

A Climate-Informed Approach to Mortality Forecasting

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Abstract

In this paper, we improve the traditional Lee-Carter model and its extensions by introducing a regime-switching framework that accounts for structural changes driven by pandemics and climate change. The model incorporates distinct regimes corresponding to normal conditions, pandemic phases, post-pandemic recovery, and various climate scenarios, enabling a more flexible representation of shifts in mortality trends.

The model is calibrated using empirical mortality data combined with climate change indicators, capturing the evolving relationship between environmental factors and mortality rates. Results demonstrate that this regime-based approach offers improvements in both model fit and predictive accuracy compared to existing models, highlighting the importance of integrating external risk drivers into mortality forecasting. Finally, we illustrate the model's potential through some actuarial applications.

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