Financial Econometrics

Professor: joachim.grammig@uni-tuebingen.de
TA: oliver.wuensche@uni-tuebingen.de
Secretary (Home Page responsible) angelika.hutt@uni-tuebingen.de

Course page: http://www.uni-tuebingen.de/uni/wwo/Grammig/veranstaltungengramm/finanzmarktoekonometrie05.html

◆ 2 h lecture
◆ 2h „exercises“ & PC Lab (most likely blocked)
◆ Revise 2h+ per week, Assignments and exercises
◆ Exam: Material of lectures, reading list
◆ Prerequisites : Undergraduate Math & Stats & Microeconomics & Finance
◆ Take notes !
◆ What is Financial Econometrics?
What is financial econometrics?

**Financial Economics**
Deals with: valuation of assets, portfolio choice

- Economic models explaining behaviour of asset prices/returns
- models contain unknown parameters
- models imply time series and cross sectional statistical properties of asset prices/returns

**Time dimension**  
(payoff in future)

**Risk (payoff uncertain)**

**Economic agents**: time preferences & risk aversion

**Data**
Prices/returns of financial assets (stocks, bonds, options)

- Estimate unknown model parameters
- Test hypotheses about parameters
- Develop statistical models that account for stylized facts (more or less close link to theory)

**Time series**

**Cross section**

other micro- and macro-economic data

statistical features of data (stylized facts)
for methods of analyzing economic time series with time-varying volatility (ARCH)
Topics in financial econometrics include

- **Estimation and testing of asset pricing models**
  Cochrane (2001)
  Campbell et al. 1997 Ch. 5 and 6

- **Modelling dynamics of financial market processes using statistical models**

- **Estimation of Value at Risk**
  Tsay (2002)

- **Estimation of Continuous Time Finance Models**
  Tsay (2002), Campbell et al. (1997) Ch. 11

- **Predictability of asset returns**
  Campbell et al. (1997) Ch. 2

- **Empirical Market Microstructure**
  Price formation processes in real markets
  Campbell et al. (1997) Ch. 3
  Bauwens and Giot (2001)
  Gourieroux and Jasiak (2001)

- **Event Studies**
  Measure effect of an economic event on value of firm
  Campbell et al. (1997) Ch. 4
Textbooks on Financial Econometrics


Agenda of this course

1. Principles of financial economics

2. Basic pricing equation conditional and unconditional moment conditions

3. Parameter estimation of asset pricing models
   (Regression, Generalized Method of Moments, Maximum Likelihood)
   3.1 GMM
   3.2 Time Series Regressions
   3.3 Cross Sectional Regressions
   3.4 Fama McBeth Methodology

4. Conditional estimation of asset pricing models
   and scaled pricing factors

5. Time Series models for asset prices. Volatility modeling (Engle‘s ARCH)

6. Topics in financial econometrics
   Event studies, term structure of interest rates, estimation of parameters of continuous time processes, Value at Risk analysis, market microstructure, predictability of asset returns
Assignments

- Review statistical basics: (Undergraduate Statistics or e.g. Hamilton, Time Series Analysis, Princeton 1994, p.739 ff.)

Random Variables and distributions (distribution function, density function), Normal distribution
Expectation Operator (Mean, Variance, higher moments) and properties
Joint distributions
Covariance and correlation
Weak Law of Large Numbers
Conditional probability and conditional distributions
Conditional expectation
Independence
Hypothesis testing