# **Damages Update**

# Simple vs. Multiple Variable Regression

• Simple regression involves one Y (dependent variable) and one X (independent variable)

• 
$$Y_i = \beta_0 + \beta_1 X_i + u_i$$
,  $i = 1,..., n$ 

- Multiple regression involves more than one X (i.e., multiple independent variables)
  - $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i$ , i = 1,...,n
  - $Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$ , i = 1,...,n
  - Etc.

Private and Confidential

## **Regression Analyses Of Interest**

- Simple vs. multiple variable models
- Hedonic pricing model
- Structural break test



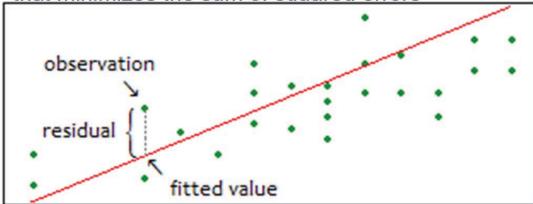
Private and Confidential

# **Ordinary Least Squares ("OLS")**

• Consider simple linear regression:

$$Y_i = \beta_0 + \beta_1 X_i + u_i, i = 1,..., n$$

• OLS involves us putting the regression line in the place that minimizes the sum of squared errors



Private and Confidential

#### **Ordinary Least Squares ("OLS")**

In Math-Speak....

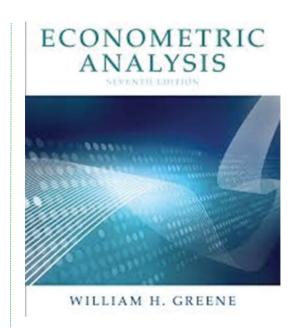
When we use OLS to estimate the unknown parameters  $\beta_0$  and  $\beta_1$ , we are picking  $b_0$  and  $b_1$  such that they solve the following calculus problem:

$$\min_{b_0,b_1} \sum_{i=1}^n [Y_i - (b_0 + b_1 X_i)]^2$$

Private and Confidential

## Why Use Regression?

- Per the classic text by NYU's William Greene:
  - Explore relationships among variables
  - Way to get yes-or-no answer to the question: Is there a significant relationship here?
  - Making predictions



Private and Confidential





Find the full text of this and thousands of other resources from leading experts in dozens of legal practice areas in the <u>UT Law CLE eLibrary (utcle.org/elibrary)</u>

Title search: Damages Update

Also available as part of the eCourse 2021 Advanced Patent Law (Austin) eConference

First appeared as part of the conference materials for the  $26^{\text{th}}$  Annual Advanced Patent Law Institute session "Damages Update"