Topics in Advanced Econometrics (Spring 2012)

Model Selection & Volatility Modeling
(Preliminary)

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Course Outline

The course will cover two distinct topics. The first topic is model selection. In most practical situations we do not know the true model, and it is not uncommon to estimate a range of models before a selection is made. Common methods for model selection are studied along with many potential pitfalls associated with these procedures. The Winner's curse of econometric models is derived in a general context, and some remedies are discussed. The second topic covers volatility estimation and modeling. Including: volatility estimation with high-frequency data (known as realized measures of volatility), ARCH and GARCH models, and some recent extensions of GARCH models that incorporate realized measures.

Grading Policy

Grades will be based on 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 (preliminary)

Week 1 Lectures: Mon. 11-13 & Wed. 15-17 & **Thu. 11-13**. (MJM Chapter 18)
Introduction: Model selection. Information criteria, AIC, BIC, Shrinkage.
The material is introduced within the context of regression models, then generalized to the quasi-maximum likelihood framework.

Week 2	Lectures: Mon. 11-13 & Wed. 15-17. More on QMLE, the Winner's Curse of Model Selection, Speciosity
Week 3	Lectures: Mon. 11-13 (**No lecture on Wednesday**). Introduction to GARCH models.
Week 4	Lectures: **Tue. 11-13** & Wed. 15-17. Volatility Estimation with High-Frequency Data.
Week 5	Lectures: Mon. 11-13 & Wed. 15-17. Realized GARCH Models and multivariate extensions.

Literature (preliminary)

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.

Engle, R. F. (1982), 'Autoregressive conditional heteroskedasticity with estimates of the variance of U.K. inflation', *Econometrica* **45**, 987–1007.

Engle, R. F. & Patton, A. J. (2001), 'What good is a volatility model?', *Quantitative Finance* **1**(2), 237–245.

Hansen, P. R. (2010), 'A winnerís 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., Huang, Z. & Shek, H. (2010), 'Realized garch: A joint model of returns and realized measures of volatility', *forthcoming in Journal of Applied Econometrics* .

Mittelhammer, R. C., Judge, G. G. & Miller, D. J. (2000), *Econometric Foundations*, Cambridge University Press.