UG Quantitative Methods in the Social Sciences lab workbook

A step-by-step guide for conducting quantitative research with R

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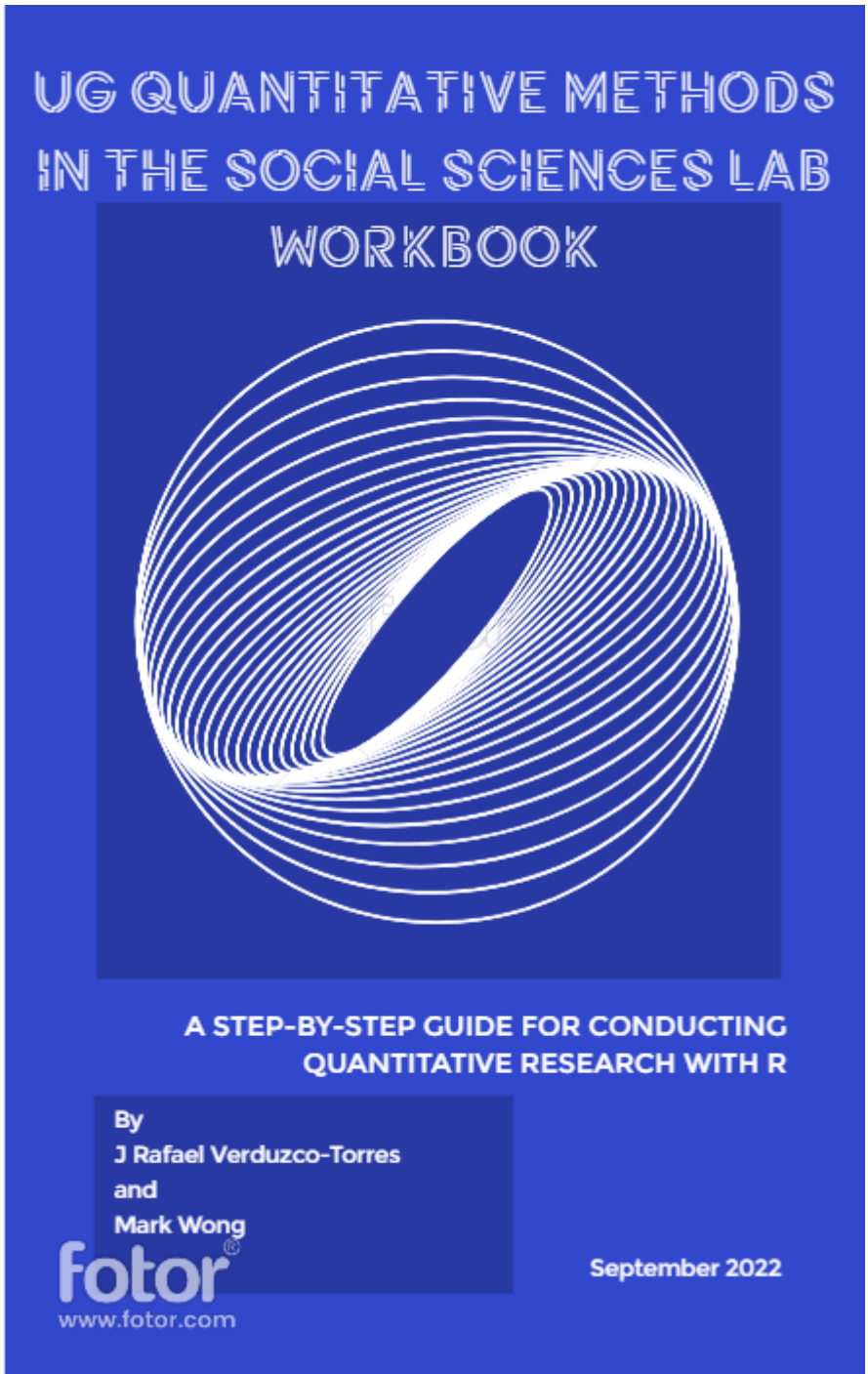
Contents

Welcome


UG QUANTITATIVE METHODS
IN THE SOCIAL SCIENCES LAB
WORKBOOK
A STEP-BY-STEP GUIDE FOR CONDUCTING
QUANTITATIVE RESEARCH WITH R
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Welcome to the Quantitative Methods in the Social Sciences lab!

