

Winter Academy 2019

Introduction to
game theory and
social choice theory,
applied to

the democratic challenge
of climate change

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December 21st 2019

Plan

- **Concepts**
- The social dilemma
- Preferences aggregation
- Role game

The approach

- Political actors
 - Citizens
 - Politicians
 - Civil servants
 - Interest groups / lobbies
- are **rational** and **self-interested**

Why is it useful?

- We leave aside the common good and the general interest (temporarily!) and focus on group dynamics
- The goal of this presentation
 - Add perspectives on the challenge of climate change
 - Applicable to (many) other settings

These are just models!

- Positive analysis: what happens in reality
- Normative analysis: what should happen
- Understanding these dynamics help to further our work for the common good

Public good vs. commons

- Public good
 - Non-excludable
 - Non-rivalrous
 - Must be provided by the state (defence, maintenance of historical monuments, etc.)
- Common good
 - Non-excludable
 - Rivalrous
 - **Tragedy of the commons**

Externalities and incentives

- Positive externalities
 - Education, clustering of companies, biodiversity of non-intensive agriculture, etc.
- Negative externalities
 - Pollution, traffic congestion, some farming
- Market failure
 - The State must intervene with incentives and disincentives

Winners and losers

- In trade policy as in environmental policy we consider countries, but the effects varies within them
- Anecdote: what they think in my village in Brandenburg

Framing the debate

- If we consider only carbon emissions, France is great thanks to nuclear energy, but it also pollutes
- Germany are environmentalists for a long time, but their carbon emissions are huge, because of coal
- The genius of the Paris targets

Consumed carbon

- Focus of global climate policy has mostly been on reducing carbon production
- But carbon consumption create harmful incentives: outsource dirty industries to poorer, authoritarian countries
- Carbon pollution also harms locally

Concepts: wrap-up

- Characteristics of the climate issue
 - Global negative externalities
 - Tragedy of the commons
 - No world state to deal with it
- From a democratic point of view
 - Mitigation impacts people differently
 - It is easy to just look nice

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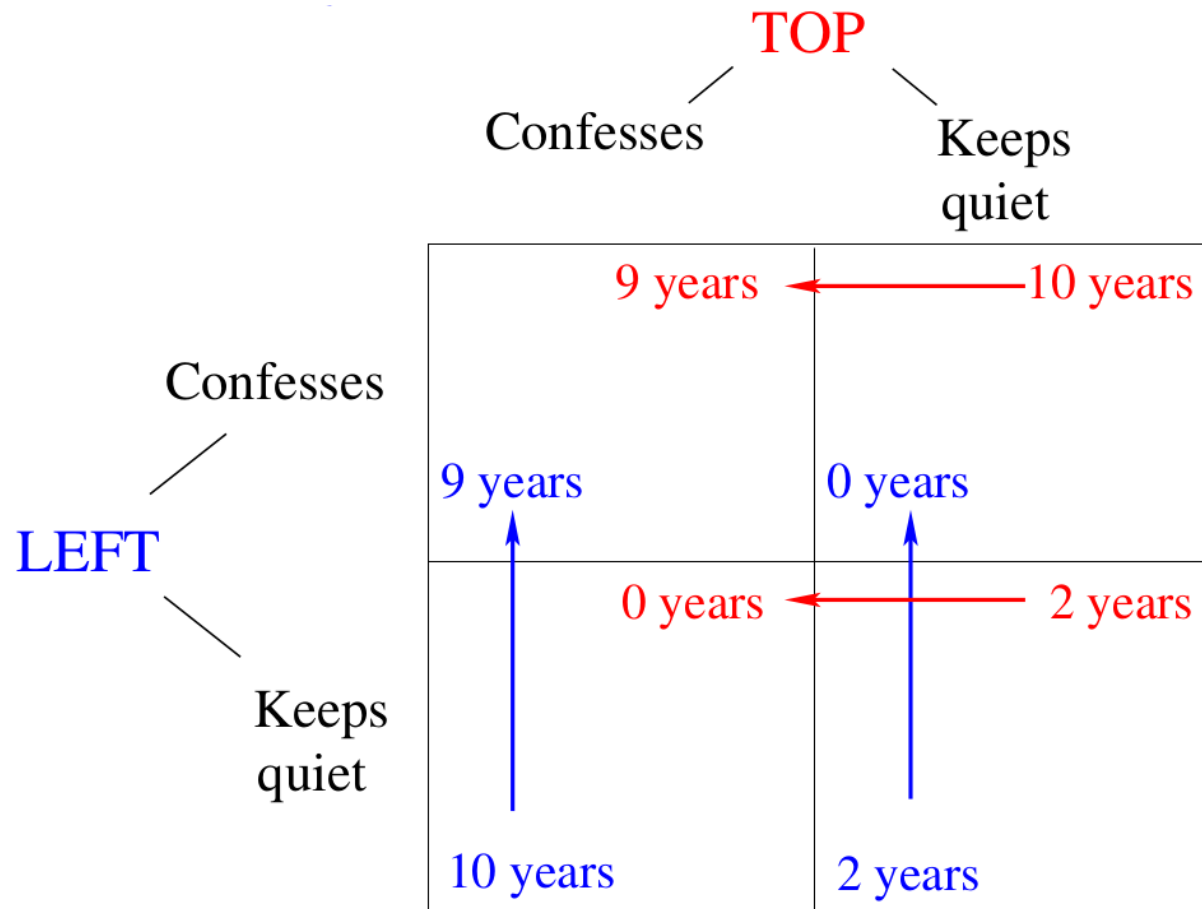
The chicken game

