

Stochastic Interest Rates in Life Insurance Mathematics

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Abstract

Basic life insurance mathematics applies some simplifications, e.g., the assumption of constant interest rates during the period of insurance (see [1]). Insurance companies in Slovakia usually follow this assumptions and they calculate the premium using the technical interest rate. According to Decree of the National Bank of Slovakia the maximum technical rate of interest shall be 2.5% p. a. From a practical point of view, insurance corporations invest collected premiums on behalf of policyholders in different types of assets (e.g., bonds, shares, deposits). However, their yields have stochastic character, because the situation on the financial and capital markets is continually changing. For insurance companies it is important to know what kind of risks and losses will they face, if premium is computed using technical interest rate, while return on investments isn't guaranteed. The aim of this paper is to present several methods for pricing the present value of potential future insurance losses. We assume that the potential losses are derived from the stochastic behavior of interest rates and market yields.

Keywords: technical rate of interest, actuarial present value, Vasicek model, ARIMA-process

AMS subject classifications: 91B30, 91G30

Acknowledgements: This research was supported by the Slovak grant VEGA No. 2/0038/12.

Bibliography

- [1] Gerber, H. U. (1997). *Life Insurance Mathematics*, Third Edition, Springer-Verlag Berlin Heidelberg. ISBN 3-540-58858-3.