Taxation, life-time uncertainty and non-industrial private forest owner’s decision-making

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The study

- Has linked the effects of capital income and inheritance taxes to those of human ageing in solving a NIPF forest-owner's problems of harvesting, consumption and bequest decisions.

- Human ageing is incorporated through:
  - a parameter of perceived probability of surviving through a future period.
Why this study?

- Inheritance/bequest and other forestry taxes have been used to regulate NIPF owners’ behavior regarding forest bequests and harvesting.

- Ollikainen (1998) and Amacher et al. (1999) studied inheritance taxes.

- No prior study has analyzed harvesting, consumption, and bequest decision making together under both forestry and non-forestry inheritance and capital income taxes.
Key questions answered

- What are the impacts of forestry and non-forestry inheritance and capital income taxes on NIPF owners' harvesting, consumption and bequest decisions?

- How do these effects vary as the forest owner ages?
Approach

- Analytical and numerical approaches

- Analytical approach
  - Two-period model with amenity preferences

- Numerical approach
  - MATLAB
Optimal consumption rule

\[
\frac{u'(c_t)}{u'(W_{t+1})} = \frac{1 + r^*}{1 + \rho}
\]

Where,

\[r^* = \left[ r - \delta r - (1-\delta) t_b (1+r) \right]\]

Standard optimal consumption rule

\[
\frac{u'(c_t)}{u'(c_{t+1})} = \frac{1 + r}{1 + \rho}
\]
Optimal harvesting rule

\[
\left[ \delta (1 + r - rt_c) + (1 - \delta) (1 + r) (1 - t_b^e) \right] \left( p_t q_i - k \right)
\]

\[
= (q_{i+1} - q_i) \left[ \delta \phi_{t+1} + (1 - \delta) p_{t+1} \frac{(1 - t_b^f)}{(1 - t_p^f)} + \frac{\alpha A'(Q_{t+1})}{1 - \alpha u(W_{t+1})} \right]
\]
Key findings (1): human ageing vs consumption

Figure 1. Effects of human ageing (i.e. decrease in survival probability) on current consumption

- Tax burden on bequest > tax burden on consumption
  - Current consumption increases as the forest-owner ages
Key findings (2): taxation & ageing vs harvesting

Figure 2. Effects on current harvesting of (a) the capital income tax on external assets, and (b) the capital income tax on timber assets
Key findings (3): taxation & ageing vs harvesting

**Figure 3.** Effects on current harvesting of (a) the inheritance tax on timber assets, and (b) the inheritance tax on external assets
Policy implications

- The age-distribution of NIPF owners in many countries is skewed towards the older generations
  - reactions of these generations to capital income and inheritance taxes may be different from those of younger generations

- Changes in the age-distribution of the forest-owners can have profound effects on the wealth distribution between forestry and other sectors.
Policy implications

- The design of taxation should consider:
  - the demographic profile of the forest-owners
  - the development of this profile
  - environmental in-situ preference and its consequence to forest conservation
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Danke
Thank you
References
