

Homework

Econometrics

October 14, 2003

General Instructions

The general instructions from problems 1 and 2 apply here as well. If you run into trouble computing these results with IML, at the very least you must produce them with 'canned' software.

You may turn in your answers in the form of annotated notes made on your SAS output. Otherwise, make sure your results and answers are easy to identify and supported by relevant IML programs and SAS output. In order to obtain credit for the exercises you must turn in both the IML programs and output. Each of the hypothesis tests need to be carried out fully, meaning that you should state the null and alternative hypotheses, the distribution of your test statistic under the null hypothesis, your decision criterion, and your decision. Unless otherwise stated, conduct all hypothesis tests at the 5% level.

Gasoline Consumption

Data on gasoline consumption in the United States from years 1960-1995 appear in Table F2.2 of *Econometric Analysis*. The variables are:

- G = total gasoline consumption
- P_g = the price of gasoline
- Y = per capita disposable income
- P_{nc} = price index of new cars
- P_{uc} = price index of use cars

- P_{pt} = price index of public transportation
- P_d = price index of durable goods
- P_n = aggregate price index of nondurable goods
- P_s = aggregate price index of consumer services

$$\ln G = \beta_1 + \beta_{P_g} \ln P_g + \beta_Y \ln Y + \beta_{nc} \ln P_{nc} + \beta_{uc} \ln P_{uc} + \beta_{pt} \ln P_{pt} + \beta_d \ln P_d + \beta_n \ln P_n + \beta_s \ln P_s + e \quad (1)$$

Using the data provided on the website, use IML and SAS to answer the following.

Problem 3

Write an IML module that computes the RESET test. Perform the RESET with powers 2 and 3 on the gasoline demand model above. Based on the outcome of this test, is your model misspecified? If so, reestimate the model in level form and repeat the RESET test.

Remember: Whenever you do a hypothesis test, be sure to state the null and alternative hypotheses, the distribution of your test statistic under the null hypothesis, your decision criterion, and your decision.

Problem 4

Data on U.S. consumption and GDP for the years 1950-2000 appear in TableF5.1 of Greene. Refer to Example 6.3 in your text for guidance. Consider the following model:

$$C_t = \alpha + \beta Y_t + \gamma C_{t-1} + e_t \quad (2)$$

In this model the short-run MPC is β and the long-run MPC is $\delta = \beta/(1 - \gamma)$.

1. Test the null hypothesis that $\delta = 1$ against the alternative that it is not at the 5% level.
2. Test the (joint) null hypothesis that $\delta = 1$ and $\beta = .5$ against the alternative $\delta \neq 1$ or $\beta \neq .5$ at the 5% level

Problem 5

The Longley [2] data is widely used to calibrate regression programs. The dependent variable in the model is employment and the regressors include a time trend (Year), the GNP deflator, GNP, size of the Armed forces, and a constant. The model appears below:

$$\text{Employment}_t = \beta_1 + \text{Year}_t\beta_y + \text{Deflator}_t\beta_d + \text{GNP}_t\beta_g + e_t \quad (3)$$

where $t = 1, \dots, T$. Investigate the parameter stability of the model using the CUSUM test and the Longley data found in TableF4-2.txt on Greene's website or on mine.

1. Regress total employment on a constant, year, deflator, and GNP using the following different sample periods: 1947-1962, 1947-1953, and 1954-1962.
2. Perform the Chow test for parameter stability at the 5% level under the assumption that the subset equation variances are the same.
3. Perform the Chow test for parameter stability at the 5% level under the assumption that the subset equation variances are not the same. See equation 7-23 [1].
4. Compute the CUSUM and its upper and lower bounds using IML. You may confirm your results using PROC AUTOREG which permits you to output these statistics into a data set which can in turn be printed. There is an example of the SAS statements needed to accomplish this posted at the end of these exercises.

References

- [1] William H. Greene. *Econometric Analysis*. Prentice-Hall, 5th edition, 2003.
- [2] J. Longley. An appraisal of least squares programs from the point of the user. *The Journal of the American Statistical Association*, 62:819–841, 1967.

Miscellaneous Sample Code

```
Proc AutoReg;  
  model y = x2 x3 x4/reset;  
  Test x2=x4,x3=0;
```

```
output out=two recres=recur cusum=c1 cusumlb=lb cusumub=ub;  
proc print data=two;
```

```
Proc Autoreg;  
model y = x2 x3 x4;  
restrict x2=x4,x3=0;
```

```
Proc IML;  
vname= { const, GasPrice, Income, NewCar};  
use one;  
read all var{y} into y;  
read all var{ int x2 x3 x4 } into x;  
read all var{ int x2 x3 x4 } into x where(x4 > 1963);  
  
t=nrow(x);  
k=ncol(x);  
b=inv(x'*x)*x'*y;
```