

Multilateral supply of global public goods: Successes, Failures, and the reasons for both

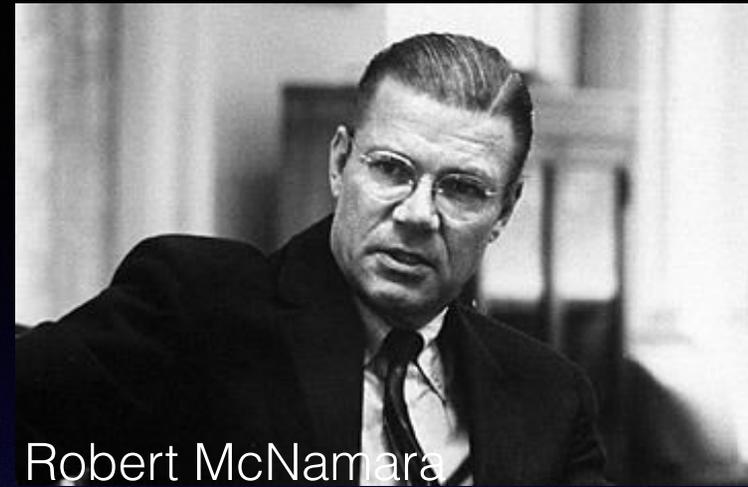
Scott Barrett
Columbia University

First principles

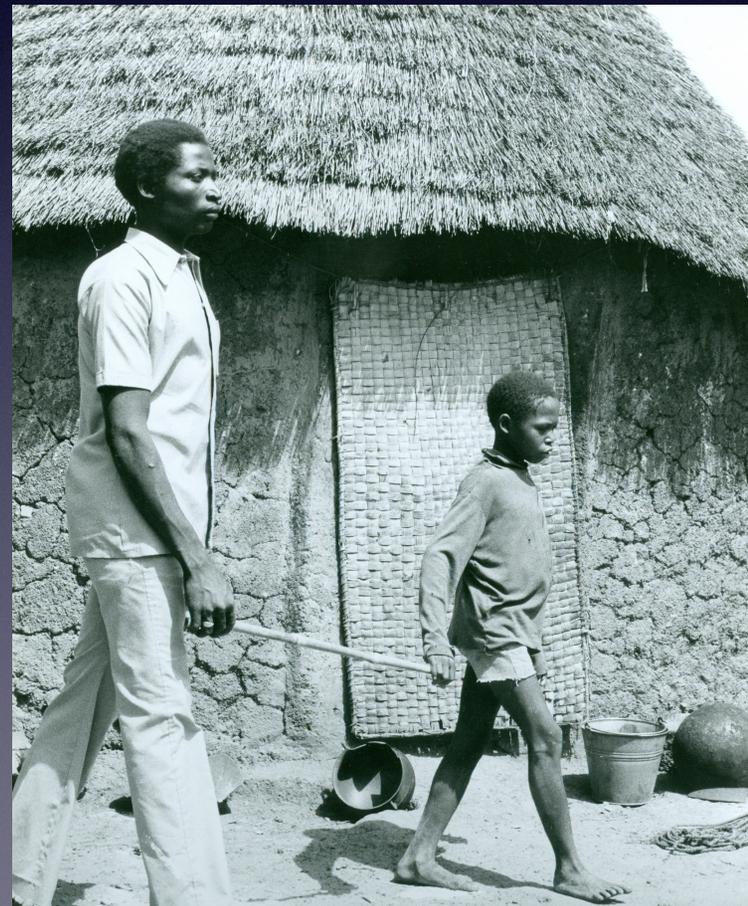
- **Definition**
 - Non-rivalry
 - Non-excludability
 - Free riding is *the* challenge.
- **Implications for the Bank**
 - Rich countries have an incentive (i) to provide finance and (ii) to ensure success.
 - If successful, all countries gain, including the poorest.
- **Provision of GPGs and development are complements.**

Riverblindness

- Begun in 1974 as an 11-country model.
- Extended in 1995 to 30 countries.
- In 2014, the goal changed to elimination in 31 countries.



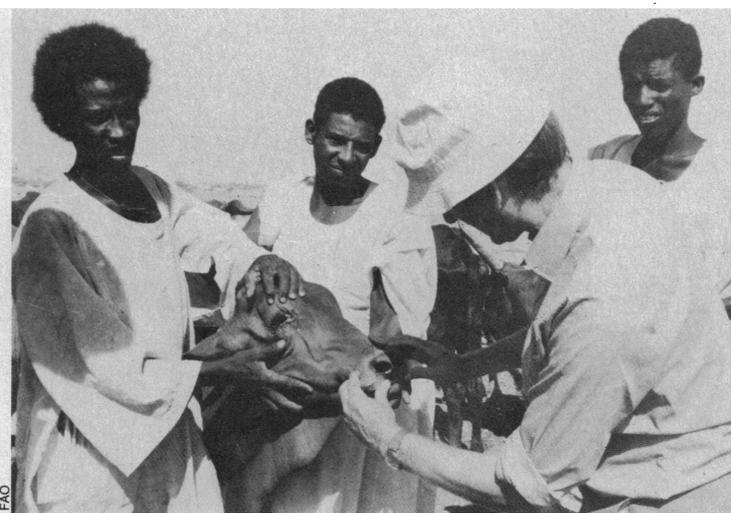
Robert McNamara



Rinderpest eradication

War on Cattle Disease Divides the Troops

Eradication of rinderpest in Africa is aim of an international campaign, but there is skepticism that the goal can be achieved soon and some agencies are not participating



Rinderpest symptoms. In Sudan, FAO veterinarian examines cow with runny eyes and lesions on the mouth that are indicators of deadly viral disease.

11 SEPTEMBER 1987

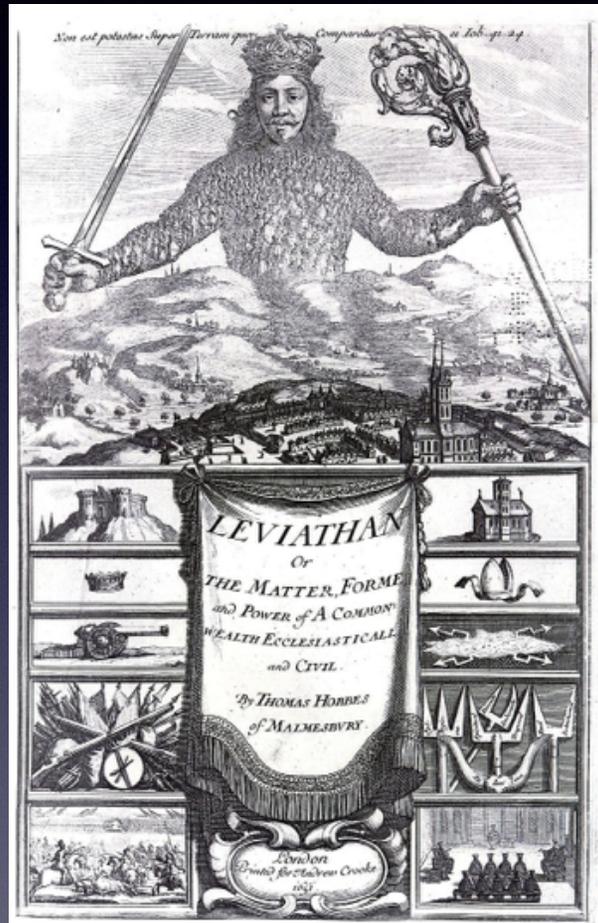
SCIENCE, VOL. 237

From the start of discussions on the rinderpest campaign, the World Bank has questioned the form and objectives of the effort. The bank was not a potential donor to PARC, which does not fit the bank rule that it make loans only for specific development projects. But the bank is represented on the committee that guides PARC and bank analyses tend to influence other donors.

Poul Sihm of the bank's technical staff says that bank objections centered on the weakness of the African veterinary services and inaccessibility of areas where there was civil strife. Sihm, a veterinarian with experience in Africa, says the bank also took into account the "question mark" over whether game animals represent a reservoir of the disease and the rumblings about PPR. He says that the bank is still arguing that "you can't eradicate rinderpest as distinct from controlling it. But you need to go on doing fire brigade work."

Launched in 1994 by UN FAO and World Organization for Animal Health; last case, 2001; certified, 2011.

