Delegation of decision-rights for wetlands to local governments under institutional rigidity

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Introduction

• Nutrient pollution damages coastal water quality.
• Wetlands serve as nutrient “sinks”.
• Does it matter who decides on wetland policy?
Why analyze wetland policy delegation?

**Motive 1:** Local governments have a cost advantage compared to central (cf. e.g. d’Amato and Valentini, 2008)

**Motive 2:** The European Water Framework Directive (WFD)

- River basin management.
- Competent Authorities (CAs) develop operational plans.
- The WFD might change the allocation of decision-right between national, regional and local governments.

Thus, delegation of decision-rights to local or regional level might be either

- *a good idea* or
- *carried out anyway because of the WFD.*
A closer look at motive 1:
Are local governments more efficient w.r.t. wetland policy? A Swedish example.

<table>
<thead>
<tr>
<th></th>
<th>CAP (Agri-environmental programmes)</th>
<th>LIP (Local Investment Programmes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision process</td>
<td>Central government decides on rules for support to wetland construction on farm land.</td>
<td>Local government designs wetland projects, central government approves funding.</td>
</tr>
<tr>
<td>Average cost, EUR/ha wetland</td>
<td>12.3</td>
<td>17.5</td>
</tr>
<tr>
<td>Nitrogen abatement, kg/ha and year</td>
<td>55-92</td>
<td>520-541</td>
</tr>
<tr>
<td>Phosphorus abatement, kg/ha and year</td>
<td>0.3-1.7</td>
<td>3.9-12.1</td>
</tr>
</tbody>
</table>

Source: Svensson et al. (2004)
The literature on hierarchical governance: I. Research questions

- Which governmental level should prescribe *policy goals* (Oates and Schwab, 1996; Wellisch, 2000; Roelfsema, 2007),
- How could local governments be provided with *incentives* to choose policy instruments or carry out enforcement efficiently (Andersen and Jensen, 2003; Demski and Sappington, 1987; Miceli and Segerson, 1999) and

*This paper addresses the first and last issue, and asks what instruments are necessary to have a socially efficient outcome.*
The literature on hierarchical governance: III. Assumptions

Higher and lower level government have *diverging objectives*, because either:

i) their constituencies differ and hence the preferences of the median voter (Oates and Schwab, 1996; Wellisch, 2000),

ii) all (or at least lower) level governments do not act to maximize the welfare of their constituencies (Demski and Sappington, 1987; Miceli and Segerson, 1999) or

iii) they possess different information (Andersen and Jensen, 2003).

Moreover:

iv) Central government has a first-mover advantage (Demski and Sappington, 1987; Miceli and Segerson, 1999).

*In this paper, ii) and iv) are assumed.*
The literature on hierarchical governance: II. Conclusions

Delegation can be counterproductive when:
• There are interjurisdictional *externalities*
• There is interjurisdictional *tax competition* (Rauscher, 1995; Porter, 1999)

…and beneficial when:
• Local regions have *different preferences* (Oates, 1998; 1999; Wellisch, 2000; Ulph, 2000)
• Decentralization promotes *institutional innovation* (Oates, 2001)

Social outcome can be improved through:
• Incentives to pool information (Andersen and Jensen, 2003)
• Recognition of the need to account for both strategic and other economic incentives (Miceli and Segerson, 1999)
Aim of this study

Investigate how delegation of decision-rights affects:

• pollution abatement and
• perceived net benefits

when there is:

• institutional rigidity,
• measures are interdependent with regard to the environmental effect and
• the local government constructs wetlands that abate more pollution per EUR.
The 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.

Policy instrument
• Intergovernmental matching grants for wetland construction.
Nutrient transports

- Nitrogen emissions from fertilizer
- Phosphorus emissions from WWTPs

WETLAND

- Nitrogen retention in soils and waterways
- Phosphorus retention in soils and waterways
- Nitrogen retention in wetlands
- Phosphorus retention in wetlands

- Nitrogen and phosphorus loads to coastal waters
Structure of the game

$t=0$
Legislature decides on
- delegation of decision rights and
- intergovernmental transfers.

$t=1$
Central government chooses the level of measures under its jurisdiction.

$t=2$
Local government chooses the level of measures under its jurisdiction.

Game ends.
The central government’s decision problem in a sequential game:

"Maximize net benefits from fertilizer reductions (and wetland construction if I have the decision-right on those) given that the local government will take my decision into account when deciding on wastewater treatment (and wetland construction if it has the decision-right on those).

I know that the local government will maximize its net benefits as well."
Empirical data and functions

• Costs and environmental effects are obtained or calculated from data in Gren et al. (2008) and Svensson et al. (2004). Benefit functions are obtained using actual policies in Sweden and assuming that policy makers equate MC and MB.

• Differences in nutrient retention between governments is explained by differences in nutrient load reaching the wetland. Locally designed wetlands capture a larger load because they are better located in the landscape.

• In the following, the incoming nutrient load to a wetland is used as a measure of wetland efficiency.
The “pure” strategic effect  
(Governments assumed identical w.r.t. benefits, costs and wetlands efficiency, no intergovernmental grants)

<table>
<thead>
<tr>
<th>Measures:</th>
<th>Socially optimal solution</th>
<th>Sequential decisions – central government decides on wetlands</th>
<th>Sequential decisions - local government decides on wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen fertilizer reduction, ktons</td>
<td>83</td>
<td>83 (=)</td>
<td>73 (↓)</td>
</tr>
<tr>
<td>Wetlands, ha</td>
<td>2338</td>
<td>2335 (↓)</td>
<td>2484 (↑)</td>
</tr>
<tr>
<td>Phosphorus reductions at WWTPs, ton</td>
<td>159</td>
<td>159 (=)</td>
<td>159 (=)</td>
</tr>
<tr>
<td>Net benefits:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central government, Million EUR</td>
<td>270</td>
<td>270 (=)</td>
<td>324 (↑)</td>
</tr>
<tr>
<td>Local government, Million EUR</td>
<td>401</td>
<td>401 (=)</td>
<td>380 (↓)</td>
</tr>
<tr>
<td>Social, Million EUR</td>
<td>265</td>
<td>265 (=)</td>
<td>261 (↓)</td>
</tr>
</tbody>
</table>
The use of different measures at different levels of local government wetland efficiency

...i.e. nothing strange here.
Net benefits at different levels of local government wetland efficiency – a tradeoff between strategic effects and wetland efficiency

= critical level where delegation to the local government is preferred
Could intergovernmental matching grants increase social benefits?

Central and local governments would be both be happy with positive grants that reduces the perceived costs of measures… but society will prefer a negative grant for wetlands!

Central government’s optimization problem:

"Maximize net benefits from fertilizer reductions (and wetland construction if I have the decision-right on those) given that the local government will take my decision into account when deciding on wastewater treatment (and wetland construction if it has the decision-right on those)…

...and the matching grant for locally decided wetlands.

The local government will maximize its net benefits as well...

...taking the matching grant into account"
Measure use as a function of the matching grant

...i.e. nothing strange here.
Net benefits as a function of the matching grant

→ 0.2<grant<0.3 could be agreed. In this interval, social net benefits are higher if wetland policy is delegated.
Policy conclusions

• 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.
Contribution to the literature

Delegation can be beneficial when:

• the local government is more efficient in measure design, but there is a risk that local government might resist delegation

Social outcome can be improved through:

• Renegotiation proof intergovernmental grants