

ERM Stochastic Analysis Tools:
Risk Drivers Revealed

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Abstract

Most stochastic enterprise risk management (ERM) models for life insurance examine only the resultant output (specifically the economic capital), and thereby separate the model results from the key input model assumptions, such as the term structure of interest rates. Now, with ERM modeling, the calculation of economic capital (EC) is very expensive due to the complexity of the products and regulatory controls placed on the industry. Add to that the requirement of a large number of scenarios to produce the empirical distribution of EC. Certain techniques have arisen to reduce this modeling cost, such as grid computing and replicating portfolios, but even with these reductions, a high cost is exacted from the enterprise. However, despite all the resources dedicated to the generation of EC, the analysis of results is frequently limited to the determination of the empirical distribution and an obligatory examination of the relationships of the five worst and five best scenarios to the EC.

If we can expand our understanding of the impact of all of the scenarios on the EC, while also targeting specific percentiles of the EC, such as the 98 percent empirical value at risk (VaR), our understanding of the enterprise's risk exposure is greatly enhanced. Also, this analysis becomes the springboard for the creation of EC dashboards that allow the study of daily changes in the economy on the VaR.

The above is accomplished by use of the quantile regression (QR) modeling of Koenker and Basset (1978).

Key Words:

Enterprise Risk Management, Quantile Regression, Economic Capital, Risk Dashboards.