Sovereignty



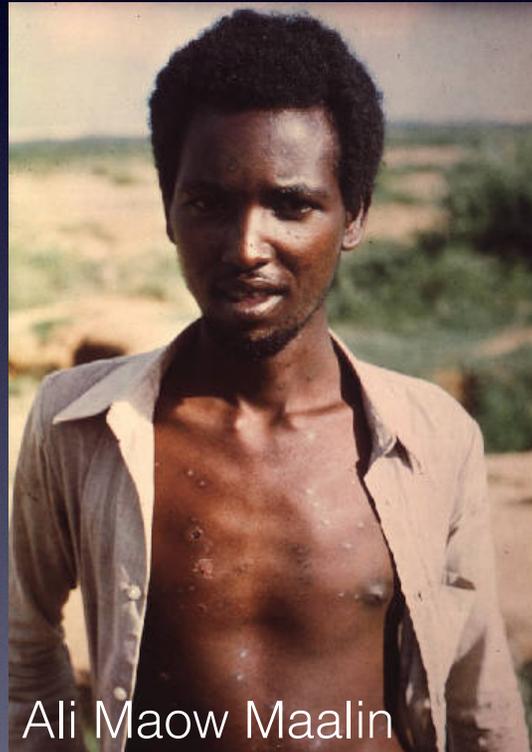
As there is no World Government, global public goods must be supplied by international agreement.

Kyoto Protocol



Peter Kent, Canada's Environment Minister, Durban 2011

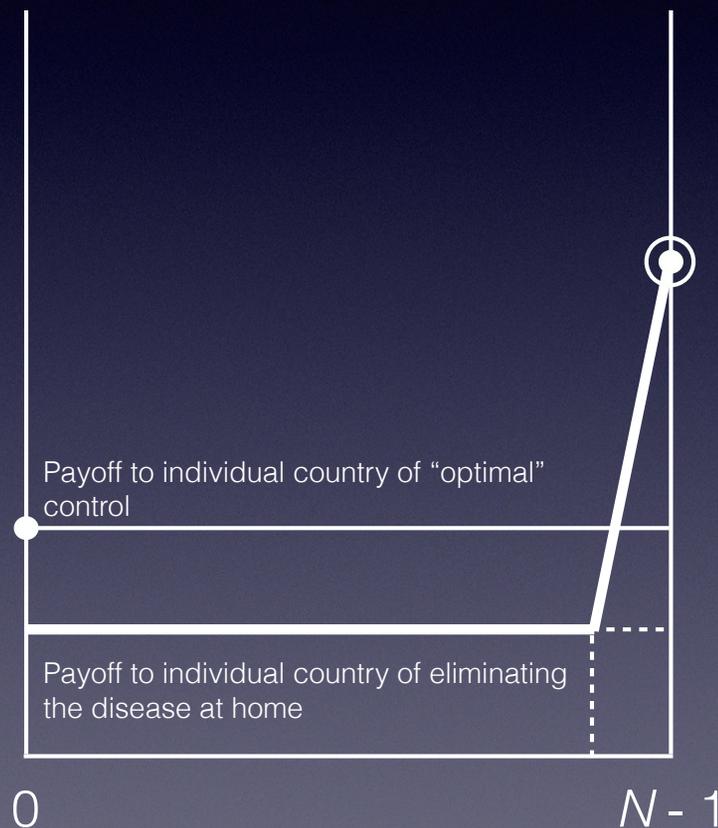
Smallpox eradication



Ali Maow Maalin

Last case, October 1977
Eradication declared May 1980

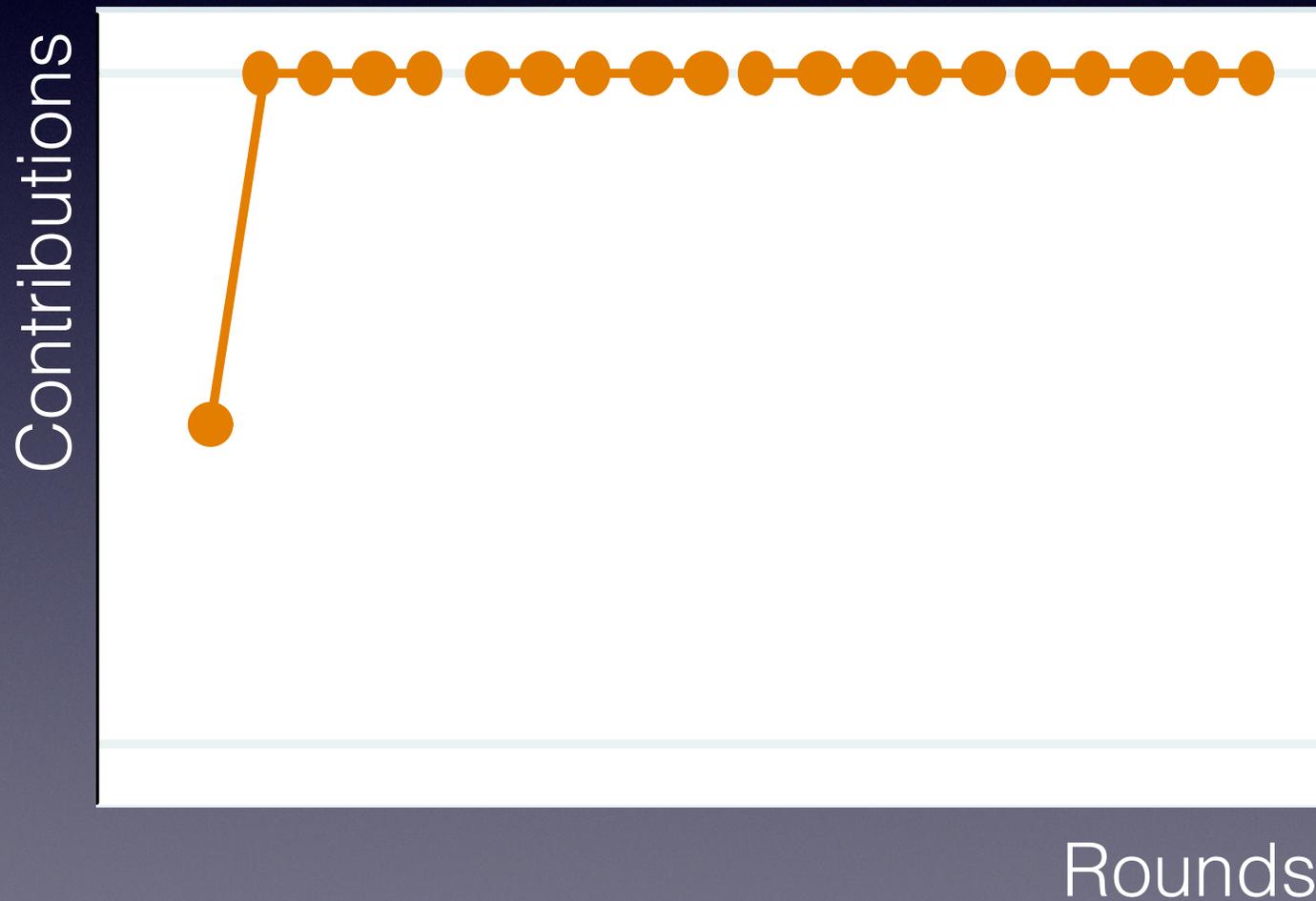
A “weakest link” game



- A disease is eradicated only if it is eliminated within **every** country.
- So long as the pathogen circulates anywhere, it doesn't pay any country to eliminate it at home.
- If pathogen eliminated everywhere else, elimination by the “last” country achieves eradication, giving all countries a dividend.
- This is an extreme form of “coordination” game.

Experiments

Players contribute or they don't.

