

TITLE: A Cautionary Note on Pricing Longevity Index Swaps

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ABSTRACT: In December 2007, Goldman Sachs launched a product called QxX index swap, which is designed to allow market participants to hedge or gain exposure to longevity and mortality risks. In this paper, we offer a quantitative analysis of this brand new financial innovation. First of all, we set up a risk-neutral framework to price QxX index swaps. This framework, which is based on the dynamics of death rates under a two-factor stochastic mortality model in a risk-adjusted probability measure, yields prices (spreads) that are fairly close to the spreads that Goldman Sachs currently offers. We then explore the uncertainty involved in this model-based pricing framework. Specifically, we study parameter risk by using Markov Chain Monte Carlo (MCMC) and model risk by examining structural changes in mortality dynamics. Our results indicate that both model risk and parameter risk are significant. Actuaries should therefore be aware of these issues when placing a value on a longevity index swap.