



IT Notes

31 October 2023

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1 Purpose

This document is a guide for the installation of the R package *sstCalculation*.

2 Install R, Rstudio, Rtools and *sstCalculation*

This chapter explains the steps that are necessary to install the software programs (R, RStudio, Rtools) and the packages required to run *sstCalculation*.

2.1 Required software programs

Step 1

Please go to this link to install the software programs R and RStudio

<https://posit.co/download/rstudio-desktop/>

and follow the instructions or contact your IT department.

Step 2

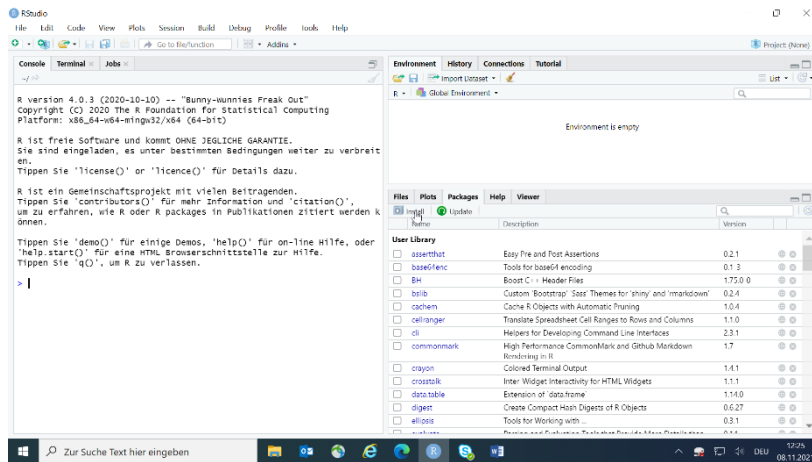
Use this link to install the software program Rtools

<https://cran.r-project.org/bin/windows/Rtools/>

2.2 Required R packages

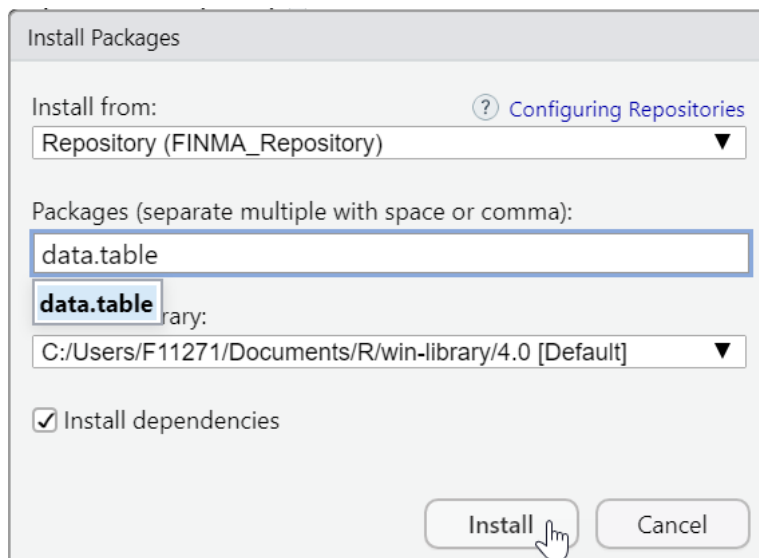
Step 1

Start RStudio. Select the tab *Packages* on the right and click on *Install*. A dialog box opens.

