

Introduction

EH6105 – Quantitative Methods

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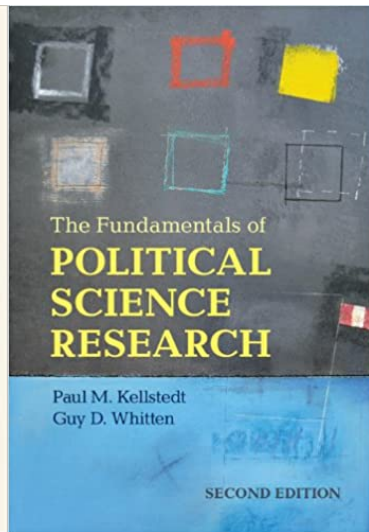
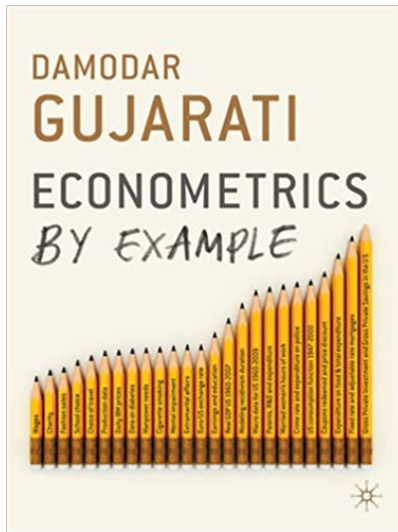
Stockholm
University

Goal(s) for Today

1. Introduce students to the basic structure of the course.
2. Get students to download and install R, Rstudio, and some required libraries.

Course Objectives

1. Read and critically evaluate research in economic history and international relations where quantitative methods are used.
2. Formulate statistical models and test hypotheses
3. Solve basic problems by reference to probability theory, correlation analysis, and regression.
4. Use statistical software and present results from analyses of source material.
5. Demonstrate an awareness of ethical aspects of research.



Grading Policy

There are a total of 100 points to be allocated this semester.

- Five problem sets ($8 \times 5 = 40$ points)
- Final exam (60 points)

Grade Distribution

Table 1: A Summary of the Grading Outcomes for the Semester

| Grade | Point Range | Summary |
|-------|-------------|--------------|
| F | 0-39 | FAIL |
| Fx* | 40-49 | INSUFFICIENT |
| E | 50-59 | ADEQUATE |
| D | 60-69 | SATISFACTORY |
| C | 70-79 | GOOD |
| B | 80-89 | VERY GOOD |
| A | 90-100 | EXCELLENT |

Lectures and Computer Labs

This class has nine lectures (seminars) and five computer labs.

- Attendance in lecture is assumed but not required.
- *Attendance in labs is mandatory.*

Missed lab policy:

- If you miss one lab, you'll have to do a make-up assignment at my discretion (in addition to the homework).
- If you miss two labs, you cannot complete the course.

Other Lab Policies

There are two lab “groups” (A, B).

- Self-select into groups, though A will ideally go at a gentler pace than B (check Athena).
- *Let me know which one works best for you.*
- For attendance: it's a case of “six of one.”
 - Just make sure you attend at least one of the two sessions that day.

All labs will be done in R and Rstudio.

- There is no way around this.
- We have the computer labs (E 347), but it's best to use your laptop.

Class Calendar

November

| | | | | | | |
|----|----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

Mon Tue Wed Thu Fri Sat Sun

December

| | | | | | | |
|----|----|----|----|----|----|----|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

Mon Tue Wed Thu Fri Sat Sun

January

| | | | | | | |
|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

Mon Tue Wed Thu Fri Sat Sun

Seminar
 Lab
 Problem Set Due
 Final Exam Due



All problem sets (and the final exam) are due "before" 5 p.m. on that corresponding day. Please check TimeEdit as well for confirmation of the schedule summarized here.

Quantitative Methods



Quantitative Methods: You couldn't escape if you wanted to.

Lab Scripts/Problem Sets

This page contains link to lab scripts throughout the semester. Clicking the title of the lab script will go directly to the “[spun](#)” HTML document from the underlying R code. The bottom left icons link to the underlying R script () and the HTML document (.

An Intro to R, Rstudio, and {tidyverse}

tldr: A {tidyverse}-oriented lab for introducing students to R and Rstudio.



Problem Sets

Here are the five problem sets you'll need to complete through the semester. Observe the deadlines for these problem sets in the syllabus, as they typically coincide with a little over 24 hours from the relevant lab session.

