

Lecture Notes in Econometrics

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Preface

This book is a collection of lecture notes and resources for ECN201 Econometrics at the School of Economics and Business at the Norwegian University of Life Sciences.

The class assumes that you are familiar with R. If you are not familiar with R, you are strongly encouraged to get familiar before proceeding. Excellent resources include Grolemond (2014) and Wickham, Çetinkaya-Rundel, and Grolemond (2023).

The book follows closely Wooldridge (2019) and (re-)uses many of the examples from that book. Lecture Notes in Econometrics is a teaching compendium and a free supplement to Wooldridge (2019).

References

Preface

What is econometrics?

Part I

Simple linear regression

1 Lecture 1

1.1 What is Econometrics?

1.2 Types of data

Heteroskedasticity

In this chapter, we will use the following packages:

```
library(tidyverse)
library(wooldridge)
library(lmtest)
```

We the constant variance assumption.

$$\text{Var}(u_i|X) = \sigma^2$$

Heteroskedasticity is a violation of the constant variance assumption and instead we have:

$$\text{Var}(u_i|X) = \sigma_i^2$$

1.3 How to detect heteroskedasticity?

We can test for heteroskedasticity using the Breusch-Pagan test. The null hypothesis is that there is no heteroskedasticity. The alternative hypothesis is that there is heteroskedasticity.

2 Lecture 2

In this chapter, we will use the following packages:

```
library(tidyverse)
library(wooldridge)
```

The simple regression model.

```
model_1 <- lm(wage ~ exper, data = wage1)
```

```
rlang::f_lhs(model_1$call$formula)
```

wage

References

References

- Grolemund, Garrett. 2014. *Hands-on Programming with r: Write Your Own Functions and Simulations*. " O'Reilly Media, Inc."
- Wickham, Hadley, Mine Çetinkaya-Rundel, and Garrett Grolemund. 2023. *R for Data Science*. " O'Reilly Media, Inc."
- Wooldridge, Jeffrey. 2019. *Introductory Econometrics - a Modern Approach*. 7th ed. South-Western College Publishing.

A Installing R and RStudio