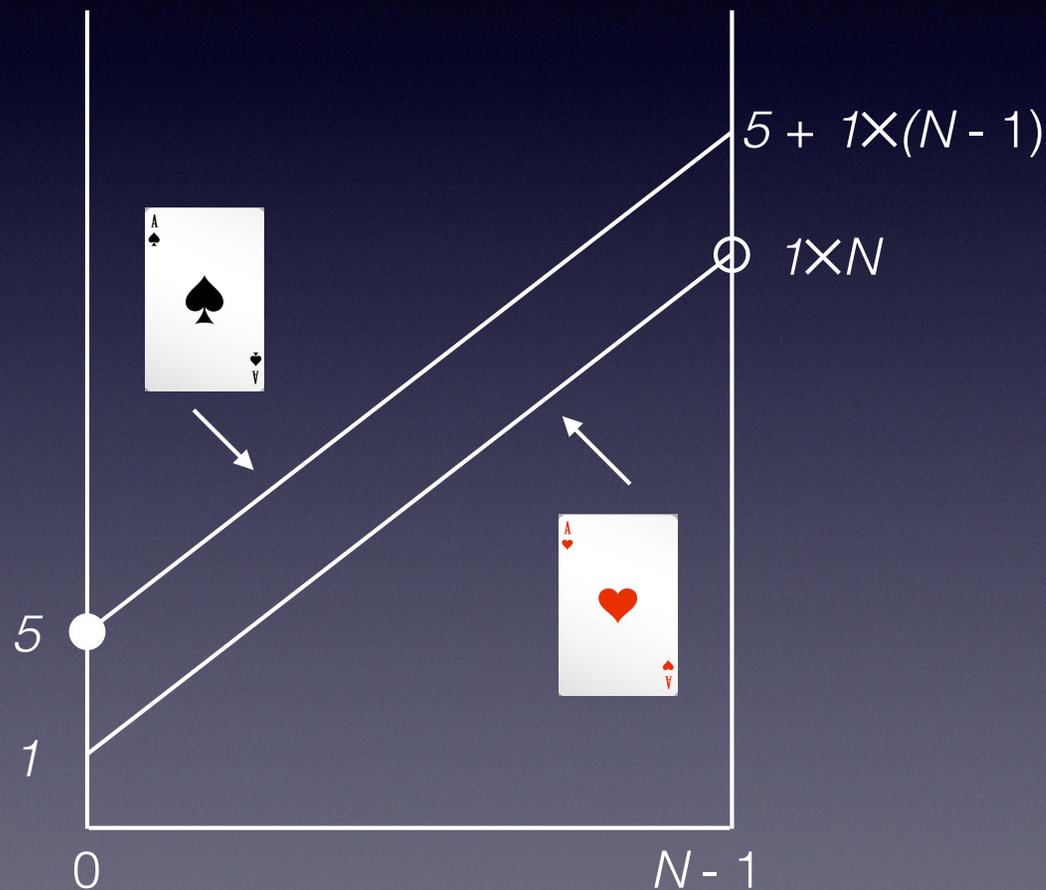


Benefit-Cost Analysis Smallpox Eradication (Millions of 1970s US dollars)

	Amount
Annual benefit to developing countries	\$1,070
Annual benefit to rich countries	\$350
Total	\$1,420
Total international expenditure	\$98
Total expenditure by endemic countries	\$200
Total	\$298
Benefit-cost ratio total cost	159:1
Benefit-cost ratio "incremental cost"	483:1

Source: Based on data from Fenner *et al.* (1988), Table 31.2, p. 1365.

The “tragedy of the commons”



- N players.
- Linear public goods game.

Number of others who hand in their red card

Experiments

Players contribute or they don't.

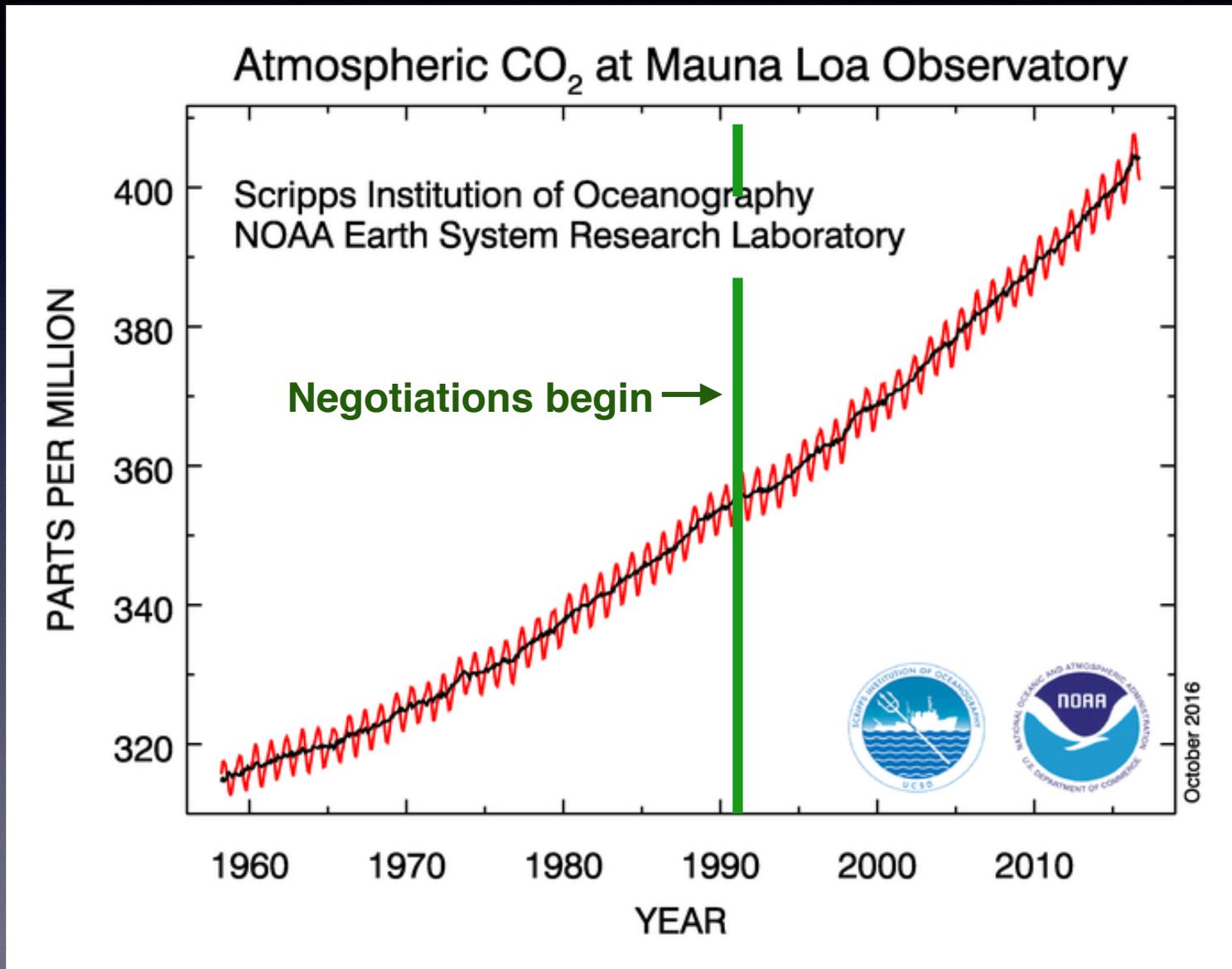


What helps

- Communication
 - But the effect wears off over time.
- Punishments
 - Lift contributions, but they have to be *used* to have this effect; payoffs may fall even if cooperation improves.
 - If retaliation is allowed, outcome worse

New research suggests Trump tariffs cost the US \$1.4bn/month in 2018. Countries that retaliated experienced similar losses.

