The impact of the underlying interest rate process
- When calculating the best estimate of liabilities

Johan Dellner[*]

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Abstract

Solvency II requires a stochastic valuation for most products with guarantees. This is done in order to determine the time value of options and guarantees (TVOG), which is a part of the best estimate of liabilities. One way to determine the TVOG is by projecting a large number of economic scenarios in a financial projection model. This paper aims to explain and examine the impact of using the following underlying interest rate processes: Hull and White (HW); Cox–Ingersoll–Ross (CIR); and Libor Market Model (LMM) when generating the economic scenarios used for the valuation. These three processes are all used in the insurance industry and fulfill the market consistency and risk neutrality required by EIOPA under Solvency II; while HW allows for negative interest rates; the CIR and LMM does not. The differences in their distributions yield different results when the TVOG is determined; which indicates the importance of using the appropriate model as well as understanding it. The TVOG is significantly different for products with a guaranteed rate of 0 % due to the allowance of negative rates in HW. This master thesis is limited to a simple guarantee product and a sample of 80 model points, applying different guaranteed rates to examine how the distributions of the generated scenario impacts the outcome.

[*]Postal address: Mathematical Statistics, Stockholm University, SE-106 91, Sweden. E-mail: johan.dellner@hotmail.com. Supervisor: Dmitrii Silvestrov.