

## Study Guide for EXAM 1 on 10/12

EC1630, Fall 2011

You are allowed to bring a calculator and a Cheat-Sheet (one-side letter-size) to the exam. There should be one clear side on the Cheat-sheet!

### 1. Inference on the mean (Chapter 3).

- (a) Difference in means test
- (b) Mean and variance of the sample average
- (c)  $t$ -statistic, large sample approximation of its distribution
- (d) Central Limit Theorem, law of large numbers
- (e) Hypothesis testing and confidence interval

### 2. Least Squares Estimation of $Y_i = \beta_0 + \beta_1 X_i + u_i$ . Chapter 4.

What is the objective function that led us to the least squares estimators?

Formulas for the estimators of  $\hat{\beta}_0$  and  $\hat{\beta}_1$ , and their mean and variances. Unbiasedness!

...(both in the Homoskedastic and Heteroskedastic Cases)

Goodness-of-fit measure:  $R^2$ .  $0 \leq R^2 \leq 1$ .

### 3. Asymptotic Inference in the linear regression model. Chapter 5.

Formulas for  $t$ -statistics.

Confidence intervals for  $\beta_0$  and  $\beta_1$  ( $t$ -distribution or  $N(0, 1)$ ).

- (a) Asymptotics results. Law of Large Numbers, convergence in probability and The Central Limit Theorem, convergence in distribution.
- (b) What are the three assumptions for asymptotic inference in the LS?  
Interpretation of asymptotic result (=that  $n$  is large enough).  
Recall:  $E(\hat{\theta}_n) = \theta$  and  $\text{var}(\hat{\theta}_n) \rightarrow 0$  as  $n \rightarrow \infty$  implies ...  $\hat{\theta}_n \xrightarrow{p} \theta$ .

### 4. Multiple Regression (Chapter 6 up to including 6.3, 6.5-6.7, 7.1-7.2 + handout).

Omitted Variable Bias

Multivariate linear regression model

Vector notation:  $y_i = x_i' \beta + u_i$ .  $\hat{\beta} = (\sum_{i=1}^n x_i x_i')^{-1} \sum_{i=1}^n x_i y_i$  and know where its elements stand for!

Matrix notation:  $Y = X\beta + u$ ,  $\hat{\beta} = (X'X)^{-1}X'y$  and know where its elements stand for (handout or 18.1)!

Formulas for the  $F$  and  $t$ -statistics (handout or 18.3) and how to use them.

The last three points are the only exam material from the handout (Rest + 18.2 are background material)!

What will the exam be like!

Expect questions on Theory, some elements will just literally be rehearsed but you might also need to combine some different elements, and applications, for example, some regression output will be provided and you will be asked to test a hypothesis or to construct a confidence interval.