Climate negotiations

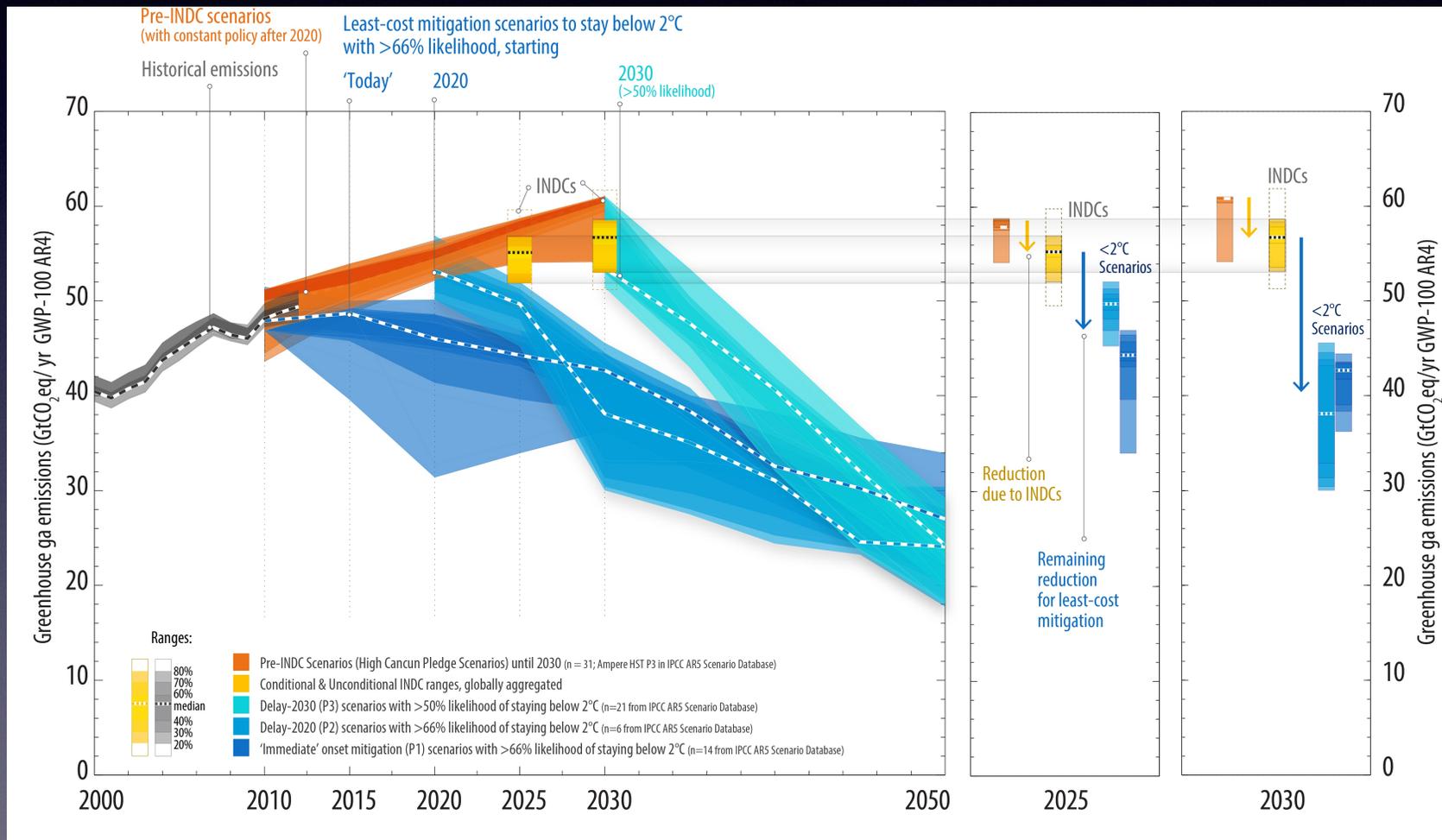


Paris Agreement



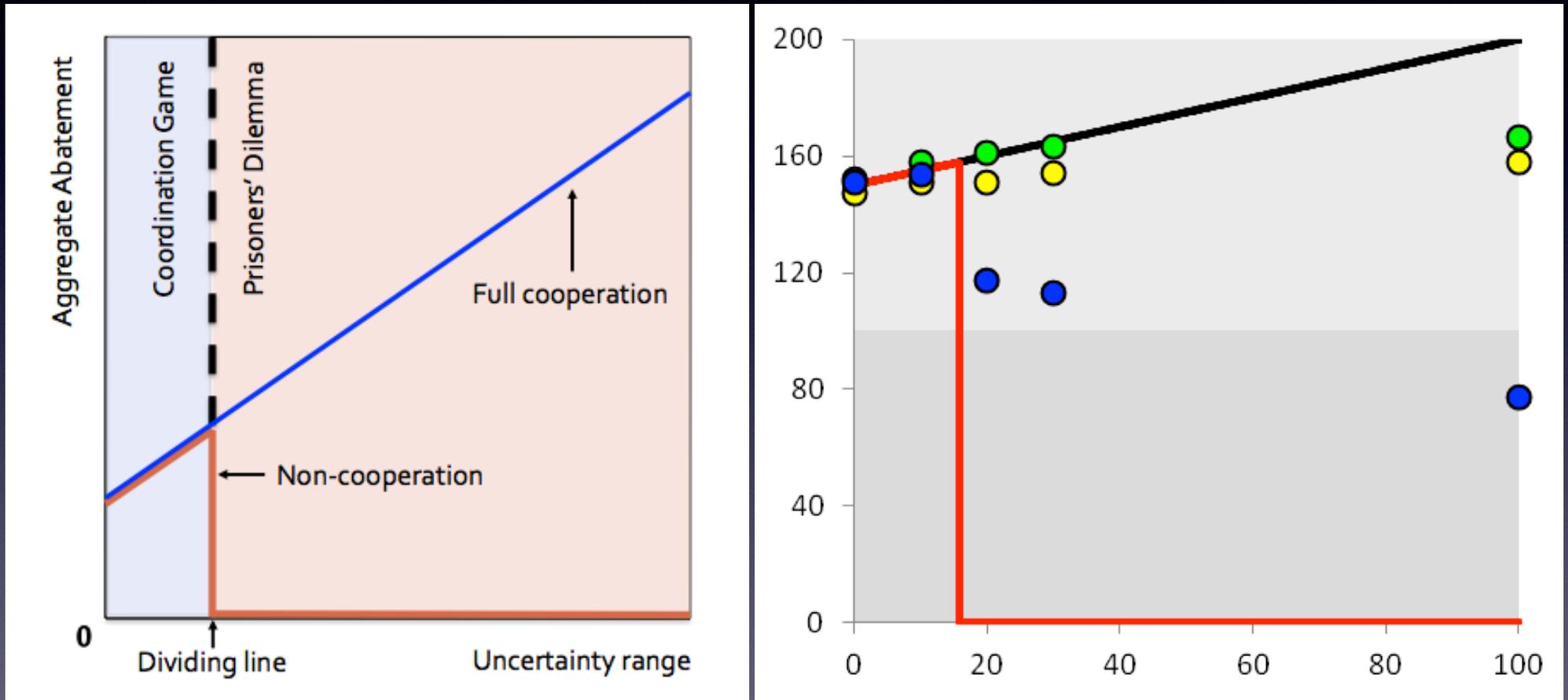
A diplomatic success, but a voluntary agreement.

Effect of Paris



Analysis by UNFCCC Secretariat.

How certain must we be?

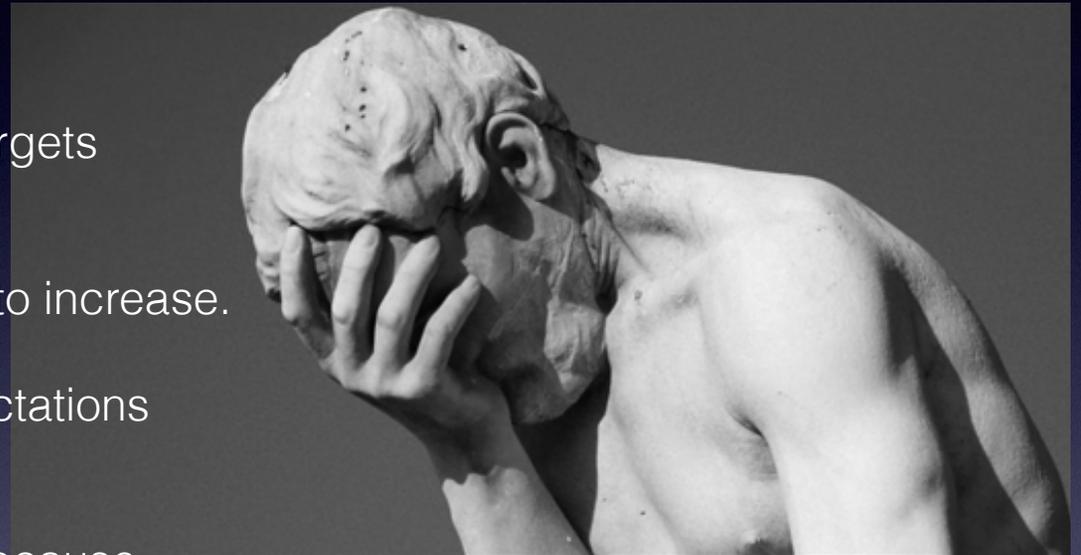


S. Barrett and A. Dannenberg (2014), "Sensitivity of Collective Action to Uncertainty about Climate Tipping Points," *Nature Climate Change* 4:36-39.

Naming and shaming

- Experimental results:

