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**Optimal lower barrier on modified surplus process.** (English) Zbl 07192015  
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**Summary:** We obtain the optimal pair of initial surplus and barrier level under the lower barrier model on the modified surplus process. In particular, we examine the defective distribution function of the time to ruin  $T_{u,k}$  with lower barrier  $k$  and initial surplus  $u$  which is suggested by *C. Nie* et al. [“Minimizing the ruin probability through capital injections”, *Ann. Actuar. Sci.* 5, No. 2, 195–209 (2011; doi:10.1017/S1748499511000054)]. We aim to take this approach one step further by proposing optimal reinsurance under the minimum finite time ruin probability and maximum benefit criteria such as the released capital, expected profit and expected utility. We calculate the optimal pairs of initial surplus and barrier levels for different time periods, loading factors and weights of the criteria. In decision-making process, we use the Technique for Order of Preference by Similarity to Ideal Solution method with Mahalanobis distance. We analyse the robustness of the results with sensitivity analysis.

**MSC:**

62 Statistics

**Keywords:**

reinsurance; ruin probability; lower barrier model; TOPSIS; Mahalanobis distance

**Full Text:** [DOI](#)

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