Rethinking Climate Negotiations

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(joint research with Astrid Dannenberg)

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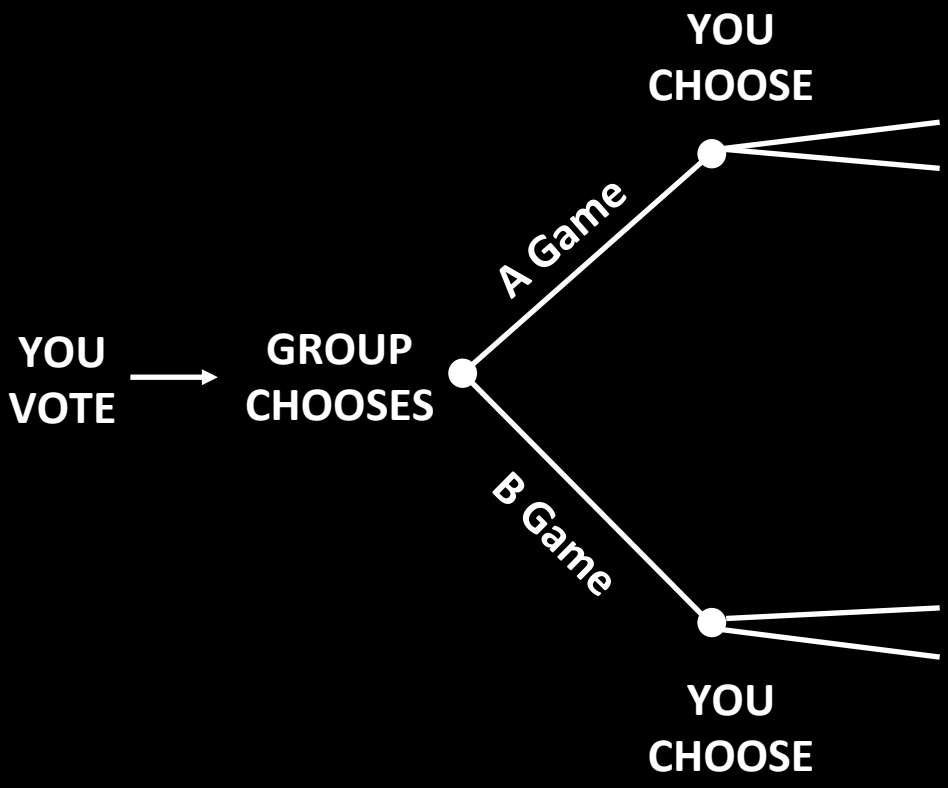
Which game do you choose, A or B?



A	Number of red cards handed in by your co-players				
	0	**1**	**2**	**3**	**4**
Red	2	4	6	8	10
Black	5	7	9	11	13

B	Number of red cards handed in by your co-players				
	0	**1**	**2**	**3**	**4**
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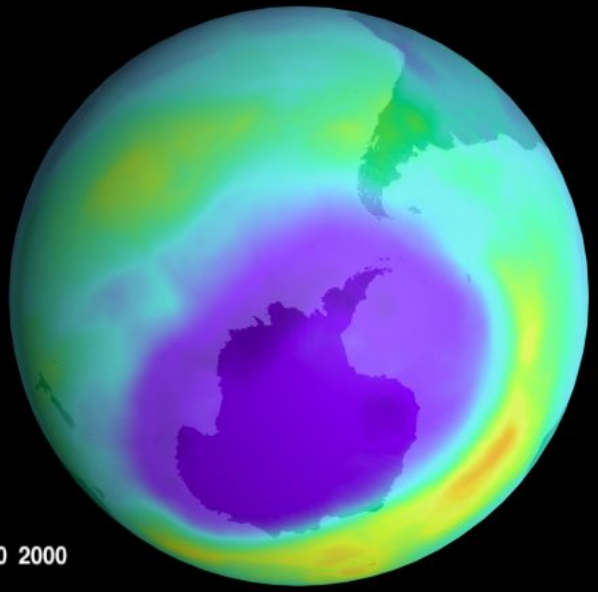
Black	5	5	5	5	5

Collective action reconsidered

- Climate talks have focused on national emission limits or "contributions."
  - This is the A game, the *prisoners' dilemma*.
  - Success depends on altruism or enforcement.
  - Kyoto provides no mechanism for enforcement; altruism seems unreliable.
- Is there another way to frame the solution to a problem like climate change? A B game?