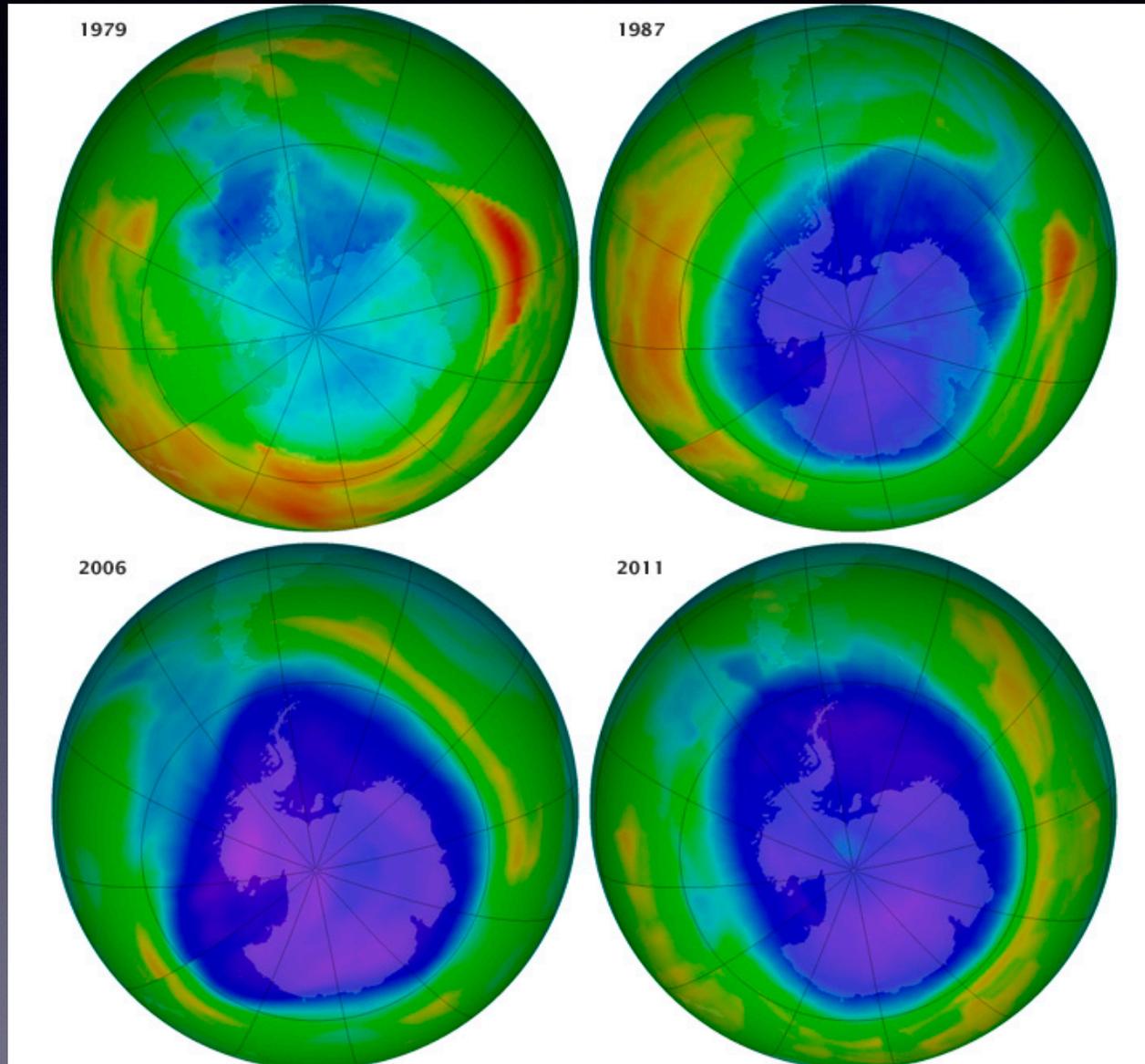
1. Review increases proposals/targets directly.
2. Higher targets cause pledges to increase.
3. Higher pledges increase expectations about others' contributions.
4. Contributions increase, both because own pledges increase and expectations about others' contributions increase.
5. However, moving down the long chain of causation, the effect of the review process on contributions loses statistical significance.



S. Barrett and A. Dannenberg (2016), "An Experimental Investigation into 'Pledge and Review' in Climate Negotiations," *Climatic Change* 138(1): 339-352.

Ozone layer

Thanks to
Montreal
Protocol,



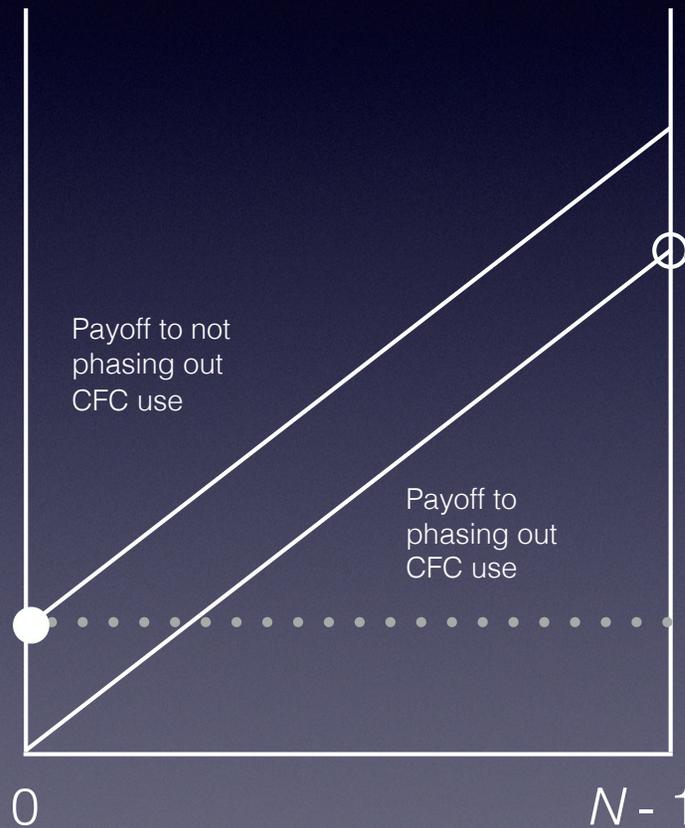
ozone
layer
should
return to
its
pre-1980
level by
the
2060s.

Montreal Protocol

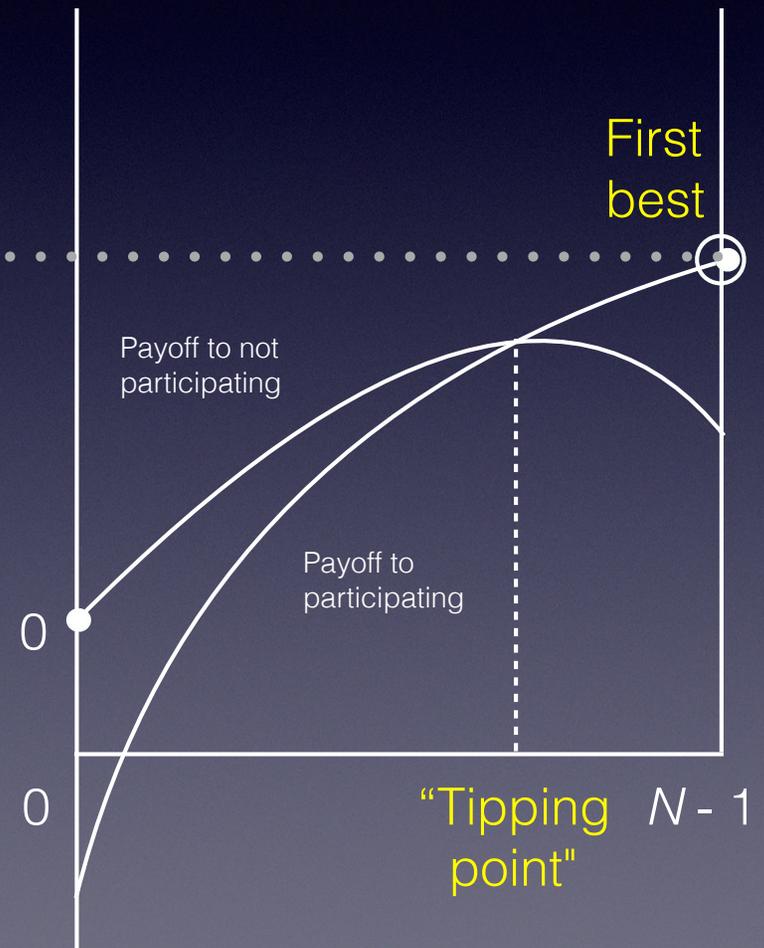
Barrett (1997)

- **Classic PD:** Players to reduce consumption.
- **Montreal:** Players to reduce consumption *and* production.
 - Side payments.
 - Trade ban between parties and non-parties.
- **Montreal made ozone protection a “coordination” game.**

Voluntary cooperation game



Montreal Protocol



Why not apply this logic to
climate change?

Kigali Amendment

Kyoto Protocol failed to limit HFCs.



Kigali will succeed better.

October 2016

Why didn't countries pursue this approach from the beginning?

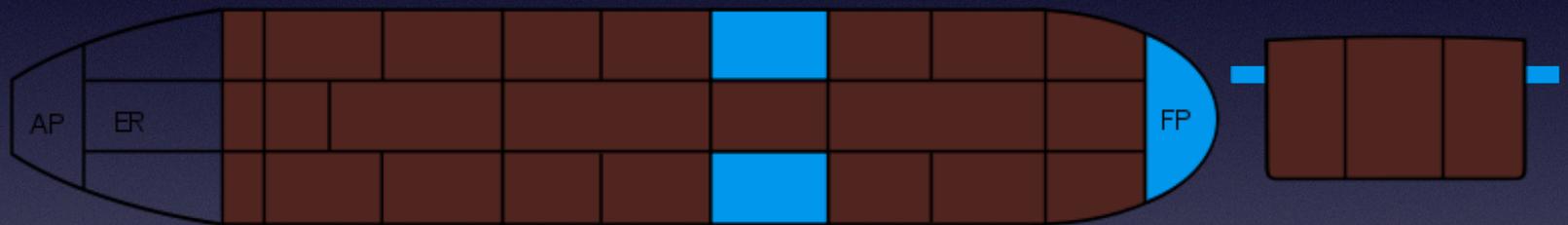
Why aren't they pursuing this approach for more sectors now?



