

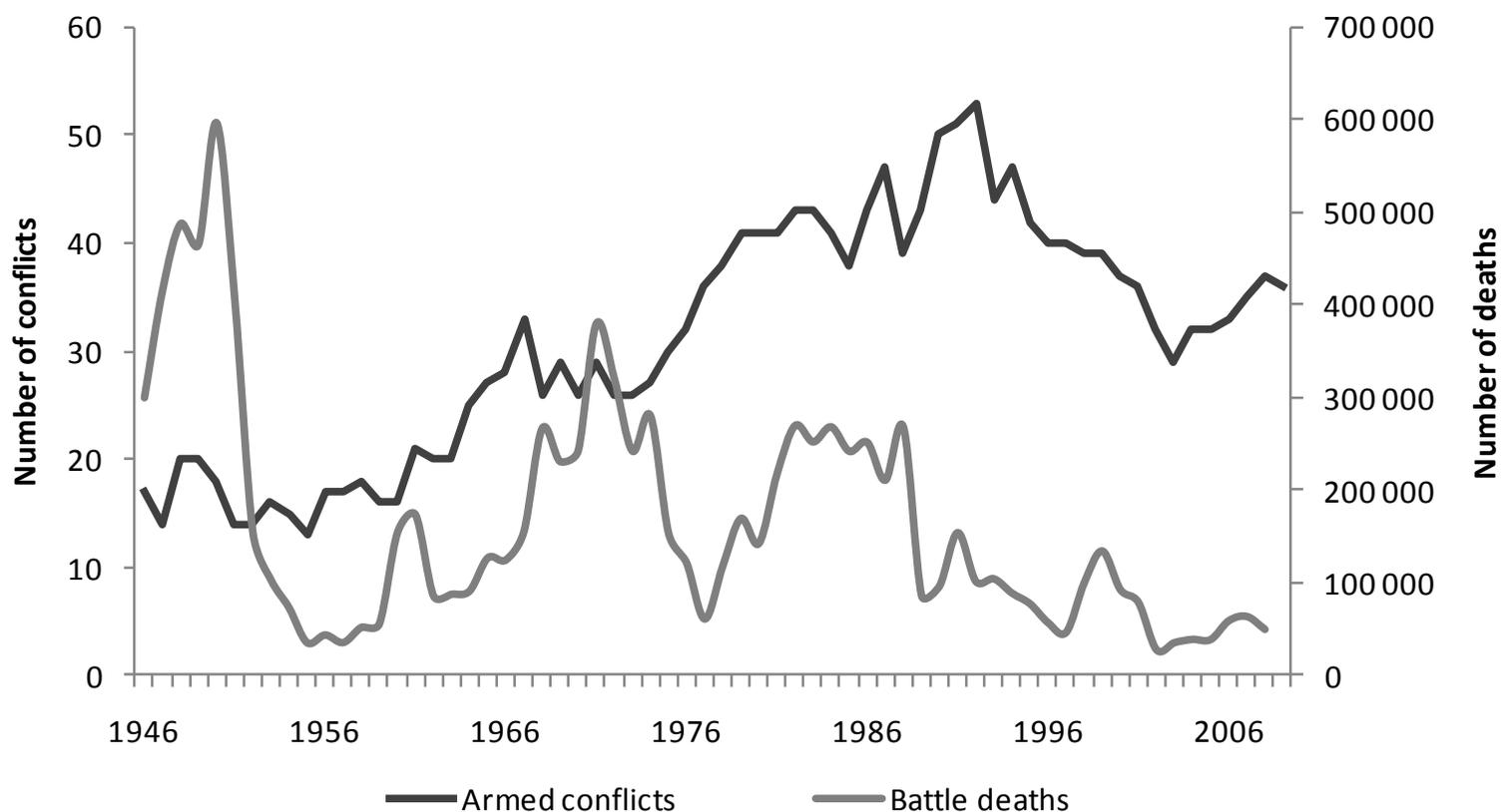
Regional Conflict and Climate change

EPA/DoE workshop on Climate Change Impacts and Associated Economic Damages
Capitol Hilton, Washington, DC, 27–28 January 2011

