SOCIETY OF ACTUARIES

Article from:

ARCH 2014.1 Proceedings

July 31-August 3, 2013

Improving Pension Product Design

Agnieszka Konicz[1], John M. Mulvey[2]

[1] Technical University of Denmark, Denmark; agko@dtu.dk
[2] Princeton University, USA

The paper develops a pension product that can be offered in a defined contribution pension scheme as a deferred or immediate life annuity. The product is characterized by linking an individual's savings directly to market returns and differs from the products available in the market by being adjusted to individual needs. We argue that the asset allocation, the payout profile and the insured sum should not only depend on the plan member's age (or time left to retirement), nor only on her risk preferences, but should capture personal and economical characteristics. Among other factors, we include current wealth, expected lifetime salary progression, mandatory and voluntary pension contributions, expected state retirement pension, choice of assets, subjective lifetime expectancy and bequest motive. Specifically, the asset allocation strategy, the payout profile and the level of insured sum defining the new product are optimal under the expected utility function of retirement benefits given the individual's characteristics.

The problem is solved via a model that combines two optimization approaches: stochastic optimal control and multistage stochastic programming. The first method is common in financial and actuarial literature, but results in theoretical values. However, the latter, which is characteristic for operations research, has highly practical application. We present the operations research methods with application of immediate and deferred life annuities in the Danish market, which have potential to stimulate new thinking and add to actuarial practice.