This workbook is targeted to University of Glasgow students enrolled in the Undergraduate Quantitative Research Methods course of the School of Social & Political Sciences. The activities are designed for RStudio Cloud.

The book was written using `R` bookdown package based on the GitHub repository: https://github.com/rstudio/bookdown-demo.

Chapter 1

Introduction to R

For this course we will be using R (**?**) and R Studio as the main tools for conducting quantitative analysis. `R` and the basic versions of `R Studio` are open-source and thus free software. Even though `R` appeared in the early 90s, it has been gaining a lot of popularity in recent years. In fact, it is now one of the most common software for doing statistics in academia.

`R` and `R Studio` are two separate things. `R` is the actual programming language and the main processing tool which does the computations in the background, whereas RStudio integrates all functionalities in a friendly and interactive interface. In short, for this course (and most of the times in practice) you chiefly RStudio whilst `R` is silently doing all the work in the background. Thereafter, we will refer to `R`, as the integrated interface.

`R` works in a command-based line environment. This means that you need to call the commands (or ***functions***, as called in R) through text. This can look intimidating at first glance. But do not worry, we will guide you step by step.

At this point you may be wondering why you need to bother learning these tools. In the next section you will see some of the advantages and examples that can be achieved using `R`.

1.1 Why R?

1.1.1 R: a flexible tool

R can be applied in a wide variety of fields and subjects, including not only those in the social sciences (e.g. sociology, politics or policy research), but also in humanities (e.g. history, digital humanities), natural and physical sciences (e.g. biology, chemistry or geography), health (e.g. medical studies, public health, epidemiology), business and management (e.g. finance, economics, marketing), among many others.

The broad application of R is due to its flexibility which allows to perform a range of tasks related to data. These cover tasks at initial stages, such as downloading, mining, or importing data. But it is also useful to manipulate, edit, transform, and organize information. Furthermore and most important for us, there are a set of tools that allow us to analyse data using a range of statistical techniques. These are useful to understand, summarize and draw conclusions about samples, e.g. people. Lastly, `R` is powerful to communicate and share information and documents. There are several extensions (called ***packages*** in R) that can help to produce static and interactive plots/charts, maps, written reports, interactive applications or even entire books! In fact this workbook was written from RStudio.

1.1.2 Advantages of using R

Some of the advantages of using R are the following:

- It is free and open source. You do not need to pay for a license. Thus you can use it anywhere at anytime even if you do not have an affiliation to an institution or organization (e.g. University or workplace);
- It is a collaborative project. This means that it is the users who maintain, extend and update its applications;
- It is reproducible. Research can be more transparent since you will get the same results every time you run your analysis through a specific pathway (i.e. through scripts);
- High compatibility. You can read and produce most types of file extensions;
- There are a number of easy-access web resources to support you in the learning process.

1.2 Getting started

1.2.1 Setting up RStudio

At this point you need to know that there are at least two alternatives to start using RStudio. One, and by far the most common, is to download both `R` and RStudio and install the applications in your local drive. The other option is RStudio Cloud. This is an on-line version of RStudio that does not require installing any additional software. You can run it directly from your browser (e.g. GoogleChrome, Safari, Firefox, etc). For now, we will use the cloud version.

To get started, follow the next steps:

Part 1 Create an RStudio Cloud account.

1. Click on this link RStudio Cloud - SSO, which should automatically open a new tab in your web browser or go directly to the browser and copy this URL: https://sso.rstudio.cloud/glasgow;