UiO : Økonomisk institutt
Det samfunnsvitenskapelige fakultet

Til:	Programrådet
Fra:	Emneansvarlig, Jonas Erraia
Sak:	Sak 32/2022
Sak:	Opprettelse av nytt valgfritt masteremne i maskinlæring
Dato:	27.09.2022

Opprettelse av nytt valgfritt masteremne i maskinlæring

Det søkes om å opprette et nytt valgfritt masteremne i maskinlæring med oppstart våren 2023. Emnet er basert på et tidligere emnet Erraia har gitt ved Copenhagen Business School.

Jonas Erraia ved Menon Economics har laget en emnebeskrivelse for emnet.

Forslag til navn på emnet: Applied time series analysis: econometrics and machine learning

Course content

The last decade has brought about an increase in the availability of new types of data, which are often messier and larger than what economists are used to. This requires a broader and more varied toolbox than what economists in both academia, policy making, and consulting are used to. This includes the need for economists to obtain hands-on experience working with real-world data and knowledge of what models to use in what situations.

The first part of the course will introduce a range of well-known models from time series econometrics. This will be done all the while students continuously work with real world data. In the last part of the course, students will be exposed to machine learning models, and how to use them in a time series context. Throughout the course, the student will be taught how to predict time series data both in economics, finance and business.

The focus of the course will be applied, rather than theoretical, but theoretical foundations of all models will be presented in the beginning of lectures.

Learning outcome

Knowledge

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Telefon: 22 85 51 27
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- Correctly download, clean, and organise time series data from a variety of online databases and sources
- Knowledge of the most common time-series econometrics models and when to use them
- Widening of the toolbox, and how to use econometrics and machine learning models in a real-world context.

Skills

- Write a program in R to undertake analysis of data or build models
- Import data from various sources and in different formats and transform them into an analysable format
- Implement time-series models
- Implement machine learning models
- Using the models above to predict time series relevant for business, economics, and finance

Competence

- An understanding on what types of problems in time-series that can be solved using econometric and machine learning models
- A clear understanding on the limits of models
- A concept of how to evaluate model both quantitatively and qualitatively

Forkunnskapskrav:

- Bachelor's degree in Economics, or equivalent.
- ECON3150 – Introductory Econometrics / ECON4150 – Introductory Econometrics , or equivalent.

Eksamensform: Semesteroppgave på 15 sider. Studentene skal selv velge tema og finne data. Erraia vil forklare vilkårene rundt oppgaven i uke 3 -4.

Obligatoriske aktiviteter: Ingen.

Pensum:

- Applied Econometric Time Series - Walter Enders, 4th Edition, Wiley

Optional:

- Analysis of Financial Time Series – Ruey S. Tsay , 3rd Edition, Wiley

Topic	Reading
Introduction Introduction to ARIMA models	Enders: ch. 1–2 Tsay: ch. 1–2
Trends Stationarity Unit root testing	Enders: ch. 4 Tsay: ch. 2
More on ARIMA models	Enders: ch. 2 Tsay: ch. 2
Introduction to ADL models	Enders: ch. 4 Tsay: ch. 2
More on ADL models	Enders: ch. 4 5 Tsay: ch. 8
Introduction to ARCH/GARCH models	Enders: ch. 3 Tsay: ch. 3
More on ARCH/GARCH models	Enders: ch. 3 Tsay: ch. 3
Introduction to VAR models	Enders: ch. 5 Tsay: ch. 8
More on VAR models Cointegration	Enders: ch. 5–6 Tsay: ch. 8
Introduction to machine learning models	–
Project exam preparation	–

Forslag til vedtak:

Programrådet vedtar å opprette det valgfrie masteremnet i maskinlæring med oppstart våren 2023. Programleder for masterprogrammet gis fullmakt til å utforme endelig emnebeskrivelse, emnekode og emnenavn i samråd med emneansvarlig.