MARPOL

Evolution of tanker design

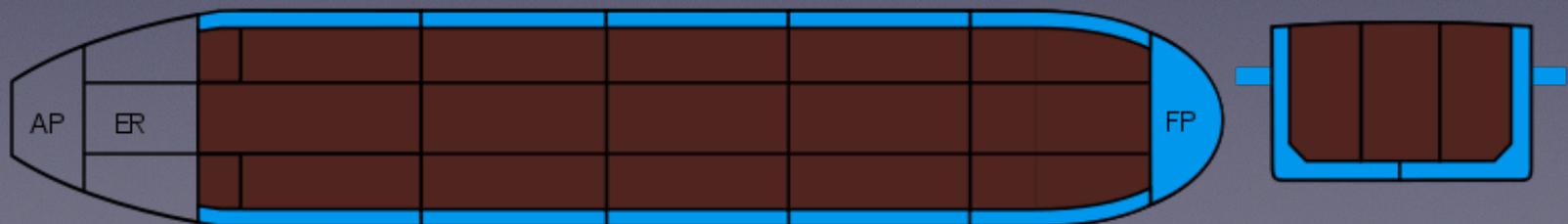
Pre-MARPOL



MARPOL



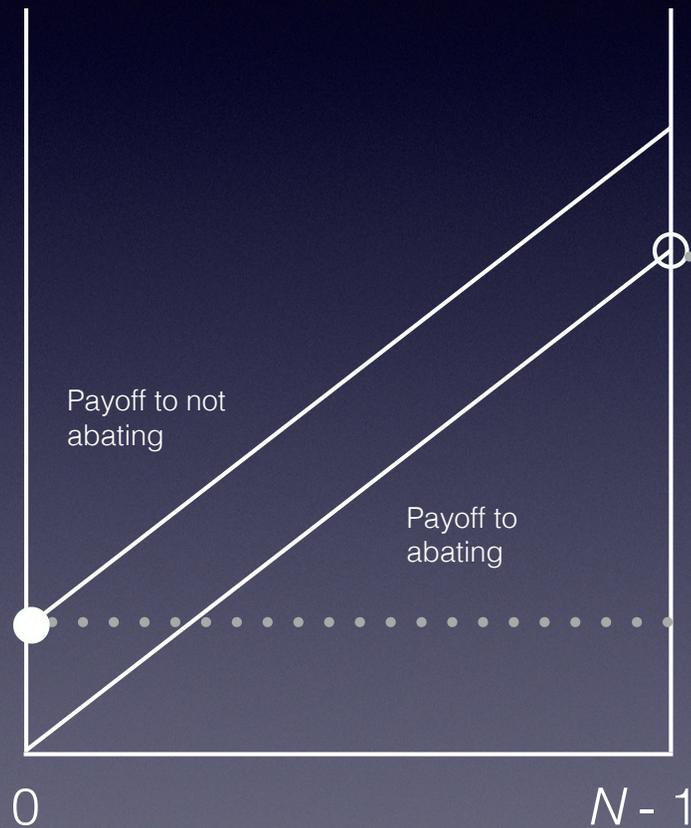
Double hull



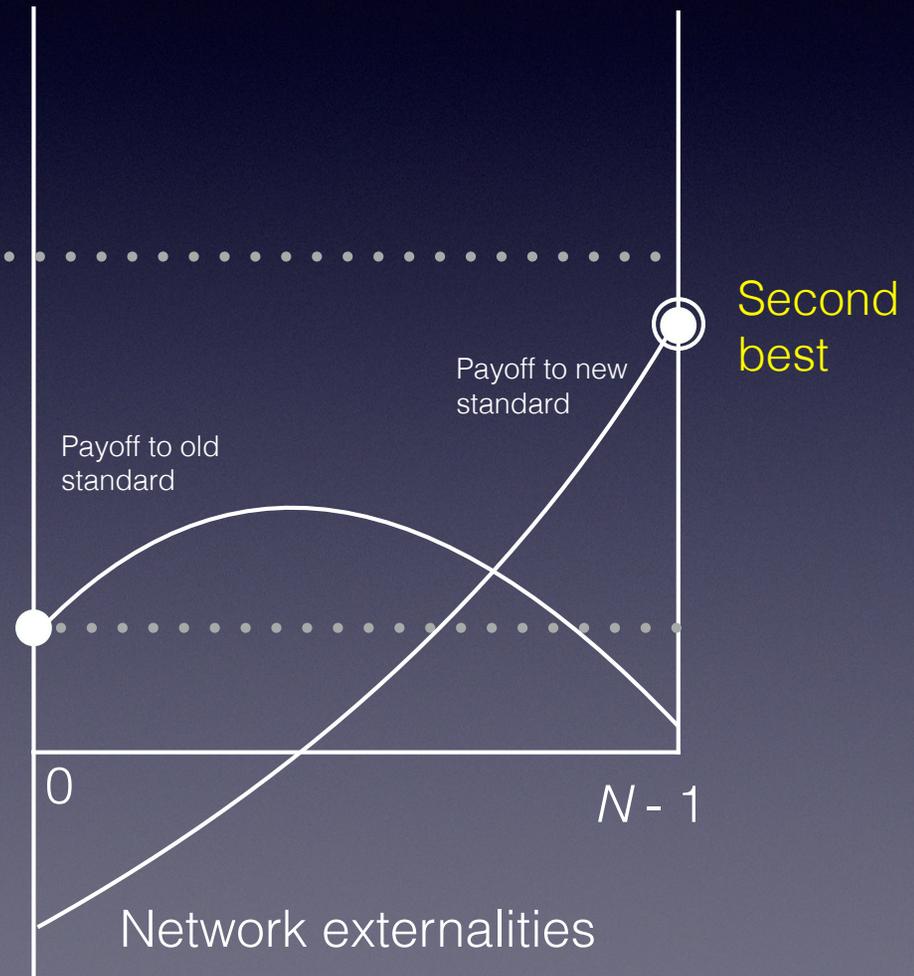
Tanker regulations

Barrett (2006)

Performance standards game



Technology standards game

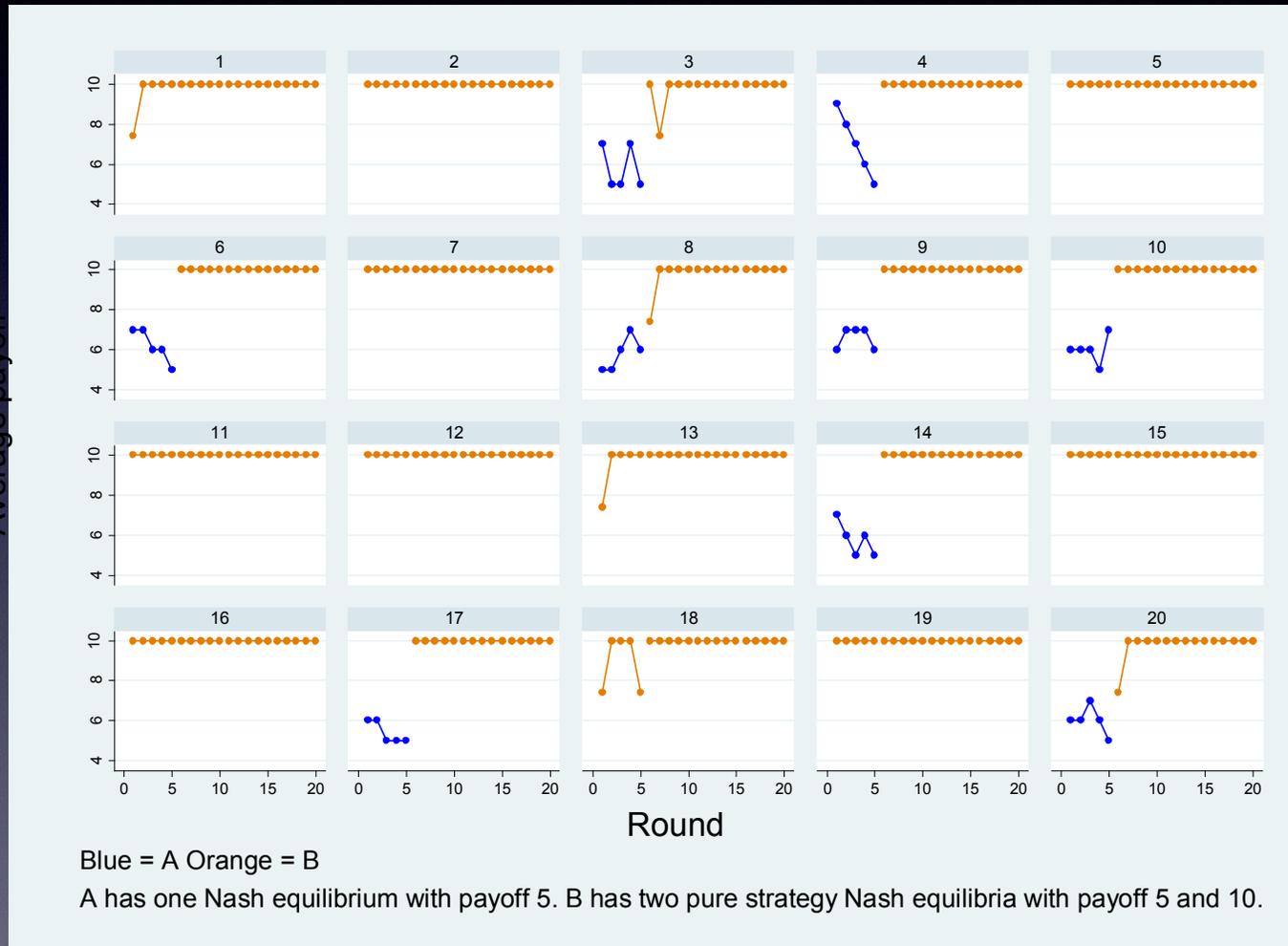


Which game to play?

