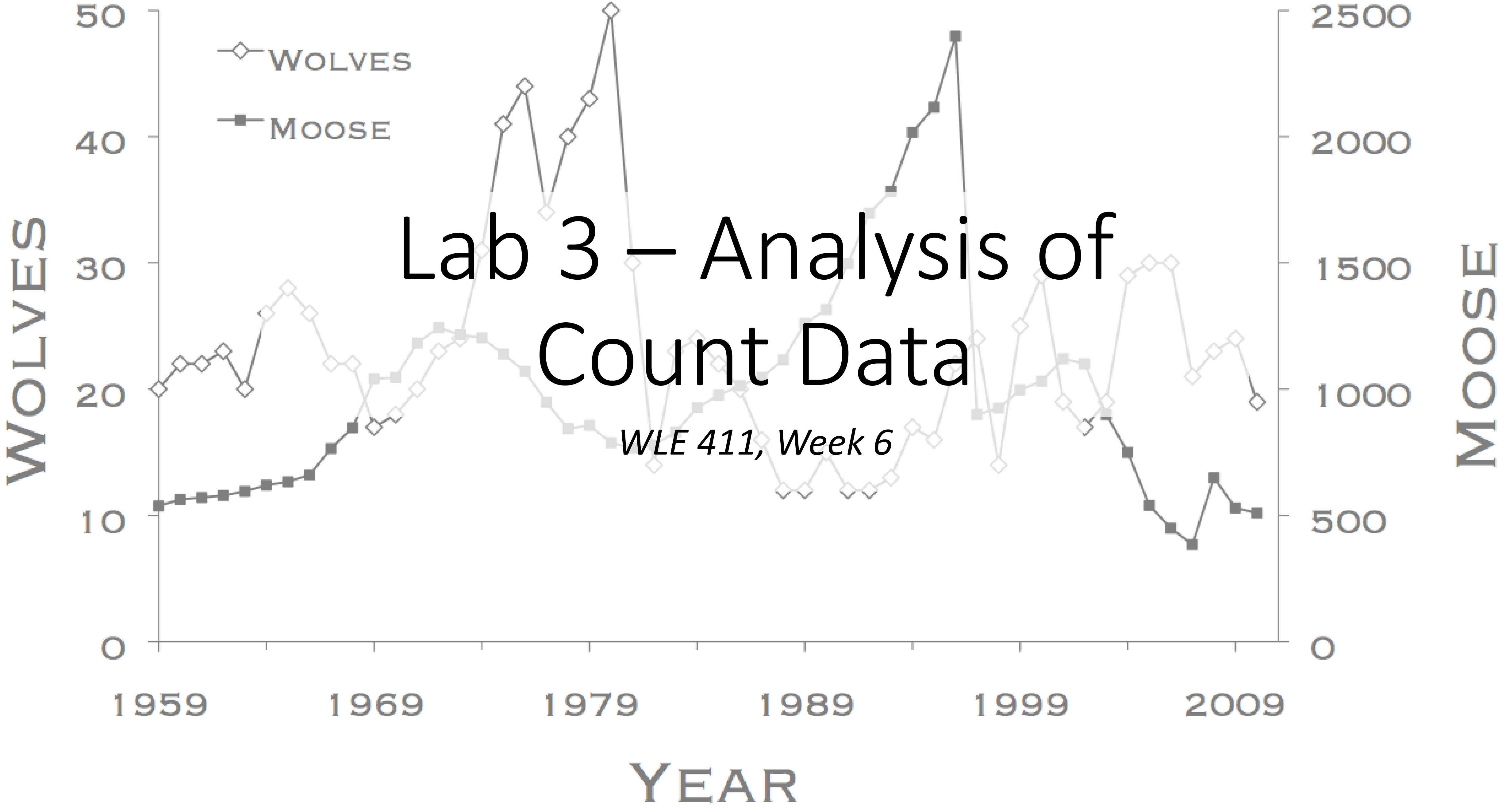


Lab 3 – Analysis of Count Data

WLE 411, Week 6

Readings and deadlines

- Lab 2 assignment due at the start of class
- Readings for this lab:
  - Chapter 6- Linear Models
- Fall break next week

Two ways to write a linear model:

$$y = mx + b$$

$$\gamma = \beta_1 x + \beta_0$$

Response
(dependent)
variable

$$y = mx + b$$

$$\gamma = \beta_1 x + \beta_0$$

Predictor
(independent)
variable

Slope

$$y = mx + b$$

$$\gamma = \beta_1 x + \beta_0$$

Y-intercept

What's the advantage of using the beta structure?

