

INTEGRATING EVIDENCE ON LANDOWNER BEHAVIOR IN FOREST SECTOR MODELS – A LITERATURE REVIEW AND SYNTHESIS

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Overview

Bioenergy from woody biomass is increasingly discussed as a possible solution to issues regarding energy security and the mitigation of global warming. Forest sector models are developed to simultaneously consider the multiple economic, technical and social aspects of a large-scale implementation of bioenergy.

In this study we investigate and synthesize the accumulated knowledge of forest landowner behavior and how this behavior is integrated in forest sector models. Through a systematic literature review of empirical studies we summarize the key determinants to harvesting decisions among four distinct ownership classes. We also review the behavioral assumptions regarding landowner behavior on which forest sector models rely. Based upon the reviewed literature, we identify discrepancies between the modeling assumptions and the empirical evidence, and discuss potential improvements from modeling the different classes of forest owners in accordance with the empirical evidence. This study contributes to the economic literature with increased knowledge, addressing an important issue from a policy perspective, both directly regarding forest ownership and management and indirectly through its potential applications in forest sector modeling.

Models involving economic interactions on a market always rely on behavioral assumptions about the economic agents involved. Forest owners are typically modeled as profit seeking firms, operating on a perfect market with complete information, amongst other standard economic assumptions. Unless more specific behavioral assumptions are introduced in the model, all forest owners are implicitly assumed to behave in the same way, operating towards the same goals, with the same knowledge and so on. This has implications for the validity of the model, depending on the discrepancies between actual and modeled behavior within each ownership class and the relative sizes of these classes.

In the literature, forest owners are usually categorized into four main classes – industrial, institutional, non-industrial, and public forest owners (e.g. Kant and Alavalapati, 2014). For reasons mentioned below, these classes may differ notably in how they respond to prices amongst many other aspects which will be examined in this study. The industrial and institutional owners are expected to have profit seeking objectives, although with important differences, while the non-industrial and public owners to a high extent can be expected to operate towards other goals than profit seeking. The industrial ownership class includes large-scale forest owners with vertically integrated processing facilities, as well as smaller industrial forest owners with processing facilities but not enough land to be self-supplying on raw materials. Institutional owners is a relatively new and growing class of forest owners, consisting mainly of investors whose objective of owning forestland is to diversify their portfolios. Institutional owners often hire large specialized firms to manage their forests, known as timberland investment management organizations (TIMOs). Non-industrial private forest owners (NIPFs) is the least homogeneous of the ownership classes and consists of small-scale forest owners, including farmers who also own forestland. They operate towards a wide range of different objectives, and are in modern studies often modeled as utility maximizing individuals instead of profit seeking firms, who may also value their forest as a leisure good (Beach et al., 2005). Public forest owners constitute globally the most common class of forest owners and also operate towards multiple objectives other than profit seeking. Responsibilities of public forestry agencies include stewardship of non-commercial lands, allocation among land and resource uses, protection and control of natural hazards, technology transfer and forestry research (Hyde, 2012).

Methods

This study consists of a literature review in two parts followed by a synthesis and discussion part based on the results and insights found in the reviewed literature.

In the first part we review the literature on empirical evidence about forest landowner behavior. Reviewed studies are categorized by ownership class and other variables such as year, country, method, etc., and the determinants to harvesting decisions are summarized together with their estimated impacts and possible ways of parameterization. In the second part we review the literature on forest sector models, from the perspective of which implicit and explicit assumptions they rely on regarding the behavior and characteristics of the different forest ownership classes. As in the first part, the reviewed studies are categorized in a similar approach and modeling assumptions about landowners in the different studies are summarized for each class of forest owners

respectively.

In the next part we synthesize the results from the two parts of the literature review by comparing the behavioral assumptions from the forest sector models with the actual empirical evidence on forest owner behavior. Discrepancies between behavioral assumptions and actual empirical evidence are identified, summarized and discussed from a forest modeling perspective and conclusions are drawn from research and policy perspectives.

Results

From the first part of the literature review, we expect results in terms of identified key determinants to harvesting behavior among four different classes of forest landowners, with a summary of signs and impacts (e.g. estimated elasticities from the econometric studies in the review) and possible parameterizations of these determinants. Differences between ownership classes are summarized based on the reviewed studies and discussed based on the economic theory behind such differences. From the second literature review part, the expected result is a summary of forest sector models and their development over time, from the perspective of which behavioral assumptions about forest owners they rely on. From the synthesis and discussion part we expect results in terms of identified discrepancies between behavioral assumptions and actual empirical evidence, and hopefully also some good examples of integrated evidence based knowledge about forest owners in forest sector models.

Conclusions

Expected conclusions from the study include identified research gaps in the field of empirical evidence on landowner behavior and in the field of forest sector models. We suggest how future studies can benefit from integrating landowner behavior in the models.

References

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