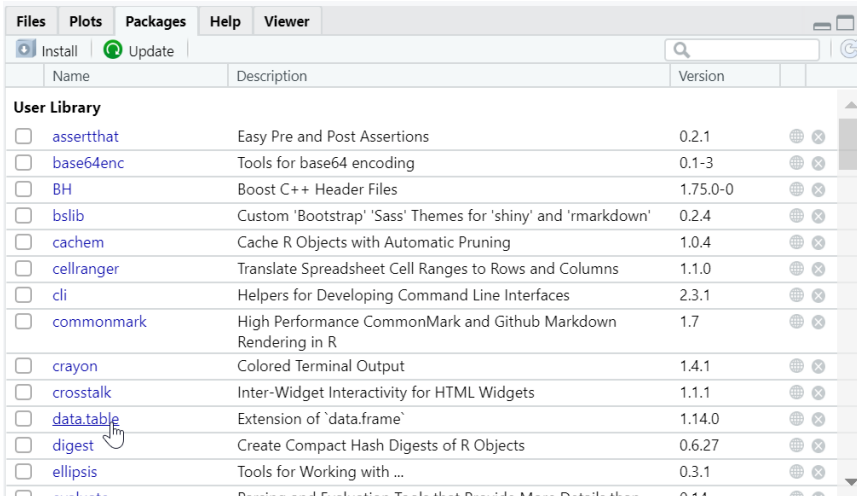


Step 2

Choose *Repository (CRAN)*, enter one of the required R packages and click on *Install* (the dialog box is shown for *data.table* in *FINMA_Repository*).



After successful installation, *data.table* appears in the list of packages of the user library.



Name	Description	Version		
User Library				
<input type="checkbox"/> asserthat	Easy Pre and Post Assertions	0.2.1		
<input type="checkbox"/> base64enc	Tools for base64 encoding	0.1-3		
<input type="checkbox"/> BH	Boost C++ Header Files	1.75.0-0		
<input type="checkbox"/> bslib	Custom 'Bootstrap' 'Sass' Themes for 'shiny' and 'markdown'	0.2.4		
<input type="checkbox"/> cachem	Cache R Objects with Automatic Pruning	1.0.4		
<input type="checkbox"/> cellranger	Translate Spreadsheet Cell Ranges to Rows and Columns	1.1.0		
<input type="checkbox"/> cli	Helpers for Developing Command Line Interfaces	2.3.1		
<input type="checkbox"/> commonmark	High Performance CommonMark and Github Markdown Rendering in R	1.7		
<input type="checkbox"/> crayon	Colored Terminal Output	1.4.1		
<input type="checkbox"/> crosstalk	Inter-Widget Interactivity for HTML Widgets	1.1.1		
<input type="checkbox"/> data.table	Extension of `data.frame`	1.14.0		
<input type="checkbox"/> digest	Create Compact Hash Digests of R Objects	0.6.27		
<input type="checkbox"/> ellipsis	Tools for Working with ...	0.3.1		
<input type="checkbox"/> evaluate	Binding and Evaluation Tools that Provide More Details than ...	0.14		

Step 3

Repeat step 2 for the packages *readxl*, *openxlsx*, *MASS*, *shinydashboard*.

Step 4

Install *sstCalculation* according to section 3.2 in chapter 3.

3 R package *sstCalculation*

The R package *sstCalculation* for the calculation of the SST Ratio consists of the following programs:

1. the standalone R package *sstCalculation* itself
2. a GUI *Dashboard* started by a web browser.

The R package *sstCalculation* requires the programs R, RTools and RStudio as well as other R packages, as described in chapter 2.

3.1 System requirements

An Intel-compatible machine, with at least 4GB RAM. However, 8GB are recommended.

The *sstCalculation* R package is compatible and has been tested with Windows 7, Windows 8.1 and Windows 10. The *sstCalculation* R-package can also run on other Unix based operating systems supported by R. However, it has been designed only for the listed Windows versions.

3.1.1 Required software programs

The following software programs need to be pre-installed on the user's machine.

Software name	Minimum version
R	3.3.0
Rtools	3.4
RStudio	1.0.136

Remark: RStudio is necessary for launching the GUI.

3.1.2 Required R packages

The *sstCalculation* R package requires the following R packages to be installed in the user's R package library. Package names in *italic* are pre-installed within R.

