Risk- and Value-Oriented Management for Non-Life Insurers Under Solvency Constraints

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Abstract

Pillar 1 of Solvency II requires that insurers derive solvency capital requirements either by means of a standard model provided by the regulatory authorities or based on a company-specific internal model that adequately reflects the firm’s risks (see, e.g., [2]). An internal model should also be used in Pillar 2 for the firm’s own risk and solvency assessment (ORSA) and should thus represent an integral part of an insurer’s risk- and value-based management, i.e., to be applied for corporate risk management and asset allocation decisions, for instance. Against this background, the aim of this paper is to establish a simplified internal model for a non-life insurer and to apply this model for deriving (optimal) risk- and value-based management decisions regarding the investment strategy, which contribute to increasing shareholder value. Toward this end, we considerably extend the analyses and model frameworks in previous work (e.g., [1], [2]) by studying the impact of several new key features and their impact on shareholder value with analytical solutions, including the policyholders’ willingness to pay depending on the insurer’s reported solvency status, which despite its great impact has not been studied to date in this context.

In previous work, [2] derive minimum requirements for a non-life insurer’s capital investment strategy that satisfy solvency restrictions based on different risk measures. Using “solvency lines”, i.e. isoquants of risk and return combinations of the asset allocation for a fixed safety level of the insurer, they determine admissible risk and return asset, and then compare these to allocation opportunities actually available at the capital market based on portfolio theory. Similarly, but in a life insurance context, [1] study optimal asset allocations taking into account restrictions from solvency capital requirements, thereby comparing the Solvency II standard formula with an internal model. Furthermore, experimental and empirical research (see, e.g., [3]) shows that an insurer’s default risk can have a strong influence on customer demand, where lower safety levels can lead to a considerable reduction of achievable premiums. These results emphasize that an insurer’s safety level should be taken into account in risk- and value-based management as the reaction of customers to default risk (by way of the premium level) can

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considerably impact shareholder value. This will be even more relevant when insurers have to publicly report their solvency status under Solvency II.

The purpose of this paper is to contribute to the existing literature in various relevant ways. We extend the analysis in [2] and [1] by focusing on the firm's shareholder value under risk- and value-based management decisions and by explicitly taking into account the policyholders' willingness to pay in our model framework when deriving admissible asset allocations under solvency constraints. To investigate the influence of the policyholders’ risk sensitivity, we also extend the approach in [3] and model the achievable premium as a function of the insurer's safety level and the policyholders’ risk assessment. In this setting, we link the admissible risk-return combinations of the insurer's asset portfolio (i.e. those that are allowed under solvency constraints) to allocation opportunities actually attainable at the capital market using portfolio theory, and then additionally derive the maximum achievable shareholder value. Our model further accounts for dependencies between assets and liabilities, proportional reinsurance contracts as well as the influence of the risk-free interest rate. In a numerical analysis, we study the impact of these determinants on the set of attainable and admissible risk-return combinations for the asset allocation as well as on the maximum shareholder value under different policyholder risk sensitivity scenarios. This allows establishing a risk- and value-based management that can be used for an enterprise-wide decision making by balancing risk-taking, solvency levels, and shareholder value. One main finding is that the consideration of policyholders’ willingness to pay is of great relevance when deriving optimal risk-return asset allocations under solvency constraints and that reinsurance can considerably impact these results, depending on the level of the policyholders’ risk sensitivity.

Keywords: Risk- and value-based decision-making; non-life insurance; Solvency II; shareholder value optimization.

References

