Linear Regression with Multiple Regressors

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Outline

1. Omitted variable bias
2. Causality and regression analysis
3. Multiple regression and OLS
4. Measures of fit
5. Sampling distribution of the OLS estimator

Omitted Variable Bias

The error u arises because of factors, or variables, that influence Y but are not included in the regression function. There are always omitted variables. Sometimes, the omission of those variables can lead to bias in the OLS estimator.

The bias in the OLS estimator that occurs as a result of an omitted factor, or variable, is called omitted variable bias. For omitted variable bias to occur, the omitted variable Z must satisfy two conditions: The two conditions for omitted variable bias (1) Z is a determinant of Y (i.e. Z is part of u); and

(2) Z is correlated with the regressor X i.e. $corr(Z, X) \neq 0$

Both conditions must hold for the omission of Z to result in omitted variable bias.