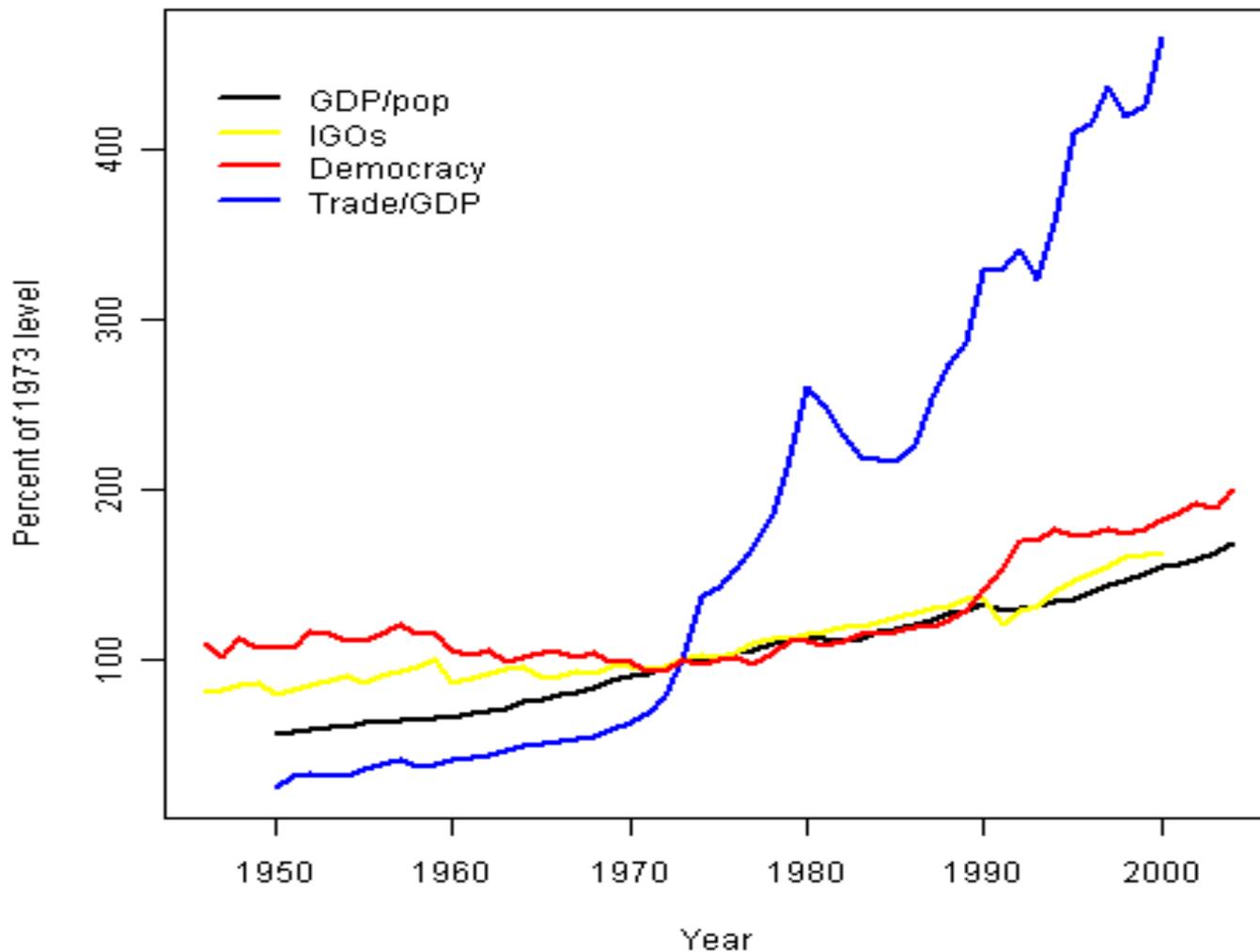
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Armed conflicts and battle deaths, 1946–2009



Towards a liberal peace?



