PH, Apr 7, 2010

Advanced Econometrics – Lecture 4: Exercise

1) The dataset DatS03 Investment, USA 1968-1982 (Economic Report of the President: 1983, also dataset F3.1 of W.H. Greene) contains the variables GNP (nominal GNP), INVEST (nominal investment), PC (consumer price index) and R (interest rate, measured as the average of the discount rate on the New York Federal Reserve Bank). Based on these variables the investment function
$$IR_t = \beta_1 + \beta_2 (t\text{-}1967) + \beta_3\ GNPR_t + \beta_4\ R_t + \beta_5 PI_t + u_t$$
is defined, where IR and GNPR are to real investment or real GNP converted variables, respectively, and the inflation rate PI is calculated from the consumer price index PC.
   a) Some economists believe that the investments are only determined by the real interest rate (R - PI), and that the inflation rate has no effect otherwise. Specify a suitable linear constraint (in matrix notation) for the investment function that makes it possible to verify this claim.
   b) Estimate the coefficients of the investment function with and without consideration of the restriction $\beta_4 + \beta_5 = 0$ and test by means of the F-, the Wald, the Lagrange multiplier and the likelihood ratio test whether $\beta_4 + \beta_5 = 0$ can be regarded as a true restriction. Explain the conditions that must be met for the use of the different tests.

2) Test the null hypothesis that in the investment function from problem 1 the following three linear constraints are true: $\beta_2 = 0$, $\beta_3 = 1$, and $\beta_4 + \beta_5 = 0$.

   a) Specify the matrices R and q

   b) For testing, use (i) the substitution method and (ii) the Wald test.