

Parameter Risks of Surplus Management Under a Stochastic Process*

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Abstract

To hedge the interest-rate risk against a firm's surplus, insurance companies commonly set the firm's asset duration equal to the debt ratio times the firm's liability duration. However, this strategy focuses only on the fluctuation of interest rates; it does not address any of the uncertainty in the underlined factors, which guide the changes in interest rates. This paper first identifies parameter risks against a firm's surplus. We further propose to use goal programming to integrate the traditional immunization strategy against interest-rate risk and the strategies against parameter risks. Since the goal programming suggested in our paper is an integrated model of immunization strategies against interest-rate risk and parameter risks, the immunization strategy suggested here includes classical immunization strategy as a special case. Moreover, the results of our simulation show that, compared to classical immunization, the goal programming proposed in this paper can reduce significantly the overall risks against an insurance company's surplus.

Keywords: asset and liability management, immunization strategy, parameter risks

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