

COURSE MANUAL

QUANTITATIVE RESEARCH METHODS IN BUSINESS ADMINISTRATION

Research Master Business in Society

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Dept. Marketing

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Course content

This course prepares the student for analyzing datasets using a freely available programming language. R is a platform for which many scholars write packages. The basis enables you to manipulate data, clean data and test hypotheses. The packages enable you to use advanced methods to analyze various types of data. You will learn how to read datasets into R, how to create and change variables, and how to conduct elementary algebraic manipulations.

Next to programming in R, you will learn how to apply basic statistical modeling to analyze quantitative data. First, we discuss how to analyze and deal with missing data. Second, we introduce the generalized linear modeling framework. Linear and logit regression are presented as special cases in this framework. Primary tests such as t-test and X-test are related to these models. Third, you will learn about latent variables and apply factor analysis to multi-item scales. Factor analysis is part of structural equation modeling. You will learn the necessary tools to analyze the fit of such models. Lastly, as part of the generalized linear modeling framework, multi-level analysis and the similarities to ANOVA discussed. Throughout the course we will use the basic module of R and download several necessary packages. You will also learn how to write your own functions.

Teacher

Co-ordination and lectures:

Dr. Meike Morren
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Office hours: on appointment



Course objectives

Upon successful completion of the course, students will

- have furthered their academic knowledge of quantitative research methods in business in general
- have started to develop their knowledge of particular quantitative data analyses methods
- be able to link concrete technologies and methodologies to research designs in quantitative methods
- be able to critically evaluate the quality of the research design of a study
- be able to evaluate the quality of quantitative data sources and methods for analysis
- have practiced with various parts of a quantitative research trajectory, as shown below
- have started developing their skills of communicating about research methods orally and in writing

Requirements

We will work in a lecture room without computers. Therefore, you are required to bring your laptop to do the exercises. We would like you to be prepared by installing (the latest version) of R on your laptop before coming to class. We would like you to warn you that some R versions have conflicts with the operating system on your laptop (especially the case with Mac). Use the latest R version that is suited for your laptop.

Course reading

Allison, P. D. (2001). *Missing data* (Vol. 136). Sage publications. [[Chapter 4](#)]

Bollen, K. A. (1989). *Structural Equations with Latent Variables*. Canada: Wiley [Chapter 7: Confirmatory factor analysis]

Everitt & Hothorn (2011). *An introduction to applied multivariate analysis with R*. [available via ub.vu.nl](http://ub.vu.nl) [Chapter 6: Cluster analysis]

Malhotra, Birks & Wills (2012). *Marketing Research. An applied approach*. 4th edition. Harlow, England: Pearson Education Limited [Chapter 22, 23: factor and cluster analysis]

Skondral, A. & Rabe-hesketh, S. (2004). *Generalized Latent variable modeling. Multilevel, longitudinal and structural equation models*. Boca Raton: Chapman & Hall/CRC [Chapter 1: The omni-presence of latent variables]

These chapters can be found on GitHub.

Study load (6 ECTS)

A total of 186 hours of study is required for a 6ECTS course which is divided into three parts:

| | |
|-------------|---|
| Lectures: | 36 contact hours (12 lectures of three hours) |
| Self-study: | 100 hours |
| Reading: | 32 hours |

Grading

60% Exam

40% Assignments (4)

Final grade should be above 5.5

The exam grade and the average grade for the assignments should be above 5.0. The exam will take place in a computer room, where the students will complete several assignments in R and will describe their interpretation of the results.

The assignments are made in groups of 2 students; the grade will apply to both students

Attendance is mandatory; to miss one class is allowed.

Assignments

You will be given two datasets with which we will work throughout the course. First, you will be given a dataset facilitated by the World Values Survey. Four countries are included in your dataset. The second dataset contains a listing of tablets sold on Amazon, their ratings and characteristics.

Assignment 1

Program multiple linear regression using a vectorised command. Use the same dataset as in assignment 1. Explain green behavior (measured by willingness to pay), by income and another variable. Add a moderator effect to estimate the country differences on one of these explanatory variables.

Assignment 2

Conduct a logit regression on the tablet dataset, and compare two models. Think of reasonable models to explain reviews (whether or not) (using tablet characteristics such as price, weight). Calculate the log-likelihood using a for loop.

Assignment 3

Analyze the missing values of income in the WVS dataset. See if the model results estimated in the second assignment change when you use imputed values.

Assignment 4

Conduct CFA on the WVS dataset and analyze the discriminant and convergent validity between environmental concern, willingness to pay and emancipation.

You should hand in the assignments at the latest 11th of May via GitHub.

Course outline

You will have two lectures per week. Both lectures will take 3 hours (3*45 minutes), in which I will present new concepts and explain how these analyses should be interpreted. You are requested to bring a laptop to conduct the exercises discussed during the lecture.

| Wk | Date | Monday (HG-09A24) | Date | Wednesday (Room: HG-0G10, except for 4/5 and 11/5 which will be in room HG-09A32) |
|----|------|-----------------------------------|------|---|
| 1 | 28/3 | | 30/3 | Introduction to R |
| 2 | 4/4 | Basic programming commands | 6/4 | Data cleaning, missing data |
| 3 | 11/4 | Simple regression | 13/4 | Multiple regression I |
| 4 | 18/4 | Multiple regression II | 20/4 | X^2 , odds ratio, and logit regression |
| 5 | 25/4 | Test M(C)AR assumption (exclude?) | 27/4 | KINGS DAY |
| 6 | 2/5 | Factor analysis I | 4/5 | Factor analysis II |
| 7 | 9/5 | Collect data online (webscraping) | 11/5 | Exam preparation |