

Title: Pricing Guaranteed Minimum Withdrawal Benefits by Analytical Methods

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Abstract:

Pioneered by Milevsky and Salisbury (2006), the guaranteed minimum withdrawal benefit (GMWB) has been studied extensively in the actuarial literature. The most prevalent approach in market practice, Monte Carlo simulation, has been observed to be time consuming and in many cases extremely costly. Other numerical methods such as PDEs have also been proposed in the literature. In this work we propose alternative analytical methods, such as spectral expansion techniques, for the pricing of GMWBs. As we demonstrate by numerous examples the methods and numerical algorithms developed in this work appear to be both accurate and computationally efficient, and may be used as the basis for developing computing methods for more sophisticated equity-linking insurance products.