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Applied Mathematical Finance > Volume 16, 2009 - Issue 6

411 38

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Valuing the Guaranteed Minimum Death Benefit Clause with Partial Withdrawals

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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-

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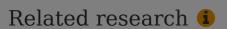
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Acknowledgement

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Notes

- ¹ Intuitively, this can be viewed as a discretely observed lookback option based on the maximum value of the underlying (Wilmott, <u>1998</u>).
- 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 For example, an alternate withdrawal policy, whereby the deposit is reduced by the amount withdrawn but the death benefit is reduced on a proportional basis, could be easily implemented.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 .



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