
lagloggdppc	3.33	0.300055	z2lagloggd~c	3.32	0.300938	z2lagloggd~c	3.32	0.301101	z2lagloggd~c	3.32	0.301508
lagpts	2.22	0.451041	z2lagpts	2.92	0.342750	z2lagape	2.24	0.446353	z2lagape	2.19	0.455856
lagape	2.22	0.451237	z2lagape	2.23	0.448380	z2lagpts	2.21	0.452917	z2lagpts	2.13	0.468678
laginternet	1.98	0.506003	z2laglndea~s	2.06	0.486587	z2laginter~t	1.98	0.506259	z2laginter~t	1.97	0.506607
lagexports~p	1.67	0.599044	z2laginter~t	1.98	0.506226	z2lagexpor~p	1.67	0.599045	z2laglogpo~h	1.71	0.583197
lagbottom50	1.62	0.615782	z2lagexpor~p	1.67	0.598294	z2lagbott~50	1.62	0.616581	z2lagexpor~p	1.67	0.598741
lagdemoc	1.62	0.617201	z2laglogpo~h	1.65	0.607891	z2lagdemoc	1.62	0.617644	z2lagdemoc	1.66	0.601676
laglogpop_th	1.62	0.618289	z2lagdemoc	1.64	0.610315	z2laglogpo~h	1.61	0.621123	z2lagbott~50	1.63	0.614700
laglaborfo~e	1.39	0.721817	z2lagbott~50	1.64	0.611476	z2laglabor~e	1.38	0.727174	z2laglabor~e	1.37	0.728357
lagadjacen~t	1.32	0.760352	z2laglabor~e	1.39	0.718189	z2lagadjac~t	1.31	0.760850	z2lagadjac~t	1.32	0.759698
lagonset_new	1.25	0.802627	z2lagadjac~t	1.31	0.760576	z2laglndur~n	1.20	0.831254	z2laglnpro~t	1.17	0.852374
lagloggdpp~h	1.06	0.945219	z2lagloggd~h	1.06	0.943105	z2lagloggd~h	1.06	0.943574	z2lagloggd~h	1.06	0.946281
Mean VIF	1.77		Mean VIF	1.90		Mean VIF	1.77		Mean VIF	1.77	

Civil Conflict Onset

Civil Conflict Severity

Civil Conflict Duration

Nonviolent conflict frequency

# Global Civil Conflict Onset Model 6, Marginal Effects

	Delta-method					
	dy/dx	std. err.	z	P> z	[95% conf. interval]	
lagonset_new	.102998	.0119046	8.65	0.000	.0796654	.1263307
lagape	-.1063038	.039273	-2.71	0.007	-.1832775	-.0293302
lagpts	.0335302	.0055254	6.07	0.000	.0227006	.0443599
lagdemoc	.0003797	.0013558	0.28	0.779	-.0022777	.0030371
lagbottom50	-.0012117	.0013369	-0.91	0.365	-.0038321	.0014087
laglaborfo~e	-.0007824	.0002113	-3.70	0.000	-.0011966	-.0003681
lagadjacen~t	.0483417	.0134415	3.60	0.000	.0219969	.0746865
lagloggdppc	-.0277827	.0066865	-4.16	0.000	-.040888	-.0146773
lagloggdpp~h	-.0059063	.0042808	-1.38	0.168	-.0142965	.002484
lagexports~p	-.0000877	.0002614	-0.34	0.737	-.0005999	.0004246
laginternet	.0003895	.000288	1.35	0.176	-.0001749	.0009539
laglogpop_th	.023955	.0037118	6.45	0.000	.01668	.0312301