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

Sepul K. Barua^a, Jari Kuuluvainen^a and Jussi Uusivuori^b

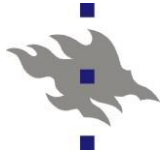
^a Dept. of Forest Economics, University of Helsinki, Finland

^b Finnish Forest Research Institute, Vantaa, Finland

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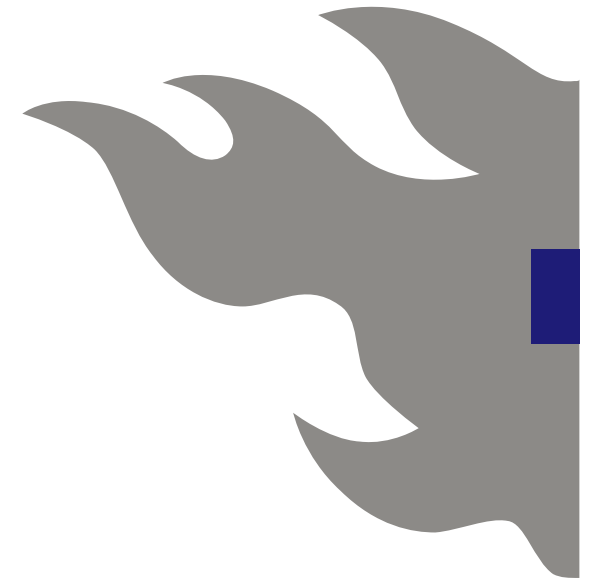
The Hunting Castle of Kranichstein, Darmstadt, Germany

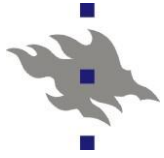
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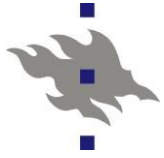
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- Why this study?
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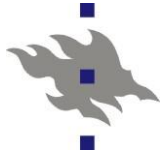
The study

- 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



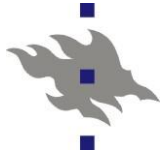
Why this study?

- 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



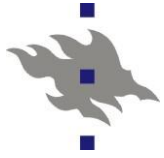
Key questions answered

- 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,

$$r^* = [r - \delta t_c - (1 - \delta)t_b^e(1 + r)]$$

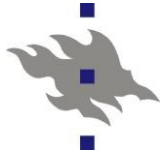
Standard optimal consumption rule

$$\frac{u'(c_t)}{u'(c_{t+1})} = \frac{1 + r}{1 + \rho}$$



Optimal harvesting rule

$$\begin{aligned} & \left[\delta(1+r-rt_c) + (1-\delta)(1+r)(1-t_b^e) \right] (p_t q_i - k) \\ & = (q_{i+1} - q_i) \left[\delta p_{t+1} + (1-\delta) p_{t+1} \frac{(1-t_b^f)}{(1-t_p)} + \frac{\alpha A'(Q_{t+1})}{1-\alpha u'(W_{t+1})} \right] \end{aligned}$$



