R in a small-sized bank’s risk management environment

The views expressed are my own and do not necessarily represent the views of the Western Union International Bank GmbH
Introduction

> cat(paste0("Risk manager since ",as.Date("2008-12-01")))
Risk manager since 2008-12-01
> cat(paste0("Working for Western Union International Bank since ",as.Date("2014-06-01")))
Working for Western Union International Bank since 2014-06-01
> cat("R enthusiast since my first course with professor Kurt Hornik
+ at the Vienna University of Economics and Business")
R enthusiast since my first course with professor Kurt Hornik
at the Vienna University of Economics and Business
> Luise <- function(Martin = 3, Giott = 4){
+ Love <- Martin + Giott
+ Luise <- Love
+ cat(paste0("Proud father of a ",Luise," month daughter"))
+
+
+
>
> Luise()
Proud father of a 7 month daughter

> print("Wholly owned subsidiary of Western Union")
[1] "Wholly owned subsidiary of Western Union"
>
> Business_model <- list("Money transfer" = c("Dedicated Location", "Online"),
+ "Derivatives for hedging business")
> Business_model
$'Money transfer'
[1] "Dedicated Location" "Online"

[[1]]
[1] "Derivatives for hedging business"
Traditional risk management in small banks

- Limited resources (IT, Mid Office)
- Regulatory pressure
- High costs of integration
Transformation to DIY risk management

- Impressed stakeholders
- Risk modelling
- Reporting

Input data → CRM → User interface

Models → Reporting

CRM

User interface

Input data

Models

Reporting

R

Shiny

CRM

User interface

Input data

Models

Reporting

R

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Input data

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CRM

User interface
Report automation

- Two ways of using APIs in R (R ↔ other tools)
  - Package support for specific tools
    - boxr
    - RForcecom
    - DBI
    - Quandl
    - readxl
  - Non-explicit packages (getting data from inhouse solutions and scraping websites)
    - httr
    - rvest

- Two ways of R interacting with third-party tools
  - Data exchange
  - Data transfer
Real life example of using APIs in R

Three examples using R packages creating APIs to third-party applications

Creating the input database for the rating tool
Real life example of using APIs in R

Three examples using R packages creating APIs to third-party applications

Margin call reporting process
Real life example of using APIs in Shiny

Three examples using R packages creating APIs to third-party applications

VaR engine in Shiny using Quandl data
→ Friction between the different tasks of creating a risk model costs a lot of time and efficiency. Is there a better way of doing it?
Historic data of the bank's clients is used to determine a rating model that predicts a probability of default per client.

All inputs and results are stored in a SQL database for reporting and validation purposes.
Example: Rating tool

- Documentation & training material
- Reporting (dashboard)
- Validation & calibration

Generating dynamic and flexible reports of the rating application. Creating training materials and development documentation. All steps are fully auditable.

Shinydashboard that gives the users an overview on the number of applications, etc.

Results stored in the database are used to calculate performance of the rating tool and to improve it.
It’s all about communication

Risk management useR!

• Decision makers
• Other departments
• Regulators

Transformation - traditional to modern
Example: ICAAP tool

Risk management useR!

- Decision makers
- Other departments
- Regulators

Transformation - traditional to modern
Many thanks to all the authors of the many great packages mentioned in my presentation, the R core team for developing R and the always helpful R community online.