One predictor variable: $\gamma = \beta_0 + \beta_1 x$

Two predictor variables: $\gamma = \beta_0 + \beta_1 x_1 + \beta_2 x_2$

How do we use regression to solve the exponential model?

$$N_t = N_0 + e^{rt}$$

rewritten as

$$\ln(N_t) = \ln(N_0) + rt$$

$$y = mx + b$$

$$\gamma = \beta_1 x + \beta_0$$

$$\ln(N_t) = rt + \ln(N_0)$$

Response
(dependent)
variable

$$y = mx + b$$

$$\gamma = \beta_1 x + \beta_0$$

$$\ln(N_t) = rt + \ln(N_0)$$

Predictor
(independent)
variable

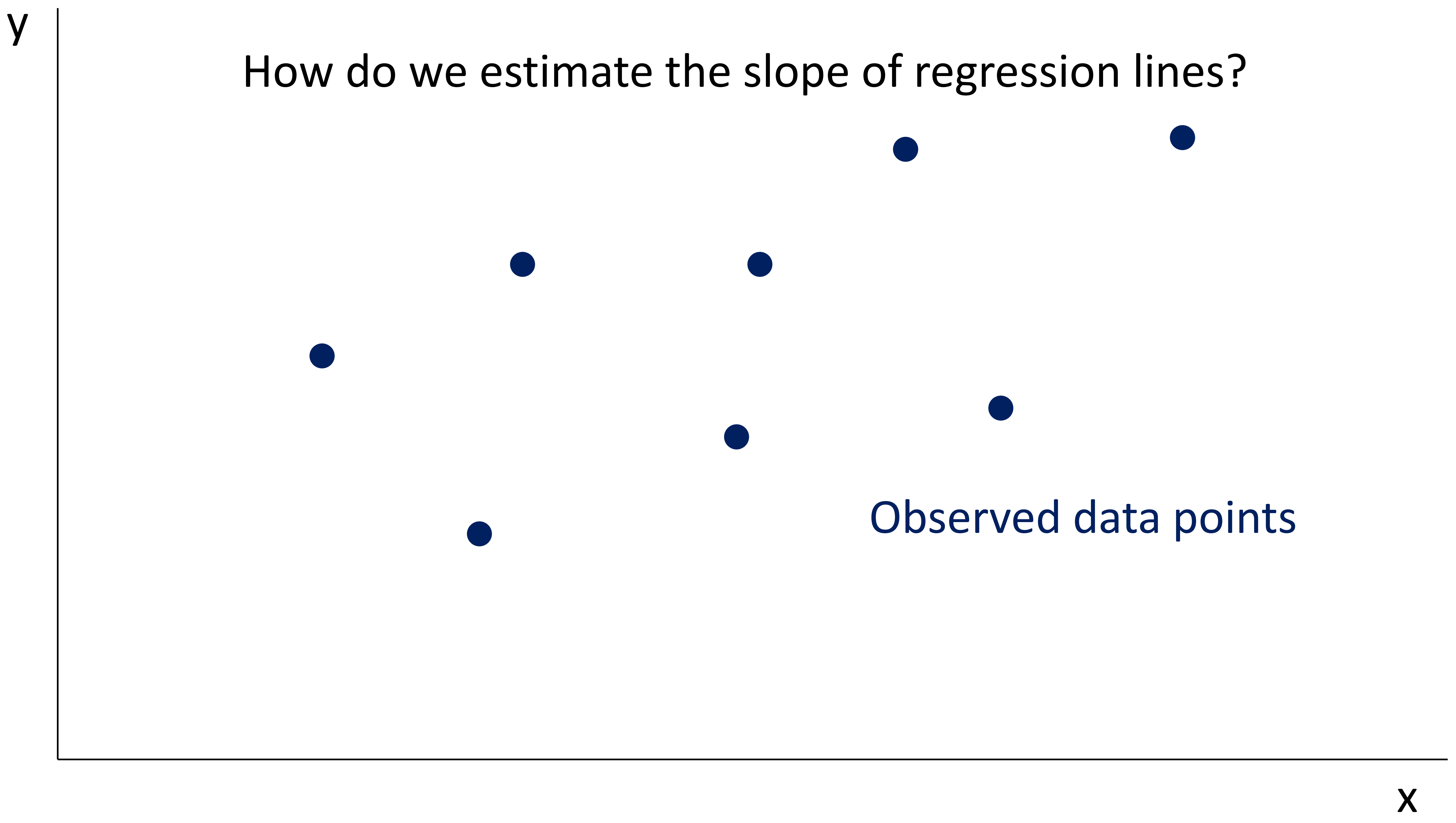
Slope

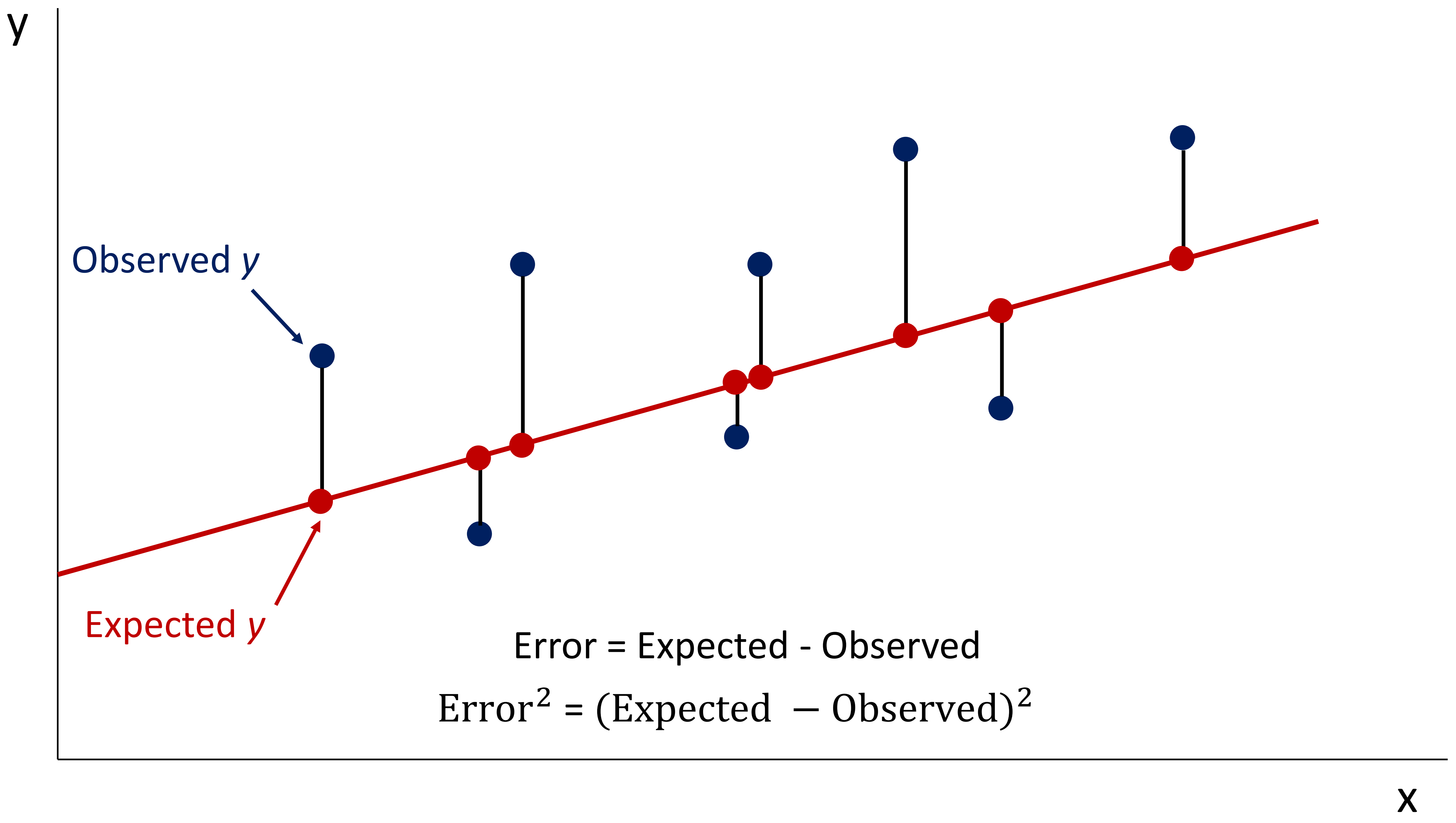
$$y = mx + b$$

