Insper

LISTA 3

Curso: Economia 4ECO
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Questão 1

The file `http://people.stern.nyu.edu/wgreene/Text/Edition7/TableF5-2.txt` contains quarterly macroeconomic observations from 1950.I to 2000.IV with the following columns:

1. `Year:` Date
2. `qtr:` Quarter
3. `realgdp:` Real GDP ($bil)
4. `realcons:` Real consumption expenditures
5. `realinvs:` Real investment by private sector
6. `realgovt:` Real government expenditures
7. `ealdpi:` Real disposable personal income
8. `cpi_u:` Consumer price index
9. `M1:` Nominal money stock
10. `tbilrate:` Quarterly average of month end 90-day T-bill rate
11. `unemp:` Unemployment rate
12. `pop:` Population, mil. interpolate of year end figures using constant growth rate per quarter
13. `infl:` Rate of inflation (first observation is missing)
14. `realint:` Ex post real interest rate, `tbilrate-infl` (First observation missing)

Consider a simple model of investiment I_t:

$$\log I_t = \beta_1 + \beta_2 i_t + \beta_3 \Delta p_t + \beta_4 \log Y_t + \beta_5 t + \varepsilon_t$$

which states that investors are sensitive to nominal interest rates, i_t, the rate of inflation, Δp_t, (the log of) real output, $\log Y_t$, and other factors that trend upward through time, embodied in the time trend, t. An alternative theory states that "investors care *only* about real interest rates." The alternative model is

$$\log I_t = \beta_1 + \beta_2 (i_t - \Delta p_t) + \beta_4 \log Y_t + \beta_5 t + \varepsilon_t,$$

which is a restricted version of the original model where $\beta_2 + \beta_3 = 0$. The statement implies something specific about the parameters in the equation that may or may not be supported by the empirical evidence.

a) Using the above data on real investment, real GDP, an interest rate (the 90-day T-bill rate), and inflation measured by the change in the log of the CPI, test the hypothesis that the alternative model is sound, i.e. $H_0 : \beta_2 + \beta_3 = 0$.

b) Test the above hypothesis along with the additional hypotheses that the marginal propensity to invest is equal to 1 and that there is no time trend. More precisely, $H_0 : \beta_2 + \beta_3 = 0, \beta_4 = 1, \beta_5 = 0$.

Questão 2

The file `http://hedibert.org/wp-content/uploads/2014/04/hprice1.txt` contains characteristics of 88 houses:

- `price:` house price, $1000s
- `assess:` assessed value, $1000s
- `bdrms:` number of bedrooms
- `lotsize:` size of lot in square feet
- `sqrft:` size of house in square feet
- `colonial:` =1 if home is colonial style

a) Perform the RESET test for the following two models:

- **Model 1:**

$$\texttt{price} = \beta_0 + \beta_1 \texttt{lotsize} + \beta_2 \texttt{sqrft} + \beta_3 \texttt{bdrms} + \varepsilon$$

- **Model 2:**

$$\texttt{lprice} = \beta_0 + \beta_1 \texttt{llotsize} + \beta_2 \texttt{sqrft} + \beta_3 \texttt{bdrms} + \varepsilon$$

where $\texttt{lprice} = \log \texttt{price}$ and $\texttt{llotsize} = \log \texttt{lotsize}$.

b) Is model 3 below more appropriate than model 2 above?

- **Model 3:**

$$\texttt{lprice} = \beta_0 + \beta_1 \texttt{llotsize} + \beta_2 \texttt{sqrft} + \beta_3 \texttt{bdrms} + \beta_4 \texttt{colonial} + \beta_5 \texttt{lassess} + \varepsilon$$

where $\texttt{lassess} = \log \texttt{assess}$.

c) Obtain the heteroskedasticity-robust standard errors for model 1. Discuss any important differences with the usual standard

d) Repeat part c) for models 2 and 3.

e) What does this example suggest about heteroskedasticity and the transformation used for the dependent variable?

Questão 3

Consider the following model to explain sleeping behavior:

$$\texttt{sleep} = \beta_0 + \beta_1 \texttt{totwrk} + \beta_2 \texttt{educ} + \beta_3 \texttt{age} + \beta_4 \texttt{age}^2 + \beta_5 \texttt{yngkid} + \beta_6 \texttt{male} + \varepsilon.$$

a) Write down a model that allows the variance of ε to differ between men and women. The variance should not depend on other factors.

b) Use the data in `sleep75.csv` to estimate the parameters of the model for heteroskedasticity. (You have to estimate the `sleep` equation by OLS, first, to obtain the OLS residuals.) Is the estimated variance of ε higher for men or for women?

c) Is the variance of ε statistically different for men and for women?

Description of the file `sleep75.csv`

1.	age	in years
2.	black	=1 if black
3.	case	identifier
4.	clerical	=1 if clerical worker
5.	construc	=1 if construction worker
6.	educ	years of schooling
7.	earns74	total earnings, 1974
8.	gdhlth	=1 if in good or excellent health
9.	inlf	=1 if in labor force
10.	leis1	sleep - totwrk
11.	leis2	slpnaps - totwrk
12.	leis3	rlxall - totwrk
13.	smsa	= 1 if live in smsa
14.	lhrwage	log hourly wage
15.	lothinc	log othinc, unless othinc < 0
16.	male	= 1 if male
17.	marr	= 1 if married
18.	prot	= 1 if Protestant
19.	rlxall	slpnaps + personal activs
20.	selfe	=1 if self employed
21.	sleep	mins sleep at night, per week
22.	slpnaps	mins sleep, including naps, per week
23.	south	=1 if live in south
24.	spsepay	spousal wage income
25.	spwrk75	=1 if spouse works
26.	totwrk	mins worked per week
27.	union	=1 if belong to union
28.	worknrm	mins work main job
29.	workscnd	mins work second job
30.	exper	age - educ - 6
31.	yngkid	=1 if children < 3 present
32.	yrsmarr	years married
33.	hrwage	hourly wage
34.	agesq	age^2