

Valuation of segregated funds in India

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Stochastic valuation modeling is an important area for actuaries and financial experts who deal in equity-linked insurance including segregated fund contracts. A stochastic analysis of the guarantee liabilities under any given segregated fund contract requires a credible long-term model of the underlying stock return process. However, there are many stochastic models in common use for the stock return process. Actuaries have no general agreement on the form of such a model (CIA (2001) and AAA (2005)).

A model of stock and bond returns for long-term applications was developed by Wilkie (1986, 1995) in relation to the U.K. market, and subsequently fitted to data from other markets, including both the United States and Canada. It has been applied to segregated fund liabilities by a number of Canadian companies. In spite of it being an invaluable tool for actuaries particularly in the context of measuring and managing financial risk, it has as well been subjected to vigorous criticisms (Huber (1997)). While different markets behave differently, it is important to factor market characteristics at an early stage in the modeling process.

In this paper, we introduce an econometric (valuation) model which is less complex than the Wilkie model for valuing and managing financial risks associated with combined guaranteed minimum maturity benefit and guaranteed minimum death benefit (GMMB/GMDB) regarding segregated fund contracts in India. Currently, the regulation of unit-linked insurance contracts in India is being developed to follow the Canadian regulation of segregated fund contracts.

The long-term stock market returns and the security bond processes are modeled by the vector autoregressive (VAR) and the Cointegrated vector autoregressive (COINT-VAR) models respectively. They offer an alternative class of models to actuaries and other financial experts.

For the VAR model, we use monthly data from the Colombo Stock, Bombay Stock and the Karachi Stock indices. However, we use the Monthly Yield to Maturity (YTM) of up to 14 days, 15 to 91 day, 92 to 182 days and 183 to 364 days from the Indian Money Market to fit the COINT-VAR model.

Finally, we assess the valuation model via simulation for a 10 year contract under the combined GMMB/GMDB for a life age 50. The simulation results clearly indicate that, the net present value of outgo is mostly in the negative.