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Effects of gender and length of land tenure on timber supply in Finland



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ABSTRACT

This study investigated timber supply from Finnish non-industrial private forests (NIPF) using the consistent Tobit model and nationwide micropanel survey data on timber sales of 1299 forest owners during 2004–2008. The effects of forest owners' gender and length of land tenure on timber supply were studied in particular. Women sold one cubic meter per hectare and per year (about 30%) less than men did. Female owners sold less frequently, but larger quantities at a time than did male owners. Short-tenure (<5 years) owners' harvests were only affected by price, owner's age, income, timber stock and forest acreage. A group with relatively high harvest levels was young, low-income new forest owners.

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Introduction

Since Binkley's (1981) seminal study on the timber supply of non-industrial private forest (NIPF) owners, empirical studies have demonstrated that harvesting decisions depend on owner-specific

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characteristics, in addition to relative prices (e.g., Carlén, 1986; Loikkanen et al., 1986; Dennis, 1989, 1990; Hyberg and Holthausen, 1989; Aronsson, 1990; Carlén, 1990; Kuuluvainen and Salo, 1991; Kuuluvainen et al., 1996; Kuuluvainen and Tahvonen, 1999). After the 1990s only a few econometric studies have addressed NIPF owners' harvesting behavior. Furthermore, only few studies have concerned the potential effects of forest owners' gender or length of their land tenure on timber supply which are the focus of this paper. In general, forest owners are growing older and the share of female owners is increasing, partly because women outlive men (Butler and Leatherberry, 2004; Butler, 2008; Schmithüsen and Hirsch, 2010).

Prestemon and Wear (2000) used a household production framework and forest inventory data to study harvesting decisions in different ownership categories in the United States. Their results were theoretically consistent with the rotation framework in that the estimated short-term price elasticities of supply were larger in absolute terms than the long-term effects. Using cross-sectional data, Pattanayak et al. (2002) studied empirically the simultaneous determination of timber supply, inventory volume, and its age-class distribution. Their results, based on the data from the southeastern United States, indicated a simultaneity of harvesting and inventory decisions, and the estimated price elasticities were in line with those of earlier studies

In addition to these two studies from the United States, microdata have been used to investigate timber supply in Finland and Norway. Bolkesjø and Baardsen (2002) and Bolkesjø and Solberg (2003) used large time-series cross-sectional microdata to investigate different aspects of NIPF timber supply behavior. The former study, focused on the effects of forest taxes on the short-term timber supply, in particular, whereas the latter analyzed the effects of prices. Favada et al. (2007) introduced a consistent estimation method allowing for heteroscedasticity (Arabmazar and Schmidt, 1981, 1982) and non-normality of the errors (Burbidge et al., 1988) in a Tobit model into the timber supply literature (cf. Reynolds and Shonkwiler, 1991; Yen et al., 1996). The theoretical framework was a single-stand rotation model of a utility-maximizing forest owner by Tahvonen (1998). Reduced-form long-run per hectare saw log supply function was estimated. Following Kuuluvainen and Tahvonen (1999), variation between forest owners in Finnish survey data from years 1994–1998 was used to estimate elasticities that were interpreted as describing the changes in the equilibrium harvests of the rotation model in response to permanent (once-and-for all) changes in the exogenous variables. According to the results, the unconditional long-run effect of stumpage price on supply was close to zero, but higher stumpage prices induced more frequent harvests with smaller per hectare cubic meters than lower stumpage prices, which is in accordance with the prediction of the rotation model. Non-separability of consumption and timber supply was confirmed by statistically significant owner and forest characteristics.

Using the same survey sample as Favada et al. (2007), Favada et al. (2009) studied aggregated annual per hectare pulpwood and saw log supply of Finnish NIPF owners with a focus on prices and directly unobservable owner objectives. They used both the cross-sectional and temporal variation in regional stumpage prices by community, and interpreted the price elasticities to describe the short-term adjustment of supply with respect to the variation in prices over time. In contrast to Favada et al. (2007), also the unconditional price elasticity of stumpage price was statistically significant and indicated price elastic short run supply. Along with observable owner characteristics, owner objectives had statistically significant effects on supply, and price responsiveness of supply differed with respect to owner objectives. Surveys of the earlier literature on NIPF forest management and timber supply can be found in Amacher et al. (2003), Beach et al. (2005) and Kuuluvainen et al. (2006).

The above-mentioned studies have provided important information on several demographic factors affecting NIPF owners' harvest levels. However, first, research on harvesting behavior and possible differences in timber supply between female and male forest owners is rare. Existing studies on the subject can be classified as either those that identify female forest ownership characteristics, forest owners' values, management objectives and attitudes (Faugère, 1998; Lidestav, 1998; Crim et al., 2003; Nordlund and Westin, 2011), or those that describe the harvesting behavior of female forest owners using owner and forest characteristics as well as market variables (Ripatti, 1999; Lidestav and Ekström, 2000). In Sweden, Andersson et al. (2010) studied forest owners' attitudes toward risk in forest management, and explored differences between male and female owners. Based on previous studies using at least partly insufficient data, evidence on the effect of gender on timber supply, with

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