Key findings (1): human ageing vs consumption

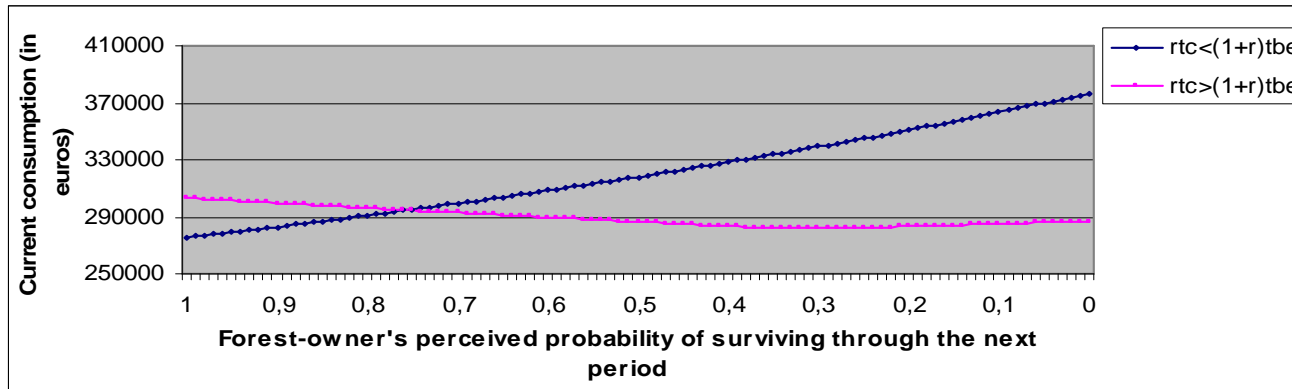


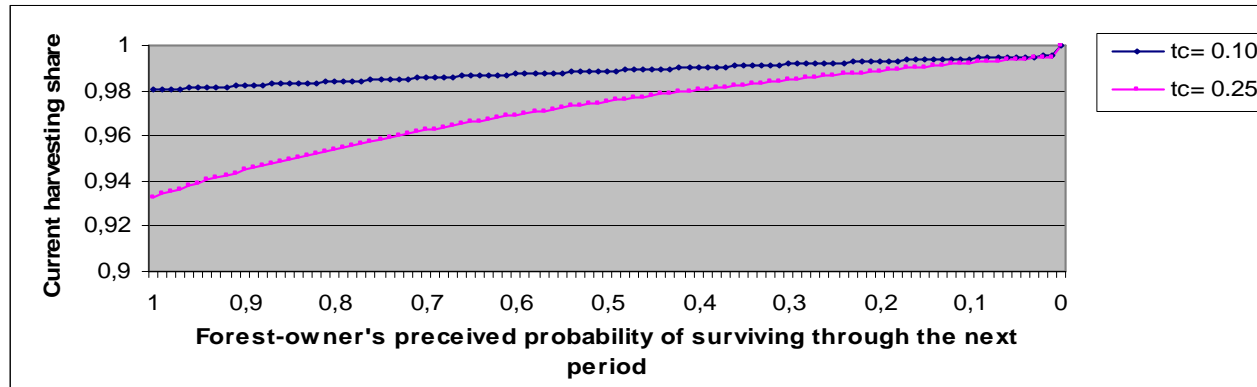
Figure 1. Effects of human ageing (i.e. decrease in survival probability) on current consumption

- Tax burden on bequest > tax burden on consumption
 - current consumption increases as the forest-owner ages



Key findings (2): taxation & ageing vs harvesting

a



b

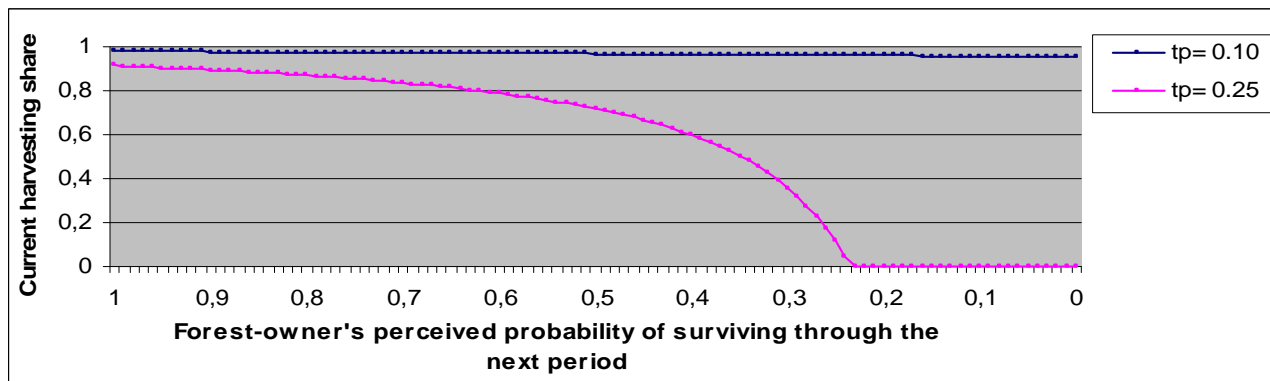


Figure 2. Effects on current harvesting of (a) the capital income tax on external assets, and (b) the capital income tax on timber assets



