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Analyzing determinants of forest owners' decision-making using a sample selection framework

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Abstract

A sample selection framework that simultaneously takes into account the two-step decision-making of forest owners (first whether or not to harvest, second the level of harvesting) is applied on representative cross-sectional data for forest properties and owners in Norway. Forest management plans, property size, forested area and income from agriculture are found to increase both the propensity to harvest and the harvesting levels. Income from engagement in other outfield-related productions and debt burden increase the propensity to harvest only, while increased age impact negatively on the harvesting decision. Wage income affects both propensities to harvest and harvesting levels negatively. The results suggest that other on-property productions may stimulate harvesting decisions, while off-property income impact harvesting decisions and levels negatively.

JEL classification: D13; D24; Q23

Keywords: Forest owner behavior; Forestry; Harvesting decision; Simultaneous equations; Translog production function

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Introduction

Numerous studies have analyzed the harvesting behavior of nonindustrial private forest owners (NIPFs) the last decades (see for reviews, Amacher et al., 2003; Cubbage et al., 2003; Beach et al., 2005). A common interpretation is that since NIPFs operate in incomplete markets, their subjective preferences and idiosyncratic characteristics will alter the harvesting decision, commonly modeled within utility-maximizing frameworks (e.g. Max and Lehman, 1988; Hyberg and Holthausen, 1989; Kuuluvainen et al., 1996). Prices and costs, though still important, will therefore be only two out of many variables affecting the timber supply.

Many studies have concerned to what degree nonmarket timber (and nontimber) amenities impact negatively on harvesting as they are assumed to be utility-increasing for the forest owner (e.g. Pattanayak et al., 2002). In addition, previous studies have also shown an impact from nonforest income on harvesting. As other income sources on- and off-property have gained importance, possible negative impacts of timber supply have been a major concern arising from the fact that forest income has become more marginal to NIPFs household economies. Kuuluvainen and Tahvonen (1999) found that nonforest income had a negative impact on harvesting. They note that wealthy forest owners can afford more financial loss in order to enjoy nontimber benefits than owners with low nontimber income. Other empirical studies (e.g. Kuuluvainen et al., 1996) have found no significant impact from the owners' exogenous income on harvesting.

There is probably a difference between the impacts on harvesting from off-property income and income from other sources at the property. Off-property (wage) income may be assumed not to conflict timber production as they are not interrelated, while on-property productions might. However, evidence from previous studies of NIPF behavior suggests that harvesting decisions are influenced both by nontimber production on the properties (Kuuluvainen et al., 1996), and off-property (wage) income (Løyland et al., 1995; Kuuluvainen and Tahvonen, 1999). Conway et al. (2003) pointed on the negative impact on both harvesting and nontimber activities from landowners who do not live on the property (absentee owners), and explain this with absentee landowners possessing perhaps less information with regard to harvesting than resident owners. This is also in accordance with the findings of Løyland et al. (1995). Conway et al. (2003) conclude that variables like debt, nontimber activities and the owners' harvesting behavior are related. Previous studies have, however, not attempted to test the impact on harvesting from various types of on- and off-property exogenous income.[1]

Most previous empirical studies on NIPFs harvesting behavior have applied various versions of discrete choice models. However, in line with the decision whether or not to harvest, also the harvest intensity depends on various property and

[1] Bolkesjø and Baardsen (2002) may be viewed as an exception. However, they found diverging results in their different models as other income and agricultural income affected harvesting behavior negatively in one model, while in another model they could not reject the null hypothesis that these variables had no or positive impact. Further they did not distinguish between other income on-property and off-property.