

# Linking decisions at international and local level

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# I. Centralized or localized decisions

- Nutrient pollution damages coastal water quality.
- Does it matter who decides on policies for different abatement measures?
- Local governments may have a cost advantage compared to central (cf. e.g. d'Amato and Valentini, 2008)
- The European Water Framework Directive (WFD) requires river basin management
- Thus, delegation of decision-rights to local level might be either *a good idea* or *carried out anyway because of the WFD*.

# Delegation model

## Agents

- Two different governments, "Central" and "Local".
- Identical benefit functions.
- Each government takes only the own cost into account.

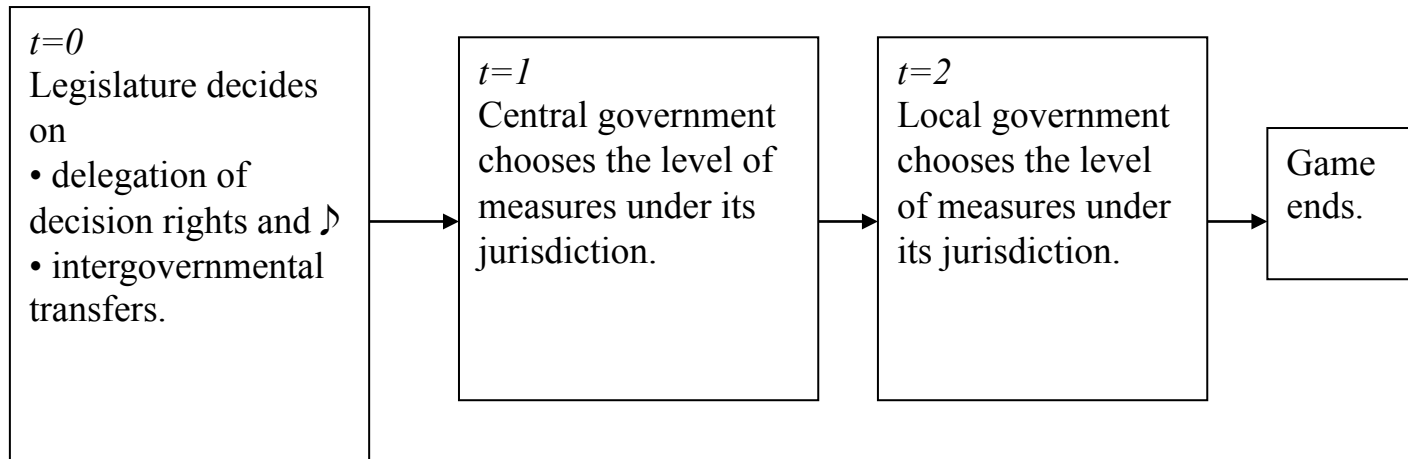
## Measures

- Three nutrient abatement measures:
- "Central" always decides on reductions of *fertilizer nitrogen*,
- "Local" always decides on *phosphorus treatment in WWTPs* and
- Either government could decide on *wetland construction*, but the local government constructs wetlands that abate more nutrients.

## Policy instrument

- Intergovernmental matching grants for wetland construction.

# Structure of the game



# Policy conclusions about delegation

- If decisions are taken sequentially and the central government makes the first move, strategic behavior becomes an important determinant of the outcome.
- The local government will not accept delegation without intergovernmental grants unless local wetlands are *considerably* more efficient than central.
- A negative intergovernmental grant is socially optimal, but the local government will not accept this unless local wetland technology is *very* efficient.
- A positive grant could make the local government accept delegation when it otherwise would not. This could imply higher benefits to society compared to letting the central government have the decision-right on wetlands.
- These are all consequences of differences in the knowledge about environmental effects of measures.

## II. Intergovernmental grants under moral hazard

- Intergovernmental grants from higher to lower level governments are an important component of environmental policy
- When there is uncertainty about the environmental effect of measures, moral hazard can be a problem
- Moral hazard = here: the risk that the opportunity to get an intergovernmental grant affects the behavior of lower level governments

# Moral hazard model

- One of two alternative states may occur, e.g. “climate change” or “not climate change”
- Climate change affects the environmental impact of nutrient abatement measures
- The state affects
  - a) Optimal level of nutrient abatement
  - b) The cost-effectiveness ranking of measures
- Neither the central nor the local government knows in advance which state will occur.

## **Principal (= international government):**

- a) Maximizes net benefits from abatement given the cost of the contract with the agent (= local government).

## **Agent (= local government):**

Acts according to the contract if

- a) Expected utility of the contract covers the abatement cost
- b) The contract provides incentives to act optimally with regard to the two different possible states, i.e. cheating is never optimal.



# Contract structure

<b>Probability of "not climate change"</b>	<b>0.1</b>	<b>0.2</b>	<b>0.3</b>	<b>0.4</b>	<b>0.5</b>	<b>0.6</b>	<b>0.8</b>	<b>0.9</b>
BP "not climate change", N red tonnes	2625	3023	3396	3542	3586	3608	3787	3953
BP "climate change", N red tonnes	4016	3858	3697	3625	3595	3566	3123	2639
BP "not climate change", compensation MSEK	0.00	0.27	1.19	2.19	2.75	3.02	3.16	3.08
BP "climate change", compensation MSEK	3.12	3.19	3.25	3.14	2.88	2.47	0.42	0.00

# Conclusions about contracts

- Can be drawn regarding compensation to water districts for nutrient management policies under uncertainty about environmental impact of measures.