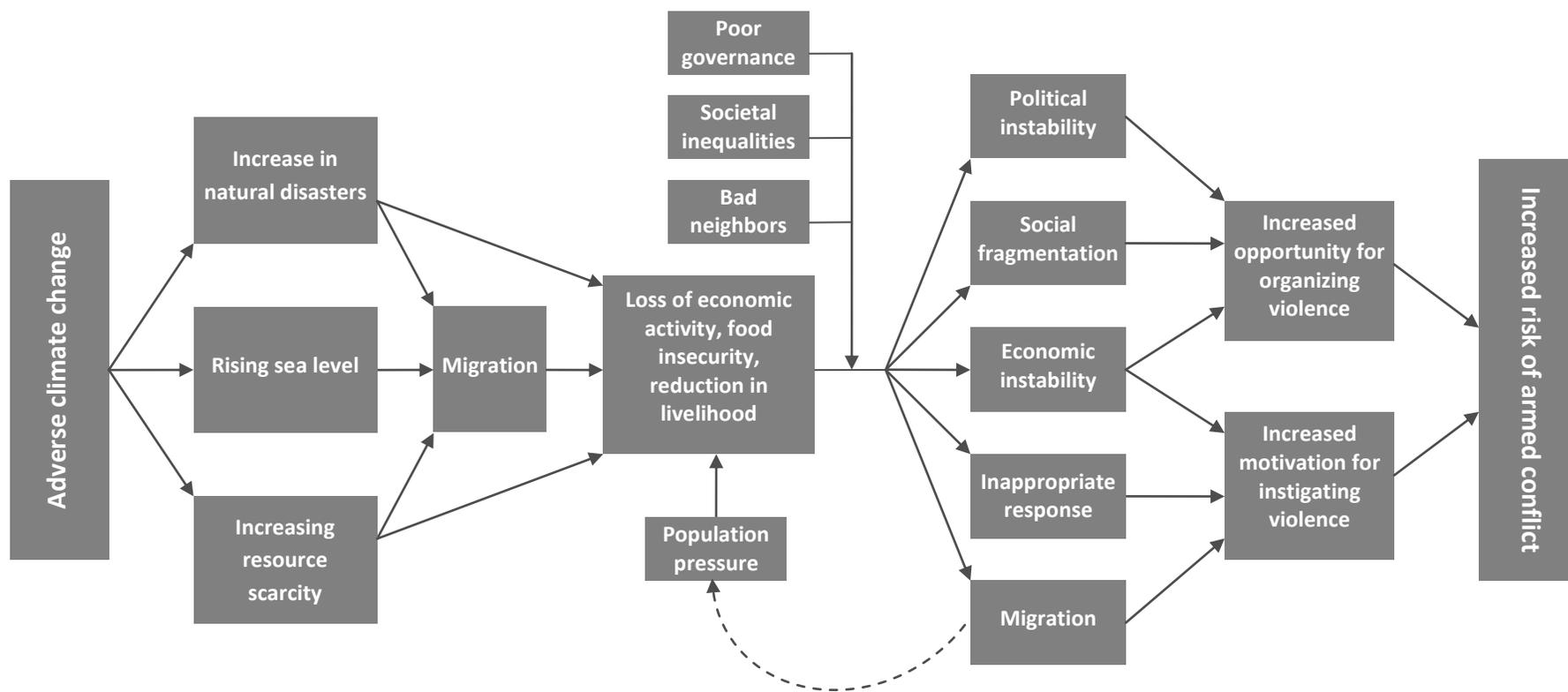
Possible threats to the liberal peace

- Shifting patterns of power
- The financial crisis
- Fundamentalist religion
- Climate change

Enter climate change: Are we heading towards disaster?