Two important histories

Montreal Protocol on Substances that Deplete the Ozone Layer.



MARPOL (International Convention for the Prevention of Pollution by Ships).

Two successful outcomes

- Montreal limited consumption plus production, and banned trade between parties and non-parties.
- MARPOL eventually adopted a technology standard, banning trade between parties and non-parties.
- Both agreements framed their challenges as requiring coordination—the B game.

Segregated ballast tanks

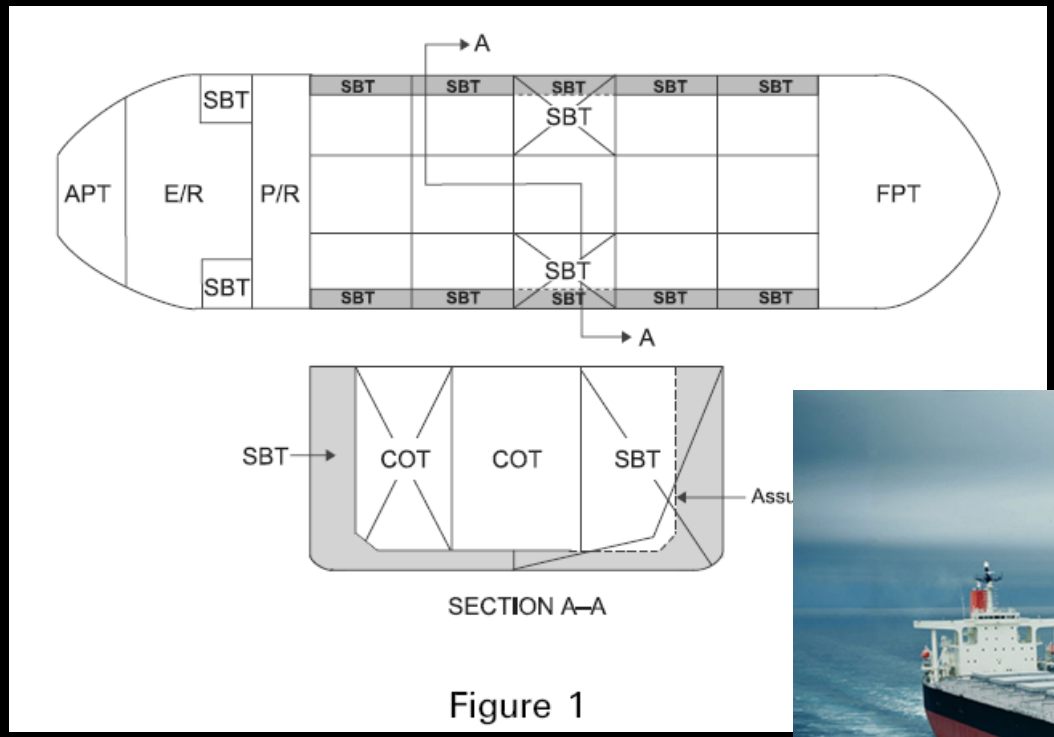


Figure 1

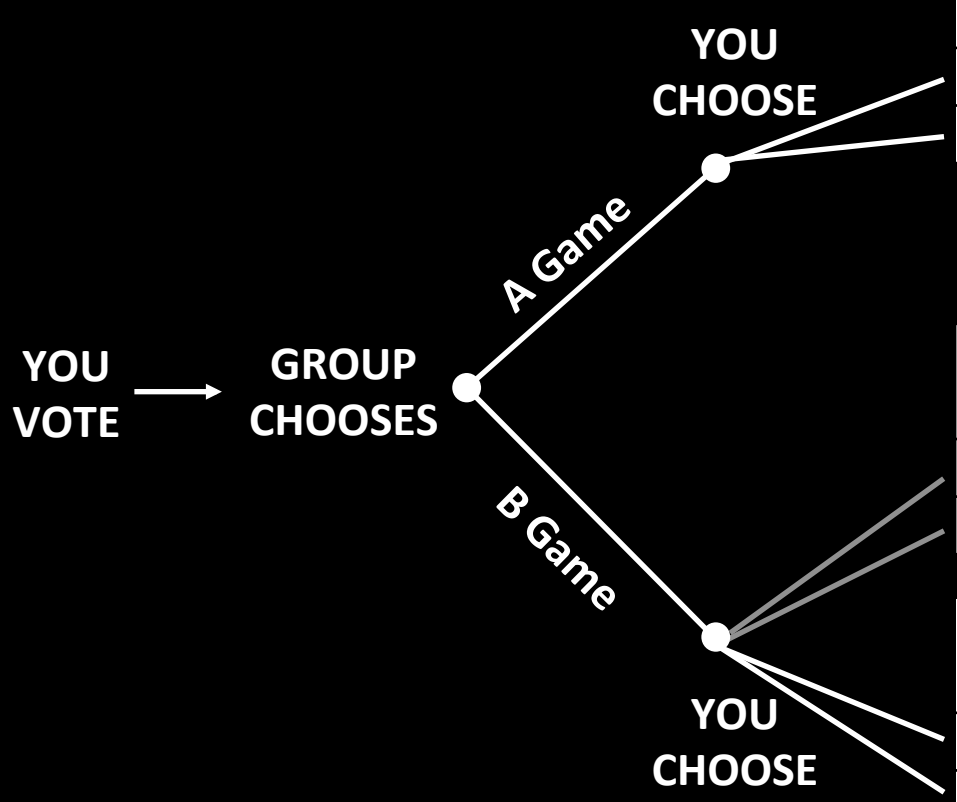
Montreal v. MARPOL

	Montreal	MARPOL
