Financial Econometrics Sample Question **2022 Spring**

This is a sample question set for the Financial Econometrics midterm exam on April 25th, 2022. The followings are descriptions for the real exam.

Date: April 25th, 2022
Time: 14:20pm - 17:20pm

There are 9 questions in this exam. Please choose 7 out of the 9 questions to answer. Each question is worth 15 points. You will have 180 minutes to complete this exam. **Please indicate clearly which 7 questions you would like to answer at the beginning of your answer sheet.** You may use a calculator during the exam. A cheatsheet (A4-size, double-sided) is also allowed. Please answer all the questions in great details.

1. For the following data generating process:

$$Y_i = \beta_0 + \beta_1 X_i + u_i$$

Please specify clearly the classic linear regression model assumptions 1 to 6. Which of the above assumptions are required for the OLS estimator to be unbiased? Please show your derivation.

2. We are interested in testing the following linear regression model:

$$Y_i = \beta_0 + \beta_1 X_i + u_i, \quad u_i \sim N(0, \sigma^2)$$

We obtained 6 pairs of (Y_i, X_i) observations: $(0,3), (4,3), (4,6), (6,6), (12,9), (4,9)$.

a) Please estimate $\widehat{\beta_0}$, $\widehat{\beta_1}$, and $\widehat{SE(\beta_1)}$.

b) Please compute the t-statistic to test the null hypothesis of $H_0 : \beta_1 = 0$.