

Optimal rotation with declining discount rate

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In recent years it has been argued, from many perspectives, that the further into the future a value flow occurs, the lower is the appropriate discount rate for it. This viewpoint can be, and has been, formalised in various ways, and has been applied to evaluating forestry investments of given durations. When the optimal duration of investment is *itself* the issue, new problems arise. Discontinuous changes of rate give stepped or cusped net present value functions, with discontinuous changes in optimal rotation. Lower discount rates make subsequent rotations longer than earlier ones, and more valuable than they would otherwise be. This affects the optimal length of earlier rotations, which in turn affects the discount rate profile applicable to later ones. In the absence of analytical solutions for the optimal *sequence* of rotations, numerical protocols are needed. If the change of discount rate is due to *expected* changes of circumstance that are *actually* realised, then the optimal sequence of rotations will remain as initially determined. If, however, it is due merely to the particular time perspective of the present generation, rotations will be revised by future generations. This will lead to the same sequence of constant rotations that would be deemed optimal at the current short-term discount rate.

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