A probability of ruin approach to optimize pension fund investments

Abraham E. Hernández-Pacheco[1,2], Agnieszka I. Bergel[1], Alfredo D. Egídio dos Reis[1]

[1] ISEG & CEMAPRE, Universidade de Lisboa

[2] Vitalis®, Expertos en Pensiones

Our work intends to explain the idea and the rationale of using ruin theory to optimize the asset allocation for a defined contribution pension fund, where current assets plus the present value of future contributions are smaller than the present value of its liabilities discounted at a "risk free" interest rate.

This approach determines the asset allocation for a portfolio that minimizes the probability of reaching a threshold where there is the need of increasing contributions or curtail benefits (which we will call ruin), under a set of different assumptions of initial funding, future contributions, and financial returns.

References

[1] HERNÁNDEZ-PACHECO, ABRAHAM E. & GONZÁLEZ-SALGADO, JONATHAN, *Optimal asset allocation for defined benefit plans under a heavy-tailed-coupled portfolio*. Available at https://www.actuaries.org/oslo2015/papers/PBSS-GonzalesSalgado&HernPach.pdf (2015).