

# Optimal profit from harvesting policies with a generalized logistic stochastic differential equation growth model

Nuno M. Brites\*

<sup>1</sup>ISEG-School of Economics and Management, Universidade de Lisboa; REM - Research in Economics and Mathematics, CEMAPRE, Portugal

## Correspondence

\*Nuno M. Brites, Rua do Quelhas, 6, gabinete 503, 1200 - 781 Lisboa. Email: nbrites@iseg.ulisboa.pt

## Present Address

Rua do Quelhas, 6, Office 503, 1200 - 781 Lisboa.

## Summary

We describe the growth dynamics of a stock using stochastic differential equations with a generalized logistic growth model, which encompasses several well-known growth functions as special cases. For each model, we compute the optimal variable effort policy and compare the expected net present value of the total profit earned by the harvester among policies. In addition, we further extend the study to include parameters sensitivity, such as the costs and volatility, and present explicitly a Crank-Nicolson discretization scheme necessary to obtain optimal policies.

## KEYWORDS:

Crank-Nicolson; Harvesting policies; Generalized logistic; Net present value; Optimal control; Profit optimization; Stochastic differential equations.