- Darfur is the first of many climate wars (Ban Ki-Moon, 2007–08)
- There is little scientific dispute that if we do nothing, we will face more drought, more famine, more mass displacement – all of which will fuel more conflict for decades (President Barack Obama's Nobel Peace Prize Lecture, 10 December 2009)
- Evidence is fast accumulating that, within our children's lifetimes, severe droughts, storms and heat waves caused by climate change could rip apart societies from one side of the planet to the other. Climate stress may well represent a challenge to international security just as dangerous — and more intractable — than the arms race between the United States and the Soviet Union during the cold war or the proliferation of nuclear weapons among rogue states today. (Thomas Homer-Dixon, *NYT*, 24 April 2007)

From climate change to conflict: Possible pathways



Evidence: Precipitation (I)

- *Miguel, Satyanath & Sergenti (2004): the probability of conflict in sub-Saharan Africa increases the year after a year with reduced rainfall (instrument for economic shock)
- *Hendrix & Glaser (2007): the level of available freshwater is positively linked to conflict, but negative deviations also yield more conflict
- *Jensen & Gleditsch (2009): the results in Miguel et al. (2004) are weaker when removing countries that participate in civil wars in other countries

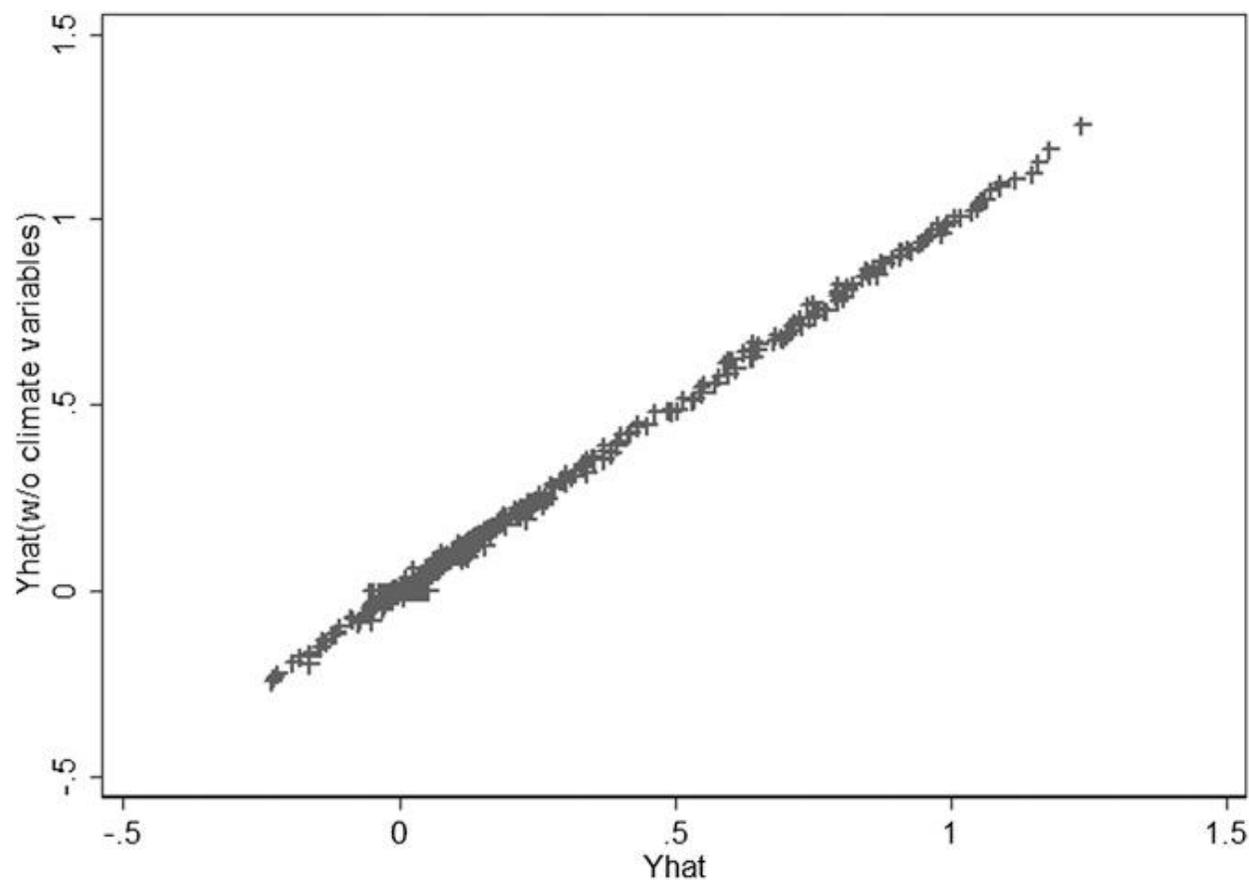
Evidence: Precipitation (II)

