

Second test in Introductory Econometrics

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1. Please list the assumptions that are required in the *multiple* linear regression model for the BLUE property (linear efficiency) of the OLS estimator (Gauss-Markov conditions). Which of these conditions is not necessary for unbiasedness? Which additional property do you need for the null distributions of F and t statistics to be F and t , respectively? [9 points]

2. The accompanying software output represents two attempts at explaining the mortality due to coronary heart diseases by several covariates, such as the consumption of beer, the intake of calcium, the number of cigarettes smoked, the intake of edible fat, the meat consumption, the intake of hard liquors, the unemployment rate, and wine consumption. Here, observations are assumed to have been randomly sampled across 34 observations. We generally assume that the Gauss-Markov conditions hold, including normal errors. [20 points]
- (a) Following the first regression, you see two F-tests reported (the commands "test" following the "reg" regression). The numerator degrees of freedom have been replaced by crosses. What would they be for these two tests (numbers, please)?
 - (b) A dedicated smoker and wine drinker says that you cannot reject the hypothesis that smoking cigarettes and drinking wine are insignificant. Is this conclusion justified?
 - (c) What is the correctly formulated null hypothesis for the second test, using our β_j notation? Can this H_0 be rejected at the 10% level? Intuitively, does this result support the second regression specification or the first one?
 - (d) Now consider the second OLS regression, the one with less regressors. Can the hypothesis that cigarettes do not affect heart deaths be rejected at 5%, can it be rejected at 1%? Which test statistic do you consider here?
 - (e) The flip side of the accompanying sheet shows a table that provides correlation coefficients for all four regressor variables. Apparently, cigarette smokers prefer wine or non-alcoholic drinks. Do these remarkable correlations imply that t -statistics are no more t -distributed under their null?

3. Assume a simple regression problem fulfils the Gauss-Markov conditions, with $n > 100$. Consider estimates $\tilde{\beta}_0$ and $\tilde{\beta}_1$ that are defined as the OLS intercept and slope calculated from the first 100 observations, i.e. ignoring the remaining $n - 100$ observations. Will $\tilde{\beta}_0$ and $\tilde{\beta}_1$ be unbiased? Will they be consistent? Explain your answers in brief. [6 points]

. reg CHD BEER CAL CIG EDFAT MEAT SPIRITS UNEMP WINE

Source	SS	df	MS	Number of obs = 34		
Model	5391.38332	8	673.922915	F(8, 25)	=	8.51
Residual	1980.29706	25	79.2118825	Prob > F	=	0.0000
				R-squared	=	0.7314
				Adj R-squared	=	0.6454
Total	7371.68038	33	223.384254	Root MSE	=	8.9001

CHD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BEER	-3.466608	1.297743	-2.67	0.013	-6.13936	-.7938559
CAL	-69.98247	78.55683	-0.89	0.382	-231.7733	91.80834
CIG	10.11641	5.071262	1.99	0.057	-.328051	20.56087
EDFAT	2.809924	1.668267	1.68	0.105	-.6259353	6.245784
MEAT	.1115922	.2430074	0.46	0.650	-.388891	.6120753
SPIRITS	21.7156	8.457239	2.57	0.017	4.297587	39.13361
UNEMP	-.6134039	1.586414	-0.39	0.702	-3.880684	2.653876
WINE	-4.561872	16.24721	-0.28	0.781	-38.02363	28.89989
_cons	226.0017	146.8303	1.54	0.136	-76.40084	528.4043

. test CIG WINE

F(xx, 25) = 2.07
 Prob > F = 0.1476

. test CAL MEAT UNEMP WINE

F(xx, 25) = 0.45
 Prob > F = 0.7726

. reg CHD BEER CIG EDFAT SPIRITS

Source	SS	df	MS	Number of obs = 34		
Model	5249.35923	4	1312.33981	F(4, 29)	=	17.93
Residual	2122.32115	29	73.183488	Prob > F	=	0.0000
				R-squared	=	0.7121
				Adj R-squared	=	0.6724
Total	7371.68038	33	223.384254	Root MSE	=	8.5547

CHD	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
BEER	-4.13156	.8628957	-4.79	0.000	-5.896379	-2.36674
CIG	10.70565	4.590399	2.33	0.027	1.317234	20.09407
EDFAT	3.380236	.9666974	3.50	0.002	1.403117	5.357354
SPIRITS	26.74896	7.036836	3.80	0.001	12.35701	41.1409
_cons	139.6778	77.94408	1.79	0.084	-19.73574	299.0913

. corr BEER CIG EDFAT SPIRITS

(obs=34)

	BEER	CIG	EDFAT	SPIRITS
BEER	1.0000			
CIG	-0.9364	1.0000		
EDFAT	0.9126	-0.9141	1.0000	
SPIRITS	0.9472	-0.8840	0.9192	1.0000