Package name	Minimum version
<i>data.table</i>	1.10.4-3
<i>readxl</i>	1.0.0
<i>openxlsx</i>	4.0.17
<i>MASS</i>	None
<i>shiny</i>	1.0.5
<i>shinydashboard</i>	0.6.1
<i>cellranger</i>	None
<i>Rcpp</i>	0.11.6
<i>tibble</i>	1.1
<i>httpuv</i>	1.3.5
<i>mime</i>	0.3
<i>jsonlite</i>	0.9.16
<i>xtable</i>	None
<i>digest</i>	None
<i>htmltools</i>	0.3.5
<i>R6</i>	2.0
<i>sourcetools</i>	None
<i>rematch</i>	None
<i>cli</i>	None
<i>crayon</i>	None
<i>pillar</i>	None
<i>rlang</i>	None
<i>assertthat</i>	None
<i>utf8</i>	1.1.3

<i>stats</i>	-
<i>utils</i>	-
<i>tools</i>	-
<i>methods</i>	-
<i>grDevices</i>	-
<i>graphics</i>	-

3.2 Installation

Above software programs and R packages must be installed before the installation of the R package *sstCalculation*.

Step 1

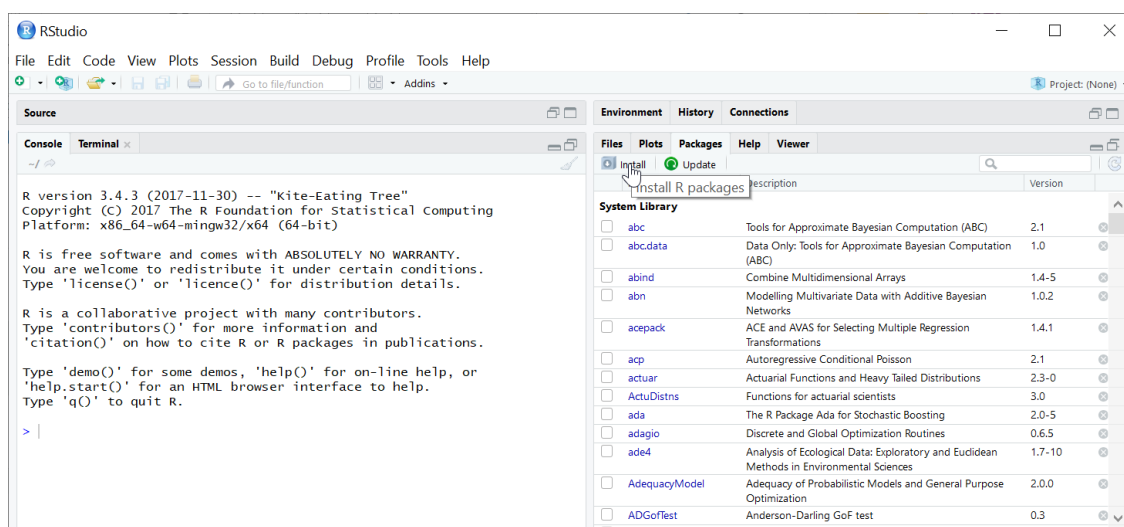
Download the archive *sstCalculation250tar.zip* from the FINMA Website here:

<https://www.finma.ch/de/ueberwachung/versicherungen/spartenubergreifende-instrumente/schweizer-solvenztest-sst/>

Unzip the archive and store the R package *sstCalculation_2.5.0.tar.gz* on your local drive.

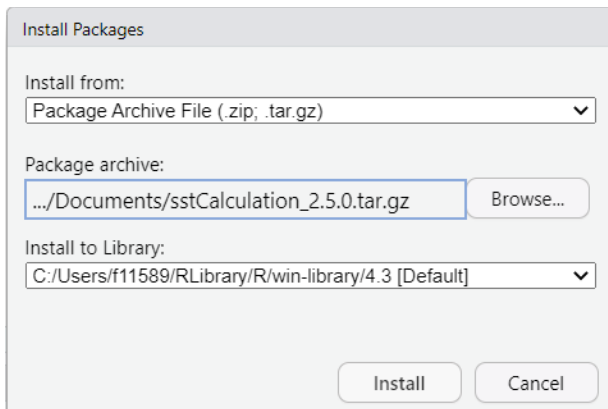
Step 2

Start RStudio. Select the tab *Packages* on the right and click on *Install*. A dialog box opens.