- Unlike Montreal, the answer isn't obvious.
- Voluntary cooperation might possibly achieve a first best.
- Coordination means settling for less.

Coordination game first best

Choice of A
versus B
random at
first.



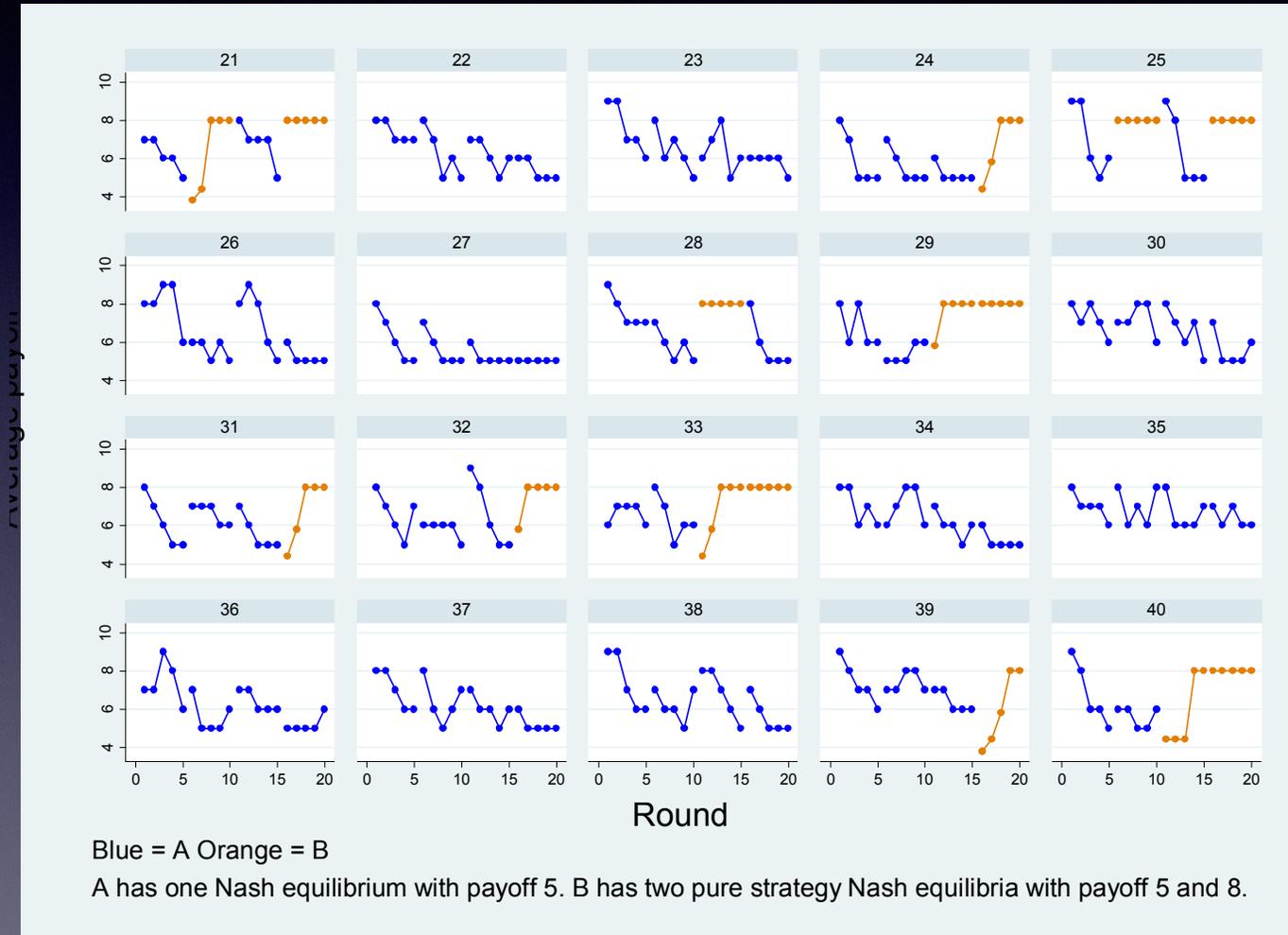
Payoffs

But
coordination
succeeds
when tried.

S. Barrett and A. Dannenberg (2017), "Tipping versus Cooperating to Supply a Public Good," *Journal of the European Economic Association* 15(4): 910-941.

Coordination second best

At first, all groups choose A!



Payoffs

Half the groups try B, and these do better.

Half never try and they think they've chosen wisely!

S. Barrett and A. Dannenberg (2017), "Tipping versus Cooperating to Supply a Public Good," *Journal of the European Economic Association* 15(4): 910-941.



"Let's sign no more trade agreements with powers that don't respect the Paris Agreement for climate change."

Emmanuel Macron, President of France
United Nations General Assembly, 25 September 2018

Nordhaus "Climate Clubs"

