

Summary
An econometric model of a forestry enterprise
on the example of Olkusz Forest District

The work presents the steps in building an econometric model of a forestry enterprise as well as application examples for economic evaluation of various forest management scenarios. The model contains a silvicultural treatment module, a catalog of costs, a timber price list, and a simulation module for manipulating stand characteristics such as age, volume, and species composition, as well as for evaluating the costs and revenues from forestry activity in successive decades. The model parameters were determined using the extensive database of the State Forest Information System containing data at the forest district level, which made it possible to generate local timber price lists as well as local cost catalogs taking into account the specific natural and economic conditions of individual forest districts. In this work, the model was parameterized for the Olkusz Forest District and used to evaluate forest management scenarios differing in terms of species composition, rotation age, regeneration type (artificial vs. natural), and long-term stand age distribution. Given the prevailing natural and economic conditions of timber production in the Olkusz Forest District, the model revealed that:

- the optimum pine rotation age maximizing timber yield is 90 years while that maximizing economic performance (revenues from timber less expenditures) is 110 years. In the case of oak, the rotation age maximizing timber yield is 130 years, while that maximizing economic performance is 140 years;
- the replacement of pine with oak stands in mixed forest sites enables a 41.6% increase in timber revenues over a period corresponding to the next optimum oak rotation age in those sites;
- the replacement of artificial regeneration with natural regeneration will decrease silvicultural costs by 11% in pine stands and 8% in oak stands, with the timber yield and price parameters remaining the same.

Furthermore, economic simulation was conducted for future consecutive management periods adopting the current costs and prices as constant. The value of timber was expressed in terms of the volume of the WC01 pine assortment.

Key words: timber prices, costs, income, forestry enterprise model, rotation age, species composition, profitability, simulation, prediction, management scenarios, forest management;