On Pricing and Hedging the No-Negative-Equity-Guarantee in Equity Release Mechanisms

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Abstract: For many people, a shortfall in retirement income can be met by participating in home equity release mechanisms (ERMs) which enable homeowners to draw down part of the equity in their houses. Among various types of ERMs, roll-up mortgages are the most popular in the UK equity release market today. In a roll-up mortgage, the homeowner receives a loan in the form of a lump sum. The loan is rolled up with interest until the homeowner dies, or moves into long-term care. The house is sold at that time, and the proceeds are used to repay the loan and interest. For most policies, the loan repayment cannot exceed the proceeds of the house sale. This is called the No-Negative-Equity-Guarantee (NNEG), which may be viewed as a put option on the sale of the property. The valuation of the NNEG requires a model for stochastic future mortality and a time-series process that can reasonably model the auto-correlation and varying volatility effects in the dynamics of house price returns. However, under the identified time-series process, there exists more than one equivalent risk-neutral probability measure, leading to many possible prices for the guarantee. This phenomenon is known as market incompleteness. The core of this study is the investigation into the pricing formula, and the hedging and capital reserving strategies for the NNEG in such an incomplete market.