

Abstract for AFIR COLLOQUIUM 9-11 SEPTEMBER 2009, MUNICH

Title: **Valuation, Hedging and Demand for Ruin-Contingent Life Annuities (RCLA)**
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Abstract:

In this research we value and provide optimal hedging strategies for a type of exotic option called a ruin-contingent life annuity (RCLA). This pension-like product jointly hedges against financial market risk and personal longevity risk. The annuitant's (i.e. long position) payoff from a generic RCLA is \$1 of income per year for life, akin to a defined benefit pension, but deferred until a pre-specified diffusion process hits zero. The RCLA provides the buyer with a type of insurance against the joint occurrence of two separate (and likely independent) events; the two events are under average investment returns and above average longevity. The RCLA is a single premium annuity that provides lifetime income, but only in bad economic scenarios. In the good scenarios, properly defined, it pays nothing. The RCLA is obviously (much) cheaper than a generic life annuity which provides income under all economic scenarios. We derive the PDE and relevant boundary conditions satisfied by the RCLA (and the so-called hedging delta) value assuming No Arbitrage is possible. We then describe some efficient numerical techniques and provide estimates of a typical RCLA under a variety of realistic parameters. The motivation for studying the RCLA is that it is now embedded in approximately \$800 billion worth of U.S. variable annuity (VA) policies which have recently attracted scrutiny from analysts and regulators.

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