Advanced Financial Econometrics

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Course Site: `http://www.kevinsheppard.com/Advanced_Econometrics`

Weblearn Site: `https://weblearn.ox.ac.uk/portal/site/socsci/sbs/mfe2012_2013/ttafe`

1 Aims, objectives and intended learning outcomes

1.1 Basic aims

This course aims to extend the core tools of Financial Econometrics I & II to some advanced forecasting problems. The first component covers techniques for working with many forecasting models – often referred to as data snooping. The second component covers techniques for handling many predictors – including the case where the number of predictors is much larger than the number of data points available.

1.2 Specific objectives

Part I (Week 1 – 4)

- Revisiting the bootstrap and extensions appropriate for time-series data

- Technical trading rules and large number of forecasts

- Formalized data-snooping robust inference

- False-discovery rates

- Detecting sets of models that are statistically indistinguishable

Part I (Week 5 – 8)

- Dynamic Factor Models and Principal Component Analysis

- The Kalman Filter and Expectations-Maximization Algorithm

- Partial Least Squares and the 3-pass Regression Filter

- Regularized Reduced Rank Regression

1.3 Intended learning outcomes

Following class attendance, successful completion of assigned readings, assignments, both theoretical and empirical, and recommended private study, students should be able to

- Detect superior performance using methods that are robust to data snooping

- Produce and evaluate forecasts in for macro-financial time series in data-rich environments

2 Teaching resources

2.1 Lecturing

Lectures are provided by Kevin Sheppard.

Kevin Sheppard is an Associate Professor and a fellow at Keble College. He joined Oxford in 2004 after completing his Ph.D. under the supervision of Rob Engle, the 2003 Economics Nobel Prize winner. His research interests lie in modeling high-dimensional systems and measuring covariance using transaction data.

2.2 Lectures and class meetings

The lectures will be held in Lecture Theater 4. Lectures will be on Wednesdays in Weeks 1 and 2, Tuesdays in Weeks 3 – 7 and again on Wednesdays in the final two weeks of term.

2.3 Examinations

The course is examined in two components

- A group project with group sizes of 2 (one group with 3 is permitted if there is an odd number of students in the course). This project is due in Week 7 and covers the first part of the course. 40% of the total mark.

- An individual project due in week 8. This project covers the second part of the course. 60% of the total mark.

3 Weekly Overview and Reading List

Part I: Many Predictions and the Evaluation of Technical Trading

Week 1: The Bootstrap

1. Chernick (2008) Chapters 2 – 5

2. Lahiri (2003) Chapters 2 and 7

3. Politis & White (2004)

4. Patton, Politis & White (2009)

5. Kreiss & Lahiri (2012)

Week 2: Technical Trading Rules

1. Brown & Jennings (1989)

2. Brock, Lakonishok & LeBaron (1992)

3. Blume, Easley & O'Hara (1994)

4. Sullivan, Timmermann & White (1999)

5. Lo, Mamaysky & Wang (2000)

6. Neely, Rapach, Tu & Zhou (2010)

7. Han, Yang & Zhou (2010)

8. Bajgrowicz & Scaillet (2012)

Week 3: Model Combination, Reality Check and the Test of Superior Predictive Ability

1. Elliott & Timmermann (2008)

2. White (2000)

3. Hansen (2005)

Week 4: False Discoveries, Stepwise Testing and the Model Confidence Set

1. Romano & Wolf (2005)

2. Hansen, Lunde & Nason (2010)

3. Bajgrowicz & Scaillet (2012)

Part II: Forecasting with Many Predictors

Citations TBC

Week 5: Dynamic Factor Models

Week 6: The Kalman Filter

Week 7: Partial Least Squares and 3-Pass Regression

Week 8: Reduced Rank Regularized Regression

References

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