BS2280 – Econometrics I
Homework 3: Interpretation of coefficients and properties of OLS

1

The output shows the result of regressing the weight of the respondent in 2004, measured in pounds, on his or her height, measured in inches. Provide an interpretation of the coefficients. Does this model provide a good fit?

```
Call:
lm(formula = WEIGHT04 ~ HEIGHT, data = EAWE21)

Residuals:
    Min      1Q  Median      3Q     Max
-63.063 -23.063  -8.174  16.881 132.232

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -177.1703    25.9350  -6.831 2.46e-11 ***
HEIGHT         5.0737     0.3816  13.295  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 34.58 on 498 degrees of freedom
Multiple R-squared:  0.2619,    Adjusted R-squared:  0.2605
F-statistic: 176.7 on 1 and 498 DF,  p-value: < 2.2e-16
```

2

Do earnings depend on education? Use the output table below to give an interpretation of the coefficients. Comment also on R^2.

```
Call:
lm(formula = EARNINGS ~ S, data = EAWE22)

Residuals:
    Min      1Q  Median      3Q     Max
-19.459  -5.908  -1.975   2.903 106.427

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   -2.426      2.706  -0.897     0.37
S              1.444      0.184   7.851 2.56e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.38 on 498 degrees of freedom
Multiple R-squared:  0.1101,    Adjusted R-squared:  0.1083
F-statistic: 61.63 on 1 and 498 DF,  p-value: 2.556e-14
```

3

What are the 6 main assumptions of OLS? For each assumption explain the implications if it does not hold.

4

The OLS estimator is BLUE. Explain what BLUE stands for and why OLS is referred to BLUE. (Hint: you can link your answer to your answer of question 3).

5

Referring to the equation below, explain what factors determine the variance of $\hat{\beta}_2$. Furthermore, use this formula to explain why OLS will be the most efficient estimator.

$$\sigma^2_{\hat{\beta}_2} = \frac{\sigma^2_{u_i}}{nMSD(X)}$$