Lesson 3

Lagged Expectations Models

3.1: Introduction

Here you will merely use the techniques learnt in earlier modules. However, when you are attempting to estimate regression models by yourself you have to make decisions on various aspects. This module tries to make you aware about the choices facing a researcher. So be careful to understand why you are undertaking each step.

We will use the example given in Maddala (Table 10.5: 428). First open the file sberry~1.fit, create intercept (int) and a time trend (time). Save the file to your folder. The figures are given in whole numbers but you have to convert them into logs. Do so, naming each variable lp, lq, lc, ld etc. Do not take logs of either int or time.

3.2: Cobweb Model

Open process window. Define:

pc = lp(-1) – lc;

pd = lp – ld;

qn = lq – ln

and click on Go.

To estimate supply function, regress: lq int pq lq(-1).

Note that as you are taking a one-period lag, the model is run omitting the first year, i.e. from 1965. But for the demand equation you should change the period back to 1964. Simply clicking the pop down box at the top right hand corner of the Estimation window, and clicking on 1964 can do this. Remember to take the correct period each *time you run regressions in this exercise. An easier alternative is to simply start the period from 1964 each time you run a model.*

To estimate demand equation, regress: pd int qn lx time.

Note that as Maddala has probably used SAS to estimate the regression models the answers may not tally. Hence we have reworked the entire problem using Microfit. The answers are given at the end.

3.3: 2-Stage Least Squares

Regress lp and lq on all predetermined values. (*Hint: on lc, ld, ln, lx, lq(-1) and time*). Save fitted values for lp and lq. Call them predp and predq, respectively. These are the reduced form values of lp and lq.

Define pc = predp – lc and qn = predq – ln.

(*Note that these variables have been defined for the OLS exercise. However, we will retain the same names to avoid confusion. If the number of variables becomes too long you will find it difficult to remember all of them even using the Variable Window.*)

To estimate supply function, regress: lq int pq lq(-1).

To estimate demand equation, regress: pd int qn lx time.

3.4: Instrumental Variable Method

Regress lp and lq on lagged values of exogenous variables:

int lc(-1) ld(-1) ln(-1) lq(-1) lx(-1) time

and obtain fitted values of lp and lq.

Call them predp and predq again.

Define new variable pc = predp – lc(-1) and regress lq on int pc lq(-1).

Define new variables pd = lp – ld(-1) and qn = predq – ln(-1) and regress pd on int qn lx(-1) time to estimate the demand equation.

Note: You can also rework the exercise by using time(-1) instead of time. Both results have been stated below.

3.5: Omitted Variable Method/3-Stage Least Square

Create new variables as follows:

Regress each exogenous variable on its lagged value (no intercept), and save the residual.

Dependent variable	Independent Variable	New Variable
Lc	Lc(-1)	Resc
Ld	Ld(-1)	Resd
Ln	Ln(-1)	Resn
Lx	Lx(-1)	Resx

Note that when you click on start there will be a warning that the regression model does not have an intercept so that the value of R^2 may be negative. Gujarati explains why a square can be negative. This is because of the method of adjustment used in computer programmes.

Obtain the reduced form equations for lp and lq by reducing them on all exogenous variables and residuals:

Int lc ld ln lx time lq(-1) resc resn resd resx

Save the fitted values of lp and lq and name them predp and predq.

Define new variable pc = predp – lc and regress lq on int pc lq(-1) to get the supply function.

Define the new variables qn = predq – ln and pd = lp – ld.

Regress pd on int qn lx time to estimate demand equation.

Solution in Microfit:-

Variable	Cobweb	2SLS	IV	OV
Supply Equation				
Intercept	-1.0122	-1.8002	-1.6684	-1.5360
Se	0.66456	.77881	.78575	.73142
Pc	0.31458	.69668	.66118	.56380
Se	.23773	.31874	.33519	.28520
Lq(-1)	1.0705	1.0855	1.0746	1.0811
Se	.062884	.059022	.059618	.060017
R^2	.94461	.95230	.95028	.95032
DW	1.529	1.5175	1.2664	1.3853
Demand Equation				
Int	-9.5585	-13.8523	-9.9796/10.0157	-13.7392
Se	10.9482	11.8128	11.4563/11.473	11.9077
Qn	-0.12036	-0.18540	-0.22122	-0.17602
Se	0.083491	.10158	0.10680	.10129
X	-2.4767	3.1472	2.5726	3.1279
Se	1.6822	1.8182	1.7663	1.8327
Time	-0.046501	-0.0045028	-0.036092	-0.045764
Se	0.019271	.019273	-0.020363	.019394
R^2	0.73980	.74553	.71576	.74136
DW	2.2777	2.4105	2.2302	2.3766