

## **PHD COURSES**

### **Regular courses**

- Financial Econometrics

### **Semester**

Spring 2012

### **Lecturer**

Professor Bent Jesper Christensen, Aarhus University

### **Purpose**

To provide PhD students with a firm understanding of the econometric methods used in empirical finance research. Both theoretical finance models and econometric methods are introduced, and the emphasis is on the interplay between the two. The course covers discrete time as well as continuous time models.

### **Structure**

The course is taught every Friday starting February 3. Students taking also the other PhD-course Advanced Financial Economics taught every Thursday by Prof. Claus Munk may stay overnight (Thursday) in Aarhus. Students taking only Financial Econometrics will be able to do so without staying overnight in Aarhus, as lectures on Friday will start only at 10:15 am. Throughout the semester, there will be compulsory theoretical and empirical homeworks.

### **Exam**

There is a final one-day take-home exam. The exam questions are distributed by email in the morning. Students return their answers by email by 16:00 the same day.

### **Prerequisites**

Participants are expected to have basic knowledge (at the Master's level) of finance theory, linear algebra and optimization, probability and statistics, stochastic processes, and econometrics. This should cover CAPM, the term structure of interest rates, option pricing, linear regression analysis, and software for econometric analysis (e.g., SAS, Gauss, Ox, EViews, PC\_GIVE, or similar). The course is taught at the PhD level, and pace and depth exceed those in Master's courses.

### **Readings**

Campbell, Lo & MacKinlay: The Econometrics of Financial Markets. Princeton University Press, 1997.

Christensen & Kiefer: Economic Modeling and Inference. Princeton University Press, 2009.

In addition articles, lecture notes, etc.

### **Topics covered**

Markets for stocks, bonds, interest rates, and options. Corporate finance. Event studies. Market microstructure. Tests of asset pricing and option pricing models in discrete and continuous time. Multivariate regression analysis. Generalized method of moments. Efficient method of moments. Maximum likelihood. Nonparametric methods. Cross-sectional, time series, and panel methods. Cointegration. Autoregressive conditional heteroskedasticity (ARCH) and GARCH (generalized

ARCH). Diffusion models. Implied, realized and stochastic volatility. Forecasting. Filtering. Arbitrage and equilibrium models. Dynamic programming. Numerical optimization. Finite difference methods. Monte Carlo methods. Bootstrap.

### **Dates**

- Fridays from February 3 through May 11

### **Place**

All meetings will take place in room 118, building 1323, University of Aarhus, Denmark.

### **Enrollment**

Please sign up as soon as possible by email to Bent Jesper Christensen at [bjchristensen@econ.au.dk](mailto:bjchristensen@econ.au.dk) and Kirsten Stentoft at [kstentoft@econ.au.dk](mailto:kstentoft@econ.au.dk), stating your name, highest degree, and current program.

Participants from all Nordic countries are welcome and participate for free, but must arrange travel and accommodation with their home institution. Participants from other countries are welcome, too, but a participation fee may apply, please contact Bent Jesper Christensen at [bjchristensen@econ.au.dk](mailto:bjchristensen@econ.au.dk) and Kirsten Stentoft at [kstentoft@econ.au.dk](mailto:kstentoft@econ.au.dk) as soon as possible in this case.

The course workload is 10 ECTS.

Practitioners are welcome (pending Professor's approval). The course fee is DKK 10,000.