

# Topics in Advanced Econometrics (Spring 2013)

## 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 is on models with time-varying parameters that include popular volatility models, such as GARCH models. 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: (MJM Chapter 18, Hayashi Chapter 7)  
                 Introduction: Risk.  $m$ -estimation. Model selection. Information criteria, AIC, BIC, Shrinkage.  
                 The material is first introduced within the context of regression models. Then we

consider the more general framework of M-estimators, that includes maximum likelihood, and quasi-maximum likelihood.

- Week 2    Lectures:  
The Winner’s Curse of Model Selection. CrossValidation
- Week 3    Lectures:  
Criterion-Based Estimation. Models for Time-Varying parameters (Test for Structural Changes). Introduction to GARCH models.
- Week 4    Lectures:  
Volatility Estimation with High-Frequency Data.
- Week 5    Lectures:  
Realized GARCH Models and multivariate extensions.

## Literature (preliminary)

## References

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