

Lectures and Seminar on Time Series Analysis

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January 17, 2024

1 Motivation

“Time series are analysed to understand the past and to predict the future, enabling managers or policy makers to make properly informed decisions. A time series analysis quantifies the main features in data and the random variation. These reasons, combined with improved computing power, have made time series methods widely applicable in government, industry, and commerce.” (Cowpertwait and Metcalfe, 2009, p. 1) Examples of time series include, but are not limited to: predicting growth rates, inflation rates, exchange rates, unemployment, demand, stocks, financial indices, and global temperatures.

2 General Issues

This course addresses Bachelor’s students of Business Administration, Economics, Internationale Wirtschaft und Entwicklung, and Philosophy & Economics. The aim is to introduce time series and practice their application with examples, using statistical software.

The course consists of three to four interactive **lectures**, which cover the main topics in time series analysis. Interactive **exercise classes** are inte-

grated into the lectures, in which we implement the learned methods using examples and the **computer programme R**. Students will apply the learned methods to a chosen topic and **present** their work to the group. Finally, students will write and submit a **seminar paper** on their chosen topic.

(Prospective) Date and Time	Topics	Chapters in Cowpertwait and Metcalfe (2009)
26.04.2024 9:00-12:30, 13:30-16:00	What is time series? Plots, decomposition, correlation.	Chapters 1, 2
17.05.2024 9:00-12:30, 13:30-16:00	Exponential smoothing, Holt-Winters method.	Chapters 3 (without 3.3), 4
13.06.2024 9:00-12:30, 13:30-16:00	Regression models with deterministic components, plots, decomposition, correlation.	Chapters 5 (only 5.1-5.5), 6, (maybe 7)
28.06.2024 9:00-12:30, 13:30-17:00	Depending on progress and interest of participants: further topics (non-stationary models, multivariate models, state-space models) and student presentations.	Chapters 7, 11, 12
29.06.2024 9:00-12:30, 13:30-17:00	Student presentations.	

The exact times for the seminar are prospective and depend on the number of participants. Times may be re-arranged if the schedules of the participants make this necessary.

After the first introductory lecture (26.04.24), students will read the respective chapters in Cowpertwait and Metcalfe (2009) in preparation for the lectures. The book is available as e-book to download via the university library

(<https://link.springer.com/book/10.1007/978-0-387-88698-5>).

Potential topics for the seminar papers will be discussed during the interactive lectures.

For further questions concerning course details please contact Hanna Adam (hanna.adam@uni-bayreuth.de) or Mario Larch (mario.larch@uni-bayreuth.de).

3 Requirements and Assessed Course Work

Requirements

In order to participate in the course, interest in and good knowledge of empirical economics is expected. Students should have at least completed the course “Empirische Wirtschaftsforschung I” or an equivalent course.

Assessed Course Work

The course work consists of:

- Active course participation during the interactive lectures and computer exercises.
- The presentation of your chosen topic (of about 30 minutes).
- A seminar paper on your chosen topic. The date of submission of the seminar paper is 30 September 2024 (of course an earlier submission is possible at any time).

Language and Formal Requirements

The language of the course is English. All the literature is also in English. Your term paper can be written in German or in English, even though we suggest to write it in English. For more details concerning the formal requirements of the written assignments please see the documents available in German (Hinweis zur Formatierung von Seminar- und Abschlussarbeiten) and in English (Formal requirements for term papers and Bachelor’s/Master’s theses).

4 Target Group

The course addresses students from the following degree courses:

- Business Administration (Bachelor's): as “Spezialisierung” (please check with the Chair responsible for the chosen “Spezialisierung”)
- Economics (Bachelor's): as “Empirisches Seminar” or “Empirische Wirtschaftsforschung II”.
- Internationale Wirtschaft und Entwicklung (Bachelor's): as “Vertiefung Empirie und Theorie”.
- Philosophy and Economics (Bachelor's): as “Empirisches Seminar” or “E6: Economics Seminar”.
- Please contact us for help if you have difficulties to find the proper module to get credits for the course.

5 Reading List

In order to have a common base for discussion in class, students are required to read the indicated chapters in *Introductory Time Series with R* by Cowpertwait and Metcalfe (2009), which can be freely downloaded via the university library (<https://link.springer.com/book/10.1007/978-0-387-88698-5>). Further literature will be announced in the lectures.

6 Overview of Important Dates

- 26 April 2024: Introductory lecture.
- 17 May 2024: Second lecture.
- 13 June 2024: Third lecture.
- 28 June 2024: Fourth lecture and student presentations.

- 29 June 2024: Student presentations.
- 7 July 2024: Registration deadline for seminar “examination” on cmlife (necessary for term paper submission).
- 30 September 2024: Submission deadline for term papers.

References

COWPERTWAIT, P. S., AND A. V. METCALFE (2009): *Introductory Time Series with R*. Springer.