Handout for Lecture 17

Inference in Regression Models

ECON 340: Economic Research Methods — Instructor: Div Bhagia

We are interested in the following relationship:

$$CrimeRate = \beta_0 + \beta_1 UnemploymentRate + u$$

We run a regression of *Crime Rate* on *Unemployment Rate* across US counties. The output from this regression is presented below. [1]

	Crime Rate
Intercept	0.003***
	(0.0002)
Unemployment Rate	0.05***
	(0.004)
Observations	2,957
R^2	0.05
Note:	*p<0.1; **p<0.05; ***p<0.01

1. Interpret the slope and intercept coefficient.
2. Interpret the R^2.
3. According to this model, what is the predicted Crime Rate for a county with an unemployment rate of 0.06 (6%)?

[1] Crime rate is defined as the ratio of crimes in a specific area to the population of that area, expressed as incidents per 1,000 people per year. The unemployment rate represents the number of unemployed people as a percentage of the labor force. The average crime rate in the data is 0.0057, while the average unemployment rate is 0.05.

4. What is the t-statistic associated with the hypothesis test that examines whether the coefficient on the unemployment rate is zero ($H_0 : \beta_1 = 0$)?

5. What is the smallest level of significance at which you would reject the hypothesis in question 4?

6. Construct a 95% confidence interval for β_1. (Note: $Pr(|Z| > 1.96) = 0.95$.) What is the interpretation of this interval?

7. Can we attach a causal interpretation to the estimates here? Why or why not?