Economics 311 — Fall 2017
Daily Problem #25 — November 29

Suppose that the government decides that everyone will work harder and earn more if they are sprinkled with pixie dust. The Department of Labor decides to run an experiment, randomly sprinkling workers with either pixie dust or placebo dust at 2017/18 New Year's Eve parties all around the country. The two kinds of dust look and smell the same, so no one (except the DOL economists) knows which kind of dust each person got. The economists collect data on all dusted workers for both 2017 and 2018.

1. The government economists consider using the following regression:

$$\ln(earnings)_{i,2018} - \ln(earnings)_{i,2017} = \beta_0 + \beta_1 pixie_i + \varepsilon_i ,$$

where $pixie_i$ is a dummy variable that is one if worker i got pixie dust and 0 if the worker got placebo dust.

   a. Why would it make sense to take logs of earnings?
   b. In intuitive terms, what is the left-hand variable?
   c. What exactly is the interpretation of β_1?
   d. How should the economists use this regression to test the effectiveness of pixie dust?

2. Alternatively, consider the following regression, where *educ* is years of education:

$$\ln(earnings)_{i,2018} - \ln(earnings)_{i,2017} = \beta_0 + \beta_1 pixie_i + \beta_2 educ_i + \varepsilon_i$$

   a. What exactly would the coefficient β_2 measure?
   b. Would you expect β_2 to be positive or negative (or not necessarily either)?
   c. If the pixie experiment was properly randomized, would omitting *educ* from the equation bias the estimate of β_1? (Think about the correlation between *pixie* and *educ*.)
   d. Overall, is the second equation better than the first for estimating the effect of pixie dust on earnings? Why or why not?

3. Finally, consider a third regression:

$$\ln(earnings)_{i,2018} - \ln(earnings)_{i,2017} = \beta_0 + \beta_1 pixie_i + \beta_2 educ_i + \beta_3 pixie_i \times educ_i + \varepsilon_i$$

   a. What would β_1, β_2, and β_3 measure?
   b. Is the third equation better than the first or second for estimating the effect of pixie dust on earnings? Why or why not?