

Investment and Reinsurance Options with Dynamic Financial Analysis

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Abstract:

Dynamic financial analysis (DFA) is a financial modeling approach and used for performance measurement, capital allocation, pricing decisions, product designing and valuation, analysis of major risks such as inflation risks, interest rate risks, and reserving risks. DFA is based on large-scale computer simulations. Financial results are projected under a variety of possible scenarios by changing internal or external conditions with DFA. For non-life insurance companies DFA is an important tool for asset management and risk management.

In this study, two different simulation studies are made with 100.000 iterations in MATLAB programming language via a DFA model that includes basic components for a non-life insurance company to minimize the probability of ruin and maximize the company's profit.

In the first study investment option is discussed. The investment option can be divided in high-risk investments, such as stocks or high-yield bonds and low-risk investments, such as government bonds or money market instruments. We try to find the best portions invested in high-risk investments and in low-risk investments.

In the second study the reinsurance option is discussed; we try to find the optimal retention limit under stop-loss, excess-of-loss and quota-share reinsurance arrangements.

Keywords: Dynamic Financial Analysis, Simulation, Investment Options, Minimizing The Ruin Probability, Maximizing The Profit, Non-life Insurance