

A dynamic parameterization modeling for the age-period-cohort mortality

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Abstract

An extended version of Hatzopoulos and Haberman (2009) dynamic parametric model is proposed for analyzing mortality structures, incorporating the cohort effect. A one-factor parameterized exponential polynomial in age effects within the generalized linear models (GLM) framework and sparse principal component analysis (SPCA) to time dependent GLM parameter estimates provides (marginal) estimates for a two-factor principal component (PC) approach structure. Modeling the two-factor residuals in the same way, in age-cohort effects, provides estimates for the (conditional) three-factor age-period-cohort model. The age-time and cohort related components are extrapolated using dynamic linear regression (DLR) models. Application is presented for England & Wales males (1841-2006).

Keywords: Cohort; Mortality forecasting; Generalized Linear Models; Sparse Principal Component analysis; Factor analysis; Dynamic Linear Regression; Bootstrap confidence intervals.

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