Timing	Incorporated trade restrictions from the beginning.	Tried limiting tanker emissions for 50 years before adopting technology standard.
Efficiency	No loss in efficiency (B-10)	Significant loss in efficiency (B-8)

Climate negotiations

as a game

B-8 Treatment



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B-10	Number of red cards handed in by your co-players				
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Red	2	4	6	8	10
Black	5	5	5	5	5

B-8	Number of red cards handed in by your co-players				
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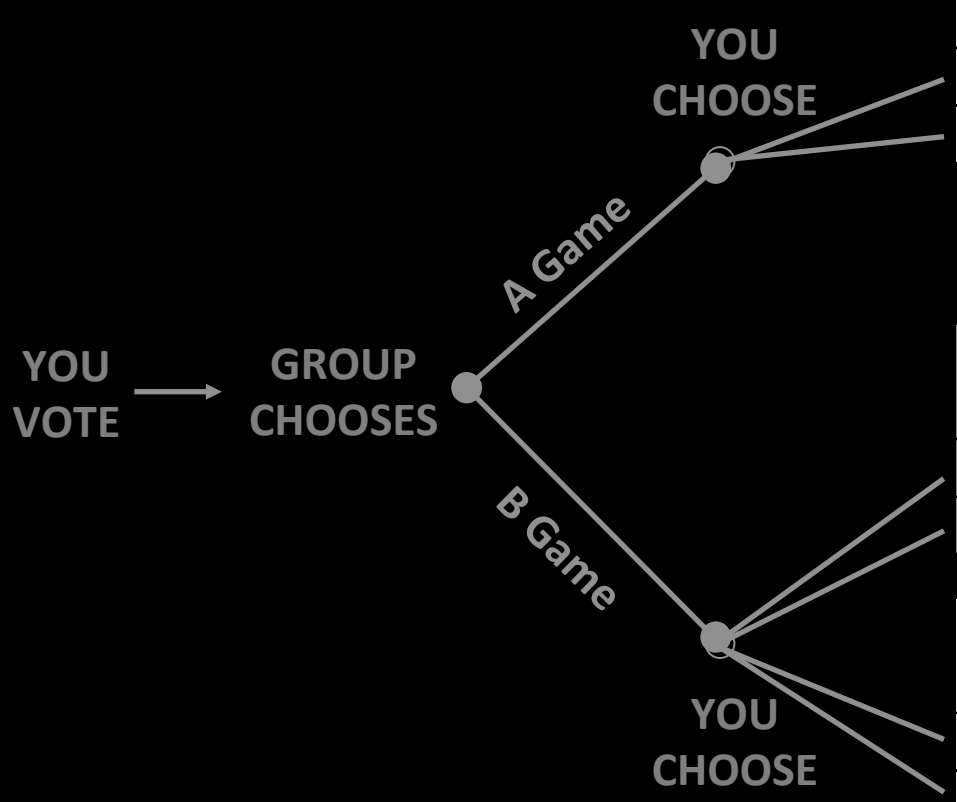
B-8 significant loss in efficiency



