Objectives of the Course

- To acquire working knowledge of financial time series data.
- To study simple models and methods for analysis of business and financial time series.
- To gain expertise in the software to conduct this analysis.
- To investigate dependence between asset returns.
- To assess market risk, credit risk, and to study methods for calculating Value at Risk (VaR) and expected shortfall.
- To have a clear idea of the limitations of models and econometric analysis of financial time series.

Textbook


Outline of the Course

1. Returns and their empirical characteristics; data analysis with R.
3. Linear time series models and their applications
4. Volatility modeling via conditional heteroscedastic models
5. High-frequency data analysis, realized volatility, and market microstructure
6. Value at Risk (VaR), stress test, peak over the threshold (extreme value theory), expected shortfall, and quantiles.
7. Multivariate models, factor models, and their applications.
8. Multivariate analysis of financial returns, (pair trading, statistical arbitrage),
time permitting.

9. Multivariate conditional heteroscedastic models, time permitting.


11. Continuous-time diffusion models and Ito’s Lemma, time permitting.

Theoretical foundations and Practical applications will be covered for all topics

**Grading**

The grading of the course will be divided as follows

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Paper</td>
<td>20%</td>
</tr>
<tr>
<td>Presentation</td>
<td>20%</td>
</tr>
<tr>
<td>Final</td>
<td>50%</td>
</tr>
</tbody>
</table>

- There will be no make-up exams without a legitimate excuse.
- **Paper**: You will be asked to write a short memo commenting on your findings on a research project where you have to use the tools learned in the course. A list of topics will be provided, ranging from evaluating a trading strategy to analyze the effects of a specific policy.
- **Presentation**: Group presentation of the paper.
- **Final Exam**: The exam will be in class. You will be allowed to have books and notes open.