- Two cars drive towards each other, the first who blink has lost
- Risk: both dies
- Simple explanation why some negotiations fail
- One way is to remove the wheel: with less choice one can be more convincing

The Prisoner dilemma

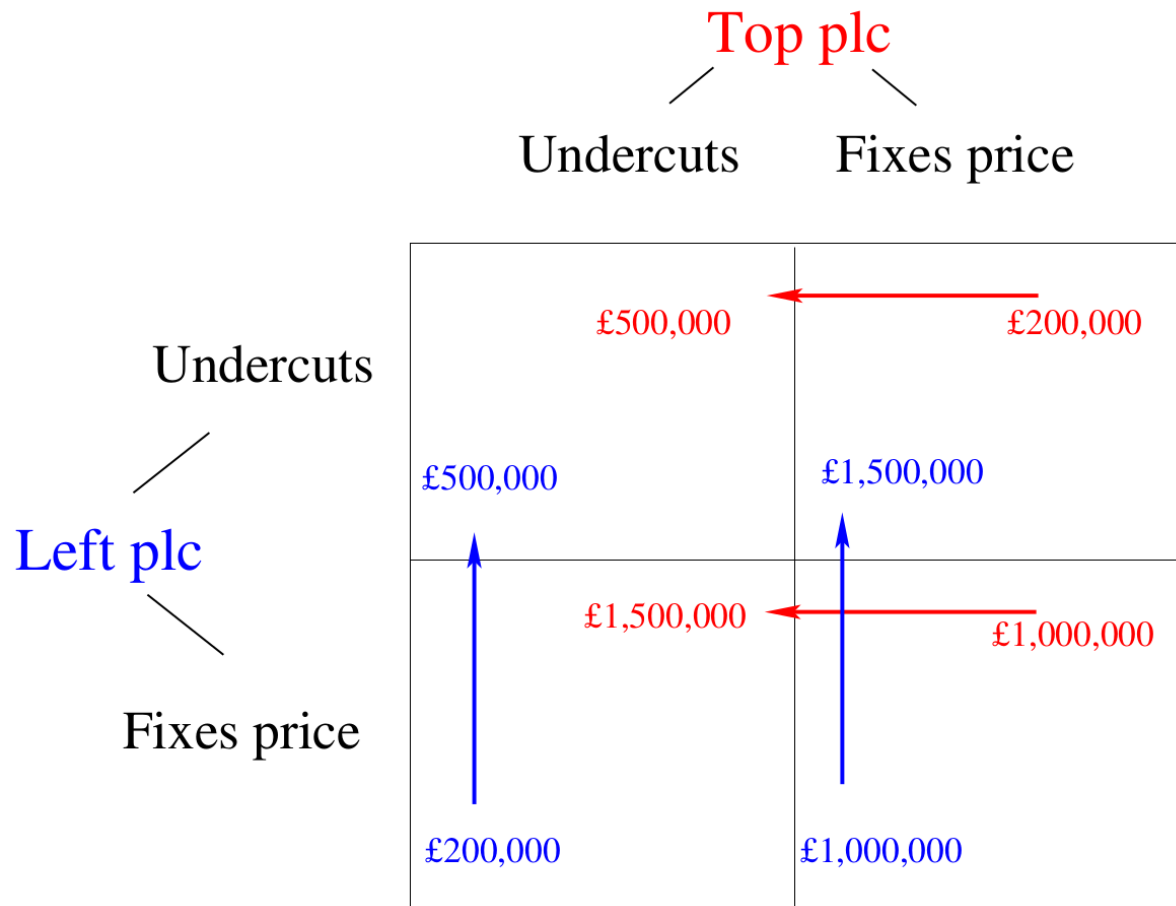
- Original way to present, but not necessarily the clearest
- What is best for both actors does not lead to the best general outcome

Prisoner dilemma



Source: David Mond, University of Warwick

Cartels



Source: David Mond, University of Warwick

Climate change

No one has an incentive to cooperate!

	Y cooperate	Y exploit
X cooperate	1, 1	1, 3
X exploit	3, 1	3, 3

Figure 1. Climate change matrix at the start

Stag hunt

Near complete collapse, one has an incentive

	$Y_{\text{cooperate}}$	Y_{exploit}
$X_{\text{cooperate}}$	1, 1	0.5, 0.5
X_{exploit}	0.5, 0.5	0, 0

Figure 2. Climate change matrix nearing the collapse of ecosystem

More complex games

- Repetitive games: incentives to cooperate tend to augment (e.g. COP)
- Tit-for-tat strategy tends to be optimal: we'll do what you have done the previous time
- Coalitions, multi-stage negotiations

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Impossibility theorem

- Arrow's impossibility theorem: under certain axioms, it is impossible to properly aggregate the preferences of a group
- There is no such thing as a people "will"

Voting systems

- Each voting system has its flaws
 - French election 2007
 - German proportional system
 - Silent consensus at EU level
- Consensus is the most legitimate, but the harder to reach
- Preferential voting ([video](#))

Conclusion

- Institutions and rules matter
 - Some situations are structurally harmful
 - Deciding as a group is difficult
- Back to values and advocacy
- The risk of violence
- Hope: we have already dealt with environmental emergencies

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