## Conflict forecasting and climate change research

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## This contribution builds on:

- Hegre, Buhaug, Calvin, Nordkvelle, Waldhoff & Gilmore, 2016. Forecasting civil conflict along the shared socioeconomic pathways. Environ. Res. Lett. 11 054002
- ViEWS a political Violence Early Warning System project under direction of Håvard Hegre (http://http://www.pcr.uu.se/research/views/)
- Gilmore, Hegre, 2017. Economic growth, armed conflict and the implications for climate change. Typescript.
- Gilmore, Hegre, Moyer, Bowslby, Petrova, 2017. Projecting Conflict and Cooperation under Climate Change Scenarios.
- Updated SSP-based projections (Hegre and Petrova)



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#### Where and when do internal armed conflicts occur?

- Internal armed conflict currently the dominant form of political violence
  - A political incompatibility between a state and a non-state armed, organized group that leads to at least 25 battle-related deaths within a calendar year
- At country level of analysis, conflicts more likely in countries with:
  - Large populations
    - but less likely in per-capita terms
  - Low income/socioeconomic development
  - Recent armed conflict
    - within country or in neighborhood
  - Rent-generating resources
  - New or contested political institutions



#### Results for SSP2 Model

	Dependent variable:			
Log population	0.398***			
	(0.040)			
Log GDP per capita	-0.558***			
	(0.069)			
Log time in peace	-2.92***			
0	(0.093)			
Log time since independence	0.307***			
	(0.046)			
Constant	2.349***			
	(0.209)			
Observations	7,518			
Log Likelihood	1664.8			
Note:	*p<0.1; **p<0.05; ***p<0.01			



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#### Simulation procedure



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# Preliminary results from ViEWS – a political Violence Early Warning System



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#### Projections based on preliminary, incomplete model



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#### Assumptions underlying the simulations

#### Table 1. Global characteristics of the five Shared Socioeconomic Pathways

Pathway	Mitigation	Adaptation	Economic	Population	Education
	challenges	challenges	growth	growth	attainment
SSP1: Sustainability	Low	Low	High	Low	High
SSP2: Middle of the road	Medium	Medium	Medium	Medium	Medium
SSP3: Fragmentation	High	High	Low	High	Low
SSP4: Inequality	Low	High	Medium	Medium	Low
SSP5: Conventional development	High	Low	High	Low	High

Note: Table adapted from Chateau, Dellink, Lanzi, and Magné (28).

#### Source: Hegre, Gilmore et al., ERL 2016



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# Assumption: IIASA global population projections

- SSP3: high population growth
- SSP2, SSP4: medium population growth:
- SSP1, SSP5: low population growth
- Differences driven by differences in fertility rates



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#### Projections

# Assumption: OECD global GDP per capita projections

- Source: Chateau et al. 2012
- SSP1, SSP5: high economic growth
- SSP2, SSP4: medium economic growth
- SSP3: low economic growth
- Projections plausible?



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## GDP per capita projections ignore political factors

- Burundi vs. Burkina Faso: Armed conflict hampers growth
- Chateau et al. model ignores such political impediments to productivity
- Model consequently too optimistic re convergence
- Explicit modeling of feedback loop could help IAMs that use such projections



Figure 1. Conflict and growth in Burundi and Burkina Faso.



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## Conclusions

- Conflict research allows simulating future prevalence of armed conflict under each SSP
- Adding explicit modeling of conflict-growth feedback to these we may improve projections for GDP per capita
- Improved projections would improve the IAMs that use them

