

Please find here below an abstract of a paper co-authored with Stéphane Loisel (ISFA Actuarial School) that we would like to submit to the Longevity Six summit.

Kind regards,

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### Longevity Basis Risk Modeling: A Co-integration Based Approach.

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#### Abstract

In recent years there has been an increasing amount of models on the stochastic modelling of mortality, encouraged as well by the latest evolution of life insurance-linked securities market. Those models are generally applied to large observation of mortality rates for an underlying national population. However, insurers have a keen interest on the mortality rates experienced on its own portfolio that are usually more limited. In this paper we propose a model that links the insured specific mortality and the national population mortality using an econometric model that captures the long-run relationship on the behaviour of both mortality dynamics. This model does not emphasize on the correlation that the two given mortality dynamic would present but rather on the long-term behaviour, which suggests that the two time-series cannot wander off in opposite directions for very long without coming back to mean distance eventually. The model captures additionally the short run relationship for the two considered mortality dynamics. A comparison of the forecast of life expectancy of portfolio-experienced mortality is performed based on the traditional relational approach and the proposed model to assess the basis risk in the portfolio when a national index is chosen to transfer longevity risk.

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Key words: Longevity risk, national and insured mortality rates, co-integration, basis risk.

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