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Black	5	7	9	11	1

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B-8	Number of red cards handed in by your co-players				
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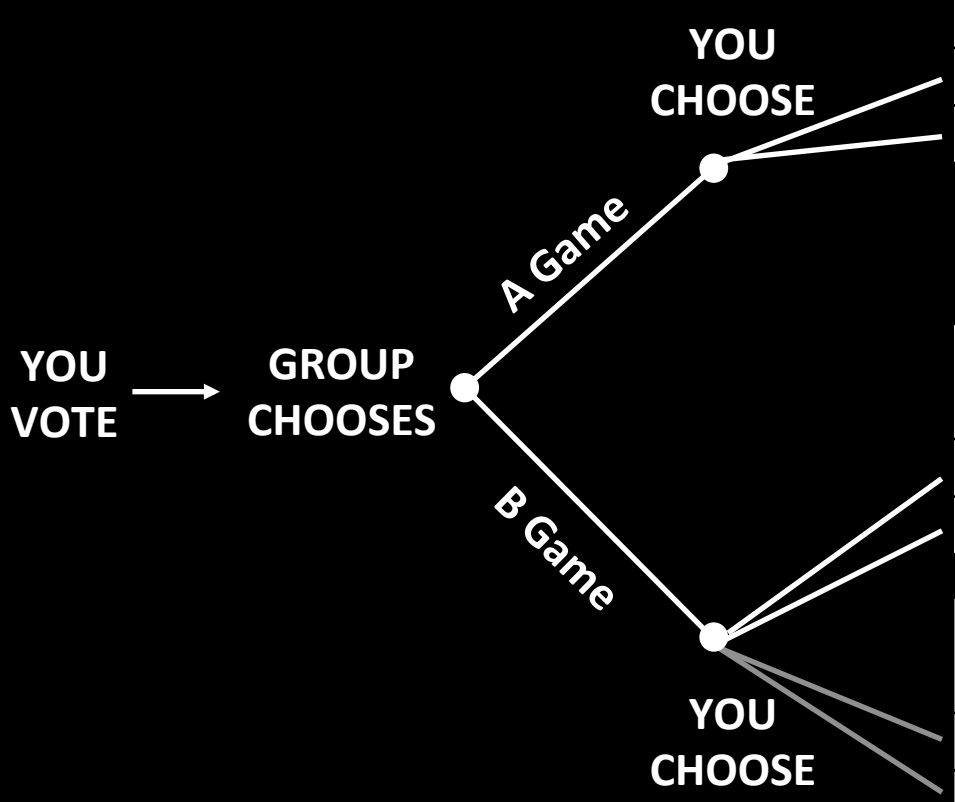
B-10 treatment



