



SUMMONS

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SEMINAR

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Coherent forecasting of multiple-decrement life tables: a test using Japanese cause of death data

Planners in public and private institutions would like coherent forecasts of the components of age-specific mortality, such as causes of death. This has been difficult to achieve because the relative values of the forecast components often fail to behave in a way that is coherent with historical experience. In addition, when the group forecasts are combined the result is often incompatible with an all-groups forecast. It has been shown that cause-specific mortality forecasts are pessimistic when compared with all-cause forecasts (Wilmoth, 1995). This paper abandons the conventional approach of using log mortality rates and forecasts the density of deaths in the life table. Since these values obey a unit sum constraint for both conventional single-decrement life tables (only one absorbing state) and multiple-decrement tables (more than one absorbing state), they are intrinsically relative rather than absolute values across decrements as well as ages. Using the methods of Compositional Data Analysis pioneered by Aitchison (1986), death densities are transformed into the real space so that the full range of multivariate statistics can be applied, then back-transformed to positive values so that the unit sum constraint is honoured. The structure of the best-known, single-decrement mortality-rate forecasting model, devised by Lee and Carter (1992), is expressed in compositional form and the results from the two models are compared for Sweden and other countries. The compositional model is extended to a multiple-decrement form and used to forecast mortality by cause of death for Japan.

Welcome!