Step 3

Click on *Browse*, search for the R package *sstCalculation_2.5.0.tar.gz* on your local drive and click *Install* in the dialog box.



Step 4

Wait a moment. This feedback is displayed in the console down left.

```
Console Terminal Background Jobs
R 4.3.1 · C:/Users/f11589/Documents/sstCalculation/
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> install.packages("C:/Users/f11589/Documents/sstCalculation_2.5.0.tar.gz", repos = NULL, type = "source")
Installation du package dans 'C:/Users/f11589/RLibrary/R/win-library/4.3'
(car 'lib' n'est pas spécifié)
* installing *source* package 'sstCalculation' ...
** using staged installation
** R
** inst
** byte-compile and prepare package for lazy loading
** help
*** installing help indices
** building package indices
** installing vignettes
** testing if installed package can be loaded from temporary location
** testing if installed package can be loaded from final location
** testing if installed package keeps a record of temporary installation path
* DONE (sstCalculation)
> |
```

The installation is completed successfully when everything is displayed in black. Otherwise, for system requirements please refer to above chapter.

Step 5

Enter the command `library(sstCalculation)` into the console to load the package.


```
> library(sstCalculation)
sstCalculation 2.5.0
```

```
Copyright (c) 2023 Swiss Financial Market Supervisory Authority FINMA
```

```
Swiss Financial Market Supervisory Authority FINMA
Laupenstrasse 27
CH-3003 Bern
```

```
info@finma.ch
```

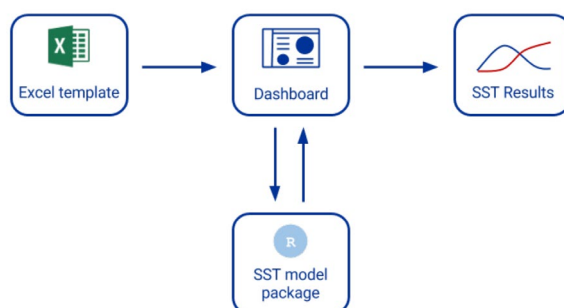
```
This program comes with ABSOLUTELY NO WARRANTY.
This is free software, and you are welcome to redistribute it
under certain conditions.
```

```
Type sstDashboard() and go to the 'Legal Notices' Tab for more details about the license.
Type sstIntroduction() to open an introduction to the sstCalculation package.
Type sstNews() to open an overview of the changes to the sstCalculation package.
```

The GUI is started via the command `sstDashboard()`. The results are exported to the folder `Documents` by default. A different folder can be defined, see `?sstDashboard`.

