Development of an automatic tool for periodic surveillance of actuarial and demographic indicators

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Abstract

As a result of the COVID-19 pandemic and its large impact across Spain, the monitoring of demographic measures as a direct result of deaths related to such pandemic and future similarly deadly events has become increasingly important. It is intended with this project to develop a tool in order to easily monitor a selection of demographic measures relating to collective deaths of individuals as a result of relevant worldwide events like the one mentioned previously. The tool consists of a shiny dashboard (developed in R) where such measures are displayed in different visualizations across time.

Introduction

The COVID-19 pandemic has led to a widespread and noticeable temporary increase in mortality and reduction in life expectancy throughout Spain. This arises a need to monitor these demographic measures more closely and in real time.

This project consists of a shiny dashboard with several features:

- Visualizing several mortality metrics:
  - Excess mortality
  - Cumulative mortality rate
  - Cumulative relative mortality rate
  - Mortality improvement factor
- Visualizing life expectancy and constructing life tables
- Visualizing a map of Spain with the previous metrics per autonomous community (CCAA)

All metrics are calculated weekly with data stretching back as far back as 2010.

Objectives

- Provide a simple-to-use, web-based, OS-agnostic tool to compute and visualize common mortality and life expectancy metrics in time series plots/maps
- Provide the user the ability to customize the plot parameters significantly
- Provide the user the ability to download the plots and the data (with or without filtering)

- Allow the user to update and push the data to the corresponding github repository hosting the data from within the application
- Have data updated in real-time from the official Spanish sources and Eurostat (also provided by INE)

Project repository tree structure

First of all, the project consists of two repositories:

- The main project repository (*tfm_uc3m*)
- The data repository (*tfm_uc3m_data*)