

Grosen, Anders; Jørgensen, Peter Løchte

Fair valuation of life insurance liabilities: The impact of interest rate guarantees, surrender options, and bonus policies. (English) Zbl 0977.62108

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Summary: The paper analyzes one of the most common life insurance products – the so-called participating (or with profits) policy. This type of contract stands in contrast to unit-linked (UL) products in that interest is credited to the policy periodically according to some mechanism which smoothes past returns on the life insurance company's (LIC) assets. As is the case for UL products, the participating policies are typically equipped with an interest rate guarantee and possibly also an option to surrender (sell-back) the policy to the LIC before maturity.

The paper shows that the typical participating policy can be decomposed into a risk free bond element, a bonus option, and a surrender option. A dynamic model is constructed in which these elements can be valued separately using contingent claims analysis. The impact of various bonus policies and various levels of the guaranteed interest rate is analyzed numerically. We find that values of participating policies are highly sensitive to the bonus policy, that surrender options can be quite valuable, and that LIC solvency can be quickly jeopardized if earning opportunities deteriorate in a situation where bonus reserves are low and promised returns are high.

MSC:

62P05 Applications of statistics to actuarial sciences and financial mathematics

Cited in **96** Documents

Keywords:

participating life insurance policies; embedded options; contingent claims valuation; bonus policy; surrender

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