

REGRESSION AND QUALITATIVE DATA

Data Analysis for Journalism and Political Communication
(Spring 2026)

Prof. Bell

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Confounder

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A variable that explains change in both the independent and dependent variable.

- ▶ When we fail to account for confounders, we face **omitted variable bias** and our estimates are not accurate.

Linear regression is just the best fit line through a scatter plot of two or more variables.

ESTIMATING THE REGRESSION (BEST FIT) LINE

The linear regression equation is:

$$Y = \beta_0 + \beta_1 X + \epsilon$$

Y = dependent variable

β_0 = intercept

β_1 = slope, also called a coefficient

X = independent variable

ϵ = error

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IN-CLASS EXAMPLE

The `lm()` function calculates the intercept and slope for the linear regression equation.

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You want to estimate the effect of income on the allocation to welfare applicants. The linear regression equation is:

$$\text{Allocation}^{\wedge} = \hat{\beta}_0 + \hat{\beta}_1 \text{Income}$$

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If “Income” in thousands has a value of 100, and the intercept is \$605, and the coefficient is -.5, what is our estimated mean of “Allocation”?

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So the coefficient (β_1) is the effect of a **one-unit** change in income (thousands) on the mean allocation.

WHAT IS ERROR?

Recall that the linear regression equation is:

$$Y = \beta_0 + \beta_1 X + \epsilon$$

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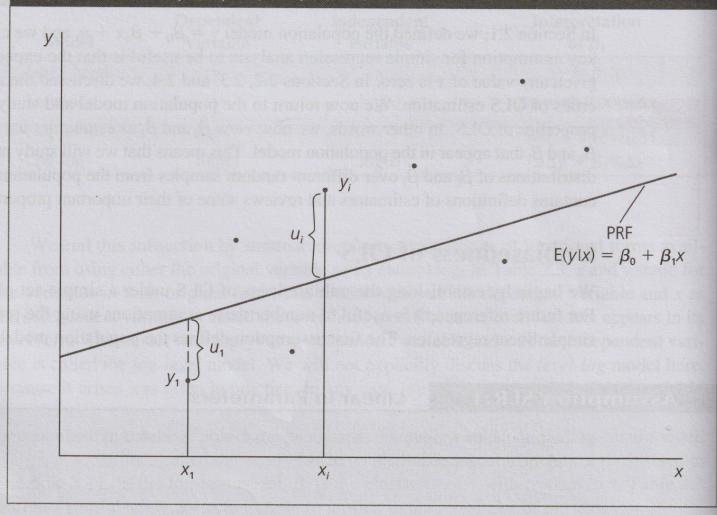
ϵ = error

WHAT IS ERROR?

- Error (ϵ or u) is also called the residual (left over from $Y = \beta_0 + \beta_1 X$, our best fit line)

WHAT IS ERROR?

FIGURE 2.7 Graph of $y_i = \beta_0 + \beta_1 x_i + u_i$.



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- Our goal in regression is to fit the best line that minimizes the error
- However, we can never get the $\epsilon = 0$, and often we don't even get close. We just do the best we can to make the “best” best fit line.

MULTIPLE LINEAR REGRESSION

The multiple linear regression equation is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

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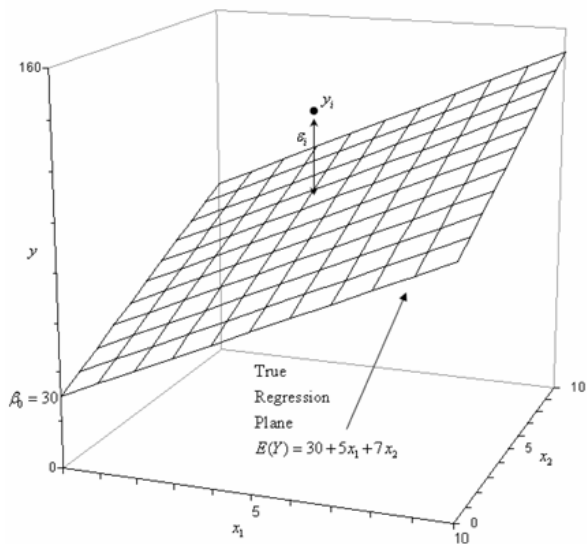
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What is the interpretation of β_1 ?

β_1 is the effect of a one-unit change in X_1 on the mean of Y , holding X_2 constant (the independent effect of X_1 on Y)

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What is the interpretation of β_2 ?

β_2 is the effect of a one-unit change in X_2 on the mean of Y , holding X_1 constant (the independent effect of X_2 on Y)

NON-CONTINUOUS DEPENDENT VARIABLES

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- What about categorical dependent variables, like party ID? The linear regression model is not well suited for these.
- What about binary dependent variables, like support for a policy?

We call this a linear probability model because it estimates the effect of a one-unit change in X on the *probability* (percent chance) of a value of “1” for the dependent variable

IN-CLASS EXAMPLE

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- We will focus on one type of qualitative analysis: text analysis

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TEXT ANALYSIS

Well, that's one problem, that [my school is] pretty small, so 1 if you say one thing to one person, and then they decide to tell two people, then those two people tell two people, and in one period everybody else knows. 2 Everybody in the entire school knows that you said whatever it was. So. . .

¹SPREADING RUMORS

²KNOWING WHAT YOU SAID

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- A **code** is just a descriptive label applied to a piece of text
- We can then quantify our codes: how frequently each code appears, in which parts of the text, from which speakers, etc.

WHERE DO CODES COME FROM?

- **Deductive Coding:** You start with a list of codes *before* you read
 - ▶ This is most often used when the goal of the study is to count the appearances of a discrete set of themes, e.g., "How often does Donald Trump talk about trade in his speeches?"

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- Most studies begin with a short list of deductive codes, then refine those codes or add new ones as you explore the data

IN-CLASS EXERCISE

From StoryCorps:

In February of 2012, Jamal Faison was a 20-year-old college sophomore home on school break in New York City when he, along with two others, were arrested for attempting to steal mobile devices from a subway rider. Transit police arrested Jamal and he spent the next eight months on Rikers Island — New York City's massive main jail complex.

In September 2012, Jamal pleaded guilty to grand larceny and attempted robbery charges and a month later was released from custody. Jamal came to StoryCorps to remember the night he was released from Rikers, and to discuss his relationship with his uncle, Born.

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 - ▶ As if you are putting all the words into a bag, drawing them out at random, and seeing how frequently they occur

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- The researcher must decide what the semantic meaning of these topics (correlated words) mean

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- ▶ The researcher must interpret and label the topic. This is a subjective, human step!

IN-CLASS EXERCISE

- Data at: [Kaggle.com](https://www.kaggle.com)
- Tool: Voyant