

**Whither human survival and longevity
or the shape of things to come
(DRAFT)**

Leslie Mayhew and David Smith
Faculty of actuarial Science and Insurance
Cass Business School
October 2008

Abstract

With the continuing increases in life expectancy, populations are ageing rapidly. Governments are concerned for the future of pensions and health care for which population forecasts are an important component for planning purposes. In this paper we focus on human survival rather than mortality rates which are the more usual starting point when estimating future populations. Using a simple model we link basic measures of life expectancy to the shape of the human survival function and consider its various forms. We then use the simple model as the basis for investigating actual survival in England and Wales from 1841 onwards and investigate the concept of a 'maximum age'. We show how the model can be used in a predictive sense and demonstrate in two tests that our model would have given more accurate results than comparable government forecasts using the same base information. We then go on to show that, based on trends in life expectancy, official population forecasts could be significantly underestimating the population at age 70+ and that this has implications for pensions and health care. A concluding discussion proposes several ways in which the work reported in this paper can be applied and developed.