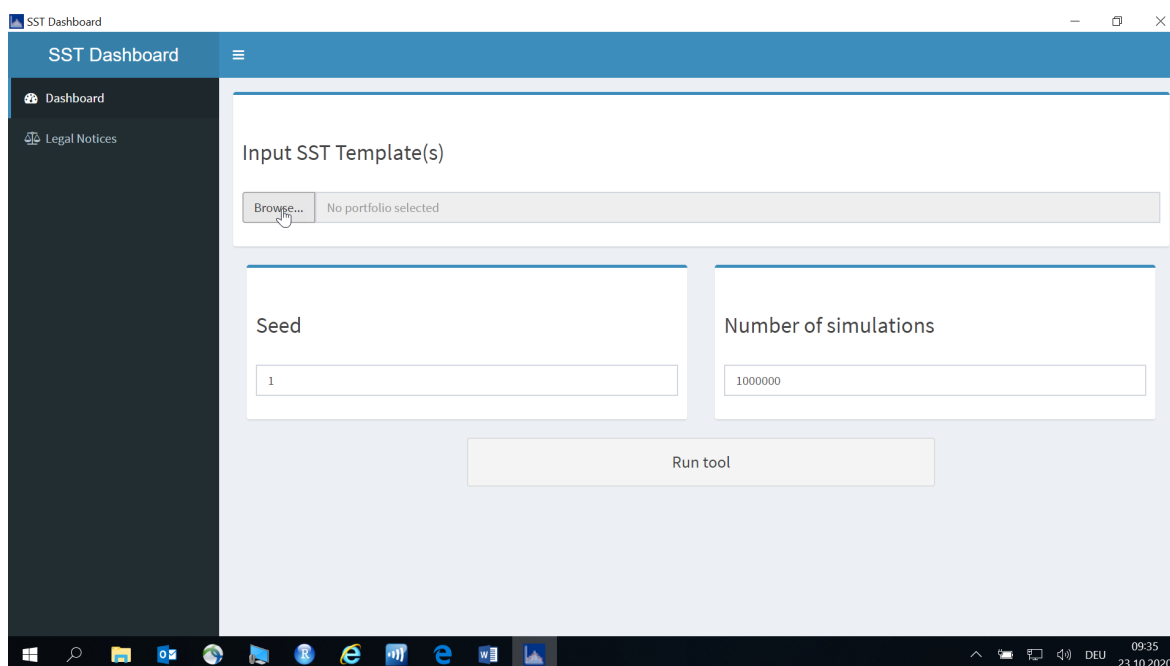
4 Run the Dashboard

The following picture shows the exchange between the Excel template, the SST dashboard and the R package.



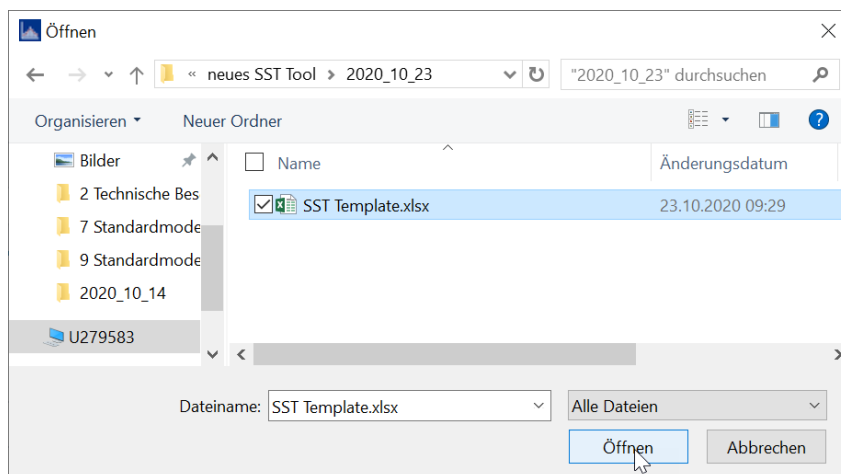
Step 1

The SST Dashboard is started and a browser opens with the dashboard. Click on Legal Notices for the legal notices related to the use and transfer of the package.



Step 2

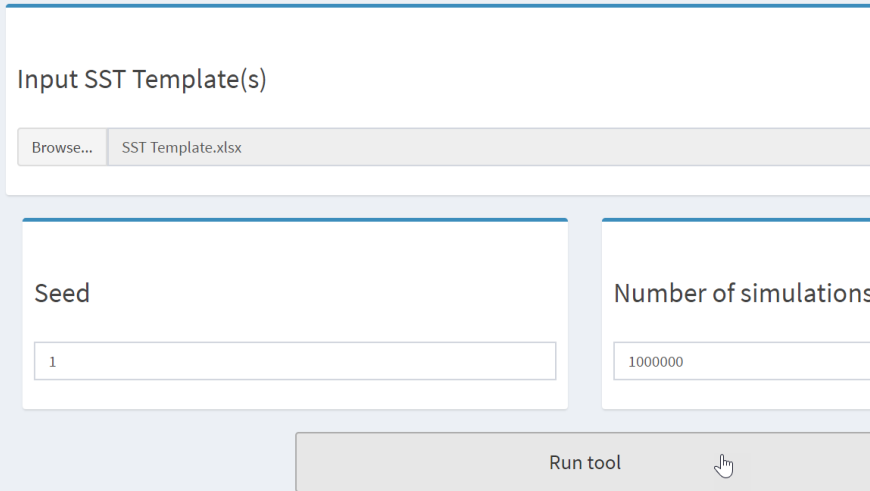
Upload the filled *SST Template*.



