

Handout for Lecture 19

Categorical Variables & Interaction Terms

ECON 340: Economic Research Methods

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1. Consider the following regression model:

$$Y = \beta_0 + \beta_1 D + \beta_2 X + \beta_3 D \cdot X + u$$

Here, X represents a continuous variable, and D is a dummy variable that takes values 1 or 0. Assume that both X and D are exogenous. Write down the expressions for the following expectations.

$$E(Y|D = 1, X) =$$

$$E(Y|D = 0, X) =$$

What is the impact of changing D from 1 to 0 on Y ? Does this impact vary by X ?

2. Consider the following regression model:

$$wages = \beta_0 + \beta_1 Female + \beta_2 Hispanic + \beta_3 Female \times Hispanic + u$$

Here, $Female$ is a dummy variable assigned the value of 1 if an individual's gender is female and 0 if not. Similarly, $Hispanic$ is a dummy variable that is set to 1 if an individual's ethnicity is Hispanic and 0 otherwise. The regression output for this model is given below. Answer the following questions.

Wages	
Intercept	70,179.09*** (473.52)
Female	-16,046.81*** (683.42)
Hispanic	-19,367.71*** (1,211.46)
Female X Hispanic	8,163.75*** (1,788.04)
Observations	17,578
R ²	0.05
Note: *p<0.1; **p<0.05; ***p<0.01	

- (a) What is the average wage income for non-Hispanic males in this sample?
- (b) What is the average wage income for Hispanic males in this sample?
- (c) What is the average wage income for non-Hispanic females in this sample?
- (d) What is the average wage income for Hispanic females in this sample?
- (e) How do we interpret the coefficient on the interaction between *Hispanic* and *Female*?