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Assessing the Resilience of the Insurance Industry under Solvency II

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Abstract : The paper aims to assess the insurance industry's resilience under Solvency II against adverse scenarios. Starting from the economic balance sheet available under Solvency II for insurance and reinsurance undertakings, we assume that assets and liabilities follow a bivariate geometric Brownian motion (GBM). Then, using the results available under Margrabe's formula, we establish an analytical solution to calibrate the volatility of the asset-liability ratio. In such a way, we can estimate the probability of default and the probability of breaching the undertaking's Solvency Capital Requirement (SCR). Furthermore, since estimating the volatility of the Solvency Ratio became crucial for insurers in light of the financial crises featured in the last decades, we introduce a novel measure that we call Resiliency Ratio. The Resiliency Ratio can be used, in addition to the Solvency Ratio, to evaluate the insurance industry's resilience in case of adverse scenarios. Finally, we introduce a simplified stress test tool to evaluate the economic balance sheet under stressed conditions. The model we propose is featured by analytical tractability and fast calibration procedure where only the disclosed data available under the Solvency II public reporting are needed for the calibration. Using the data published regularly by the European Insurance and Occupational Pensions Authority (EIOPA) in an aggregated form by country, an empirical analysis has been performed to calibrate the model and provide the related results at the country level.

Keywords : Solvency II, solvency ratio, volatility of the asset-liability ratio, probability of default, probability to breach the SCR, resilience ratio, stress test
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