

Selected Methodical Approaches to Regional Population Forecast: A case study in the South Bohemian Region

Abstract

The aim of this thesis is to introduce selected methodological approaches to population forecasts, focusing on the regional level and considering different lengths of time series. Specific procedures are applied to create a population forecast for the South Bohemian Region. In the theoretical part of this thesis, the stages of population forecasts processing are determined. The Cohort Component method with migration, which can be used to create population forecast, is characterized. Another part describes selected analytical models and functions for partial mortality, fertility and migration forecasts, including Indirect estimation of net migration. To extrapolate parameters, selected trending functions and the Box-Jenkins methodology are characterized in the part of the time series analysis. The analytical part of this thesis focuses on the creation of the South Bohemian Region forecast from short initial time series and long initial time series. From short initial time series, the partial forecast of mortality is analyzed by the Heligman-Pollard model, the partial forecast of fertility is analyzed by the Beta function and the partial forecast of migration is analyzed by 25%, 50% and 75% quartiles of the migration balance in time by age. To analyze a relationship between Heligman-Pollard and Beta function parameters, a factor analysis is used. From the factor analysis, factor scores are obtained that are extrapolated by trending functions. From these partial forecasts the forecast of the South Bohemian Region until 1. 1. 2025 is created. The partial forecasts of mortality, fertility, immigration and emigration from the long initial time series are processed by Lee-Carter's models. The Mortality and Fertility Index are extrapolated by the Box-Jenkins Methodology. For extrapolating the emigration and immigration level index, trending functions were selected. By Cohort Component method with migration is then created a full-value population forecast of the South Bohemian Region until 31. 12. 2035, which is compared with the middle version of the forecast created by the Water Research Institute T. G. Masaryk and with the projection of the Czech Statistical Office.

Keywords: Cohort Component Method with migration, Lee-Carter model, Heligman-Pollard model, Beta function, Indirect estimation of net migration