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Minimizing the Probability of Lifetime Ruin under Borrowing Constraints

We determine the optimal investment strategy of an individual who targets a given rate of consumption and who seeks to minimize the probability of going bankrupt before she dies, also known as *lifetime ruin*. We impose two types of borrowing constraints: First, we do not allow the individual to borrow money to invest in the risky asset nor to sell the risky asset short. However, the latter is not a real restriction because in the unconstrained case, the individual does not sell the risky asset short. Second, we allow the individual to borrow money but only at a rate that is higher than the rate earned on the riskless asset.

We consider two forms of the consumption function:

(1) The individual consumes at a constant (real) dollar rate, and

(2) the individual consumes a constant proportion of her wealth.

The first is arguably more realistic, but the second is closely connected with Merton's model of optimal consumption and investment under power utility. We demonstrate that connection in this paper, as well as include numerical examples to illustrate our results.

This is a joint work with Virginia R. Young.