Key findings (3): taxation & ageing vs harvesting

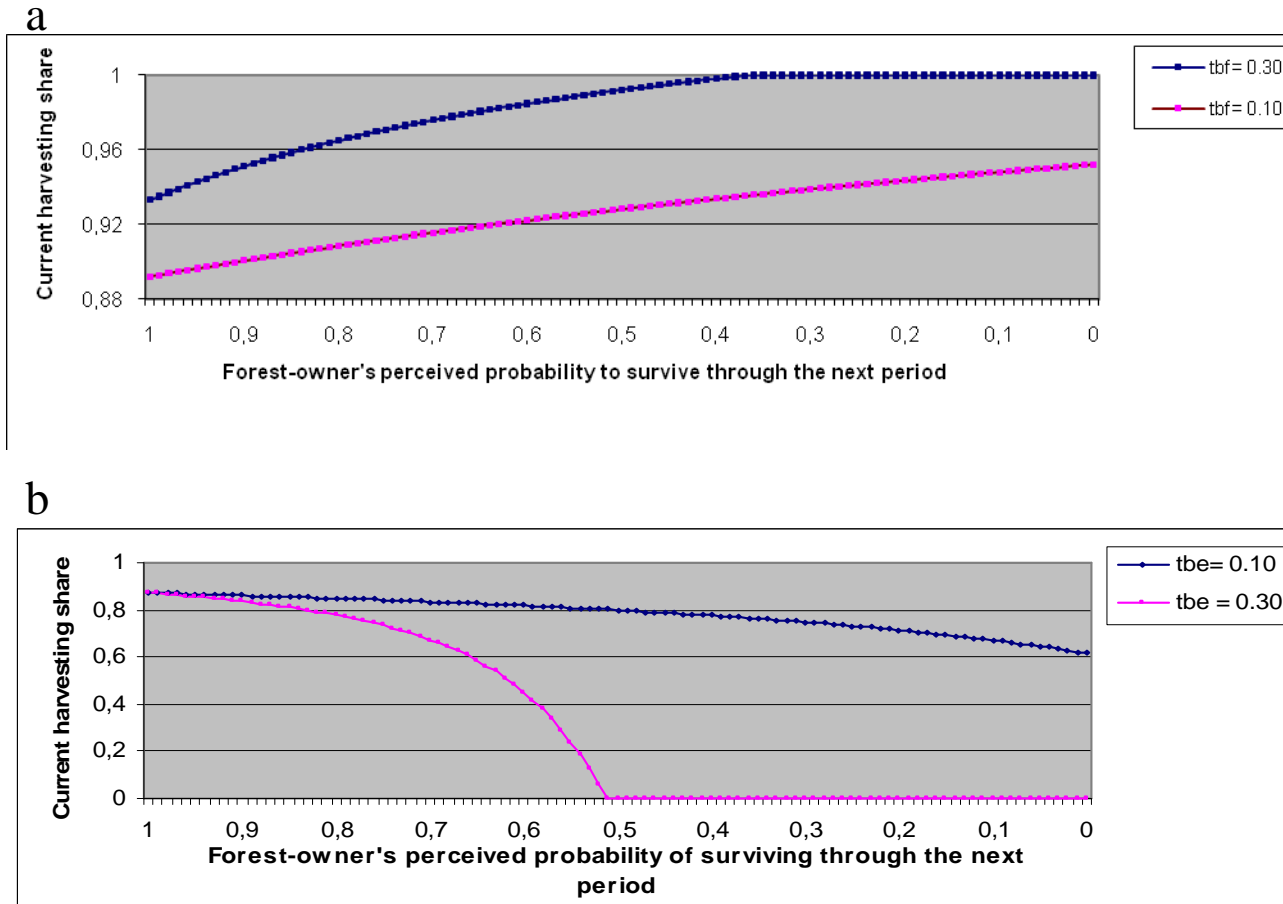
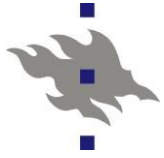


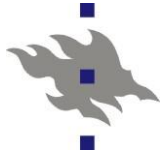
Figure 3. Effects on current harvesting of (a) the inheritance tax on timber assets, and (b) the inheritance tax on external assets



Policy implications

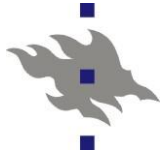
- The age-distribution of NIPF owners in many countries is skewed towards the older generations
 - reactions of these generations to capital income and inheritance taxes may be different from those of younger generations

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

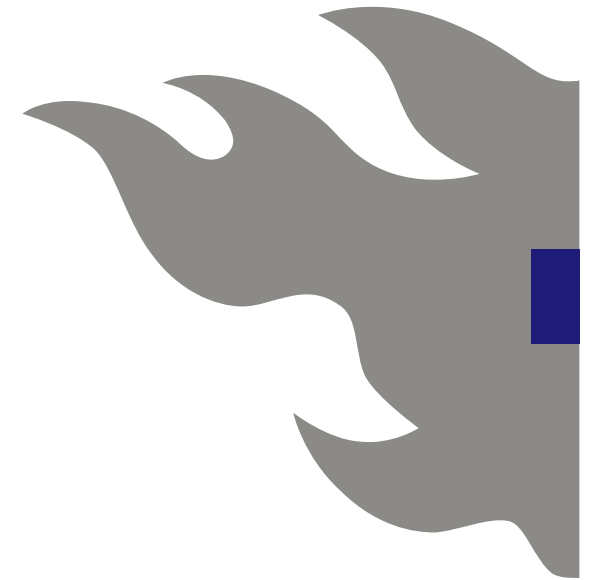


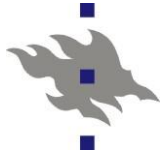
Policy implications

- 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



Dhonnobad
Danke
Thank you





References

- Amacher, G., Brazee, R., Koskela, E., and Ollikainen, M. 1999. Taxation, bequests, short and long run timber supplies: an overlapping generation problem. *Environmental and Resource Economics* 13 (3), 269-288.
- Ollikainen, M. 1998. Sustainable forestry: timber bequests, future generations and optimal tax policy. *Environmental and Resource Economics* 12 (3), 255-273.