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Modelling and management of mortality risk:
a reviewAndrew J. G. Cairns , David Blake & Kevin Dowd

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Abstract

In the first part of the paper, we consider the wide range of extrapolative stochastic mortality models that have been proposed over the last 15–20 years. A number of models that we consider are framed in discrete time and place emphasis on the statistical aspects of modelling and forecasting. We discuss how these models can be evaluated, compared and contrasted. We also discuss a discrete-time market model that facilitates valuation of mortality-linked contracts with embedded options. We then review some of the models for dynamic hedging (traded) and these, such as mortality swaps, are used in the market.

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Keywords

SCOR market model Mortality-linked securities Mortality swaps q-forwards

Notes

- ¹In our notation the subscript c in $m_c(t, x)$ distinguishes the crude or actual death rate from the underlying or expected death rate.
- ²To date, we are unaware of any studies that have explicitly attempted to model the exposures as unobserved variables.
- ³The discrete-time models described in Section 4 can all be described as short-rate models, with the exception of the market model in Section 4.7.

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