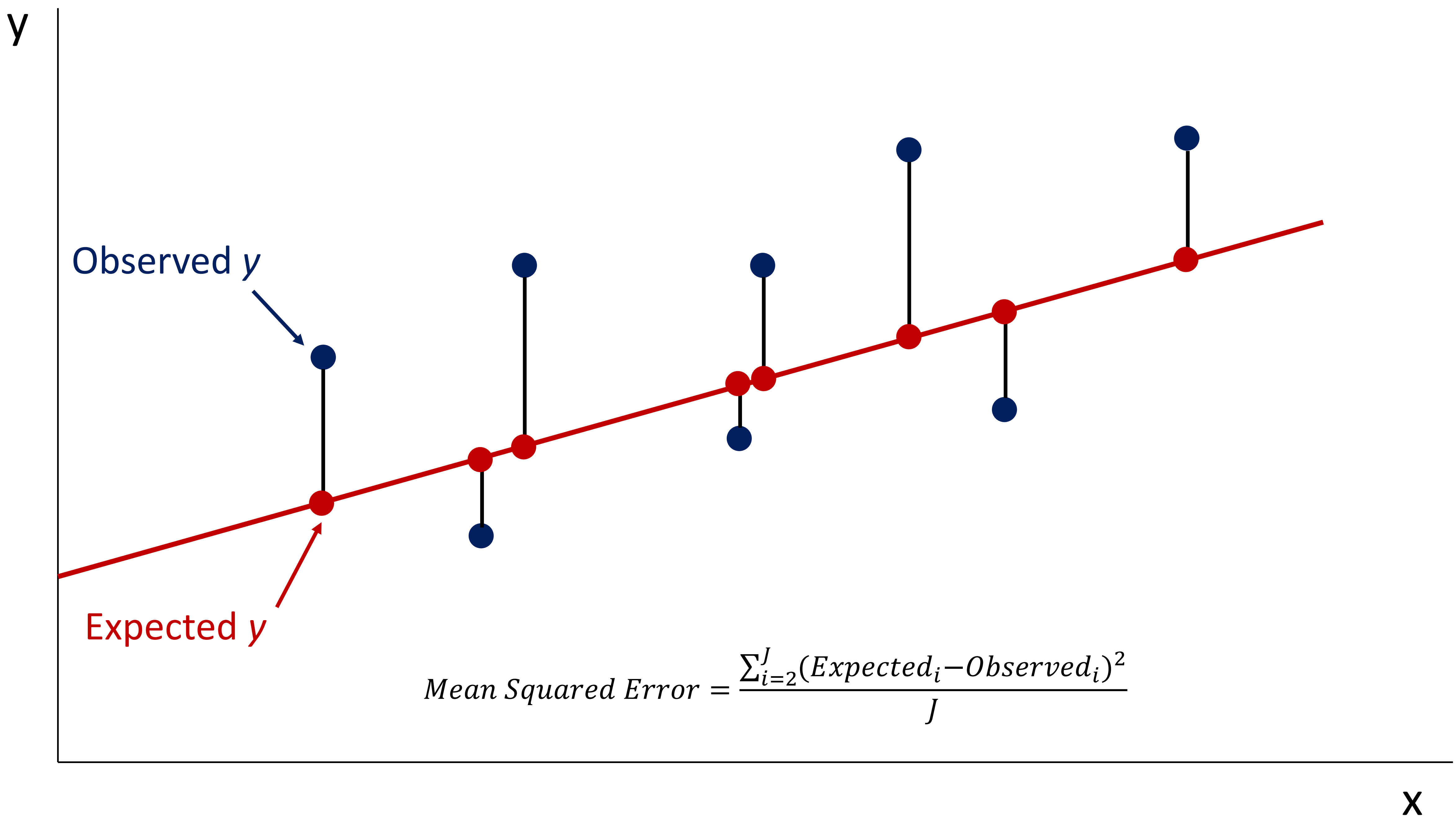
$$\gamma = \beta_1 x + \beta_0$$

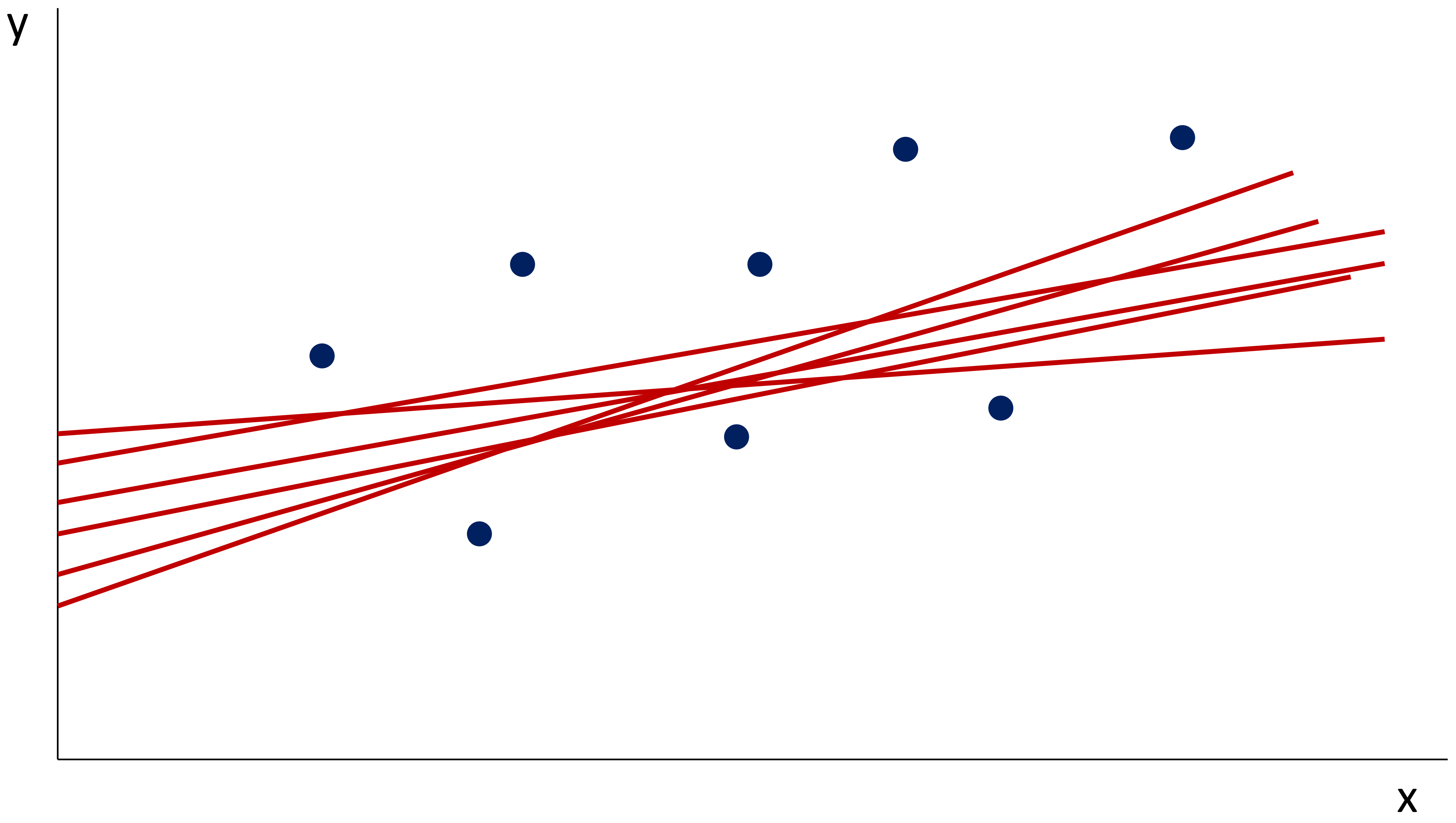
$$\ln(N_t) = rt + \ln(N_0)$$

Y-intercept


y
How do we estimate the slope of regression lines?
Observed data points
x


y
Observed y
Expected y
Error = Expected - Observed
$\text{Error}^2 = (\text{Expected} - \text{Observed})^2$
x


y
Observed y
Expected y
$Mean\ Squared\ Error = \frac{\sum_{i=2}^{J}(Expected_i - Observed_i)^2}{J}$
x


y
x

Lab 3 - Analysis of Count Data to Derive Trend Estimates

Erik Blomberg (edited by Matt Mensinger & Liam Berigan)

07/12/2023

Contents