



Milliman

Consultants and Actuaries

Milliman's Financial Risk Management Services

Product Design

We provide expertise on the design of new products such as:

- Feasibility analysis of illustrative product designs
- Design of product guarantees based on market research and financial objectives
- Implementation of systems for the ongoing management of business

Economic Capital and Risk Management Frameworks

Our services cover all aspects of risk management including:

- The valuation of risks and the amount of economic and risk based capital required to support them
- The collection of portfolio and market data to monitor the evolution of risk exposures
- The implementation of appropriate control processes to manage these exposures
- The development of financial and risk reporting systems and templates to quantify and monitor the success of the risk management procedures

Risk Profiling and Analysis

We assess the path-dependent performance, economics, and risks related to a business segment, product or investment (e.g. mortgage servicing, variable annuities, UK with-profits, defined benefit pensions).

We consider all types of risk, including:

- Market (equity, interest rate and credit) risks
- Liquidity risks
- Insurance and demographic risks
- Operational risks

Our analytics include the application of actuarial techniques and the ability to model unique behavior at the policy-level (seriatim). These may then be integrated into holistic Monte Carlo simulation models that can then be used to assess the economics, risks, daily hedging, or long term reinsurance requirements for the business. We use this analysis to generate periodic reports profiling the risk (e.g. VaR, CTE, Greeks, Return and Risk Attribution) of the particular business segment, product, or investment.

We are platform independent and can employ either our own models or those of a specified vendor if a client has a particular preference.

Hedging Programs

Specifically for market risk, we utilise technologically based solutions to develop risk management tools to enable clients to:

- Initiate new hedging programs
- Evaluate the ex-ante projected performance of different hedging strategies
- Monitor the actual performance of the hedging program over time
- Improve the performance of existing risk management strategies
- Take advantage of market opportunities to lower cost and increase the effectiveness of market and credit risk management
- Achieve industry best practices for financial controls and management reporting of hedging programs

Market Simulation

Milliman utilises option pricing and stochastic on stochastic time series models to support risk management reports, or to test the performance of alternate risk management procedures such as trading or



hedging strategies under a wide range of scenarios. The computing power for these applications is derived from a grid computing system optimised to facilitate rapid turnaround of large scale computational demands in a short amount of time.

Our purpose built realistic and arbitrage free stochastic scenario generation models enable us to model a wide range of market conditions

Financial & Risk Reporting

Financial reports are aimed at communicating the extent to which the risk management framework itself is working, thereby completing the risk management control cycle process.

At Milliman we work with clients to customise financial and risk reports to their particular needs. Examples include:

- Reports based on risk adjusted returns on economic capital which enable the relative performances of different business units to be measured.
- Profit attribution reports aimed at regularly explaining the sources of profit or loss, thereby demonstrating that the management of the business is under control
- Periodic snapshots of the economic balance sheet, showing the level of economic capital for each business unit.
- Reports representing both risk and value. These may come in the form of the distribution of outcomes. For example the distribution of embedded value profit, VaR or CTE measures.
- Risk inventory reports, risk dashboards or operational risk score-cards by business unit.

Operational Risk

Although by definition operational risk cannot be eliminated, at Milliman we have developed risk frameworks involving actions aimed at significantly reducing the frequency and severity of the main sources of operational risk: event, business, strategic and control failure.

At Milliman, we advocate frameworks which are focused on control processes aimed at mitigating against operational risks. These typically involve risk and control assessments, with “key risk indicators” being used to report on the progress of the operational risk safeguards.