A comparison of selected models for smoothing and extrapolation of the death curve

Abstract

Due to demographic consequences of the 20^{th} century, a life expectancy has rapidly increased and the propotion of the oldest-age group has grown. The aim of this thesis is to present six models used for smoothing and extrapolation of the data and verify their accuracy using empirical data.

The theoretical part of the thesis contents a summary of bibliography and information about used data sets. The second part presents chosen models of smoothing and extrapolating of the data and it suggests the possibilities of comparison among models.

The analytical part is aimed to compare the data from 36 developed countries over 4 continents. Countries are divided by similar characteristics into a few smaller groups and the groups are analyzed by period and by life expectancy at birth. Every country is analyzed separately as well as with the others and the model that is the best for the group is recomended. At the end of the analytical part, results are interpreted and the best models are chosen. The logistic models – especially Kannistö model – were the most suitable in the analysis by period and by life expectancy at birth. The least suitable models were Coale-Kisker and Gompertz-Makeham model.

Keywords: mortality, extrapolating, smoothing, information criterion, Coale-Kisker model, Gompertz model, Gompertz-Makeham model, Heligman-Pollard model, Kannistö model, Thatcher model