- *Hendrix & Salehyan (2010): (47 African countries, 1990–2009) Wetter years are more likely to see civil wars. Rainfall variability has a significant effect on other forms of political unrest.
- Theisen, Holtermann & Buhaug (2010): In a disaggregated analysis, drought has no influence on civil conflict in Africa
- Ciccone (2010): Miguel et al. look only at annual deviations rather than deviations from the long-term mean
- *Burke et al. (2009): Precipitation changes in Africa cannot be predicted precisely from existing climate models

Evidence: Temperature (I)

- *Burke et al. (2009, 2010): Higher temperatures in SS Africa yield more conflict (impact on agriculture);
- *Buhaug (2010a,b) Their results are not robust to standard control variables, to variations in the model specification, or to an extension of the time series to more recent years

Civil war risk with/without climate variables



Evidence: Temperature (II)

- *Zhang (2006, 2007) War, population decline, and dynastic changes were more common in China in cold periods (1000-year time frame)
- *Tol & Wagner (2010) Violent conflict in Europe was more common in cold periods, but the relationship disappears in the most recent three centuries
- *Büntgen et al. (2010) Warmer summers improve conditions for human settlements and the rise of civilizations – but this may be less relevant for modern civilizations
- CIA (1974) Global cooling threatens to produce drought, famine, and political unrest, particularly in the Sahel region. Climate modification could lead to international conflict

