Applied Mathematical Finance ›
Volume 16, 2009 - Issue 6

Original Articles

Valuing the Guaranteed Minimum Death Benefit Clause with Partial Withdrawals

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Pages 451-496 | Received 16 Jun 2008, Published online: 06 Nov 2009
Cite this article https://doi.org/10.1080/13504860903075464

Abstract

In this paper, we give a method for computing the fair insurance fee associated with the guaranteed minimum death benefit (GMDB) clause included in many variable annuity contracts. We allow for partial withdrawals, a common feature in most GMDB contracts, and determine how this affects the GMDB fair insurance charge. Our method models the GMDB pricing problem as an impulse control problem. The resulting quasi-variational inequality is solved numerically using a fully implicit penalty method. The numeric ... itching models. ... w that the discrete ... onvergence to th ... ts show that the a ... insurance charge f

Key Wo...
impulse control | fully implicit penalty method

Acknowledgement

This work was supported by the Natural Sciences and Engineering Research Council of Canada.

Notes

[1] Intuitively, this can be viewed as a discretely observed lookback option based on the maximum value of the underlying (Wilmott, 1998).

[2] We remark that our PDE approach can easily be extended to model different withdrawal policies. For example, an alternate withdrawal policy, whereby the deposit is reduced by the amount withdrawn but the death benefit is reduced on a proportional basis, could be easily implemented.

[3] Note that this is trivially true at .