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Paper homework

1. (i) and (iii)

Heteroskedasticity and omitting an important explanatory variable cause OLS to be invalid. Heteroskedasticity is about the error variance is non-constant or violating SLR5 (homoskedasticity). It is also in the CLM assumption which means that there is no correlation between independent variables. Where omitting an important explanatory variable violates the assumption MLR4.

2.

i. H0 : $\beta 3 = 0$, H1 : $\beta 3 > 0$.

ii. The proportionate effect on salary hat is .00024(50) = .012.
To obtain the percentage effect, we multiply this by 100: 1.2%. Therefore, a 50 point ceteris paribus increase in ros is predicted to increase salary by only 1.2%. Practically speaking, this is a very small effect for such a large change in ros.

iii. The 10% critical value for a one-tailed test, using df = ∞, is obtained from Table as 1.282. The t statistic on ros is .00024/.00054 ≈ .44, which is well below the critical value. Therefore, we fail to reject H0 at the 10% significance level.

iv. Based on this sample, the estimated ros coefficient appears to be different from zero only because of sampling variation. On the other hand, including ros may not be causing any harm; it depends on how correlated it is with the other independent variables (although these are very significant even with ros in the equation).

Computer questions

C1

i. $\beta 1$ is 1% increase in expenditures by candidates. An increase in 1% vote received by candidate A

ii. H0: expendA = - expendB or H0: expendA + expendB = 0

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. regress voteA expendA expendB

      Source |       SS           df       MS      Number of obs   =       173
-------------+----------------------------------   F(2, 170)       =     95.83
       Model |  25679.8879         2  12839.9439   Prob > F        =    0.0000
    Residual |  22777.3607       170  133.984474   R-squared       =    0.5299
-------------+----------------------------------   Adj R-squared   =    0.5244
       Total |  48457.2486       172  281.728189   Root MSE        =    11.575

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       voteA |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     expendA |   .0383308   .0033868    11.32   0.000     .0316452    .0450165
     expendB |  -.0361275   .0031071   -11.63   0.000     -.042261   -.0299939
       _cons |    49.619   1.426147    34.79   0.000     46.80376    52.43423
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C6

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. regress lwage educ exper tenure
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Source	SS	df	MS	Number of obs	=	935
				F(3, 931)	=	56.97
Model	25.6953242	3	8.56510806	Prob > F	=	0.0000
Residual	139.960959	931	.150334005	R-squared	=	0.1551
				Adj R-squared	=	0.1524
Total	165.656283	934	.177362188	Root MSE	=	.38773

lwage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
educ	.0748638	.0065124	11.50	0.000	.062083	.0876446
exper	.0153285	.0033696	4.55	0.000	.0087156	.0219413
tenure	.0133748	.0025872	5.17	0.000	.0082974	.0184522
_cons	5.496696	.1105282	49.73	0.000	5.279782	5.713609

i. H0: β2 = β3 or H0: β2 - β3 = 0
ii. t = (0.015 - 0.013)/(0.0034 - 0.0026) = 2.5
The p-value is 0.01259. where we reject null hypothesis means that it is statistically significant.

C8

i. There are 2,017 single-person households that are in the dataset. (i.e 2,017 observations)

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. regress nettfa inc age if fsize == 1
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Source	SS	df	MS	Number of obs	=	2,017
				F(2, 2014)	=	136.46
Model	544916.989	2	272458.495	Prob > F	=	0.0000
Residual	4021048.06	2,014	1996.54819	R-squared	=	0.1193
				Adj R-squared	=	0.1185
Total	4565965.05	2,016	2264.86361	Root MSE	=	44.683

nettfa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inc	.7993167	.0597307	13.38	0.000	.6821762	.9164572
age	.8426563	.0920169	9.16	0.000	.6621982	1.023115
_cons	-43.03981	4.080393	-10.55	0.000	-51.04204	-35.03758

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ii. If β1 hat increase 1000 dollar increase in income means that there will be an increase in net financial wealth of 799 dollars.

If β2 hat increase as 1 year in age means that there will be an increase in net financial wealth of 842 dollars.

iii. β0 hat is equal to -43.04 this is when the age and income is equal to 0 also meaning it is about the net financial wealth of new borns so it wouldn't much of an interested data.

iv. The t-statistic is (0.84-1)/0.092 ≈ -1.74
One-sided alternative H1 : $\beta 2 < 1$ the p-value is $P(T < -1.74) = 0.5-0.4591 = 0.0409$
Therefore we can reject the null hypothesis at the 5% significance level and at the 1% significance level.

v. We get an estimate of $\beta 1 = 0.821$ which is not very different from the estimate of 0.799 in the last regression.

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. regress nettfa inc if fsize == 1
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Source	SS	df	MS		
Model	377482.064	1	377482.064	Number of obs	= 2,017
Residual	4188482.98	2,015	2078.6516	F(1, 2015)	= 181.60
				Prob > F	= 0.0000
				R-squared	= 0.0827
				Adj R-squared	= 0.0822
Total	4565965.05	2,016	2264.86361	Root MSE	= 45.592

nettfa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
inc	.8206815	.0609	13.48	0.000	.7012479	.940115
_cons	-10.57095	2.060678	-5.13	0.000	-14.61223	-6.529671