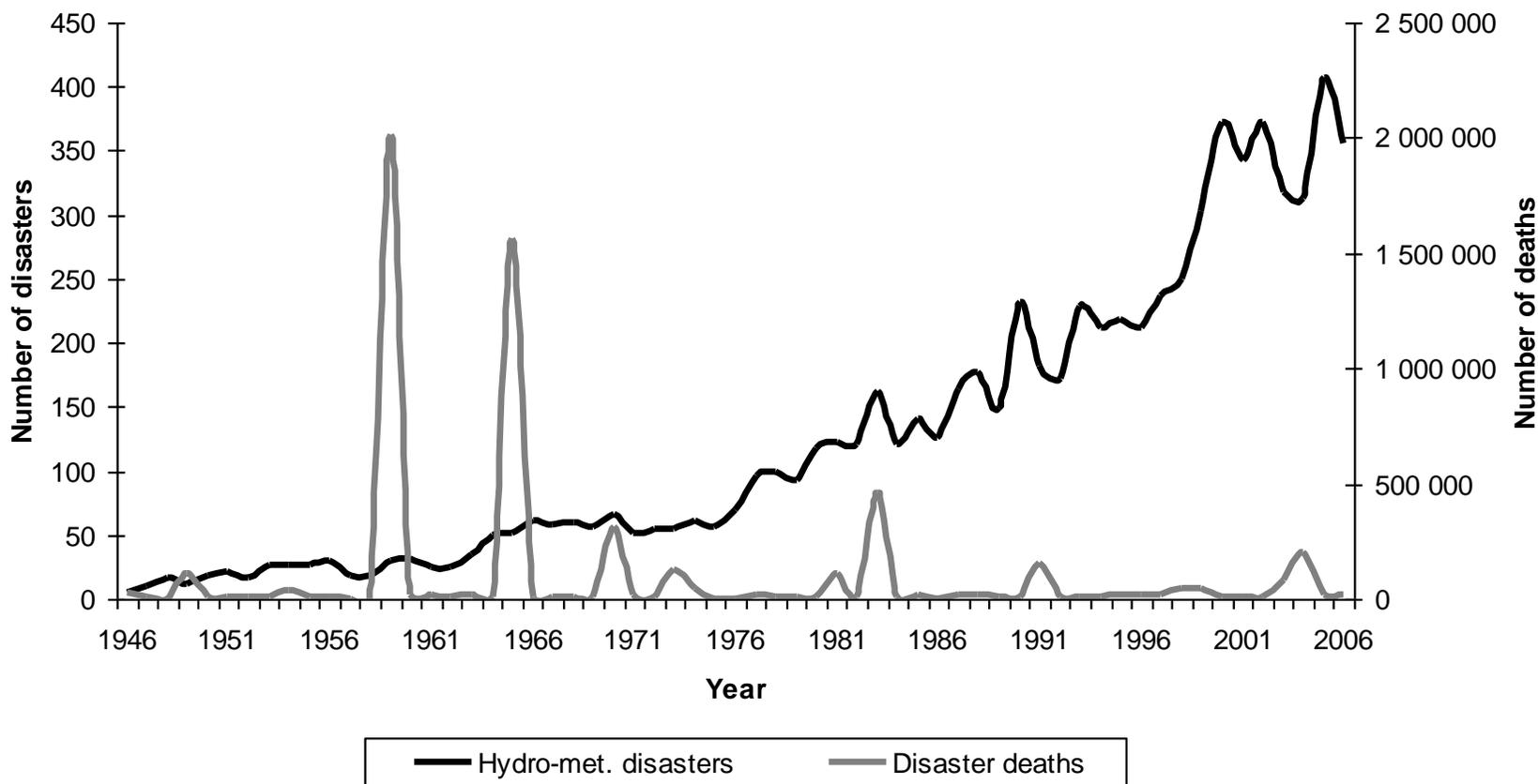
Evidence: Sea-level change

- IPCC (2007, WG II: 323): Global mean sea-level rise to 2100: 0.28-0.43 cm
- *Grinsted, Moore & Jevrejeva (2009): 0.9–1.3 m
- Myers, IPCC, Stern: 150–200–250 mill ‘climate refugees’
- *Nicholls & Small (2002): 1.2 bill. live in coastal areas, rising to 5.2 bill. by the end of the century
- *Salehyan & Gleditsch (2006): Countries with a high influx of refugees have a greater risk of civil war
- Gleditsch, Nordås & Salehyan (2007): Will this also apply to climate refugees?
- *Reuveny (2007): In 38 cases of environmental migration since the 1930s, half experienced armed conflict of some kind – but is this representative?

Evidence: Natural disasters (I)

- CRED data show that the number of natural disasters is increasing, more people affected, fewer people die
- Is the increase in numbers due to global warming, better reporting, shifting settlements?
- Increase in cost, but mainly due to more high-value objects insured?
- Analyses of disasters and conflict suggest a connection (*Drury & Olson, 1998; *Brancati, 2007; *Nel & Righarts, 2008), but mostly for geological disasters, and mechanisms unclear

Hydro-meteorological disasters



Evidence: Natural disasters (II)

- Even for geological disasters, Aceh points in a different direction (*Le Billon & Waizenegger, 2007; *Enia, 2008; *Beardsley & McQuinn, 2009)
- Slettebak & de Soysa (2010): Earlier studies fail to include proper controls, particularly population size. Using the Fearon & Laitin model, climate-related disasters, tend (if anything) to lower the probability of conflict; consistent with a long tradition in disaster sociology that people unite in the face of adversity
- Bergholt & Lujala (2010): Natural disasters lower economic growth but do not increase conflict via this mechanism

Economic effects of climate change

- Economic factors important in conflict – economic interdependence limits interstate conflict, economic development limits intrastate conflict
- Economic decline could reverse this
- Debate about the economic effects of climate change hinges on the value of discounting future economic effects – Stern (2007) uses a low value, while Nordhaus (2007) uses a high value
- Few empirical studies: Bernauer et al. (2010) study effects of precipitation and conflict, Bergholt & Lujala (2010) natural disasters and conflict, neither study finds any effect on conflict via economic growth, but Bernauer et al. find that political institutions modify the relationship

