Abstract of PhD Thesis

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"Financial consequences of longevity risk and the welfare state model"

In the doctoral dissertation, research is conducted on the analysis of the longevity risk within established groups of countries among 26 OECD countries, characterized by a similar regime of social and social policy and health protection, that is, assigned to the same welfare state model. Referring to the current state of knowledge, the main objective of the dissertation is to investigate the impact of the welfare state model, represented mainly by the size of social and social expenditures, on the financial consequences of the longevity risk. The financial consequences of the longevity risk are assessed based on the underestimation of the forecasts of expected remaining life expectancy. It is assumed that they are the difference between the actually incurred social and social expenditures and their value estimated based on the forecasts of expected remaining life expectancy, obtained using selected mortality models. The main goal defined in this way was decomposed into eight specific goals that serve its implementation. In connection with the indicated goals, the following main hypothesis was formulated: "The welfare state model has an impact on the financial consequences of the longevity risk, expressed in terms of the costs associated with a longer than expected life span." and three auxiliary hypotheses.

The set goals are implemented using a developed multi-stage research procedure, which determines the amount of public pension and health expenditures incurred in countries divided into groups according to the way their social policy is conducted. For this purpose, the results of forecasts of expected remaining life expectancy are used, which are determined using selected single and multi-population stochastic mortality models. An important element of the research is the inclusion of economic factors in the forecasting process in the form of GDP per capita, which help to explain future trends in the mortality rate.

Stochastic mortality models that allow for the inclusion of the explanatory power of economic variables are constructed by proposing their own computational procedure. The procedure for a single-population model is based on a generalized nonlinear model and meets the theoretical assumptions of the concept developed by Niu and Melenberg. The proposed next, author's procedure for a multi-population model, allowing for the determination of forecasts using demographic and economic trends, is based on the concept by Boonen and Li.

The use of multi-population mortality models requires the identification of homogeneous populations characterized by a similar welfare state model. To isolate them, two author's approaches were used, one based on a literature review on social policy regimes, and the second using cluster analysis methods, in which the similarity between objects is determined using the Dynamic Time Warping (DTW) algorithm.