

1. Regression analysis: introduction
  - Fitting a line to some data
  - How to judge goodness of fit
2. Ordinary least-squares regression: minimizing the sum of squared deviations
  - Definition of sum of squared deviations
  - Regression line as best prediction of Y given a value of X
3. Regression as a model
  - Systematic influence of X on Y
  - Random error
  - Parameters and estimates
4. Useful regression statistics
  - EViews regression output
  - Measures of the overall fit:
    - Sum of squared residuals (SSR)
    - R-squared ( $R^2$ )
    - Standard error (S.E.) of the regression
    - F-statistic
5. The coefficient estimates and their standard errors
  - Standard error
  - Confidence intervals for coefficients
  - Hypothesis tests

Reading for next time: *Notes on Regression*, finish it.

Homework #4: Due Tuesday, October 16. From Data Analysis Project #1, do **Part I**. Please make sure to hand in a final version of this with your completed project (make a copy if you need to).

Economics 150

Fall 2001

Notes on the mathematics of natural logs (ln)

1. The natural log is the inverse of the exponential function:

$$y = e^x \Rightarrow x = \ln(y)$$

2. Algebra of logs:

$$\ln(xy) = \ln(x) + \ln(y) \quad \ln(x^a) = a \ln(x)$$

3. Calculus (derivative) of logs:

$$y = \ln(x) \Rightarrow \frac{dy}{dx} = \frac{1}{x}$$

An earnings equation such as  $\ln(Y) = b_0 + b_1 S$  implies that

$$b_1 = \frac{d \ln(Y)}{dS} = \frac{dY/Y}{dS}$$

which is the percentage change in income for one more year of schooling.