Empirical Economics with R

Overview

Uni Ulm

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Course Overview

- We will look in detail at several empirical economic applications, e.g.
  - Develop a simple formula to predict future prices of Bordeaux red wines
  - Estimate a complex machine learning model to predict house prices
  - Evaluate the effect of minimum wages on employment
  - Assess the revenue impact of search engine marketing
  - ...
- Based on those and other applications we learn and dig deeper into methods like linear regression, machine learning with random forests, difference-in-difference estimation or instrumental variable estimation.
- The course extends your introductory statistics classes.

Organisation

- Lecturer: Prof. Dr. Sebastian Kranz (sebastian.kranz@uni-ulm.de)
- Teaching Assistant: Theresa Gräfe (theresa.graefe@uni-ulm.de)
- All teaching material can be found on Moodle.
  - Youtube videos will be prepared that can be viewed anytime.
  - There will also be some live question and answer sessions via BBB.

R

- We will extensively use the statistical programming language R in this class
- You will learn a lot of skills and tricks that are generally useful beyond this class and beyond your time as student
- You don’t need previous knowledge in R but you should be willing to learn it and solve exercises on your computer
- We will use R together with **RStudio** in this class
  - RStudio is a convenient IDE that facilitates working with R
- Both R and RStudio are open source programs and are freely available.
- Please follow the course-specific instructions for installation and set-up on Moodle.

Interactive RTutor Problem Sets

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- During the course, you will be asked to solve and hand in, several interactive RTutor problem sets.
  - They are based on the package RTutor
  - You can immediately check your solution, get automatic feedback and can ask for hints.
  - The goal is to provide a fun and effective way to learn R and the contents of this course
- Some contents of the course are only introduced via RTutor problem sets. Working through them is absolutely crucial for this course.
- The problem sets count a total of 10% of your final grade

Further Ressources to Learn R

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- If you are a complete beginner to R, you may want to take a look at some further resources to learn R. There is a huge amount of free teaching material. Here are just some links:
- https://education.rstudio.com/learn/beginner/
- https://rstudio.cloud/learn/primers
- https://www.datacamp.com/courses/free-introduction-to-r

Final Exam

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- The final exam will determine 90% of your grade (the remaining 10% are the RTutor problem sets)
- If the class is sufficiently large, there will be a written exam
  - Questions will be in English but you can answer in English or German
- If the class is not too large, there may be an oral exam (mündliche Prüfung)
  - You can freely decide whether you want to take the exam in English or German

Questions:

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- On the Moodle page of the course is a Question and Answer forum. Please try to post your question there if there is a chance that it is also of interest to other students (which is the case for almost all questions.)
- In other cases send an email. We can then schedule a time to discuss the question via Webex.

Optional Textbooks

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- Jeffrey Wooldridge: "Introductory Econometrics"
  - A classic textbook to learn about classic econometrics. Does not cover machine learning methods.
- Matt Taddy: "Business Data Science"
  - A very nice modern overview of econometric and machine learning techniques for business relevant decisions. Book uses many R examples.
- Hank et. el.: "Econometrics with R"
  - https://www.econometrics-with-r.org/
  - A modern, nice and free online textbook

Is it the right course for me?

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- You learn a lot, but also have to invest considerably time and effort.
- If you are not sure, just try out the course and see if you like it.