

**Discipline:** special methods

**1 Language**

English

**2 Title**

Endogeneity in Applied Empirical Research

**3 Lecturer**

Prof. Dr. Dominik Papies (University of Tübingen)

**4 Date and Location**

6.9.2023 (online)

13.-15.9.2023: University of Tübingen

**5 Course Description**

5.1 Abstract and Learning Objectives

Many empirical research projects in business and economics that use non-experimental data struggle with the proper identification of causal effects of independent variables (e.g., price, management decisions) on dependent variables (e.g., demand, firm performance). The reason is that the identification of a causal effect hinges on the untestable assumption that the error term of a model is uncorrelated with the independent variables. If this assumption is not met, a model is plagued by endogeneity.

The topic of endogeneity has received considerable attention, and it is probably the most frequently encountered troublemaker in a review process at an academic journal.

This course therefore has the goal of making students familiar with the problem of endogeneity and potential remedies. This implies that it will cover the opportunities and problems associated with traditional approaches (e.g., Instrumental Variable estimation, Matching, Difference-in-Difference) as well as more recent developments (e.g., Gaussian Copulas; Machine Learning and Causal Inference; Synthetic Control Methods; Directed Acyclical Graphs (DAG)). The course will also cover how the data structure (e.g., panel data) can be utilized to address the problem.

Because the literature on endogeneity is often quite technical, this course aims at providing an easily accessible approach to this topic. Special emphasis will also be given to understanding when endogeneity indeed poses a real problem as compared to settings in which endogeneity is less likely to be a real threat to the validity of the findings.

After completing this course, students will be able to define and describe endogeneity problems in different empirical settings, they will have a better understanding of whether and when causal

identification is possible how to implement techniques that address endogeneity, and they will be aware of the (dis)advantages of different methods.

## 5.2 Content

1. Introduction to Endogeneity & Causality
2. Overview of potential approaches for causal inference with non-experimental data
3. Implementing approaches for causal inference with non-experimental data

## 5.3 Schedule

### **Part 1 (Online):**

Wednesday, September 6, 2023: 9 a.m. – 6 p.m.: Online Session with lecture, discussions, coding, breakout sessions

*September 7 – September 12, 2023: Students work (in groups) on applied cases of causal inference and endogeneity*

### **Part 2 (In-person, University of Tübingen)**

Wednesday, September 13, 2023: 11:30 a.m. – 6 p.m.: Lecture, discussions, coding, breakout sessions

Thursday, September 14, 2023: 9 a.m. – 6 p.m.: Lecture, discussions, coding, breakout sessions

Friday, September 15, 2023: 9 a.m. – 3 p.m.: Lecture, discussions, coding, breakout sessions

Informal networking activities in Tübingen will be offered in the evenings of September 13 & 14.

## 5.4 Course format

Lecture, group discussion, student presentation, PC-based implementation

## **6 Preparation and Literature**

### 6.1 Prerequisites

Participants should have experience with empirical analyses, statistics, and econometrics.

Participants should have a solid degree of familiarity with writing statistical code, either in Stata or R. This includes writing loops, drawing random numbers from (multivariate) normal distributions (e.g., “drawnorm” in Stata or “MASS:mvrnom()” in R).

### 6.2 Essential Reading Material

Angrist, J. D., & Krueger, A. B. (2001). Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. *Journal of Economic Perspectives*, 15(4), 69–85.

Bascle, G. (2008). Controlling for endogeneity with instrumental variables in strategic management research. *Strategic Organization*, 6(3), 285–327.

Ebbes, P., Papies, D., & Heerde, H. J. van. (2016). Dealing with Endogeneity: A Nontechnical Guide for Marketing Researchers. In C. Homburg, M. Klarmann, & A. Vomberg (Eds.), *Handbook of Market Research* (pp. 1–37). Springer International Publishing.

Papies, D., Ebbes, P., & Heerde, H. van. (2017). Addressing Endogeneity in Marketing Models. In P. S. . Leeflang, J. E. Wieringa, T. H. A. Bijmolt, & K. Pauwels (Eds.), *Advanced Methods in Modeling Markets*.

Wolfolds, S. E., & Siegel, J. (2019). Misaccounting for endogeneity: The peril of relying on the Heckman two-step method without a valid instrument. *Strategic Management Journal*, 40(3), 432–462.

### 6.3 To prepare

Students should familiarize themselves with the key points of endogeneity with the help of the reading list. Participants who seek to earn credits (6 ECTS) are expected to give a short (5 slides maximum) presentation on their own research problem, focusing on potential endogeneity problems.

Students must have a computer with either R or Stata installed available during the course.

## 7 Administration

### 7.1 Max. number of participants

20

### 7.2 Assignments

Participants who seek to earn credits (6 ECTS) will present (1) a summary of their research (plan) with a special focus on (potential) endogeneity problems, or a paper from the reading list (e.g., if a participant has not specific research (plans) yet. In that case, the specific paper will be assigned to participants once the list of participants is complete). (2) Students will actively participate in all in-class discussions. (3) Students will actively work on the completion of the in-class programming assignments, present part of their (group) assignments in class, and submit the assignments after the completion of the course.

### 7.3 Exam

To successfully pass this class, students must complete all assignments described above.

### 7.4 Credits

The course corresponds to a scope of 6 LP/ECTS.

**8 Working hours**

<b>Working Hours</b>	<b>Stunden</b>
<i>Vorbereitung (Literatur &amp; Präsentation)</i>	50
<i>Aktive Mitarbeit</i>	25,5
<i>Nachbereitung Literatur</i>	54,5
<i>Assignments</i>	50
<b>TOTAL</b>	<b>180 h</b>