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Optimal and Nearly-Optimal Strategies for Minimizing the Probability of Ruin in Retirement

The increasing risk of poverty in retirement has been well-documented; this phenomenon is driven by demographic trends, changes in employer-sponsored pension plans, and inadequate private retirement savings. We study the optimal investment strategy for a retiree whose objective is to minimize the probability of lifetime ruin, namely the probability that a fixed consumption strategy will lead to zero wealth while the individual is still alive. We derive a variational inequality that governs the ruin probability and the optimal strategy, and we demonstrate that the problem can be recast as a related optimal stopping problem which yields a free-boundary problem that is more tractable. In the special case of exponential future lifetime, one can solve the free-boundary problem explicitly and recover a concise expression for the optimal asset allocation. For more general mortality, we numerically calculate the ruin probability and optimal strategy and examine how they change as we vary the mortality assumption and parameters of the financial model. In addition, we consider suboptimal strategies that are easier to implement and examine the impact on the ruin probabilities.

This is joint work with Virginia Young.