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Optimal Investment and Consumption under Habit Formation

In the standard Merton formulation of optimal investment and consumption, the integrated discounted lifetime utility of consumption together with the discounted future bequest, are optimized. In this standard formulation the time t utility of consumption depends only on the amount consumed at that time. However, it is both theoretically and empirically reasonable to suppose that the utility of consumption depends on past individual consumption history. Economists term this 'habit formation'. In this paper we construct a simple mathematical description of this habit formation and derive Merton style nonlinear partial differential equations (PDEs) having an additional 'spatial' variable for the resulting investment-consumption problem. We present numerical solutions for the resulting PDE and draw insights from these solutions.

This is joint work with Roman Naryshkin (Western Ontario)