

Optimal Asset Allocation Incorporating with Longevity Risk in the Defined Contribution Pension Plan

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Abstract

Mortality improvement has become an inevitable factor of the required pension preparation. Since a longer retirement phase is expected, it is crucial to include the factor of mortality improvement into the plan of retirement preparation. This paper first investigates an appropriate method to predict the future mortality properly, then we derive the formulation of the optimal asset allocation with taking longevity risk into account for a DC pension plan. In order to capture the prediction of longevity risk more precisely, time adjustment of mortality trend is applied to the Lee-Carter mortality model. This paper finds that if we ignore both factors of mortality improvement and time adjustment, we might underestimate the target pension liability up to 20%. Therefore, if we don't increase contribution rate, we should take a risky investment strategy when we consider the factor of longevity risk, since, for the larger target pension liability, we should hold more risky asset in order to make more profits to match the larger liabilities. In average, we should invest 6.6% more in equities when we consider mortality improvement, and we should hold 2.1% more in equities when we further consider time adjustment of mortality.

Key words:

Lee-Carter model; Time adjustment; Defined contribution; Asset allocation

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