

Consider the following regression model

$$Y = \gamma_0 + Z\gamma_1 + v \quad (*)$$

where Y and Z are observable random variables, v is the unobservable regression error term and $E[v | Z] = 0$ [note that this implies that $\text{cov}(v, Z) = 0$]. Suppose we draw a sample from the joint distribution of $[Y \ Z]$ and apply the ordinary least squares (OLS) method to (*).

- a) Will the OLS estimates of γ_0 and γ_1 be unbiased?
- b) Would you describe Z as an exogenous (i.e. non-endogenous) variable in (*)?
- c) Can the OLS estimated version of (*) be used to analyze the causal effect of Z on Y ?

Explain your answers.