Estimating the Duration of Non-Maturing Liabilities in a User-Friendly Shiny Web Application

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Context

- Non-maturing assets/liabilities
- ALM and interest rate risk management (duration gap between assets and liabilities)
- Probably more important for banks than for insurance companies

Replicating Portfolio Approach

- Basic idea: look for an investment strategy or portfolio that (1) is based on assets for which the duration is known analytically and (2) mimicks the behavior of the target instrument

- Calibration: Determining the investment or portfolio weights with the objective of replicating as close as possible the cash flows or FV changes of the target instrument

- Classic optimisation problem

- Different techniques to solve this problem (going from analytical regression techniques to brute force simulation)

Shiny

- Web application framework for R
- Allows R code to be transformed into a user-friendly webapplication
- Eeasy to learn
- Free to use
- Developed by Rstudio
- Link: http://shiny.rstudio.com/

Case Study

- Belgian Saving Accounts
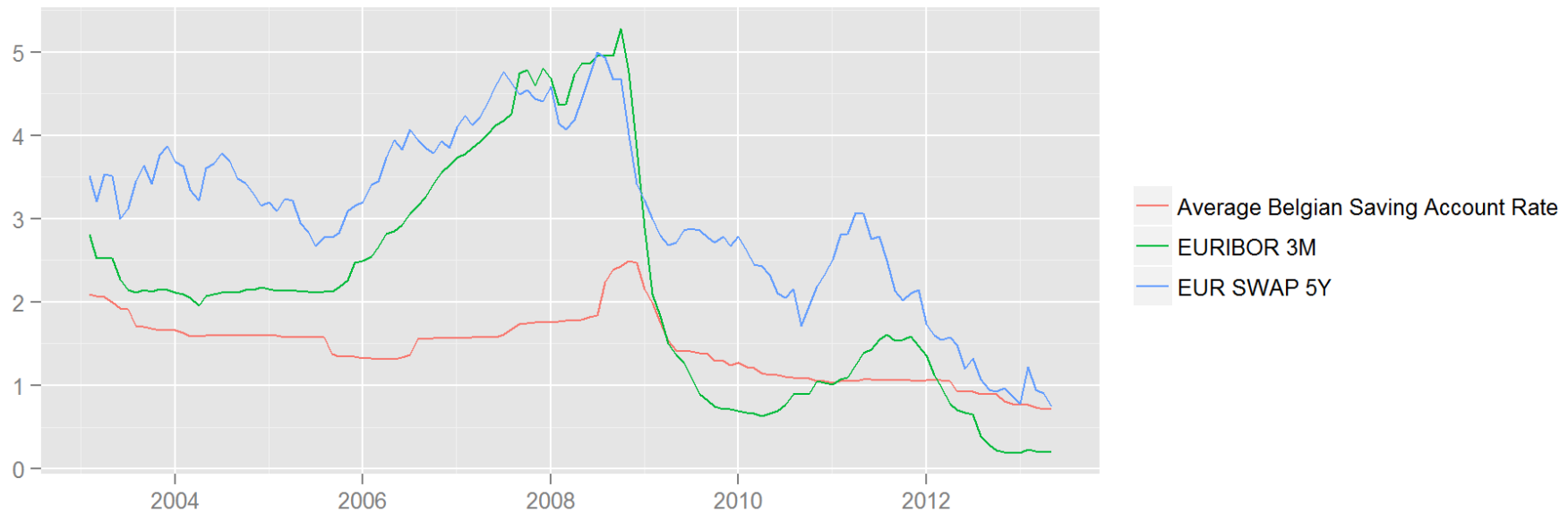
- Buy-and-hold portfolio with fixed reinvestment weights
- Reinvestment weights are optimsed used a brute force Monte Carlo approach

Demo

http://spark.rstudio.com/wkonings/Replicator