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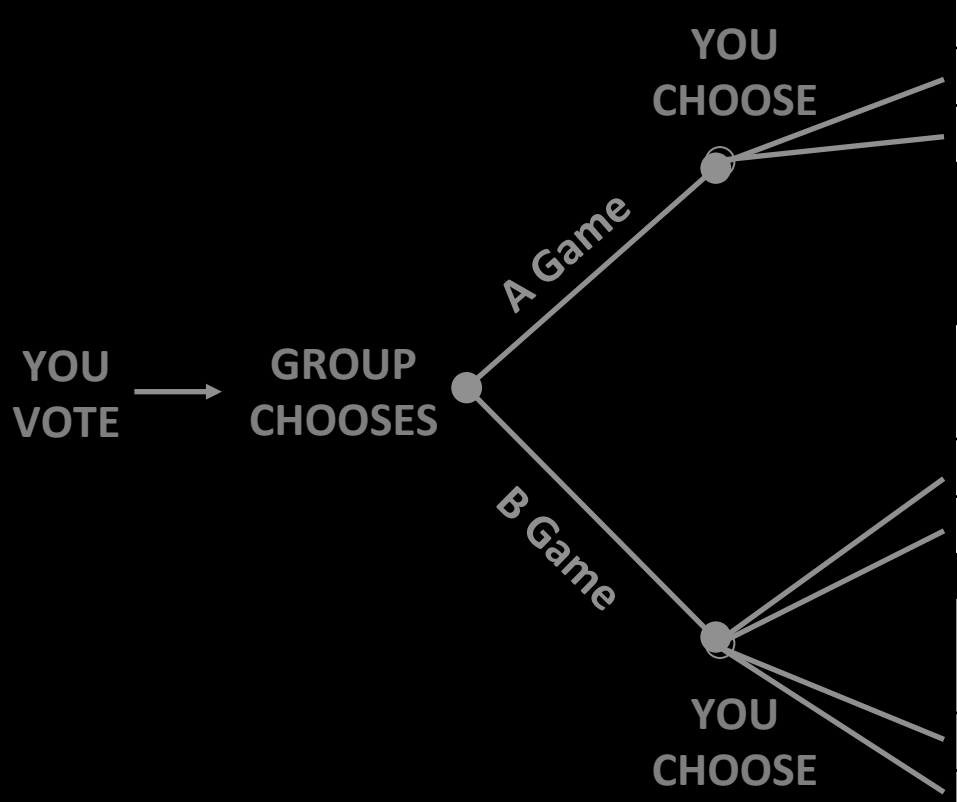
B-10 no loss in efficiency



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B-8	Number of red cards handed in by your co-players				
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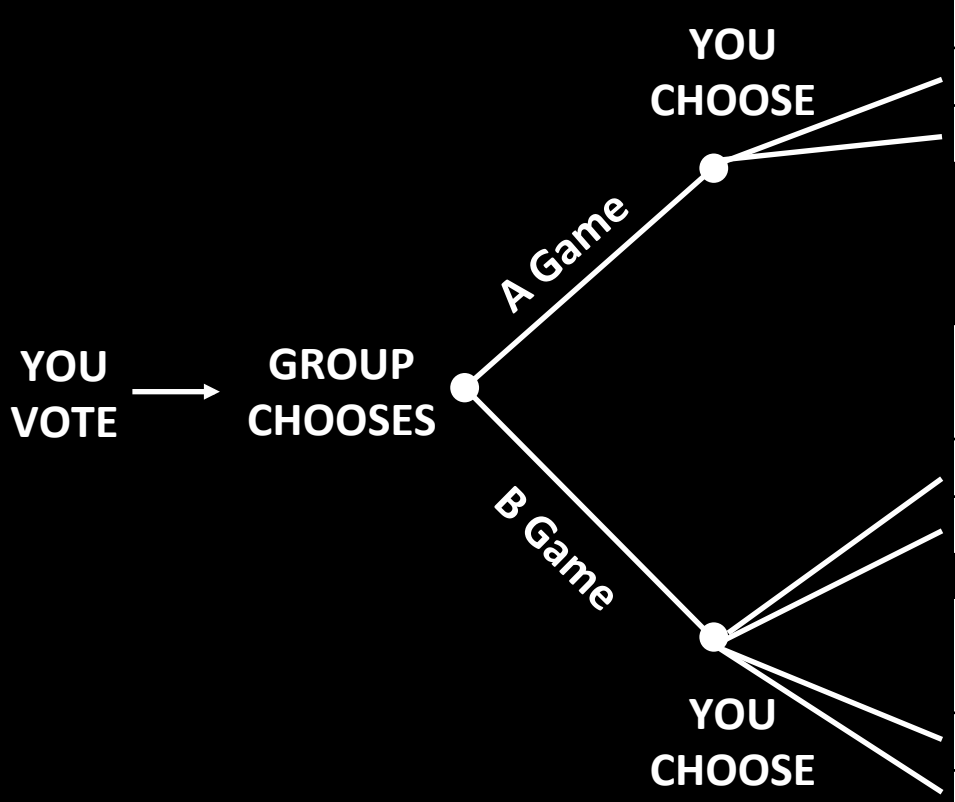
Tipping point is higher for *B-8*



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B-8	Number of red cards handed in by your co-players				
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Red	0	2	4	6	8
Black	5	5	5	5	5

How will people play?