I've attached an answer template for your consideration as well. Download this file (i.e. right-click the link and save): [eh6105-ps1-svensson-sven.Rmd](#). Open it in Rstudio, take a quick look at its contents, and then press the “Knit” button. In the same directory in which you saved the R Markdown file, there'll be a corresponding Word document. Open that in your Word document reader to see what you did. From there, you might be able to follow your intuition as to what's happening. You can [read more about R Markdown here](#).

Problem Set #1

The first problem set makes use of the [Systemic Banking Crises Database II](#) in `{stevedata}` to learn about basic data summary, data exploration, and data manipulation.

Elsewhere in the R

Configure Rstudio

Get Acclimated in R

Current Working Directory

Create "Objects"

Install/Load Libraries

Load Data

Learn Some Important R/"Tidy"
Functions

The Pipe (%>%)

`glimpse()` and `summary()`

`select()`

`group_by()`

`summarize()`

`mutate()`

`filter()`

Don't Forget to Assign!

An Intro to R, Rstudio, and {tidyverse}

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Abstract

This is a lab script for [EH6105](#), a graduate-level quantitative methods class that I teach at Stockholm University. It will not be the most sophisticated R-related write-up of mine—check [my blog](#) for those—but it should be useful for discussion around the associated R script for the week's 'lab' session.

Elsewhere in the R "Steveverse"

Some of what I offer here may be (aggressively) plagiarized from other resources I've made available. In particular, check out [this near identical guide](#) I made available for graduate students at my previous employer. I have a [somewhat dated guide](#) on my website too.

Configure Rstudio

When you're opening R for the very first time, it'll be useful to just get a general sense of what's happening. I have a [beginner's guide that I wrote in 2014](#) (where did the time go!). Notice that I built it around [Rstudio](#), which you should download as well. Rstudio desktop is free. Don't pay for a "pro" version. You're not running a server. You won't need it.

When you download and install Rstudio on top of R, you should customize it just a tiny bit to make the most of the graphical user interface. To do what I recommend doing, select "Tools" in the menu. Scroll to "global options" (which should be at the bottom). On the pop-up, select "pane layout." Rearrange it so that "Source" is top left, "Console" is top right, and the files/plots/packages/etc. is the bottom right. Thereafter: apply the changes.

Options

Download R (cran.r-project.org)

The Comprehensive R Archive Network

Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#) ([Debian](#), [Fedora/Redhat](#), [Ubuntu](#))
- [Download R for macOS](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2022-10-31, Innocent and Trusting) [R-4.2.2.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

A Few Comments on Installing R

For Windows users:

- You'll also need to install Rtools (which you can get from the same place).

For Mac users:

- Be mindful of your Mac OS X system version.
- You *may* need to install XQuartz or upgrade Xcode for package installation.

For Linux users:



- You're going to get poked to install some development libraries.

For Chromebook/tablet users:

- It may be best to use the computer lab.

I'll assume silence on any issues with R means the absence of any problem.

Download Rstudio (posit.co)

| <div> PRODUCTS ▾ SOLUTIONS ▾ LEARN & SUPPORT ▾ EXPLORE MORE ▾</div> <div> DOWNLOAD RSTUDIO</div> | | | |
|--|---|----------|--------------------------|
| OS | Download | Size | SHA-256 |
| Windows 10/11 | RSTUDIO-2022.07.2-576.EXE ± | 190.49MB | B38BF925 |
| macOS 10.15+ | RSTUDIO-2022.07.2-576.DMG ± | 224.49MB | 35028D02 |
| Ubuntu 18+/Debian 10+ | RSTUDIO-2022.07.2-576-AMD64.DEB ± | 133.19MB | B7D0C386 |

Note: download the free version. Don't ever pay for anything related to R.

Install These R Packages

```
install.packages("tidyverse")      # for most things workflow  
# ^ This is a huge installation. It should take a while.  
install.packages("stevedata")      # for toy data sets to use in-class  
install.packages("stevemisc")      # for some helper functions  
install.packages("stevetemplates") # for preparing reports  
install.packages("lmtest")         # for model diagnostics
```

Note: you'll only need to install a package once, but you'll need to load it every session.

Conclusion

Welcome to the course!

- Read the syllabus.
- Get acclimated with the course website (eh6105.svmiller.com)
- Check out Athena (where you'll submit assignments).

Install R and Rstudio.

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Lab Stuff

A Tour of the Course Website (eh1605.svmiller.com)

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Conclusion