

Pricing of Guaranteed Minimum Benefits in Variable Annuities

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Abstract

Increasing life expectancy as well as reduction of the state retirement pensions in several countries has led to the rapid growth of variable annuities, products allowing guaranteed payments and participation in the financial markets at the same time. These fund-linked annuity products are frequently offered with additional living and death benefits. Due to the complex structure of these Guaranteed Minimum Benefits and their exposure to different risk factors, consistent pricing of variable annuities becomes a comprehensive task. As it is often a tradeoff between a realistic model and analytical tractability, several studies in the academic literature were either focusing on closed-form solutions and thus simplifying the contract setups and the modeling assumptions or proposing numerical routines for the multi-factor models. This work aims to fill this gap and shows how the explicit expressions for prices of some of the VA products currently offered on the market can be derived in a hybrid model for insurance and market risks.