

# The Role of the Transversality Condition in the Timber Harvest Scheduling Problem

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*Abstract:* This paper reports a mathematical treatment of the linear control problem of managing an even-aged stand of trees over an infinite series of rotations. We propose a continuous-time type dynamic timber harvesting model with a novel stand growth function and a stand establishment cost function that depends on the quantity of seedlings planted by a forest firm. By using the transversality conditions of Pontryagin's maximum principle (MP), the upper limit of the optimal rotation age is identified. In addition, by using other conditions of MP, graphical arguments, and Green's integration formula, it is shown that if the optimal rotation age comes under one of three different time ranges, then the optimal quantity of seedlings to be planted is confined to one of the corresponding three different quantity ranges.

*JEL classification:* C61, D21, Q23

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