

## Regressions with Interaction Effects



<i>Dependent variable:</i>				
	wages			
	(1)	(2)	(3)	(4)
Constant	22,969*** (493)	9,584*** (365)	6,323*** (339)	7,847*** (421)
female	6,711*** (698)		6,598*** (309)	3,565*** (595)
years:female				200*** (34)
years		1,104*** (21)	1,102*** (17)	1,001*** (24)
Observations	1,000	1,000	1,000	1,000

*Note:*

$p < 0.1$ ;  $p < 0.05$ ;  $p < 0.01$

### Model 1: Do men and women earn different wages, on average?

**Model:**  $Wages = b_0 + b_1 * Female$

**Test:** If  $b_0$  is significant, Men's wages are different than zero. If  $b_1$  is significant, Women's wages are different than Men's.

*Note:* This is an unconditional average, so it might be explained by other factors like differences in experience between men and women.

### Model 2: What is the wage gain related to an extra year of experience?

**Model:**  $Wages = b_0 + b_1 * Years$

**Test:** If  $b_1$  is significant then it is different than zero, experience does impact wages.

### Model 3: Do men and women have different initial wages at the start of their careers?

**Model:**  $Wages = b_0 + b_1 * Years + b_2 * Female$

**Test:** If  $b_2$  is significant then the Female intercept ( $b_0+b_2$ ) is different than the Male intercept ( $b_0$ ).

### Model 4: Are the gains in wages related to experience the same for men and women?

**Model:**  $Wages = b_0 + b_1 * Years + b_2 * Female + b_3 * Years * Female$

**Test:** If  $b_3$  is significant then the slope for Women ( $b_1+b_3$ ) is different than the slope for Men ( $b_1$ ).

*Note:* If  $b_3$  is not significant it is better to use the model with one slope for both groups.

### Use Model 4 to answer the following questions:

- (1) How much do men earn in their first job (zero years of experience)?
- (2) How much do women earn in their first job?
- (3) What is the average raise men receive each year?
- (4) Do men and women receive different raises? How do we know?
- (5) What is the average raise women receive each year?