2nd PBSS Colloquium
21-23 May 2007
Helsinki, Finland

Topic D. Projection Methods for Pension and Social Security Financing

Fair valuation of a non-statutory participating pension contract in the presence of economic cycles

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Market-consistent valuation (known as the fair valuation) of liabilities is an important part of analyzing a non-statutory participating pension contract. Liabilities can be valued in the Black-Scholes framework, however, the Black-Scholes approach does not capture long-term behaviour of financial markets well. One way to improve the long-term behaviour is to model stochastic economic cycles in the form of an embedded Markov process, which modulates parameters of a geometric Brownian motion underlying the Black-Scholes approach. In this study, we consider the valuation of a participating pension contract in the Markov modulated Black-Scholes framework by employing the Esscher transform. Using this approach, we analyze how various parameters influence the fair value of a participating pension contract, and which sets of parameters are fair for such a contract.