

Topics in Advanced Econometrics (Spring 2014)

Model Selection & Multiple Testing

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Course Outline

The course will cover a range of topics that spans, model selection, overfitting problems, m-estimation, GMM, parameter instability and models for time-varying parameters. In the second part of the course focuses on multiple comparisons, such as the problem of determining the best forecasting model from a potential large pool of competing forecasts.

Grading Policy

Grades will be based on four problem sets and a term paper. Problem sets will have theoretical and empirical components. You need to obtain a data set for the term paper – ideally replicating the empirical work in an existing paper – and undertake a suitable robustness analysis using methods taught in this course.

Schedule:

- Lecture 1 Introduction: Risk. Subset Selection, Mallow's Criterion, AIC BIC James-Stein Shrinkage
MJM Chapter 18 (ask Marcia about this material)
- Lecture 2 M-estimation. A general estimation framework that includes maximum likelihood, and quasi-maximum likelihood.
Hayashi Chapter 7
- Lecture 3 GMM
Hayashi Chapter 3.4-3.6

- Lecture 4 The Winner's Curse of Model Selection.
working paper
- Lecture 5 Cross Validation
- Lecture 6 Criterion-Based Estimation
working paper
- Lecture 7 Models for Time-Varying parameters and introduction to ARCH and GARCH models
Creal, Koopman, and Lucas
- Lecture 8 Multiple Comparison.
Lecture 9 Test for Superior Predictive Ability
- Lecture 10 Model Confidence Set

References

- Akaike, H. (1974), 'A new look at the statistical model identification', *IEEE transactions on automatic control* **19**, 716–723.
- Bollerslev, T. (1986), 'Generalized autoregressive heteroskedasticity', *Journal of Econometrics* **31**, 307–327.
- Creal, D. D., Koopman, S. J. & Lucas, A. (2012), 'Generalized autoregressive score models with applications', *Journal of Applied Econometrics*, *forthcoming* .
- Engle, R. F. (1982), 'Autoregressive conditional heteroskedasticity with estimates of the variance of U.K. inflation', *Econometrica* **45**, 987–1007.
- Hansen, P. R. (2005), 'A test for superior predictive ability', *Journal of Business and Economic Statistics* **23**, 365–380.
- Hansen, P. R. (2010), 'A winner's curse for econometric models: On the joint distribution of in-sample fit and out-of-sample fit and its implications for model selection', *working paper* .
- Hansen, P. R., Lunde, A. & Nason, J. M. (2011), 'The model confidence set', *Econometrica* **79**, 456–497.
- Hayashi, F. (2000), *Econometrics*, Princeton University Press.
- Mittelhammer, R. C., Judge, G. G. & Miller, D. J. (2000), *Econometric Foundations*, Cambridge University Press.
- White, H. (2000), 'A reality check for data snooping', *Econometrica* **68**, 1097–1126.