

# Multiple Regression Analysis

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## Assignment 4

October 28, 2018

### 1 DERIVATION AND INTERPRETATION OF COEFFICIENTS

1. Explain why inclusion of intercept term in a regression model makes it reasonable to assume zero expectation for disturbance term and also how it could be a potential problem.
2. Deduce value of covariance between disturbance terms of any two observations of a sample using regression assumptions.
3. State the theorem in *full*, which is the basis for normal distribution assumption of the disturbance term.

### 2 MULTICOLLINEARITY

1. Demonstrate that

$$b_1 = \beta_1 + \sum c_i u_i, \quad (2.1)$$

where  $c_i = \frac{1}{n} - a_i \bar{X}$  and  $a_i = \frac{(X_i - \bar{X})}{\sum_{i=1}^n (X_i - \bar{X})^2}$

### 3 GOODNESS OF FIT AND ADJUSTED R<sup>2</sup>

Suppose true model for a population is assumed to be

$$Y_i = 3 + 3.4X_i \quad (3.1)$$

and disturbance term follows t-distribution. Explain steps involved in conducting Monte Carlo experiment to deduce distribution of OLS estimators of parameters for this model.