Pre-Class Response for Lecture 9:

Suppose that you want to understand the effect of windfall income, and you want to control for age.

The way the world works (for the purposes of this thought experiment) is the following. Young people save almost all the money they earn, consuming very little. Even if they win the lottery, they'll put it in the bank for later, and their consumption doesn't change. Older people, by contrast, do change their behavior if they win the lottery. They'll spend the money on a new house or a new car or their kids' college tuition, and their consumption will increase when they win the lottery.

Formally, let W_i be a variable that is 1 if person *i* wins the lottery and 0 otherwise. Let X_i represent the age of person *i*, either 0 if young or 1 if old. Let Y_i be consumption, which can either be 0 (low) or 1 (high). Our potential outcomes are

$$Y_i(0) = Y_i(1) = 0 \text{ if } X_i = 0 \text{ (young)}$$

and

$$Y_i(0) = 0, Y_i(1) = 1 \text{ if } X_i = 1 \text{ (old)}.$$

You'd like to control for age in order to understand the ATE of winning the lottery on consumption (that is, the ATE of W on Y). Based on the last few classes, you think that you might write down a regression model:

$$Y_i = \beta W + \beta_X X + \alpha + (\text{noise}).$$

In the model of the world described above, would this regression be a good idea? Why or why not?