Users of the standard model for participations select all needed *SST Templates*.

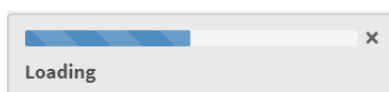
Step 3

Seed and number of simulations are loaded from the *SST Template*. Number of simulations for solvency calculation purposes should be 1 million. Click on *Run tool* to start the SST calculation.



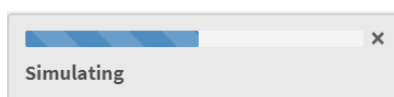
Step 4

The *SST Template* is parsed. Specific error messages are displayed in case any inputs are incomplete or incorrect.



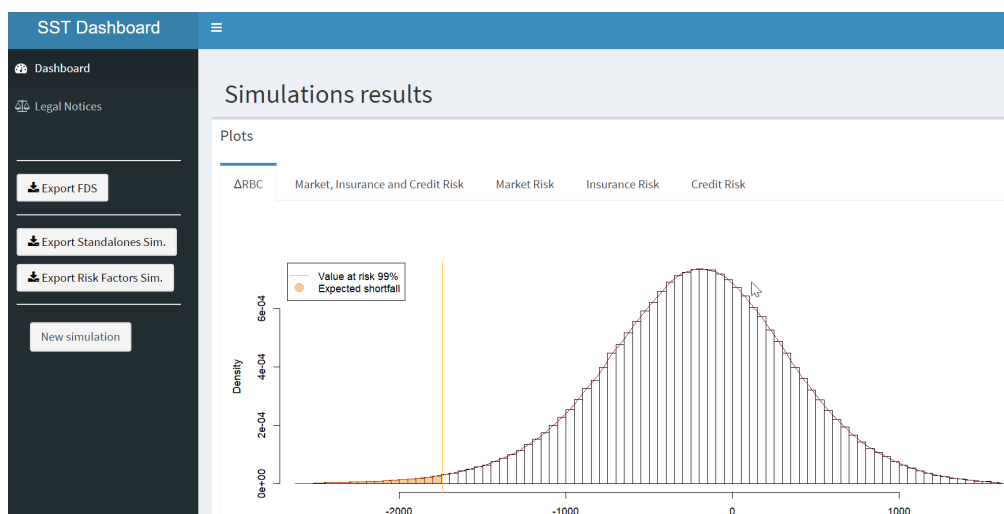
Step 5

The simulations for the calculation of the SST ratio are generated. This step can take a few minutes.



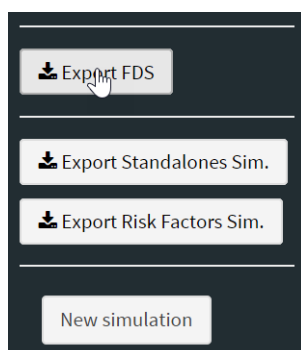
Step 6

Once the simulations are generated and the results for the *Fundamental Data Sheet* are calculated, a graphic is displayed on the screen showing the most important results and marginal distribution functions.



Step 7

Click on the box *Export FDS* to download the results for the *Fundamental Data Sheet*.



Step 8

An Excel file *Fundamental_Data.xlsx* containing the results is saved.