ECON 5101: Questions to seminar 5.

18 March, 2014.

1. **Fulton fish market VAR, and model of VAR**

   Add a variable called `hol` to the Fulton Fish Market data set.

   As explained in Lecture 8, `hol` is 1 for observations 18, 34 and 95, and zero elsewhere and represents holidays (broadly interpreted).

   Augment the VAR(1) that we worked with during lecture 8 with `hol` and formulate a model of the VAR where quantity is completely inelastic in supply while demand is elastic.

   Check interpretability of results, and comment on the LR test of over-identification (if available) for you model.

2. **The New Keynesian Phillips curve**

   Consider the forward looking New Keynesian Phillips-curve (NPC)

   $$\pi_t = \beta_0 + \beta\pi^e_{t+1} + \lambda x_t + \varepsilon_t. \tag{1}$$

   π_t denotes inflation, π^e_{t+1} is the mathematical expectation of inflation conditional on period t information (call it $\mathcal{I}_t$), or period $t-1$ information ($\mathcal{I}_{t-1}$):

   $$\pi^e_{t+1} \equiv E(\pi_{t+1} \mid \mathcal{I}_{t-1}) \text{ or } \pi^e_{t+1} \equiv E(\pi_{t+1} \mid \mathcal{I}_t).$$

   (You will find examples of both these in the NPC literature).

   x_t is a variable which is correlated with the marginal cost of production. The most common operational definition is that x_t is the log of the wage-share, but the rate of unemployment, and the output-gap is also used.

   ε_t is the disturbance term of the NPC. It is either set to zero (see below) or when it is random, it is an innovation $E(\varepsilon_t \mid \mathcal{I}_{t-1}) = 0$. Homoskedasticity is usually also assumed.

   (a) In the NPC literature, the case of all $\varepsilon_t = 0$ is known as *the exact Phillips curve*. One interpretation is that the exact PCM is just a simplification, since the estimation equation is going to include a disturbance in any case. Why is that, and what is the interpretation of that disturbance?

   (b) Download the data set posted on the course web page, and the information in the batch file *GGLstart.fl* (OxMetrics batch files are human readable, so the information about variable definitions is available also if you use Stata, Eviews or Mathlab or other programs in your own work).

   Equation (13) in the GGL paper is the estimated version of the theoretical NPC in equation (10) in the paper. Estimate GGL's equation (13), either

with GMM (for exact replication) or with IV estimation (as a test of robustness with respect to estimation method).

Note: For comparison of results, let us regard both `Dpylead` and `wsh` as endogenous, and use the 11 instrumental variables: wsh_1, wsh_2, Dpy_1, Dpy_2, Dpy_3, Dpy_4, Dpy_5, YGAP_1, YGAP_2, DW_1, DW_2, which seems to be a reasonable interpretation of the paragraph above equation (12) in GGL.

What do you see as the most important result(s) of your estimation?

(c) PcGive IVE output reports `Specification test:  Chi^2(9) = 18.426 [0.0305]*` What is the interpretation of this result?

(d) Run the regression between the residuals obtained in your IV estimation of the NPC and the set of instruments, including a constant term. Multiply the R^2 from this regression with the number of observation (107). What do find?

(e) From the same regression, calculate the so called J-statistic by running an exclusion F-test on the additional instruments, and multiply the F-test value by the number of observations.

(f) Equation (12) in GGL represents the hybrid form of the NPC. Estimate this model with IV and compare with the Euro area results in Table 2 in GGL.

(g) To test robustness with respect to *choice of instruments* and *sample length*: Replace YGAP with the alternative measure YGAPEMU and omit DW_1 and DW_2 from the list of instruments. Estimate by IV on a sample that starts in 1972(2). What do you find?

(h) Try to test whether the model in question (g) has (IV estimated) parameters that are invariant with respect to structural breaks in "forecasting equation" defined as the regression of Dpy on the full set of instruments.

(i) Assume that x_t in equation (1) follows a causal AR model of degree p, and assume that there are no other instrumental variables to use. What must p be (at least) for the parameters of (1), and the hybrid version of the NPC to be identified?

(j) What is the form of the (rational expectation) solution of the hybrid NPC in the case where the lags of x_t are the only instruments, and x_t follows an AR(p) process. Could this solution be estimated econometrically?

Reference

Gali, J.; Gertler, M. and López-Salido, D. European Inflation Dynamics European Economic Review, 2001, 45, 1237-1270.

Gali, J. and M. Gertler (1999): Inflation Dynamics: A Structural Econometric Analysis. Journal of Monetary Economics 44(2), 233-258.