

Prototypes of questions for the 'Midterm Test for Financial Econometrics'

Theoretical part, chapter 1:

- (I.1.a) Describe the stylized fact which motivates GARCH models.
- (I.1.b) How do we measure volatility.
- (I.1.c) Characterize the various types of GARCH models, we have discussed.
- (I.1.d) How do we estimate GARCH models and what are the properties of the estimates.

- (I.2.a) Characterize the non-stationarity of RWs.
- (I.2.b) What is a unit root. Has the model
$$y_t = 1.5 y_{t-1} - 0.5 y_{t-2} + \epsilon_t$$
a unit root.
- (I.2.c) Describe the Dickey-Fuller test. Describe the different models, null hypothesis, the alternative, test statistic and test distribution.

- (I.3) We have distinguished strictly exogenous and predetermined explanatory variables. How are they defined. Which different properties have the estimates, when you compare models with strictly exogenous variables only and models containing predetermined variables.

- (I.4) We have discussed several examples exhibiting the problem of endogeneity of the regressors.
 - (I.4.a) One is simultaneity. Make the problem visible in an example.
 - (I.4.b) How could we solve that problem in case of predetermined variables.

- (I.5)
 - (I.5.a) Show that the LS estimator of a linear model is biased when the regressor is correlated with the error.
 - (I.5.b) What are suitable instruments for non-exogenous regressors.
 - (I.5.c) Describe the steps of IV estimation.
 - (I.5.d) What can you say about the efficiency of an IV estimator.

- (I.6) Give an outline of the Hausmann test for endogeneity. What is H_0 , H_A . How is the test statistic constructed.

Theoretical part, chapter 2:

- (II.1) Specify for each case a 2-dimensional VAR(1). A model with
 - (II.1.a) coupled variables,
 - (II.1.b) unidirectional relationship,
 - (II.1.c) feedback relationship.

- (II.2) What are the conditions for weakly stationarity of VAR(1), a VAR(p) model.

- (II.3) Which estimators for VARs have been discussed. State their properties.

- (II.4) What is meant by curse of dimensionality.

- (II.5) Describe the relation between a structural VAR and a VAR (in standard form).
 - (II.5.a) State the assumptions for the VAR, and for the structural VAR.

Describe the transformations from a structural VAR to VAR in standard form.

What problems arise when trying to go back from a VAR to a structural VAR.

(II.5.b) How do you forecast a structural VAR, although it is not straight forward to identify all parameters.

(II.6) The impulse response function for observed residuals is not used in general, but instead for orthogonalized residuals. Why.

Theoretical part, chapter 3:

(III.1) What is the idea behind the variance-ratio test.

(III.2) Apart from the squared daily (log) return there are other more efficient measures for daily volatilities. What information do they use.

(III.3) What is the statistical reason for the 1st order autocorrelation induced in returns on tick bases by the bid-ask spread. (bid-ask bounce)

(III.4) Which effects are responsible for autocorrelation in returns in case of asynchronous trading.

(III.5)

(III.5.a) Define realized volatility.

(III.5.b) What are its asymptotic properties, and under which assumption do they hold.

(III.5.c) What should we take care of when calculating it using tick data.

(III.6) Describe the HAR model.

Applications:

Have a look at all empirical homework problems.