

ESTIMATING THE LENGTH OF WORKING CAREERS FROM THE FINNISH LABOUR FORCE SURVEY DATA

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Background. Demographic aging is ensued by many adverse societal consequences. The concerns are encountered in all developed countries like Finland with a very fast aging population profile. Extending the time spent in employment has been proposed as one of the key drivers for adjusting to the prolonged longevity of the population, and thereby to work out the involved public health and socioeconomic problems. Yet the measurement of the length of working careers is quite a statistical chore and currently not a standard practice.

Objectives. This paper first refers to the definitions of alternative expectancy measures and analytically re-examines the practices of statistical methods employed for estimating *working-life expectancy*, i.e. the expected number of years in employment remaining in one's life at a given age. The estimation is then done jointly for the future occupation times in the states of employment, unemployment and outside the labor force. The final aim is to explain and discuss the reasons for the discrepancies between the estimates.

Data and Methods. Because of the methodological nature of this discourse, the reviewed studies were not selected systematically, rather they were included based on their relevance, currency and high scientific quality. Expressly, the focus was on the examination of the advantages and limitations of two fundamentally unlike approaches – the period life table technique (1) and a multiple regression model for the multistate cohort life table (2) – and the comparison of their estimates derived from a population-based study (3), which was designed to analyze the aggregated annual Labor Force Survey data from Finland in the years 2000-2010 produced by Statistics Finland. Further, the model-based predictions were projected for the years 2011-2015.

Results. The study (3) found a marked difference (gap) between period (the Sullivan method) and cohort (the Davis et al. method) working-life expectancies. The methodological article (4) provided cogent arguments, substantiated by empirical findings from previous studies, to evince the superior performance of the preferred multistate vector regression approach over the traditional period life table technique for measuring working-life expectancies in epidemiological research and actuarial practice.

Conclusions. The multistate modeling and estimation methodology presented makes possible an improved statistical analysis of stochastic processes in working life. The major advantage of the multistate modeling lies in its way to reconstruct the relevant elements of the longitudinal (cohort) stochastic process that generated the working-life table datasets from annual cross-sectional surveys. This method quantifies successfully the magnitude of the national demographic problem that stresses the demand for pension reforms and other sociopolitical actions.

References

1. Sullivan DF. A single index of mortality and morbidity. *Health Services and Mental Health Administration Health Reports* 1971;86:347-54.
2. Davis BA, Heathcote CR, O'Neill TJ. Estimating cohort health expectancies from cross-sectional surveys of disability. *Statistics in Medicine* 2001;20:1097-1111.
3. Nurminen M. Working-life expectancy in Finland: trends and differentials 2000-2015. A multistate regression modeling approach. Helsinki: Finnish Centre for Pensions, *Reports* 03/2012 [100 pages]. http://www.markstat.net/en/images/stories/career_length.pdf
4. Nurminen M. Measuring working-life expectancies: Multistate vector regression approach vs. prevalence-based life table method. *The Internet Journal of Epidemiology* 2014 Volume12 Number 1. <https://ispub.com/IJE/12/1/14812>