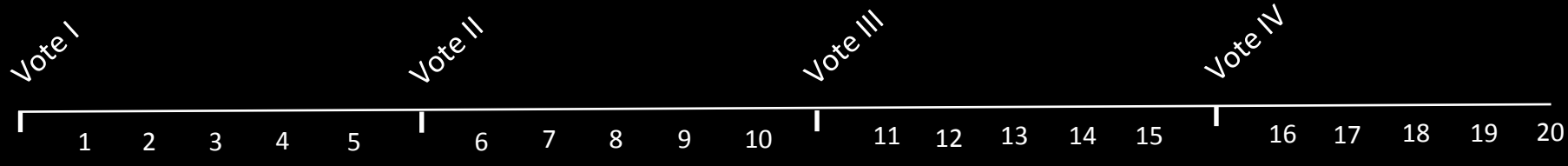
- In B-10, there are strong reasons to go for B.
- In B-8, it's not so clear.
  - A is enticing—potentially more efficient.
  - B is risky.

Experimental design

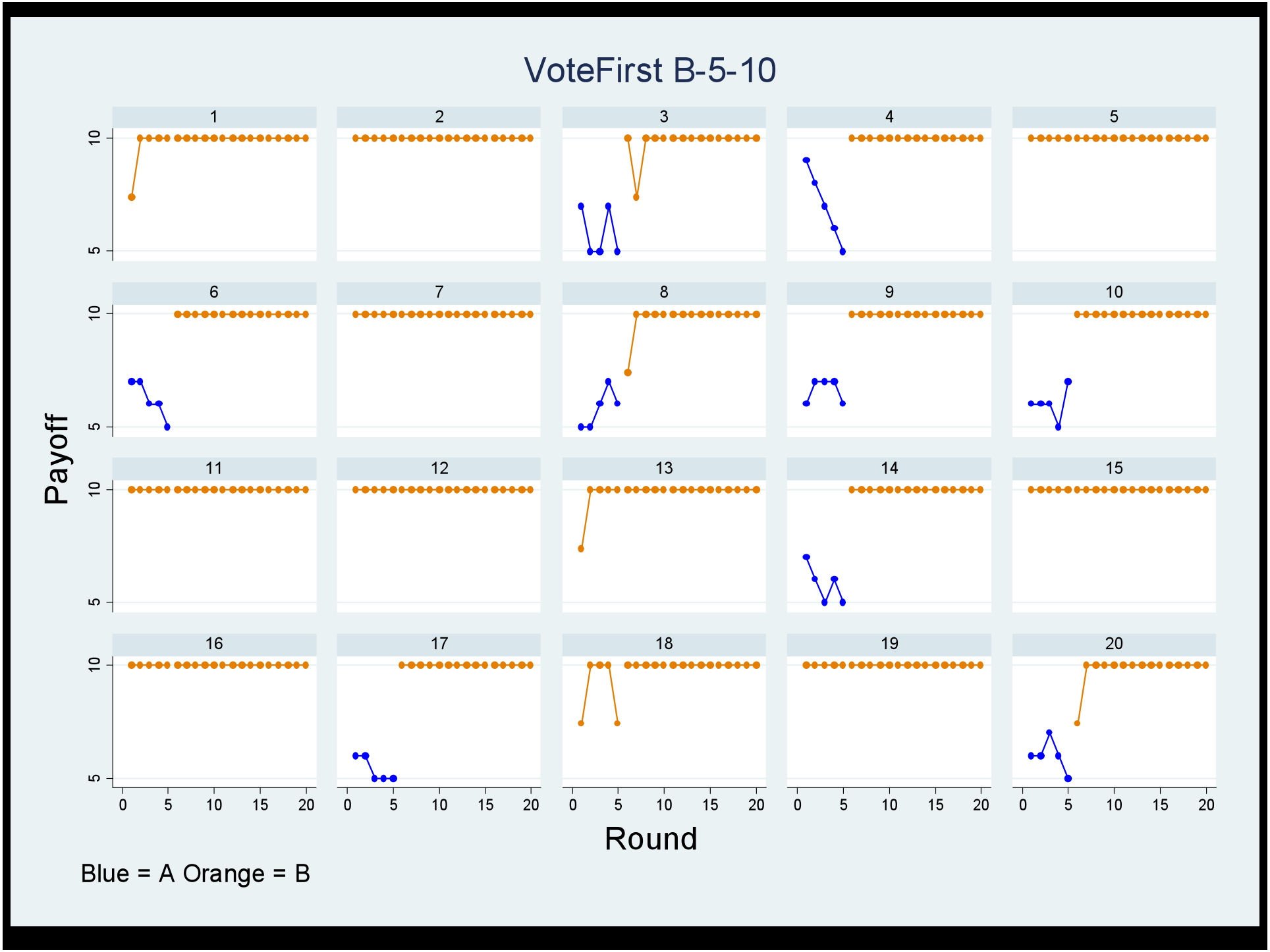
- 5 players per group; undergraduates in Germany, earn an average of about €20.
- 4 phases.

