

Robust Hedging of Longevity Risk

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First version: August 2011
This version: August 26, 2011

Abstract

We consider situations where a pension plan has opted to hedge its longevity risk using an index-based longevity hedging instrument such as a q -forward or deferred longevity swap. The use of index-based hedges gives rise to basis risk, but benefits, potentially, from lower costs to the hedger and greater liquidity. We focus on quantification of optimal hedge ratios and hedge effectiveness and investigate how robust these quantities are relative to inclusion of recalibration risk, parameter uncertainty and Poisson risk. We find that strategies are robust relative to the inclusion of parameter uncertainty and Poisson risk. In contrast, single-instrument hedging strategies are found to lack robustness relative to the inclusion of recalibration risk at the future valuation date, although we also demonstrate that some hedging instruments are more robust than others. To address this problem, we develop multi-instrument hedging strategies that are robust relative to recalibration risk.

Keywords: Robust hedging, recalibration risk, hedge ratios, hedge effectiveness, Delta hedging, Nuga hedging.