Climate change and interstate conflict

- Argument 1: Increased scarcity → interstate conflict
- Counterargument: Scarcity model generally unpersuasive and less so today
- Argument 2: Climate change will open up new trade routes and new ocean territories for exploration, there will be uncertainty about ownership and competition for exploiting these resources, danger of conflict
- Counterargument: a) little systematic research, b) introduction of EEZs proceeded largely peacefully
- Tir & Stinnett (2010): Institutionalized cooperation in shared rivers is likely to prevent distribution conflicts
- Gartzke (2010): climate change may affect where nations fight, rather than whether or when (militarized disputes move to higher latitudes in summer, lower latitudes in winter)

Methods

The neomalthusian theory of conflict has generally drawn on case studies for support, notably those by Homer-Dixon and others

Large-n studies have found little support for the scarcity theories. So is it a methodological divide?

Several recent case studies, by *Benjaminsen (2008) on Mali, *Witsenburg & Adano (2009) on Northern Kenya, *Brown (2010) on Darfur, and others have also questioned the scarcity perspective

The neomalthusian case studies in the scarcity tradition have been criticized for selecting on the dependent variable, i.e. studying only the conflict cases

But they can also be criticized for relatively shallow case description and for focusing too rapidly on scarcity factors

We may perhaps see a convergence of case studies and statistical work, including time-series for single countries and disaggregated statistical studies

Interactions

Critics of Homer-Dixon and others may have overlooked how scarcity interacts with poverty, poor governance, ethnic dominance, etc.

Threat multiplier (CNA , 2007)

Double exposure (O'Brien), also Temesgen (2010)

'Unfortunately, pollution, population growth and climate change are not in the distant future: they are occurring now and hitting the poorest and most vulnerable hardest. Environmental degradation has the potential to destabilize already conflict-prone regions, especially when compounded by inequitable access or politicization of access to scarce resources.' – Kofi Annan (2006)

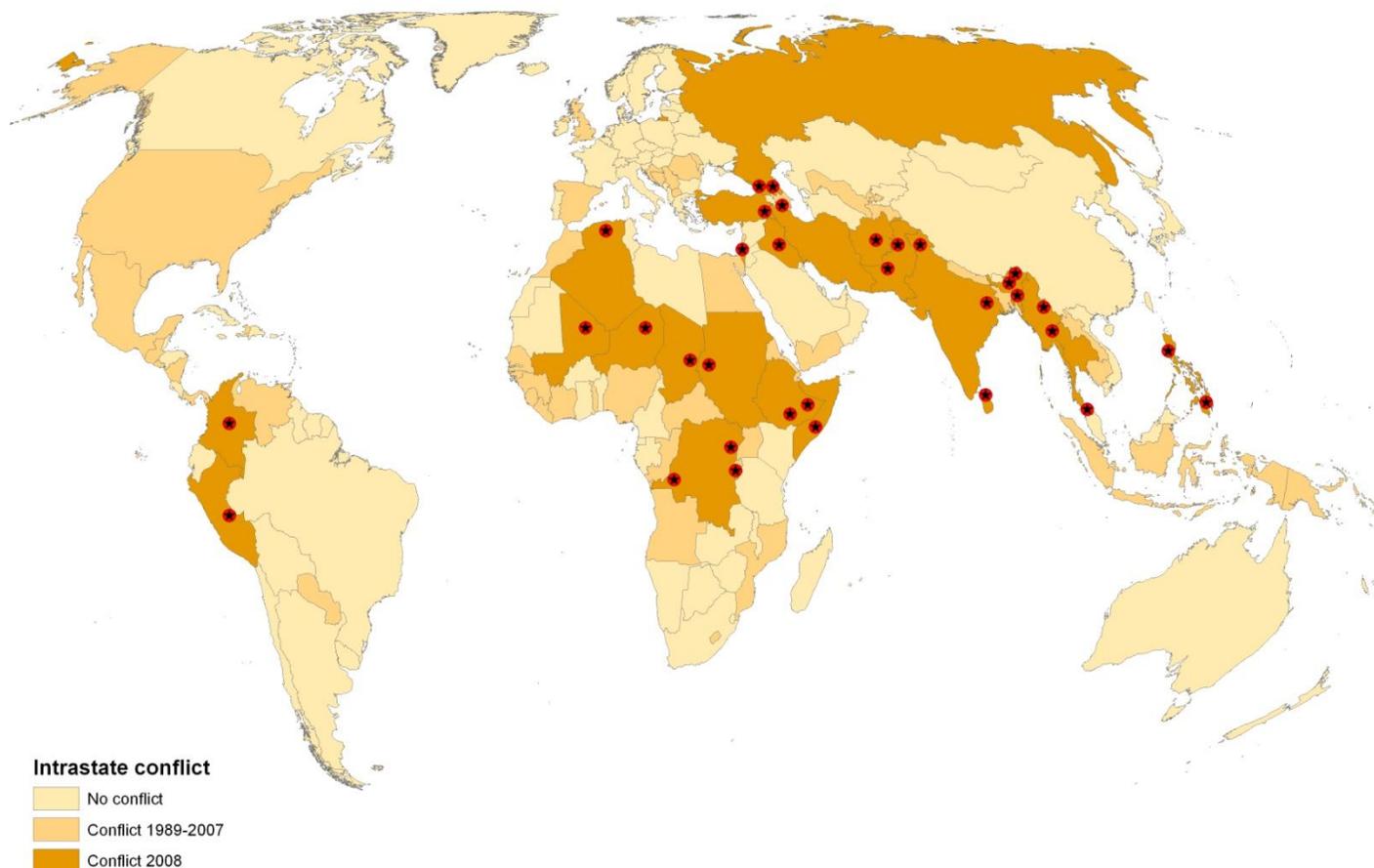
Hard to test for interactions of four factors ...