The game

Treatment “Vote First”

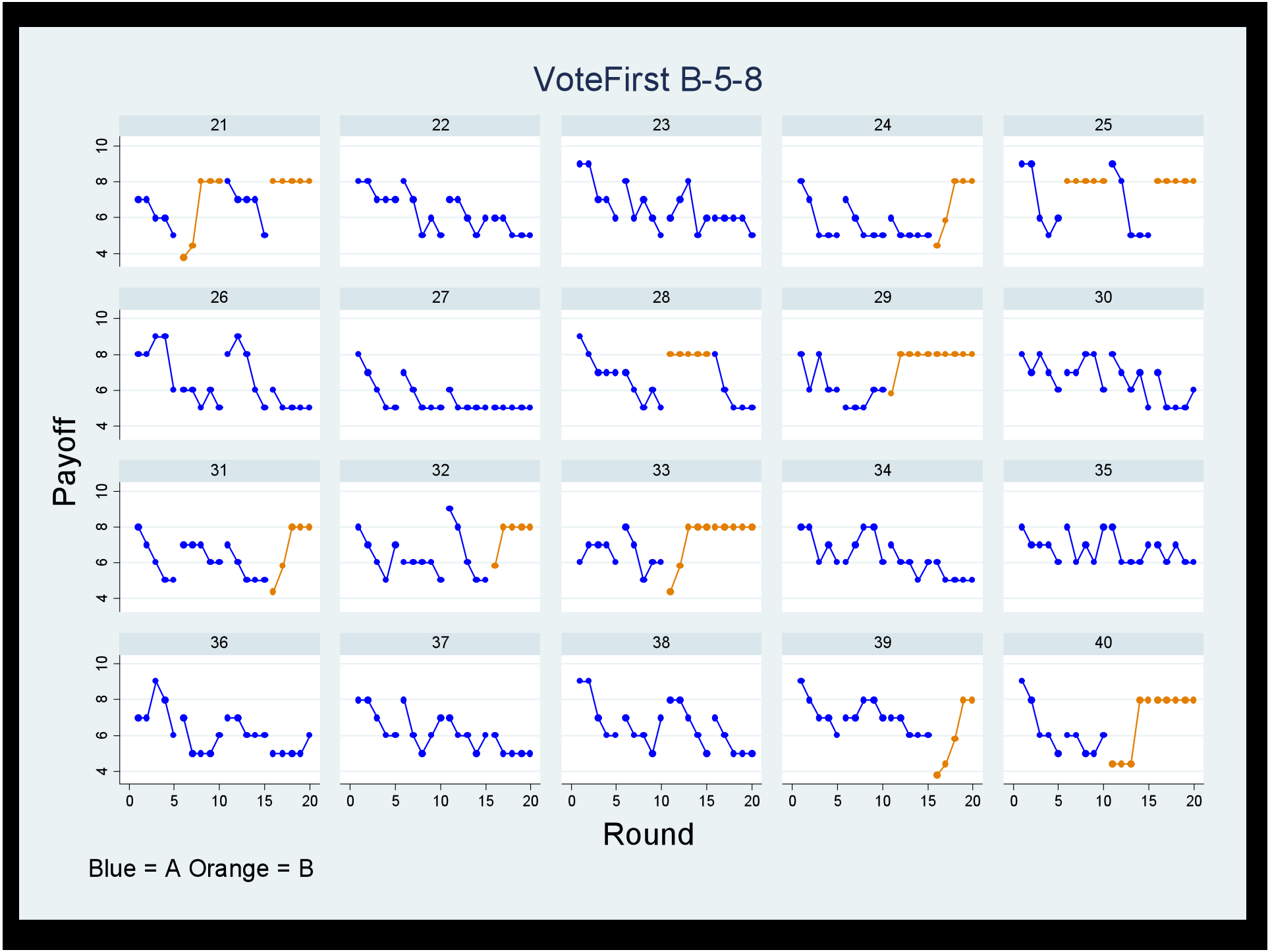


Results


VoteFirst B-5-10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Payoff
10
5
0
5
10
15
20
Round
Blue = A Orange = B

Result 1

- For B-10, all groups move decisively for B.


VoteFirst B-5-8
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
Payoff
4
6
8
10
0
5
10
15
20
Round
Blue = A Orange = B

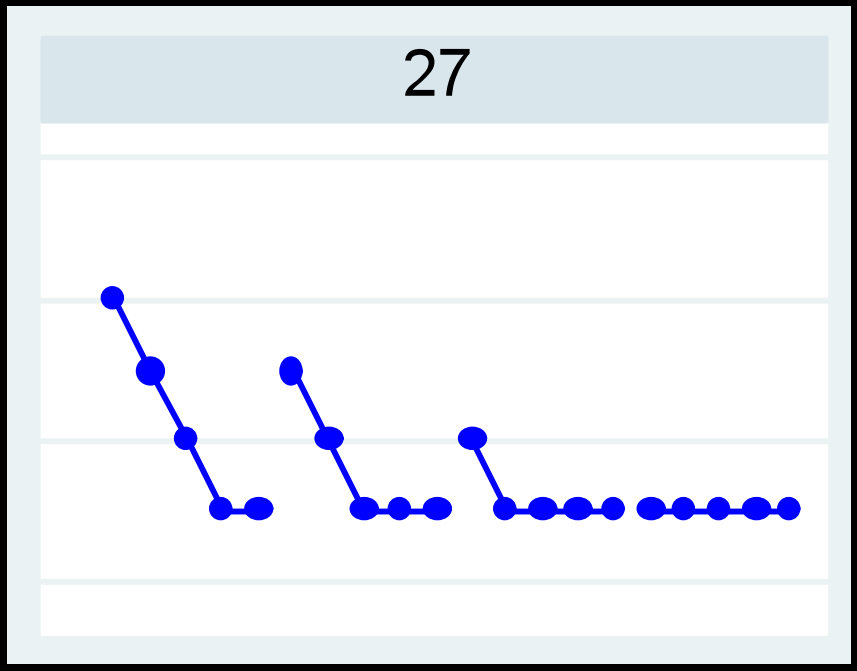
Result 2

- For B-8, some groups move reluctantly to B, but about half the groups never try B.

Votes, contributions, payoffs

Voting round	Game	Vote-First-B-10			Vote-First-B-8		
		% Groups	Avg. % Red cards	Average payoff	% Groups	Avg. % Red cards	Average payoff
1	A	45	21	6.1	100	39	7.0
	B	55	99	9.8	0	--	--
2	A	0	--	--	90	24	6.2
	B	100	100	9.9	10	90	7.2
3	A	0	--	--	80	26	6.3
	B	100	100	10	20	90	7.1
4	A	0	--	--	55	10	5.5
	B	100	100	10	45	94	7.5

Result 3. *In both treatments, contributions and payoffs are higher in B than in A.*



Result 4. *In B-8, half the groups get "trapped" in A. They would probably do better by switching, but they don't switch.*

The Kyoto syndrome.

Escaping the trap?

Further research shows:

Result 5. *Groups that escape the trap are "pushed" out of A and "pulled" towards B.*

Policy implications: climate change

- We need to escape from the A-trap.
- Models for B include:
  - Amend the MP to include HFCs.
  - Require that aluminum production use inert anodes (to reduce PFCs); restrict trade with countries that don't adopt this process standard.
  - Fuel efficiency standards for airplanes (ICAO), again enforced by trade restrictions.
- This approach is less potentially efficient, but more likely to be effective.
- The approaches needn't be mutually exclusive.