Sample problem

Suppose you are interested in studying the effects of the education of mothers on the birth weight of their children. You hypothesize the following relationship between birth weight the mother's years of education.

$$bweight = \beta_0 + \beta_1 educ + u$$

where:

$bweight$ = the weight of the child at birth, in hundreds of grams

$educ$ = level of education, in years

You gather data and run a simple ordinary least squares (OLS) linear regression. The result is the following OLS regression line relating birth weight and education.

$$\widehat{bweight} = 33.65 + 0.15 educ$$

a) If a mother has no education, her child's predicted birth weight is how many grams?

If a mother has no education, we plug $educ = 0$ into the regression line:

$$\widehat{bweight} = 33.65 + 0.15(0) = 33.65$$

The variable $bweight$ is measured in hundreds of grams, so the predicted birth weight is 33.65 hundred grams or $33.65(100) = 3365$ grams.

b) If a mother's education level is 12 years of education, her child's predicted birth weight is how many grams?

We plug $educ = 12$ into the regression line:

$$\widehat{bweight} = 33.65 + 0.15(12)$$

$= 35.45$

The variable *bweight* is measured in hundreds of grams, so the predicted birth weight is 33.65 hundred grams or $33.65(100) = 3365$ grams.

c) Regardless of initial education level, a 1 year increase in mother's education results in a predicted change in birth weight of how many grams?

From the coefficient on *educ*, we have:

$$\Delta\widehat{bweight} = 0.15\Delta educ$$

Plug in an increase of 1 year, $\Delta educ = 1$

$$\Delta\widehat{bweight} = 0.15(1)$$

$$\Delta\widehat{bweight} = 0.15$$

The resulting increase is 0.15 hundreds of grams, or $0.15(100) = 15$ grams.