

Study for a Model Splitting Death Counts by Age and Time into Designating by Birth Cohort

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The Japanese Mortality Database (JMD) is a database of life tables in Japan, which is compatible with the Human Mortality Database (HMD). The life tables in the HMD are constructed based on deaths by the *Lexis triangle*, namely, by age, time, and birth cohort, which is similar to the JMD. In Japan, however, the number of deaths by prefecture and by the Lexis triangle is available only after 1972 (excluding 1947–1950), which resulted in the availability of prefectural life tables in the JMD only after 1975.

In the HMD protocol, a method for splitting death data by age and time into the Lexis triangle is used for constructing life tables in countries or time periods in which death counts by the Lexis triangle are unavailable. This method proposes a linear model for "the proportion of the lower Lexis triangle" with infant mortality rate and ratio of adjacent cohorts, among others, as the explanatory variables and is used to estimate death counts by the Lexis triangle.

This study aims to develop a model for estimating death counts by the Lexis triangle from the data by age and time in Japan before 1972 based on the HMD method. On the basis of results, the study concluded that Model VI of the six models is the most efficient one, which is based on data from 1947 to 1975 with interaction terms for the logarithm of infant mortality rates and dummy variables for age classes. Moreover, it presents variables derived using the backward selection method with AIC. The study posits that the proposed model is applicable to the estimation of prefectural life tables prior to 1975, enabling further extension of the JMD.

Keywords: deaths by prefecture, Lexis triangle, the Japanese Mortality Database