From a policy perspective, easiest to reduce climate change or to change other factors in the interaction?

Vulnerable regions

- Africa is high on conflict, low on development, low on governance; includes two thirds of the 'bottom billion' countries. However, Africa is experiencing a decline in conflict, increasing economic growth, and improving governance
- East Asia had the most severe wars in the second half of the twentieth century; now largely peaceful
- Most battle deaths currently occur in Central and South Asia. Middle East also sees frequent conflict, but not currently very severe
- Empirical studies have focused on Africa (particular SSA) a) because it is more vulnerable b) because of low adaptive capacity

The distribution of armed conflict



Models

- Disagreements about security effects do not appear to depend on the choice of emissions scenarios
- No standard conflict model, but *Fearon & Laitin (2003) and *Collier & Hoeffler (2004) frequently used
- Endogeneity problems?
- *Ward, Greenhill & Bakke (2010): Standard conflict models do a poor job of predicting new conflicts
- If studies of historical data provide little evidence for a security effect, projection is less urgent

Uncertainty

- IPCC WG I : quantitative likelihood scale: Virtually certain = 99% probability of occurrence, etc.
- IPCC WG II: quantitative confidence scale: Very high confidence = 90% or higher chance of being correct
- IPCC WG III: qualitative level-of-understanding scale, high to low agreement on one axis, much to little evidence on the other
- IAC (2010) criticizes WG II for reporting high confidence in statements for which there was little evidence
- Peer-reviewed sources: relatively fewer in WG II than in WG I and even lower in WG III

Research priorities

- Look at interactions between climate change and political and economic factors
- Focus on countries with low adaptive capacity
- Look at a broader set of conflicts (one-sided, non-state, riots)
- Disaggregated studies of geo-referenced data
- Balance negative and positive effects (e.g. food)
- (possibly) Couple models of climate change to models of conflict

What if climate change has negligible impact on conflict?

Does it matter?

- For the credibility of climate change research – very much
- For mitigation – very little
- For adaption – possibly a lot

THANK YOU FOR YOUR ATTENTION