

# ECON 2123 Introduction of Econometrics

## HW2 Answer Key

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Topics: Stock and Watson Chapter 4, selected questions (60 pts)

### Question 1. (S&W Q4.1, 10 pts)

Note: Different versions of textbook has a different number in the questions, as long as the calculation is correct, you will get the full credits.

- (a) The predicted average test score is

$$\widehat{Testscore} = 520.4 - 5.82 \times 22 = 392.36$$

- (b) The predicted change in the classroom average test score is

$$\Delta \widehat{Testscore} = (-5.82 \times 19) - (-5.82 \times 23) = 23.28$$

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### Question 2 (S&W Q4.3, 20 pts)

(a) The coefficient 9.6 shows the marginal effect of *Age* on *AWE*; that is, *AWE* is expected to increase by \$9.6 for each additional year of age. 696.7 is the intercept of the regression line. It determines the overall level of the line.

(b) SER is in the same units as the dependent variable (*Y* or *AWE* in this example). Thus, SER is measured in dollars per week.

(c)  $R^2$  is unit free.

(d) (i)  $696.7 + 9.6 \times 35 = \$936.7$

(d) (ii)  $696.7 + 9.6 \times 45 = \$1,128.7$

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### Question 3 (Stata Outputs, 30 pts)

3.1. Calculate  $R^2$

$$R^2 = \frac{ESS}{TSS} = \frac{5131.29534}{5775.9377} = 0.888392$$

3.2. Calculate the standard error of the regression (SER)

$n=998$  (data),  $k=2$  (how many coefficients you estimated)

$$SER = \sqrt{\frac{SSR}{n-k}} = \sqrt{\frac{644.642356}{996}} = 0.804507$$

3.3 Calculate the root mean square error (RMSE)

$$RMSE = \sqrt{\frac{SSR}{n}} = \sqrt{\frac{644.642356}{998}} = 0.8037$$

3.4. Compare SER and RMSE

$0.804507 - 0.8037 = 0.000807$ . They are almost equal when the sample size is large enough (the difference is very small or negligible)

3.5. Fit the regression line

$$Wintert = 3.12 + 0.77 \times Springt$$

3.6. Identify the slope and give interpretation

$$Slope = 0.77$$

for a unit increase in Springt, Wintert increases by 0.77 units