Valid from 2026.FS

Module description: Smart Data Analytics for Financial Assets

Module Code	w.BA.XX.WPM-SDA.XX
ECTS Credits	3
Language of Instruction/Examination	English
Module Description	Smart data analytics for financial assets helps to analyze stock prices and improves trading abilities over time. Using real data sets with asset prices and asset returns, students learn to identify trends and detect cycles and seasonality with statistical time series methods. Vast amounts of data are collected across the globe on a daily basis over time: Traders use real-time stock price information to forecast stock prices and their returns; banks gather information on the income, wealth, creditworthiness, and transactions of their clients, and tech giants (e.g., Apple, Google) harvest data on essentially any dimension of our personal life, from consumption patterns and social interactions to customer solvency information via email, social media, or mobile devices. One key advantage of increased data availability is that it allows banks, companies, financial analysts, and scientists alike to answer a series of highly relevant real-world questions. How does a stock price or a stock market index move over time? How can I predict a stock return and price tomorrow? Answering such questions requires solid statistical knowledge on how to properly analyze the newly available data. This module introduces students to the most important quantitative methods used in the forecasting of financial products (e.g., stock price, asset, return, and debt) and provides an introduction to the Python. Students learn how to carry out an empirical project predicting returns on financial assets (i.e., stock price and return), in which they will apply the techniques taught in class based on real stock data (e.g., Bloomberg and Refinitiv, which will be provided in class to all participants). Topics include linear regression analysis, the analysis of stochastic processes (time series), and causal analysis. Examples from the literature and computer tutorials offer hands-on experience in utilizing the methods. The distinctive feature of the module is a learning-by-doing approach with a strong emphasis on the application of methods to real data and the correct interpretation of results. In addition, the module introduces students to time series econometrics using real-time financial data.
Organizational Unit	Institut für Wealth & Asset Management
Module Coordinator	Andrea Maria Günster
Deputy Module Coordinator	Fabian Oehninger
Program and Specialization	• Elective module (see module table)
Legal Framework	Academic Regulations BSc dated 29.01.2009, for the degree programs in Business Administration, International Management, Business Information Technology, Business Law, Business Law and Applied Law, first adopted on 12.05.2009
Module Category	**Module Type** Compulsory Elective **Program Phase** Main Study Period
Prerequisite Knowledge	The module is aimed at BSc students with a solid knowledge of (basic) statistics and a strong interest in working with data and statistical software.
Contribution to Program Learning Objectives (by the concerned Module)	• Professional Competence • Methodological Competence • Social Competence • Self-Competence

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Contribution to Program Learning Objectives

Professional Competence
- Knowing and Understanding Content of Theoretical and Practical Relevance
- Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance
- Evaluate Content of Theoretical and Practical Relevance

Methodological Competence
- Problem-Solving & Critical Thinking
- Scientific Methodology
- Work Methods, Techniques, and Procedures
- Information Literacy
- Creativity & Innovation

Social Competence
- Written Communication
- Oral Communication
- Teamwork & Conflict Management

Self-Competence
- Learning & Change

Module Learning Objectives

Students...
- are able to explain the basic principles of modern empirical finance.
- are able to interpret empirical results and conduct statistical significance tests using financial data.
- are able to explain the obstacles in the causal interpretation of empirical results.
- are able to work with the statistical software Python.
- are able to plan and apply the methods discussed in class in their own work (e.g., module project, Bachelor's thesis).
- are able to summarize their empirical findings and present them to their peers.
- are able to explain the basic principles of stochastic processes and time series econometrics.

Module Content
- Introduction to key empirical methods in financial data over time (linear regression and time series models).
- Introduction to the statistical software Python.
- Working with real-world data (on asset prices).
- Methods are illustrated using simulated and real-world data on financial markets over time.

Links to other modules

This module is linked to the following modules:

Digital Learning Resources
- Practice and Application Exercises (with Key)

Methods of Instruction
- Project Work
- Problem-Oriented Teaching
- Exercises
- Lecture

Social Settings Used:
- Group Work
- Individual Work

Type of Instruction

	Classroom Instruction	Guided Self-Study	Autonomous Self-Study
Large Class	20 h	-	
Small Class	-	-	
Group Instruction	-	-	
Practical Work	8 h	-	
Seminar	-	-	
Total	**28 h**	**0 h**	**62 h**

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Performance Assessment

End-of-module exam	Form	Length (min.)	Weighting
-			
Permitted Resources			

Others	Assessment	Format	Length (min.)	Weighting
Written Assignment	Grade	Gruppenarbeit	0	100.00

Classroom Attendance Requirement

None

Compulsory Reading

- Wooldridge, J. (2008). Introductory Econometrics: A Modern Approach. 4th edition. New York: Nelson Education. ISBN 978-133755886.

Recommended Reading

Comments