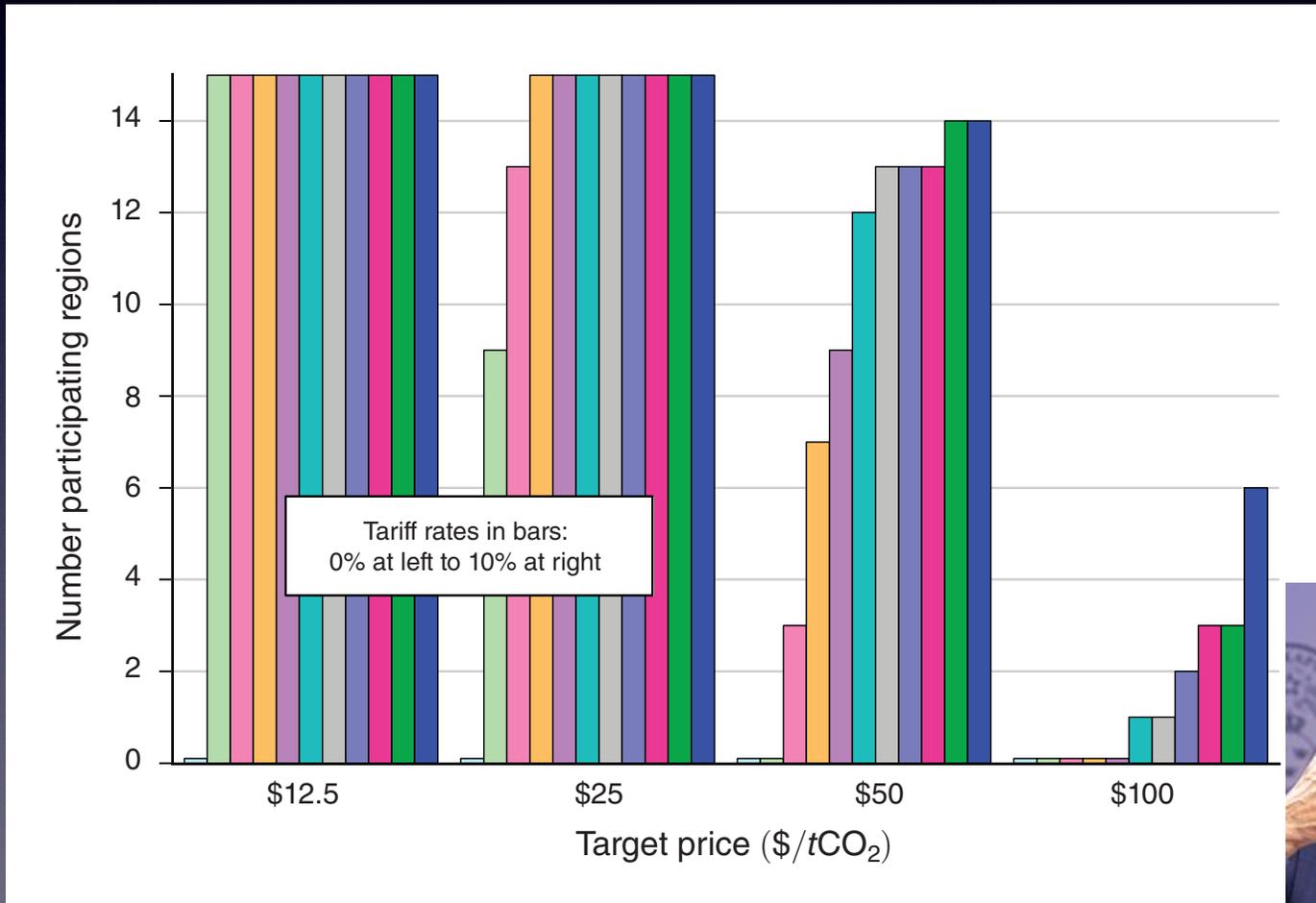
**Without
retaliation**

PD

Chicken

Coordination

Cooperation



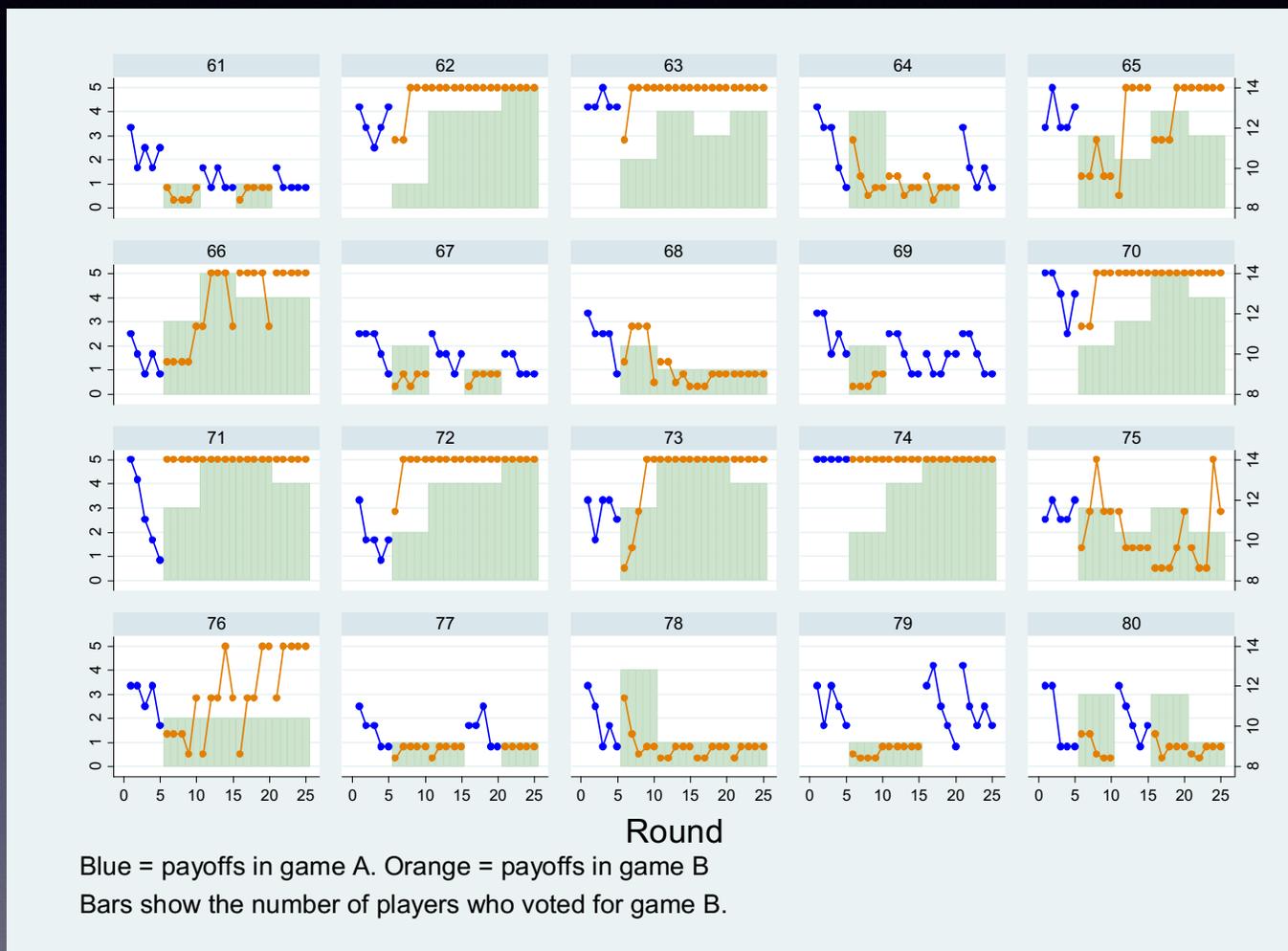
**With
retaliation**

PD

Coordination
("best case")



“Best” case: Unilateral

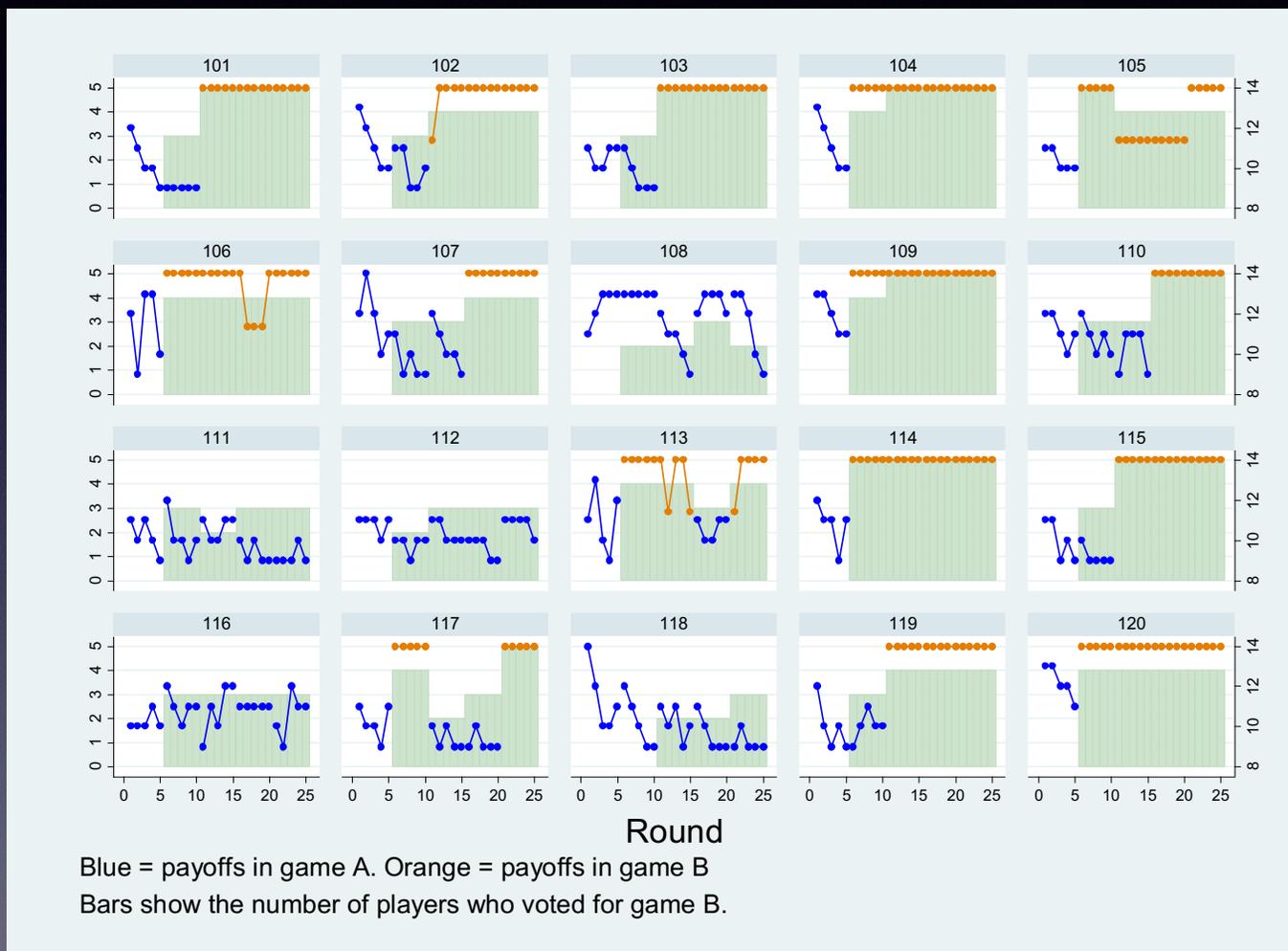


Payoffs

Unilateral is risky.

All groups try B, but only half coordinate.

“Best” case: Multilateral



Payoffs

Multilateral is better.

Three-quarters of groups try B; all coordinate.

Conclusions

- Multilateralism, when effective, promises huge rewards.
- Voluntary cooperation is difficult.
- Coordination is more likely to succeed.
- For multilateralism to succeed, we should ask countries to do what they're good at doing, and not what they're bad at doing.