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20208 - ECO430-KX - Applied Econometrics (Fall 2020) Sasign	nents Take Test: Homework Assignment 1				?

Take Test: Homework Assignment 1

Test Information Description Homework Assignment 1 Submission Deadline: 6:35pm or Instructions You should submit all your answ Please, try to answer all questior I just need your answers. You do Multiple Attempts Force Completion This test allows multiple attempt Force Completion This test can be saved and resum Your answers are saved automat Your answers are saved automat QUESTION 1 Consider the following sample: (a) What is the sample size? (b) Calculate the sample average hourly earnin (c) Calculate the sample average hourly earnin (c) Calculate the sample variance of hourly earnin (c) Calculate the sample covariance between h (g) Calculate the sample correlation between (g) Calculate the sample correlation between (g) Calculate the sample correlation between						
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QUESTION 2

Consider the following regression:

 $Y_i = \beta_0 + \beta_1 X_i + u_i, i = 1, ..., 10,000.$

X has a sample average of 15 and a sample standard deviation of 2. Y has a sample average of 25 and a sample standard deviation of 5. The sample correlation between X and Y is 0.30.

(a) Calculate the OLS estimate of $eta_1.$

(b) Calculate the OLS estimate of eta_0 .

(c) Assume the standard error of $\widehat{\beta}_0$ is 6 and the standard error of $\widehat{\beta}_1$ is 0.3.

(i) You want to test $H_0: \beta_1 = 1.5$ vs. $H_1: \beta_1 \neq 1.5$. Calculate the relevant t-statistic. Will you reject the null hypothesis at 1%

significance level?

(ii) Calculate the lower limit and the upper limit of the 95% confidence interval for $meta_1$.

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QUESTION 3				10 points Save Answer
The following regree	sion is estimated	for a sample of 150 countries:		
		$\widehat{ChildMort_i} = 28.11 - 0.00082 \times GDPpc$	C _i ,	
		(6.02) (0.0003)		
where <i>ChildMort</i> is the the coefficient on <i>GDP</i>	number of death <code>pC</code> by $oldsymbol{eta}_1$. We wa	s of children under 5 per 1,000 live births and GDPpC nt to test $H_0: \beta_1 = 0$ vs. $H_1: \beta_1 < 0$.	is GDP per capita. Let's denote the true value of	
(a) Calculate the actu (b) What is the relev (c) Would you reject	ual value of the re ant critical value f H ₀ in favor of H ₁	levant t-statistic. or the test statistic (use the large-sample normal appi at 5% significance level?	roximation) at 5% significance level?	
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QUESTION 4 20 points Save Answer You decide to estimate the following three regressions using the same sample of data (assume that sample size is 10,000): wage_i = $b_0 + b_1$ female_i + u_i (1) wage_i = $c_0 + c_2$ male_i + v_i (2) wage_i = d_1 female_i + d_2 male_i + e_i (3) where wage refers to average hourly earnings, u, v, and e are the regressions' error terms, and female_i = 1 if observation i refers to a female, and = 0 if observation i refers to a male male_i = 1 if observation i refers to a male, and = 0 if observation i refers to a female (a) How much is the expected wage of a female according to each regression? (b) How much is the expected wage of a male according to each regression? (c) Interpret the vertical intercept and the slope in regression (1). (d) Interpret the vertical intercept and the slope in regression (2). (e) Interpret the coefficients d_1 and d_2 in regression (3). **♦** 3 (12pt) + T - III - III - IV - 0 23 Arial TTT \square i \mathbb{R} Path: p Words:0 **QUESTION 5** 10 points Save Answer You estimate the linear regression: $\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_i$, i = 1, ..., 350, and find that the standard error of the regression, SER, equals 0.7. The total sum of squares, TSS, equals 200. (a) Calculate the residual sum of squares (RSS), also referred to as the sum of squared residuals (SSR). (b) Calculate R². **T T T** Arial 🖵 i 🐹 🎽 Path: p Words:0 **QUESTION 6** 30 points Save Answer

Consider the following regression output, where *ahe* refers to average hourly earnings and *yrseduc* refers to years of education.

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Call: lm(formula = ahe ~ yrseduc, data = earn) Residuals: 1Q Median 3Q Max Min -30.517 -8.877 -2.527 4.750 62.290 Coefficients: Estimate Std. Error t value Pr(>|t|) (Intercept) -10.9135 3.7147 -2.938 0.00347 ** yrseduc 2.4100 0.2444 9.862 < 2e-16 *** Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 Residual standard error: 13.81 on 466 degrees of freedom Multiple R-squared: 0.1727, Adjusted R-squared: 0.1709 F-statistic: 97.25 on 1 and 466 DF, p-value: < 2.2e-16 (a) What fraction of the sample variance of *ahe* is explained by *yrseduc*?(b) How much is the standard error of the regression (SER)? (c) What is the sample size? [Hint: Check the degrees of freedom of the SER and note that we have lost 2 degrees of freedom when estimating the two coefficients of the regression.]
 (d) What is the OLS estimate of the slope? (e) What is the standard error of the OLS estimator of the slope?
(f) What is the t-statistic corresponding to the two-sided test with null hypothesis that the slope equals 0. (g) Will you reject the null hypothesis that the slope equals 0 in favor of the two-sided alternative at 5% significance level?(h) Find the lower and the upper limit of the 95% confidence interval for the slope of the regression (use the normal approximation, which is justified since the sample size is large enough). (i) Calculate the predicted wage (i.e., average hourly earnings) of a person with 16 years of education.(j) What would be the predicted increase in the wage of a high-school graduate if he/she obtains a college degree? In answering this question assume that college takes 4 years. (k) Give an example of a variable that can directly increase a person's wage and can be positive correlated with years of education. (l) In view of (k), do you expect the OLS estimator of the slope to be unbiased? In particular, do you think that the expected value of the OLS estimator of the slope is greater, smaller, or equal to the true slope? **T T T T** Arial ♦ 3 (12pt) ♦ **T** • ⋮ = • ⋮ = • ♥ → ∅ ▷ ▷ 🖵 i 🔣 🎽 Path: p Words:0

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