Private forest owners’ willingness to accept contracts for ecosystem service provision

DØRS
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Ecosystem services in private forests

• Many initiatives rely on landowners’ voluntary participation in schemes – or landowners private motivation

• Danish forest owners WTA contracts for ecosystem services

• Both - assessment of required compensation
  - assessment of landowners willingness to provide services based on their own initiative

• Additionality: Try to relate forest owners WTA to the current management and their current provision level of ecosystem services in the forest

• Owners’ attitudes towards doing something beneficial for the community – and what effect is has on WTA
A choice experiment to assess the costs of provision:

Distributed through postal letters to 1429 forest owners

- Statement of support by Danish Forest Owners’ Association and Danish Forest Extension Services

- Addresses from NFI, random set, stratification based on area, all owners in the large size classes

- Gift voucher of 3.000 DKK

Online questionnaire (surveyxact), 6 choice sets
A choice experiment to assess the costs of provision:

283 respondents completed the questionnaire (response rate 19.8%)

They own 14.4% of the total private forest area

Survey: Improvements in
- Nature quality based on Natura 2000 initiatives – preserve endangered species/habitats, leave dead wood and untouched areas
- Access outside roads and paths
- Securing groundwater reserves
### CE: Private provision of ecosystem services

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set aside an area as untouched forest</td>
<td>No change</td>
</tr>
<tr>
<td>Leave 5 old trees for natural decay</td>
<td>No change</td>
</tr>
<tr>
<td>Increase the area with broadleaves</td>
<td>0% broadleaves</td>
</tr>
<tr>
<td>Increase the public's access</td>
<td>No change</td>
</tr>
<tr>
<td>Lower property tax</td>
<td>0 DKK</td>
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</tbody>
</table>
Questionnaire

- Detailed questions regarding
  - property
  - management
  - harvesting
  - revenue and costs
- Decision-making on the property
- Experience and motivation

- CE: Payment vehicle ‘Lower property tax’ is per ha/year for the whole property – even though some of the management restrictions (e.g. untouched forest) only applies to a part of the forest.

It will be registered in the deed along with other contract attributes will therefore be binding (in perpetuity).
## Results: RPL with interactions

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard error</th>
<th>Z</th>
<th>WTA</th>
<th>95% confidence interval</th>
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</thead>
<tbody>
<tr>
<td><strong>Random parameters in utility functions</strong></td>
<td></td>
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<tr>
<td>UNTOUCH</td>
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<td>-3.34</td>
<td>8.3***</td>
<td>(3.5 - 13)</td>
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<tr>
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<td>.41657</td>
<td>-5.13</td>
<td>138***</td>
<td>(80 - 196)</td>
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<td><strong>Non-random parameters in utility functions</strong></td>
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<tr>
<td>ASC</td>
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<tr>
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<td><strong>Standard deviation of normal distributed random parameters</strong></td>
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<td><strong>Standard deviations of error component</strong></td>
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<td>Sigma*10</td>
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<td>Number of respondents / Pseudo R²</td>
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<td>Log-likelihood / R² adjusted</td>
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<td>Restricted LL / χ²</td>
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</table>
Main results:

- Owners require no compensation for:
  - Leaving 5 trees per ha for natural decay,
  - Accepting a broadleaves restriction of up to 50% of the total forest area

They do require compensation for:

- Granting access on up to 15 meters from road and path, or everywhere on the forest floor, are the most expensive elements in the contract (on average 138 DKK, 276 DKK)

- Broadleaves restriction of 75%: 67 DKK in compensation

- Untouched forest: 8.3 DKK (leaving 7% untouched of a 100 ha forest amounts to 5810 DKK/year for the entire forest)
Effect of current level of provision:

- Interaction effects:

*Untouched forest*
Owners who already have 5% of untouched forest on their property do not require compensation (sample bias, 60% of owners have min. 5%)

*Leave 5 trees for decay*
Compensation reduction of 15 DKK (50% already do this)

*Minimum percentage of broadleaves*
Owners only required compensation for a restriction of 75%, but here there is no effect of already fulfilling this requirement => it is the restriction in itself which owners require compensation for
Effect of current level of provision II:

- Interaction effects:

Access as a well-known public good – interacted with three owner and property characteristics:

Status quo
Compensation reduced to nearly zero if access is granted everywhere in the forest already (9% already do this)

Hunting
Hunting on the property (owner family or let out):
increases compensation for access from 138 to 185 DKK per level

Attitude towards providing benefits for the local community (motivating factor for entering a scheme):
decreases the required compensation for access from 138 to 57 DKK per level
Conclusions I:

• Situation with fragmented forest areas, many forest owners
• Large proportion of privately owned forest land

• Private initiatives and voluntary agreements are important for provision of ecosystem services
• ...and often involves many individual owners

• Self-selection bias in survey, overrepresentation of owners who already provide e.g. untouched forest => however sample covers a substantial part of the private forest area (14.4%)
Conclusions II:

• Combining choice data with current property management:
  Forest owners do differentiate their compensation requirement for ecosystem services according to the current provision level on their property => zero costs of provision

• Access is the most expensive/dis-motivating service to provide (maintain privacy close to home)
  - recent studies of the public’s wtp for enhanced assess show that they are divided on this issue (Campbell, Vedel, Jacobsen and Thorsen, 2013)

• Attitude towards providing for the local community:
  This has a large (reducing) effect on compensation (potential endogeneity)

Scope for further work on improving schemes
“Economists’ simplistic view on human (landowner) motivation”

Landowners are motivated by a variety of things and yet we often only adjust the sum of money...