Life Insurance Mathematics: Home Assignment 2

Academic Year 2021-2022

UNIVERSITEIT VAN AMSTERDAM

Instructions for the Assignments

You should provide answers in Dutch or in English. You must use R for your calculations and graphics. You must use R markdown for reporting, see http://rmarkdown.rstudio.com/.

Deliverables for the Assignments

Please hand in on or before September 19, 2021 via Canvas:

1. An R markdown script that you have used for all your calculations. Your script should be well-organized and easy to read. Your text should be brief and guide the reader through your calculations.

2. An html or pdf file that is the compiled version of your R markdown script. Relevant results should be printed in the html or pdf file.

Please mention the names and student numbers of your team members. You should work in teams (with two students minimum, and four students maximum); it suffices to submit one solution per team.

Motivation of the Assignment

In the lectures we covered numerous ways to visualize the features of mortality data and the evolution of mortality rates over time. Now you will design some extra graphics to gain further intuition. You will learn where to find mortality data, how to load these in R and build insightful graphics.

Assignment Questions

(1) You start with the DataCamp Chapter on Life Tables, see https://www.datacamp.com/courses/valuation-of-life-insurance-products-in-r. You watch the videos and solve the exercises. This is an individual assignment question, to be completed by each student.

(2) Download historical data for a country of your own choice from the Human Mortality Database (www.mortality.org) and visualize:

    (a) $\mu_{x,t}$ the force of mortality of an (x) year old in year t, versus x, for different selected time periods t

(b) $\mu_{x,t}$ versus t, for different selected ages x

(c) the survival function $S_{0,t}(x)$ of a newborn, when using data from different selected time periods t

(d) your own defined graph.

Explain which data you downloaded, which assumptions you made. Be creative, design your own graphics, and try to make your plots visually appealing.

Katrien Antonio
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