

# Econometric Theory I

## Computer Lab Class I

Juergen Amann juergen.amann@nottingham.ac.uk Wednesday 12:00 - 13:00, C42 SCGB

#### About the lab sessions

#### **Preliminaries**

- Four computer classes.
- Sessions provide an opportunity for you to implement the econometric techniques studied in class using econometric software.

#### About the lab sessions

#### **Preliminaries**

- Four computer classes.
- Sessions provide an opportunity for you to implement the econometric techniques studied in class using econometric software.

#### Goals

- Learn how to perform empirical analysis.
- Get a taste of a very popular econometric software.
- Improve statistical and econometric skills.

#### About the lab sessions

#### Why is this important

- Interpreting results of an empirical analysis might be part of the exam.
- You may need to use regression analysis in your dissertation.
- Interpretation of an empirical analysis is sometimes part of the job application process.
- Collecting data and estimating models may be something you will at your job in the near future.

• Regression analysis is a statistical process for modelling and estimating a relationship between a dependent variable,  $y_t$ , and a number (k) of explanatory variables,  $x_{ti}$ .

- Regression analysis is a statistical process for modelling and estimating a relationship between a dependent variable,  $y_t$ , and a number (k) of explanatory variables,  $x_{ti}$ .
- The linear regression model with an intercept term is specified as

$$y_t = \beta_1 + \beta_2 x_{t2} + ... \beta_k x_{tk} + u_t$$

for t = 1, ..., T where k denotes the number of explanatory variables and T the sample size.

- Regression analysis is a statistical process for modelling and estimating a relationship between a dependent variable,  $y_t$ , and a number (k) of explanatory variables,  $x_{ti}$ .
- The linear regression model with an intercept term is specified as

$$y_t = \beta_1 + \beta_2 x_{t2} + ... \beta_k x_{tk} + u_t$$

for t = 1, ..., T where k denotes the number of explanatory variables and T the sample size.

• We can use the method of Ordinary Least Squares (OLS) to obtain values for  $\hat{\beta}_1, \hat{\beta}_2, ..., \hat{\beta}_k$ .

- Regression analysis is a statistical process for modelling and estimating a relationship between a dependent variable,  $y_t$ , and a number (k) of explanatory variables,  $x_{ti}$ .
- The linear regression model with an intercept term is specified as

$$y_t = \beta_1 + \beta_2 x_{t2} + ... \beta_k x_{tk} + u_t$$

for t = 1, ..., T where k denotes the number of explanatory variables and T the sample size.

- We can use the method of Ordinary Least Squares (OLS) to obtain values for  $\hat{\beta}_1, \hat{\beta}_2, ..., \hat{\beta}_k$ .
- Ultimately, we want to know about the statistical significance of the coefficient estimates by testing

$$H_0: \beta_i = 0$$
, for  $i = 1, 2, ...k$ .

## What you you will see today

How do we run these models in practice?













## Today's problem

 We want to estimate a linear relationship, modelling earnings as a function of years in full-time education and years of work experience.

## Today's problem

- We want to estimate a linear relationship, modelling earnings as a function of years in full-time education and years of work experience.
- We estimate

$$earnings_i = \beta_1 + \beta_2 educ_i + \beta_3 workexp_i + u_i$$

#### where

- earnings; earnings of individual i in USD per hour
- educ<sub>i</sub>: education of individual *i* as in years
- workexp;: work experience of individual i in years
- $u_i$ : idiosyncratic error of i

#### Today's problem

- We want to estimate a linear relationship, modelling earnings as a function of years in full-time education and years of work experience.
- We estimate

$$earnings_i = \beta_1 + \beta_2 educ_i + \beta_3 workexp_i + u_i$$

#### where

- earnings; earnings of individual i in USD per hour
- educ<sub>i</sub>: education of individual i as in years
- workexp;: work experience of individual i in years
- $u_i$ : idiosyncratic error of i
- We would expect to find a positive and significant effect of educ and workexp on earings.

- Launch Stata
- Download and import data earnings.xls into Stata

- Launch Stata
- Download and import data earnings.xls into Stata
- View data (plots) and summary statistics

- Launch Stata
- Download and import data earnings.xls into Stata
- View data (plots) and summary statistics
- Estimate and interpret results of the regression

$$earnings_i = \beta_1 + \beta_2 educ_i + \beta_3 workexp_i + u_i$$

• Test for significance of coefficients

- Launch Stata
- Download and import data earnings.xls into Stata
- View data (plots) and summary statistics
- Estimate and interpret results of the regression

$$earnings_i = \beta_1 + \beta_2 educ_i + \beta_3 workexp_i + u_i$$

- Test for significance of coefficients
- (Export regression output to Word)

Thank you and see you next week!

Juergen Amann

juergen.amann@nottingham.ac.uk Wednesday 12:00 - 13:00, C42 SCGB